Cos

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Notations

Traditional name

Cosine

Traditional notation

$\cos(z)$

Mathematica StandardForm notation

`Cos[z]`

Primary definition

01.07.02.0001.01

$$\cos(z) == \frac{e^{i z} + e^{-i z}}{2}$$

Specific values

Specialized values

01.07.03.0001.01

$$\cos(\pi\, m) == (-1)^m \;/;\; m \in \mathbb{Z}$$

01.07.03.0002.01

$$\cos\left(\pi\left(\frac{1}{2} + m\right)\right) == 0 \;/;\; m \in \mathbb{Z}$$

Values at fixed points

01.07.03.0003.01

$$\cos(0) == 1$$

01.07.03.0004.01

$$\cos\left(\frac{\pi}{12}\right) == \frac{1 + \sqrt{3}}{2\sqrt{2}}$$

01.07.03.0005.01

$$\cos\left(\frac{\pi}{12}\right) == \left(z; 16\, z^4 - 16\, z^2 + 1\right)_4^{-1}$$

01.07.03.0006.01

$$\cos\left(\frac{\pi}{10}\right) = \frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{2}}$$

01.07.03.0007.01

$$\cos\left(\frac{\pi}{10}\right) = \left(z;\, 16\,z^4 - 20\,z^2 + 5\right)_4^{-1}$$

01.07.03.0008.01

$$\cos\left(\frac{\pi}{9}\right) = \frac{1}{4}\left(\left(1 + i\sqrt{3}\right)\sqrt[3]{-\frac{1}{2}\,i\left(-i + \sqrt{3}\right)} + \sqrt[3]{\frac{1}{2}\,i\left(i + \sqrt{3}\right)}\,\left(1 - i\sqrt{3}\right)\right)$$

01.07.03.0009.01

$$\cos\left(\frac{\pi}{9}\right) = \left(z;\, 8\,z^3 - 6\,z - 1\right)_3^{-1}$$

01.07.03.0010.01

$$\cos\left(\frac{\pi}{9}\right) = -\frac{1}{2}\,(-1)^{8/9}\left(1 + (-1)^{2/9}\right)$$

01.07.03.0011.01

$$\cos\left(\frac{\pi}{8}\right) = \frac{\sqrt{2+\sqrt{2}}}{2}$$

01.07.03.0012.01

$$\cos\left(\frac{\pi}{8}\right) = \left(z;\, 8\,z^4 - 8\,z^2 + 1\right)_4^{-1}$$

01.07.03.0013.01

$$\cos\left(\frac{\pi}{8}\right) = -\frac{1}{2}\,(-1)^{7/8}\left(1 + \sqrt[4]{-1}\right)$$

01.07.03.0014.01

$$\cos\left(\frac{\pi}{7}\right) = \frac{1}{24\sqrt[3]{14 - 42\,i\sqrt{3}}}\left(4\sqrt[3]{14 - 42\,i\sqrt{3}} + \sqrt[3]{2}\left(\left(i + \sqrt{3}\right)\left(2\sqrt{7} - i\sqrt[3]{28 - 84\,i\sqrt{3}}\right)\sqrt[3]{14 + i\sqrt{7} + 3\sqrt{21}} + 2\sqrt{7}\right.\right.$$
$$\left.\left.\left(-i + \sqrt{3}\right)\sqrt[3]{14 - i\sqrt{7} - 3\sqrt{21}} + \left(1 + i\sqrt{3}\right)\sqrt[3]{28 + 2\,i\sqrt{7} + 6\sqrt{21}}\,\left(14 - i\sqrt{7} - 3\sqrt{21}\right)^{2/3}\right)\right)$$

01.07.03.0015.01

$$\cos\left(\frac{\pi}{7}\right) = \left(z;\, 8\,z^3 - 4\,z^2 - 4\,z + 1\right)_3^{-1}$$

01.07.03.0016.01

$$\cos\left(\frac{\pi}{7}\right) = -\frac{1}{2}\,(-1)^{6/7}\left(1 + (-1)^{2/7}\right)$$

01.07.03.0017.01

$$\cos\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$$

01.07.03.0018.01

$$\cos\left(\frac{\pi}{5}\right) = \frac{\sqrt{5}+1}{4}$$

01.07.03.0019.01

$$\cos\left(\frac{2\pi}{9}\right) = \frac{1}{2}\left(\sqrt[3]{-\frac{1}{2}\, i\left(-i+\sqrt{3}\right)} + \sqrt[3]{\frac{1}{2}\, i\left(i+\sqrt{3}\right)}\right)$$

01.07.03.0020.01

$$\cos\left(\frac{2\pi}{9}\right) = \left(z;\, 8z^3-6z+1\right)_3^{-1}$$

01.07.03.0021.01

$$\cos\left(\frac{2\pi}{9}\right) = -\frac{1}{2}(-1)^{7/9}\left(1+(-1)^{4/9}\right)$$

01.07.03.0022.01

$$\cos\left(\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}}$$

01.07.03.0023.01

$$\cos\left(\frac{2\pi}{7}\right) = \frac{1}{6}\sqrt[3]{\frac{7}{2}\left(1-3\, i\sqrt{3}\right)} - \frac{1}{6} + \frac{7^{2/3}}{3\, 2^{2/3}\sqrt[3]{1-3\, i\sqrt{3}}}$$

01.07.03.0024.01

$$\cos\left(\frac{2\pi}{7}\right) = \left(z;\, 8z^3+4z^2-4z-1\right)_3^{-1}$$

01.07.03.0025.01

$$\cos\left(\frac{2\pi}{7}\right) = -\frac{1}{2}(-1)^{5/7}\left(1+(-1)^{4/7}\right)$$

01.07.03.0026.01

$$\cos\left(\frac{3\pi}{10}\right) = \frac{1}{2}\sqrt{\frac{5-\sqrt{5}}{2}}$$

01.07.03.0027.01

$$\cos\left(\frac{3\pi}{10}\right) = \left(z;\, 16z^4-20z^2+5\right)_3^{-1}$$

01.07.03.0028.01

$$\cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$$

01.07.03.0029.01

$$\cos\left(\frac{3\pi}{8}\right) = \frac{\sqrt{2-\sqrt{2}}}{2}$$

01.07.03.0030.01

$$\cos\left(\frac{3\pi}{8}\right) = \left(z;\, 8z^4-8z^2+1\right)_3^{-1}$$

01.07.03.0031.01

$$\cos\left(\frac{3\pi}{8}\right) = -\frac{1}{2}(-1)^{5/8}\left(1+(-1)^{3/4}\right)$$

01.07.03.0032.01

$$\cos\left(\frac{2\pi}{5}\right) = \frac{\sqrt{5}-1}{4}$$

01.07.03.0033.01

$$\cos\left(\frac{5\pi}{12}\right) = \frac{\sqrt{3}-1}{2\sqrt{2}}$$

01.07.03.0034.01

$$\cos\left(\frac{5\pi}{12}\right) = \left(z;\,16z^4-16z^2+1\right)_3^{-1}$$

01.07.03.0035.01

$$\cos\left(\frac{3\pi}{7}\right) = \frac{1}{24\sqrt[3]{14-42i\sqrt{3}}}\Big(4\sqrt[3]{14-42i\sqrt{3}} - 2\left(28-2i\sqrt{7}-6\sqrt{21}\right)^{2/3}\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}} - 4i\sqrt{7}\sqrt[3]{28+2i\sqrt{7}+6\sqrt{21}} + \left(28+2i\sqrt{7}+6\sqrt{21}\right)^{2/3}\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}} - 2\sqrt{7}\left(i+\sqrt{3}\right)\sqrt[3]{28-2i\sqrt{7}-6\sqrt{21}} + \sqrt{3}\left(28+2i\sqrt{7}+6\sqrt{21}\right)^{2/3}\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}}\,i\Big)$$

01.07.03.0036.01

$$\cos\left(\frac{3\pi}{7}\right) = \left(z;\,8z^3-4z^2-4z+1\right)_2^{-1}$$

01.07.03.0037.01

$$\cos\left(\frac{3\pi}{7}\right) = -\frac{1}{2}(-1)^{4/7}\left(1+(-1)^{6/7}\right)$$

01.07.03.0038.01

$$\cos\left(\frac{4\pi}{9}\right) = \frac{1}{4}i\left(\sqrt[3]{-\frac{1}{2}i\left(-i+\sqrt{3}\right)}\left(i+\sqrt{3}\right) - \left(-i+\sqrt{3}\right)\sqrt[3]{\frac{1}{2}i\left(i+\sqrt{3}\right)}\right)$$

01.07.03.0039.01

$$\cos\left(\frac{4\pi}{9}\right) = \left(z;\,8z^3-6z+1\right)_2^{-1}$$

01.07.03.0040.01

$$\cos\left(\frac{4\pi}{9}\right) = -\frac{1}{2}(-1)^{5/9}\left(1+(-1)^{8/9}\right)$$

01.07.03.0041.01

$$\cos\left(\frac{\pi}{2}\right) = 0$$

01.07.03.0042.01

$$\cos\left(\frac{5\pi}{9}\right) = \frac{1}{4}\left(\left(1-i\sqrt{3}\right)\sqrt[3]{-\frac{1}{2}i\left(-i+\sqrt{3}\right)} + \sqrt[3]{\frac{1}{2}i\left(i+\sqrt{3}\right)}\left(1+i\sqrt{3}\right)\right)$$

01.07.03.0043.01

$$\cos\left(\frac{5\pi}{9}\right) = \left(z;\, 8z^3 - 6z - 1\right)_2^{-1}$$

01.07.03.0044.01

$$\cos\left(\frac{5\pi}{9}\right) = -\frac{1}{2}(-1)^{4/9}\left(1 - \sqrt[9]{-1}\right)$$

01.07.03.0045.01

$$\cos\left(\frac{4\pi}{7}\right) = \frac{-4\sqrt[3]{1 - 3i\sqrt{3}} - 2i\sqrt[3]{2}\,7^{2/3}\left(-i + \sqrt{3}\right) + \sqrt[3]{7}\left(i + \sqrt{3}\right)\left(2 - 6i\sqrt{3}\right)^{2/3} i}{24\sqrt[3]{1 - 3i\sqrt{3}}}$$

01.07.03.0046.01

$$\cos\left(\frac{4\pi}{7}\right) = \left(z;\, 8z^3 + 4z^2 - 4z - 1\right)_2^{-1}$$

01.07.03.0047.01

$$\cos\left(\frac{4\pi}{7}\right) = -\frac{1}{2}(-1)^{3/7}\left(1 - \sqrt[7]{-1}\right)$$

01.07.03.0048.01

$$\cos\left(\frac{7\pi}{12}\right) = -\frac{\sqrt{3} - 1}{2\sqrt{2}}$$

01.07.03.0049.01

$$\cos\left(\frac{7\pi}{12}\right) = \left(z;\, 16z^4 - 16z^2 + 1\right)_2^{-1}$$

01.07.03.0050.01

$$\cos\left(\frac{3\pi}{5}\right) = -\frac{\sqrt{5} - 1}{4}$$

01.07.03.0051.01

$$\cos\left(\frac{5\pi}{8}\right) = -\frac{\sqrt{2 - \sqrt{2}}}{2}$$

01.07.03.0052.01

$$\cos\left(\frac{5\pi}{8}\right) = \left(z;\, 8z^4 - 8z^2 + 1\right)_2^{-1}$$

01.07.03.0053.01

$$\cos\left(\frac{5\pi}{8}\right) = -\frac{1}{2}(-1)^{3/8}\left(1 - \sqrt[4]{-1}\right)$$

01.07.03.0054.01

$$\cos\left(\frac{2\pi}{3}\right) = -\frac{1}{2}$$

01.07.03.0055.01

$$\cos\left(\frac{7\pi}{10}\right) = -\frac{1}{2}\sqrt{\frac{5 - \sqrt{5}}{2}}$$

01.07.03.0056.01

$$\cos\left(\frac{7\pi}{10}\right) == \left(z;\ 16z^4 - 20z^2 + 5\right)_2^{-1}$$

01.07.03.0057.01

$$\cos\left(\frac{5\pi}{7}\right) == \frac{1}{24\sqrt[3]{14-42i\sqrt{3}}}\left(4\sqrt[3]{14-42i\sqrt{3}} + \sqrt[3]{2}\left(-2\left(\sqrt[3]{28-84i\sqrt{3}} + \sqrt{7}(-i) + \sqrt{21}\right)\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}} + \left(1-i\sqrt{3}\right)\sqrt[3]{28+2i\sqrt{7}+6\sqrt{21}}\left(14-i\sqrt{7}-3\sqrt{21}\right)^{2/3} + 4\sqrt{7}\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}}\ i\right)\right)$$

01.07.03.0058.01

$$\cos\left(\frac{5\pi}{7}\right) == \left(z;\ 8z^3 - 4z^2 - 4z + 1\right)_1^{-1}$$

01.07.03.0059.01

$$\cos\left(\frac{5\pi}{7}\right) == -\frac{1}{2}(-1)^{2/7}\left(1-(-1)^{3/7}\right)$$

01.07.03.0060.01

$$\cos\left(\frac{3\pi}{4}\right) == -\frac{1}{\sqrt{2}}$$

01.07.03.0061.01

$$\cos\left(\frac{7\pi}{9}\right) == \frac{1}{2}\left(-\sqrt[3]{-\frac{1}{2}i\left(-i+\sqrt{3}\right)} - \sqrt[3]{\frac{1}{2}i\left(i+\sqrt{3}\right)}\right)$$

01.07.03.0062.01

$$\cos\left(\frac{7\pi}{9}\right) == \left(z;\ 8z^3 - 6z - 1\right)_1^{-1}$$

01.07.03.0063.01

$$\cos\left(\frac{7\pi}{9}\right) == -\frac{1}{2}(-1)^{2/9}\left(1-(-1)^{5/9}\right)$$

01.07.03.0064.01

$$\cos\left(\frac{4\pi}{5}\right) == -\frac{\sqrt{5}+1}{4}$$

01.07.03.0065.01

$$\cos\left(\frac{5\pi}{6}\right) == -\frac{\sqrt{3}}{2}$$

01.07.03.0066.01

$$\cos\left(\frac{6\pi}{7}\right) == \frac{-4\sqrt[3]{1-3i\sqrt{3}} + \sqrt[3]{7}\left(-1-i\sqrt{3}\right)\left(2-6i\sqrt{3}\right)^{2/3} + 2\sqrt[3]{2}\ 7^{2/3}\left(i+\sqrt{3}\right)i}{24\sqrt[3]{1-3i\sqrt{3}}}$$

01.07.03.0067.01

$$\cos\left(\frac{6\pi}{7}\right) == \left(z;\ 8z^3 + 4z^2 - 4z - 1\right)_1^{-1}$$

01.07.03.0068.01

$$\cos\left(\frac{6\pi}{7}\right) = -\frac{1}{2}\sqrt[7]{-1}\left(1-(-1)^{5/7}\right)$$

01.07.03.0069.01

$$\cos\left(\frac{7\pi}{8}\right) = -\frac{\sqrt{2+\sqrt{2}}}{2}$$

01.07.03.0070.01

$$\cos\left(\frac{7\pi}{8}\right) = \left(z;\, 8z^4-8z^2+1\right)_1^{-1}$$

01.07.03.0071.01

$$\cos\left(\frac{7\pi}{8}\right) = -\frac{1}{2}\sqrt[8]{-1}\left(1-(-1)^{3/4}\right)$$

01.07.03.0072.01

$$\cos\left(\frac{8\pi}{9}\right) = -\frac{1}{4}\,i\left(\frac{i\left(-1-i\sqrt{3}\right)^{4/3}}{\sqrt[3]{2}} - \sqrt[3]{\frac{1}{2}\,i\left(i+\sqrt{3}\right)}\left(i+\sqrt{3}\right)\right)$$

01.07.03.0073.01

$$\cos\left(\frac{8\pi}{9}\right) = \left(z;\, 8z^3-6z+1\right)_1^{-1}$$

01.07.03.0074.01

$$\cos\left(\frac{8\pi}{9}\right) = -\frac{1}{2}\sqrt[9]{-1}\left(1-(-1)^{7/9}\right)$$

01.07.03.0075.01

$$\cos\left(\frac{9\pi}{10}\right) = -\frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{2}}$$

01.07.03.0076.01

$$\cos\left(\frac{9\pi}{10}\right) = \left(z;\, 16z^4-20z^2+5\right)_1^{-1}$$

01.07.03.0077.01

$$\cos\left(\frac{11\pi}{12}\right) = -\frac{1+\sqrt{3}}{2\sqrt{2}}$$

01.07.03.0078.01

$$\cos(\pi) = -1$$

01.07.03.0079.01

$$\cos\left(\frac{13\pi}{12}\right) = -\frac{1+\sqrt{3}}{2\sqrt{2}}$$

01.07.03.0080.01

$$\cos\left(\frac{13\pi}{12}\right) = \left(z;\, 16z^4-16z^2+1\right)_1^{-1}$$

01.07.03.0081.01

$$\cos\left(\frac{11\pi}{10}\right) == -\frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{2}}$$

01.07.03.0082.01

$$\cos\left(\frac{11\pi}{10}\right) == \left(z;\,16\,z^4-20\,z^2+5\right)_1^{-1}$$

01.07.03.0083.01

$$\cos\left(\frac{10\pi}{9}\right) == -\frac{1}{4}\,i\left(\frac{i\left(-1-i\sqrt{3}\right)^{4/3}}{\sqrt[3]{2}}-\sqrt[3]{\frac{1}{2}\,i\left(i+\sqrt{3}\right)}\left(i+\sqrt{3}\right)\right)$$

01.07.03.0084.01

$$\cos\left(\frac{10\pi}{9}\right) == \left(z;\,8\,z^3-6\,z+1\right)_1^{-1}$$

01.07.03.0085.01

$$\cos\left(\frac{10\pi}{9}\right) == -\frac{1}{2}\sqrt[9]{-1}\left(1-(-1)^{7/9}\right)$$

01.07.03.0086.01

$$\cos\left(\frac{9\pi}{8}\right) == -\frac{\sqrt{2+\sqrt{2}}}{2}$$

01.07.03.0087.01

$$\cos\left(\frac{9\pi}{8}\right) == \left(z;\,8\,z^4-8\,z^2+1\right)_1^{-1}$$

01.07.03.0088.01

$$\cos\left(\frac{9\pi}{8}\right) == -\frac{1}{2}\sqrt[8]{-1}\left(1-(-1)^{3/4}\right)$$

01.07.03.0089.01

$$\cos\left(\frac{8\pi}{7}\right) == \frac{-4\sqrt[3]{1-3\,i\sqrt{3}}+\sqrt[3]{7}\left(-1-i\sqrt{3}\right)\left(2-6\,i\sqrt{3}\right)^{2/3}+2\sqrt[3]{2}\;7^{2/3}\left(i+\sqrt{3}\right)i}{24\sqrt[3]{1-3\,i\sqrt{3}}}$$

01.07.03.0090.01

$$\cos\left(\frac{8\pi}{7}\right) == \left(z;\,8\,z^3+4\,z^2-4\,z-1\right)_1^{-1}$$

01.07.03.0091.01

$$\cos\left(\frac{8\pi}{7}\right) == -\frac{1}{2}\sqrt[7]{-1}\left(1-(-1)^{5/7}\right)$$

01.07.03.0092.01

$$\cos\left(\frac{7\pi}{6}\right) == -\frac{\sqrt{3}}{2}$$

01.07.03.0093.01

$$\cos\left(\frac{6\pi}{5}\right) == -\frac{\sqrt{5}+1}{4}$$

01.07.03.0094.01

$$\cos\left(\frac{11\pi}{9}\right) = \frac{1}{2}\left(-\sqrt[3]{-\frac{1}{2}\,i\left(-i+\sqrt{3}\right)} - \sqrt[3]{\frac{1}{2}\,i\left(i+\sqrt{3}\right)}\right)$$

01.07.03.0095.01

$$\cos\left(\frac{11\pi}{9}\right) = \left(z;\, 8z^3 - 6z - 1\right)_1^{-1}$$

01.07.03.0096.01

$$\cos\left(\frac{11\pi}{9}\right) = -\frac{1}{2}(-1)^{2/9}\left(1-(-1)^{5/9}\right)$$

01.07.03.0097.01

$$\cos\left(\frac{5\pi}{4}\right) = -\frac{1}{\sqrt{2}}$$

01.07.03.0098.01

$$\cos\left(\frac{9\pi}{7}\right) = \frac{1}{24\sqrt[3]{14-42\,i\sqrt{3}}}\left(4\sqrt[3]{14-42\,i\sqrt{3}} + \sqrt[3]{2}\left(-2\left(\sqrt[3]{28-84\,i\sqrt{3}} + \sqrt{7}\,(-i) + \sqrt{21}\right)\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}} + \left(1-i\sqrt{3}\right)\sqrt[3]{28+2\,i\sqrt{7}+6\sqrt{21}}\left(14-i\sqrt{7}-3\sqrt{21}\right)^{2/3} + 4\sqrt{7}\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}}\;i\right)\right)$$

01.07.03.0099.01

$$\cos\left(\frac{9\pi}{7}\right) = \left(z;\, 8z^3 - 4z^2 - 4z + 1\right)_1^{-1}$$

01.07.03.0100.01

$$\cos\left(\frac{9\pi}{7}\right) = -\frac{1}{2}(-1)^{2/7}\left(1-(-1)^{3/7}\right)$$

01.07.03.0101.01

$$\cos\left(\frac{13\pi}{10}\right) = -\frac{1}{2}\sqrt{\frac{5-\sqrt{5}}{2}}$$

01.07.03.0102.01

$$\cos\left(\frac{13\pi}{10}\right) = \left(z;\, 16z^4 - 20z^2 + 5\right)_2^{-1}$$

01.07.03.0103.01

$$\cos\left(\frac{4\pi}{3}\right) = -\frac{1}{2}$$

01.07.03.0104.01

$$\cos\left(\frac{11\pi}{8}\right) = -\frac{\sqrt{2-\sqrt{2}}}{2}$$

01.07.03.0105.01

$$\cos\left(\frac{11\pi}{8}\right) = \left(z;\, 8z^4 - 8z^2 + 1\right)_2^{-1}$$

01.07.03.0106.01

$$\cos\left(\frac{11\pi}{8}\right) = -\frac{1}{2}(-1)^{3/8}\left(1-\sqrt[4]{-1}\right)$$

01.07.03.0107.01

$$\cos\left(\frac{7\pi}{5}\right) = -\frac{\sqrt{5}-1}{4}$$

01.07.03.0108.01

$$\cos\left(\frac{17\pi}{12}\right) = -\frac{\sqrt{3}-1}{2\sqrt{2}}$$

01.07.03.0109.01

$$\cos\left(\frac{17\pi}{12}\right) = \left(z;\, 16z^4-16z^2+1\right)_2^{-1}$$

01.07.03.0110.01

$$\cos\left(\frac{10\pi}{7}\right) = \frac{-4\sqrt[3]{1-3i\sqrt{3}} - 2i\sqrt[3]{2}\,7^{2/3}\left(-i+\sqrt{3}\right) + \sqrt[3]{7}\left(i+\sqrt{3}\right)\left(2-6i\sqrt{3}\right)^{2/3} i}{24\sqrt[3]{1-3i\sqrt{3}}}$$

01.07.03.0111.01

$$\cos\left(\frac{10\pi}{7}\right) = \left(z;\, 8z^3+4z^2-4z-1\right)_2^{-1}$$

01.07.03.0112.01

$$\cos\left(\frac{10\pi}{7}\right) = -\frac{1}{2}(-1)^{3/7}\left(1-\sqrt[7]{-1}\right)$$

01.07.03.0113.01

$$\cos\left(\frac{13\pi}{9}\right) = \frac{1}{4}\left(\left(1-i\sqrt{3}\right)\sqrt[3]{-\frac{1}{2}i\left(-i+\sqrt{3}\right)} + \sqrt[3]{\frac{1}{2}i\left(i+\sqrt{3}\right)}\left(1+i\sqrt{3}\right)\right)$$

01.07.03.0114.01

$$\cos\left(\frac{13\pi}{9}\right) = \left(z;\, 8z^3-6z-1\right)_2^{-1}$$

01.07.03.0115.01

$$\cos\left(\frac{13\pi}{9}\right) = -\frac{1}{2}(-1)^{4/9}\left(1-\sqrt[9]{-1}\right)$$

01.07.03.0116.01

$$\cos\left(\frac{3\pi}{2}\right) = 0$$

01.07.03.0117.01

$$\cos\left(\frac{14\pi}{9}\right) = \frac{1}{4}i\left(\sqrt[3]{-\frac{1}{2}i\left(-i+\sqrt{3}\right)}\left(i+\sqrt{3}\right) - \left(-i+\sqrt{3}\right)\sqrt[3]{\frac{1}{2}i\left(i+\sqrt{3}\right)}\right)$$

01.07.03.0118.01

$$\cos\left(\frac{14\pi}{9}\right) = \left(z;\, 8z^3-6z+1\right)_2^{-1}$$

01.07.03.0119.01

$$\cos\left(\frac{14\pi}{9}\right) == -\frac{1}{2}(-1)^{5/9}\left(1+(-1)^{8/9}\right)$$

01.07.03.0120.01

$$\cos\left(\frac{11\pi}{7}\right) == \frac{1}{24\sqrt[3]{14-42i\sqrt{3}}}\left(4\sqrt[3]{14-42i\sqrt{3}} - 2\left(28-2i\sqrt{7}-6\sqrt{21}\right)^{2/3}\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}} - 4i\sqrt{7}\sqrt[3]{28+2i\sqrt{7}+6\sqrt{21}} + \left(28+2i\sqrt{7}+6\sqrt{21}\right)^{2/3}\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}} - 2\sqrt{7}\left(i+\sqrt{3}\right)\sqrt[3]{28-2i\sqrt{7}-6\sqrt{21}} + \sqrt{3}\left(28+2i\sqrt{7}+6\sqrt{21}\right)^{2/3}\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}}\; i\right)$$

01.07.03.0121.01

$$\cos\left(\frac{11\pi}{7}\right) == \left(z;\, 8z^3-4z^2-4z+1\right)_2^{-1}$$

01.07.03.0122.01

$$\cos\left(\frac{11\pi}{7}\right) == -\frac{1}{2}(-1)^{4/7}\left(1+(-1)^{6/7}\right)$$

01.07.03.0123.01

$$\cos\left(\frac{19\pi}{12}\right) == \frac{\sqrt{3}-1}{2\sqrt{2}}$$

01.07.03.0124.01

$$\cos\left(\frac{19\pi}{12}\right) == \left(z;\, 16z^4-16z^2+1\right)_3^{-1}$$

01.07.03.0125.01

$$\cos\left(\frac{8\pi}{5}\right) == \frac{\sqrt{5}-1}{4}$$

01.07.03.0126.01

$$\cos\left(\frac{13\pi}{8}\right) == \frac{\sqrt{2-\sqrt{2}}}{2}$$

01.07.03.0127.01

$$\cos\left(\frac{13\pi}{8}\right) == \left(z;\, 8z^4-8z^2+1\right)_3^{-1}$$

01.07.03.0128.01

$$\cos\left(\frac{13\pi}{8}\right) == -\frac{1}{2}(-1)^{5/8}\left(1+(-1)^{3/4}\right)$$

01.07.03.0129.01

$$\cos\left(\frac{5\pi}{3}\right) == \frac{1}{2}$$

01.07.03.0130.01

$$\cos\left(\frac{17\pi}{10}\right) == \frac{1}{2}\sqrt{\frac{5-\sqrt{5}}{2}}$$

01.07.03.0131.01

$$\cos\left(\frac{17\pi}{10}\right) = \left(z;\, 16z^4 - 20z^2 + 5\right)_3^{-1}$$

01.07.03.0132.01

$$\cos\left(\frac{12\pi}{7}\right) = \frac{1}{6}\sqrt[3]{\frac{7}{2}\left(1 - 3i\sqrt{3}\right)} - \frac{1}{6} + \frac{7^{2/3}}{3\, 2^{2/3}\sqrt[3]{1 - 3i\sqrt{3}}}$$

01.07.03.0133.01

$$\cos\left(\frac{12\pi}{7}\right) = \left(z;\, 8z^3 + 4z^2 - 4z - 1\right)_3^{-1}$$

01.07.03.0134.01

$$\cos\left(\frac{12\pi}{7}\right) = -\frac{1}{2}(-1)^{5/7}\left(1 + (-1)^{4/7}\right)$$

01.07.03.0135.01

$$\cos\left(\frac{7\pi}{4}\right) = \frac{1}{\sqrt{2}}$$

01.07.03.0136.01

$$\cos\left(\frac{16\pi}{9}\right) = \frac{1}{2}\left(\sqrt[3]{-\frac{1}{2}i\left(-i + \sqrt{3}\right)} + \sqrt[3]{\frac{1}{2}i\left(i + \sqrt{3}\right)}\right)$$

01.07.03.0137.01

$$\cos\left(\frac{16\pi}{9}\right) = \left(z;\, 8z^3 - 6z + 1\right)_3^{-1}$$

01.07.03.0138.01

$$\cos\left(\frac{16\pi}{9}\right) = -\frac{1}{2}(-1)^{7/9}\left(1 + (-1)^{4/9}\right)$$

01.07.03.0139.01

$$\cos\left(\frac{9\pi}{5}\right) = \frac{\sqrt{5} + 1}{4}$$

01.07.03.0140.01

$$\cos\left(\frac{11\pi}{6}\right) = \frac{\sqrt{3}}{2}$$

01.07.03.0141.01

$$\cos\left(\frac{13\pi}{7}\right) = \frac{1}{24\sqrt[3]{14 - 42i\sqrt{3}}}\left(4\sqrt[3]{14 - 42i\sqrt{3}} + \sqrt[3]{2}\left(\left(i + \sqrt{3}\right)\left(2\sqrt{7} - i\sqrt[3]{28 - 84i\sqrt{3}}\right)\sqrt[3]{14 + i\sqrt{7} + 3\sqrt{21}} + 2\sqrt{7}\left(-i + \sqrt{3}\right)\sqrt[3]{14 - i\sqrt{7} - 3\sqrt{21}} + \left(1 + i\sqrt{3}\right)\sqrt[3]{28 + 2i\sqrt{7} + 6\sqrt{21}}\left(14 - i\sqrt{7} - 3\sqrt{21}\right)^{2/3}\right)\right)$$

01.07.03.0142.01

$$\cos\left(\frac{13\pi}{7}\right) = \left(z;\, 8z^3 - 4z^2 - 4z + 1\right)_3^{-1}$$

01.07.03.0143.01

$$\cos\left(\frac{13\pi}{7}\right) == -\frac{1}{2}(-1)^{6/7}\left(1+(-1)^{2/7}\right)$$

01.07.03.0144.01

$$\cos\left(\frac{15\pi}{8}\right) == \frac{\sqrt{2+\sqrt{2}}}{2}$$

01.07.03.0145.01

$$\cos\left(\frac{15\pi}{8}\right) == \left(z;\, 8z^4-8z^2+1\right)_4^{-1}$$

01.07.03.0146.01

$$\cos\left(\frac{15\pi}{8}\right) == -\frac{1}{2}(-1)^{7/8}\left(1+\sqrt[4]{-1}\right)$$

01.07.03.0147.01

$$\cos\left(\frac{17\pi}{9}\right) == \frac{1}{4}\left(\left(1+i\sqrt{3}\right)\sqrt[3]{-\frac{1}{2}i\left(-i+\sqrt{3}\right)}+\sqrt[3]{\frac{1}{2}i\left(i+\sqrt{3}\right)}\left(1-i\sqrt{3}\right)\right)$$

01.07.03.0148.01

$$\cos\left(\frac{17\pi}{9}\right) == \left(z;\, 8z^3-6z-1\right)_3^{-1}$$

01.07.03.0149.01

$$\cos\left(\frac{17\pi}{9}\right) == -\frac{1}{2}(-1)^{8/9}\left(1+(-1)^{2/9}\right)$$

01.07.03.0150.01

$$\cos\left(\frac{19\pi}{10}\right) == \frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{2}}$$

01.07.03.0151.01

$$\cos\left(\frac{19\pi}{10}\right) == \left(z;\, 16z^4-20z^2+5\right)_4^{-1}$$

01.07.03.0152.01

$$\cos\left(\frac{23\pi}{12}\right) == \frac{1+\sqrt{3}}{2\sqrt{2}}$$

01.07.03.0153.01

$$\cos\left(\frac{23\pi}{12}\right) == \left(z;\, 16z^4-16z^2+1\right)_4^{-1}$$

01.07.03.0154.01

$$\cos(2\pi) == 1$$

01.07.03.0155.01

$$\cos\left(\frac{\pi}{17}\right) == \frac{1}{4}\sqrt{\left(\frac{1}{2}\left(\sqrt{\left(2\left(-\sqrt{2\left(17-\sqrt{17}\right)}+6\sqrt{17}+\sqrt{34\left(17-\sqrt{17}\right)}-8\sqrt{2\left(17+\sqrt{17}\right)}+34\right)\right)}+\sqrt{17}+\sqrt{2\left(17-\sqrt{17}\right)}+15\right)\right)}$$

01.07.03.0156.01

$$\cos\left(\frac{\pi}{30}\right) == \frac{1}{4}\sqrt{\frac{5-\sqrt{5}}{2}} + \frac{\sqrt{5}+1}{8}\sqrt{3}$$

$\cos\left(\frac{n\pi}{m}\right)$ can be expressed using only square roots if $n \in \mathbb{Z}$ and m is a product of a power of 2 and distinct Fermat primes $\{3, 5, 17, 257, \ldots\}$.

Values at infinities

01.07.03.0157.01

$$\cos(i\,\infty) == \infty$$

01.07.03.0158.01

$$\cos(-i\,\infty) == \infty$$

01.07.03.0159.01

$$\cos(\tilde{\infty}) == ¿$$

General characteristics

Domain and analyticity

$\cos(z)$ is an entire analytical function of z which is defined over the whole complex z-plane.

01.07.04.0001.01

$$z \longrightarrow \cos(z) :: \mathbb{C} \longrightarrow \mathbb{C}$$

Symmetries and periodicities

Parity

$\cos(z)$ is an even function.

01.07.04.0002.01

$$\cos(-z) == \cos(z)$$

Mirror symmetry

01.07.04.0003.01

$$\cos(\bar{z}) == \overline{\cos(z)}$$

Periodicity

$\cos(z)$ is a periodic function with period 2π.

01.07.04.0009.01

$$\cos(z + 2\pi) == \cos(z)$$

01.07.04.0004.01

$$\cos(z + 2\pi m) == \cos(z) \;/;\; m \in \mathbb{Z}$$

01.07.04.0005.01

$$\cos(z + \pi m) == (-1)^m \cos(z) \;/;\; m \in \mathbb{Z}$$

Poles and essential singularities

The function $\cos(z)$ has only one singular point at $z = \tilde{\infty}$. It is an essential singular point.

01.07.04.0006.01

$$\mathcal{S}ing_z(\cos(z)) = \{\{\tilde{\infty}, \infty\}\}$$

Branch points

The function $\cos(z)$ does not have branch points.

01.07.04.0007.01

$$\mathcal{BP}_z(\cos(z)) = \{\}$$

Branch cuts

The function $\cos(z)$ does not have branch cuts.

01.07.04.0008.01

$$\mathcal{BC}_z(\cos(z)) = \{\}$$

Series representations

Generalized power series

Expansions at $z = z_0$

For the function itself

01.07.06.0027.01

$$\cos(z) \propto \cos(z_0) - \sin(z_0)(z - z_0) - \frac{1}{2}\cos(z_0)(z - z_0)^2 + \ldots \;/;\; (z \to z_0)$$

01.07.06.0028.01

$$\cos(z) \propto \cos(z_0) - \sin(z_0)(z - z_0) - \frac{1}{2}\cos(z_0)(z - z_0)^2 + O\left((z - z_0)^3\right)$$

01.07.06.0029.01

$$\cos(z) = \sum_{k=0}^{\infty} \frac{1}{k!} \cos\left(\frac{\pi k}{2} + z_0\right)(z - z_0)^k$$

01.07.06.0030.01

$$\cos(z) = \frac{1}{2}\left(e^{-i z_0}\, {}_0F_0(;\,;\, -i(z - z_0)) + e^{i z_0}\, {}_0F_0(;\,;\, i(z - z_0))\right)$$

01.07.06.0031.01

$$\cos(z) \propto \cos(z_0)(1 + O(z - z_0))$$

01.07.06.0032.01

$$\cos(z) = F_\infty(z, z_0) \;/;\; \left(\left(F_n(z, z_0) = \sum_{k=0}^{n} \frac{\cos\left(\frac{\pi k}{2} + z_0\right)(z - z_0)^k}{k!} = \frac{1}{2}\left(e^{-i z}\, Q(n+1, -i(z - z_0)) + e^{i z}\, Q(n+1, i(z - z_0))\right)\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

Expansions at $z == 0$

For the function itself

01.07.06.0001.02

$$\cos(z) \propto 1 - \frac{z^2}{2} + \frac{z^4}{24} - \ldots \;/;\; (z \to 0)$$

01.07.06.0033.01

$$\cos(z) \propto 1 - \frac{z^2}{2} + \frac{z^4}{24} - O\left(z^6\right)$$

01.07.06.0002.01

$$\cos(z) == \sum_{k=0}^{\infty} \frac{(-1)^k z^{2k}}{(2k)!}$$

01.07.06.0003.01

$$\cos(z) == {}_0F_1\left(; \frac{1}{2}; -\frac{z^2}{4}\right)$$

01.07.06.0004.02

$$\cos(z) \propto 1 + O\left(z^2\right)$$

01.07.06.0034.01

$$\cos(z) == F_\infty(z) \;/;\; \left(\left(F_n(z) == \sum_{k=0}^{n} \frac{(-1)^k z^{2k}}{(2k)!} == \cos(z) + \frac{(-1)^n \sqrt{\pi}\; z^{2n+2}}{2^{2n+2}}\, {}_1\tilde{F}_2\left(1; n + \frac{3}{2}, n + 2; -\frac{z^2}{4}\right)\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For powers of the function

For the second power

01.07.06.0005.02

$$\cos^2(z) \propto 1 - z^2 + \frac{z^4}{3} - \ldots \;/;\; (z \to 0)$$

01.07.06.0035.01

$$\cos^2(z) \propto 1 - z^2 + \frac{z^4}{3} - O\left(z^6\right)$$

01.07.06.0006.01

$$\cos^2(z) == 1 + \sum_{k=1}^{\infty} \frac{(-1)^k 2^{2k-1} z^{2k}}{(2k)!}$$

01.07.06.0007.01

$$\cos^2(z) == \frac{1}{2} + \frac{1}{2}\, {}_0F_1\left(; \frac{1}{2}; -z^2\right)$$

01.07.06.0036.01

$$\cos^2(z) \propto 1 + O\left(z^2\right)$$

01.07.06.0037.01

$$\cos^2(z) = F_\infty(z) /; \left(\left(F_m(z) = 1 + \frac{1}{2} \sum_{j=1}^{m} \frac{(-1)^j \, 2^{2j} \, z^{2j}}{(2j)!} = \cos^2(z) + \frac{(-1)^m \sqrt{\pi}}{2} z^{2m+2} \, {}_1\tilde{F}_2\left(1; m + \frac{3}{2}, m+2; -z^2\right)\right) \bigwedge m \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For the third power

01.07.06.0008.02

$$\cos^3(z) \propto 1 - \frac{3 z^2}{2} + \frac{7 z^4}{8} - \ldots /; (z \to 0)$$

01.07.06.0038.01

$$\cos^3(z) \propto 1 - \frac{3 z^2}{2} + \frac{7 z^4}{8} - O\left(z^6\right)$$

01.07.06.0009.01

$$\cos^3(z) = \frac{1}{4} \sum_{k=0}^{\infty} \frac{(-1)^k \left(3^{2k} + 3\right) z^{2k}}{(2k)!}$$

01.07.06.0039.01

$$\cos^3(z) = \frac{3}{4} \, {}_0F_1\left(; \frac{1}{2}; -\frac{z^2}{4}\right) + \frac{1}{4} \, {}_0F_1\left(; \frac{1}{2}; -\frac{9}{4} z^2\right)\Big)$$

01.07.06.0040.01

$$\cos^3(z) \propto 1 + O\left(z^2\right)$$

01.07.06.0041.01

$$\cos^3(z) = F_\infty(z) /; \left(\left(F_m(z) = 1 + \frac{1}{4} \sum_{j=1}^{m} \frac{(-1)^j \left(3 + 3^{2j}\right) z^{2j}}{(2j)!} = \right.\right.$$

$$\left.\left.\cos^3(z) + (-1)^m \, 2^{-2m-4} \sqrt{\pi} \, z^{2m+2} \left(3 \, {}_1\tilde{F}_2\left(1; m + \frac{3}{2}, m+2; -\frac{z^2}{4}\right) + 3^{2m+2} \, {}_1\tilde{F}_2\left(1; m + \frac{3}{2}, m+2; -\frac{9 z^2}{4}\right)\right)\right) \bigwedge m \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For symbolical integer power

01.07.06.0042.01

$$\cos^n(z) \propto 1 + \frac{1}{2^{n+2}} \left((1 + (-1)^n) \binom{n}{\left\lfloor \frac{n}{2} \right\rfloor} \left(n - 2 \left\lfloor \frac{n}{2} \right\rfloor\right)^2 - 2^{n+1} \, n\right) z^2 +$$

$$\frac{1}{3 \, 2^{n+4}} \left(2^{n+1} \, n \, (3n - 2) - (1 + (-1)^n) \binom{n}{\left\lfloor \frac{n}{2} \right\rfloor} \left(n - 2 \left\lfloor \frac{n}{2} \right\rfloor\right)^4\right) z^4 + \ldots /; (z \to 0) \bigwedge n \in \mathbb{N}^+$$

01.07.06.0043.01

$$\cos^n(z) \propto 1 + \frac{1}{2^{n+2}}\left((1+(-1)^n)\binom{n}{\left\lfloor \frac{n}{2}\right\rfloor}\left(n-2\left\lfloor \frac{n}{2}\right\rfloor\right)^2 - 2^{n+1}\,n\right)z^2 + \frac{1}{3\,2^{n+4}}\left(2^{n+1}\,n\,(3\,n-2)-(1+(-1)^n)\binom{n}{\left\lfloor \frac{n}{2}\right\rfloor}\left(n-2\left\lfloor \frac{n}{2}\right\rfloor\right)^4\right)z^4 + O\!\left(z^6\right) /;\, n \in \mathbb{N}^+$$

01.07.06.0044.01

$$\cos^n(z) = 1 + 2^{1-n}\sum_{j=1}^{\infty}\left(\frac{(-1)^j}{(2\,j)!}\sum_{k=0}^{\left\lfloor \frac{n-1}{2}\right\rfloor}\binom{n}{k}(n-2\,k)^{2\,j}\right)z^{2\,j} /;\, n \in \mathbb{N}^+$$

01.07.06.0045.01

$$\cos^n(z) = 2^{-n}\binom{n}{\frac{n}{2}}(1-n \bmod 2) + 2^{1-n}\sum_{k=0}^{\left\lfloor \frac{n-1}{2}\right\rfloor}\binom{n}{k}\,{}_0F_1\!\left(;\frac{1}{2};-\frac{(n-2\,k)^2\,z^2}{4}\right) /;\, n \in \mathbb{N}^+$$

01.07.06.0046.01

$$\cos^n(z) \propto 1 + O\!\left(z^2\right) /;\, n \in \mathbb{N}^+$$

01.07.06.0047.01

$$\cos^n(z) = F_\infty(z) /;\left(\left(F_m(z) = 1 + 2^{1-n}\sum_{j=1}^{m}\left(\frac{(-1)^j}{(2\,j)!}\sum_{k=0}^{\left\lfloor \frac{n-1}{2}\right\rfloor}\binom{n}{k}(n-2\,k)^{2\,j}\right)z^{2\,j} = \cos^n(z) + \frac{(-1)^m\sqrt{\pi}\;z^{2\,m+2}}{2^{2\,m+n+1}}\sum_{k=0}^{\left\lfloor \frac{n-1}{2}\right\rfloor}\binom{n}{k}(n-2\,k)^{2\,m+2}\,{}_1\tilde{F}_2\!\left(1;m+\frac{3}{2},m+2;-\frac{(n-2\,k)^2\,z^2}{4}\right)\right)\bigwedge m \in \mathbb{N}\bigwedge n \in \mathbb{N}^+\right)$$

Summed form of the truncated series expansion.

Expansions at $z = \frac{\pi}{2}$

For the function itself

01.07.06.0010.02

$$\cos(z) \propto -\left(z-\frac{\pi}{2}\right) + \frac{1}{6}\left(z-\frac{\pi}{2}\right)^3 - \frac{1}{120}\left(z-\frac{\pi}{2}\right)^5 + \ldots /;\left(z \to \frac{\pi}{2}\right)$$

01.07.06.0048.01

$$\cos(z) \propto -\left(z-\frac{\pi}{2}\right) + \frac{1}{6}\left(z-\frac{\pi}{2}\right)^3 - \frac{1}{120}\left(z-\frac{\pi}{2}\right)^5 - O\!\left(\left(z-\frac{\pi}{2}\right)^5\right)$$

01.07.06.0011.01

$$\cos(z) = \sum_{k=0}^{\infty}\frac{(-1)^{k-1}}{(2\,k+1)!}\left(z-\frac{\pi}{2}\right)^{2\,k+1}$$

01.07.06.0012.01

$$\cos(z) = -\left(z-\frac{\pi}{2}\right){}_0F_1\!\left(;\frac{3}{2};-\frac{1}{4}\left(z-\frac{\pi}{2}\right)^2\right)$$

01.07.06.0013.02

$$\cos(z) \propto -\left(z-\frac{\pi}{2}\right)+O\left(\left(z-\frac{\pi}{2}\right)^3\right)$$

01.07.06.0049.01

$$\cos(z) == F_\infty(z) /; \left(\left(F_n(z) == -\left(z-\frac{\pi}{2}\right)\sum_{k=0}^{n}\frac{(-1)^k\left(z-\frac{\pi}{2}\right)^{2k}}{2^{2k}\,k!\left(\frac{3}{2}\right)_k} == \cos(z)+\frac{(-1)^n}{(2n+3)!}\left(\frac{\pi}{2}-z\right)^{2n+3}{}_1F_2\left(1;n+2,n+\frac{5}{2};-\frac{1}{4}\left(\frac{\pi}{2}-z\right)^2\right)\right)\bigwedge n\in\mathbb{N}\right)$$

Summed form of the truncated series expansion.

For powers of the function

For the second power

01.07.06.0014.02

$$\cos^2(z) \propto \left(z-\frac{\pi}{2}\right)^2-\frac{1}{3}\left(z-\frac{\pi}{2}\right)^4+\frac{2}{45}\left(z-\frac{\pi}{2}\right)^6-\ldots /; \left(z\to\frac{\pi}{2}\right)$$

01.07.06.0050.01

$$\cos^2(z) \propto \left(z-\frac{\pi}{2}\right)^2-\frac{1}{3}\left(z-\frac{\pi}{2}\right)^4+\frac{2}{45}\left(z-\frac{\pi}{2}\right)^6-O\left(\left(z-\frac{\pi}{2}\right)^8\right)$$

01.07.06.0015.01

$$\cos^2(z) == \sum_{k=1}^{\infty}\frac{(-1)^{k-1}\,2^{2k-1}}{(2k)!}\left(z-\frac{\pi}{2}\right)^{2k}$$

01.07.06.0016.01

$$\cos^2(z) == \left(z-\frac{\pi}{2}\right)^2{}_1F_2\left(1;2,\frac{3}{2};-\left(z-\frac{\pi}{2}\right)^2\right)$$

01.07.06.0051.01

$$\cos^2(z) \propto \left(z-\frac{\pi}{2}\right)^2+O\left(\left(z-\frac{\pi}{2}\right)^4\right)$$

01.07.06.0052.01

$$\cos^2(z) == F_\infty(z) /; \left(\left(F_m(z) == \frac{1}{2}\left(z-\frac{\pi}{2}\right)^2\sum_{j=0}^{m}\frac{(-1)^j\,2^{2(j+1)}}{\Gamma(2j+3)}\left(z-\frac{\pi}{2}\right)^{2j} == \cos^2(z)+\frac{(-1)^m\sqrt{\pi}}{2}\left(z-\frac{\pi}{2}\right)^{2m+4}{}_1\tilde{F}_2\left(1;m+\frac{5}{2},m+3;-\left(z-\frac{\pi}{2}\right)^2\right)\right)\bigwedge m\in\mathbb{N}\right)$$

Summed form of the truncated series expansion.

For the third power

01.07.06.0017.02

$$\cos^3(z) \propto -\left(z-\frac{\pi}{2}\right)^3 + \frac{1}{2}\left(z-\frac{\pi}{2}\right)^5 - \frac{1}{120}\,13\left(z-\frac{\pi}{2}\right)^7 + \ldots\ /;\ \left(z\to\frac{\pi}{2}\right)$$

01.07.06.0053.01

$$\cos^3(z) \propto -\left(z-\frac{\pi}{2}\right)^3 + \frac{1}{2}\left(z-\frac{\pi}{2}\right)^5 - \frac{1}{120}\,13\left(z-\frac{\pi}{2}\right)^7 - O\left(\left(z-\frac{\pi}{2}\right)^9\right)$$

01.07.06.0018.01

$$\cos^3(z) = \frac{1}{4}\sum_{k=1}^{\infty}\frac{(-1)^k\left(3^{2k+1}-3\right)}{(2k+1)!}\left(z-\frac{\pi}{2}\right)^{2k+1}$$

01.07.06.0054.01

$$\cos^3(z) = \frac{3}{4}\left(z-\frac{\pi}{2}\right)\left({}_0F_1\left(;\frac{3}{2};-\frac{9}{4}\left(z-\frac{\pi}{2}\right)^2\right) - {}_0F_1\left(;\frac{3}{2};-\frac{1}{4}\left(z-\frac{\pi}{2}\right)^2\right)\right)$$

01.07.06.0055.01

$$\cos^3(z) \propto -\left(z-\frac{\pi}{2}\right)^3 + O\left(\left(z-\frac{\pi}{2}\right)^5\right)$$

01.07.06.0056.01

$$\cos^3(z) = F_\infty(z)\ /;\ \left(\left(F_m(z) = -\frac{1}{4}\left(z-\frac{\pi}{2}\right)^3\sum_{j=0}^{m}\frac{(-1)^j\left(-3+3^{2j+3}\right)}{(2j+3)!}\left(z-\frac{\pi}{2}\right)^{2j} = \cos^3(z) - \frac{3(-1)^m}{4\,\Gamma(2m+6)}\left(z-\frac{\pi}{2}\right)^{2m+5}\right.\right.$$
$$\left.\left.\left(9^{m+2}\,{}_1F_2\left(1;m+3,m+\frac{7}{2};-\frac{9}{4}\left(z-\frac{\pi}{2}\right)^2\right) - {}_1F_2\left(1;m+3,m+\frac{7}{2};-\frac{1}{4}\left(z-\frac{\pi}{2}\right)^2\right)\right)\right) \bigwedge m\in\mathbb{N}\right)$$

Summed form of the truncated series expansion.

For symbolical integer power

01.07.06.0057.01

$$\cos^n(z) \propto$$
$$(-1)^n\left(z-\frac{\pi}{2}\right)^n\left(1-\left(\frac{2^{1-n}}{(n+2)!}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n}{k}(n-2k)^{n+2}\right)\left(z-\frac{\pi}{2}\right)^2 + \left(\frac{2^{1-n}}{(n+4)!}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n}{k}(n-2k)^{n+4}\right)\left(z-\frac{\pi}{2}\right)^4 + \ldots\right)/;$$
$$\left(z\to\frac{\pi}{2}\right)\bigwedge n\in\mathbb{N}^+$$

01.07.06.0058.01

$$\cos^n(z) \propto (-1)^n\left(z-\frac{\pi}{2}\right)^n\left(1-\left(\frac{2^{1-n}}{(n+2)!}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n}{k}(n-2k)^{n+2}\right)\left(z-\frac{\pi}{2}\right)^2 +\right.$$
$$\left.\left(\frac{2^{1-n}}{(n+4)!}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n}{k}(n-2k)^{n+4}\right)\left(z-\frac{\pi}{2}\right)^4 + O\left(\left(z-\frac{\pi}{2}\right)^6\right)\right)/;\ n\in\mathbb{N}^+$$

01.07.06.0059.01

$$\cos^n(z) = 2^{1-n} (-1)^n \left(z - \frac{\pi}{2}\right)^n \sum_{j=0}^{\infty} \left(\frac{(-1)^j}{(2j+n)!} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n}{k} (n-2k)^{2j+n} \right) \left(z - \frac{\pi}{2}\right)^{2j} /; n \in \mathbb{N}^+$$

01.07.06.0060.01

$$\cos^n(z) = \frac{2^{1-n} (-1)^n}{n!} \left(z - \frac{\pi}{2}\right)^n \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n}{k} (n-2k)^n \, {}_1F_2\left(1; \frac{n+1}{2}, \frac{n}{2}+1; -\frac{(n-2k)^2}{4} \left(z - \frac{\pi}{2}\right)^2\right) /; n \in \mathbb{N}^+$$

01.07.06.0061.01

$$\cos^n(z) \propto (-1)^n \left(z - \frac{\pi}{2}\right)^n \left(1 + O\left(\left(z - \frac{\pi}{2}\right)^2\right)\right) /; n \in \mathbb{N}^+$$

01.07.06.0062.01

$$\cos^n(z) = F_\infty(z) /; \left(\left(F_m(z) = 2^{1-n} (-1)^n \left(z - \frac{\pi}{2}\right)^n \sum_{j=0}^{m} \left(\frac{(-1)^j}{(2j+n)!} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n}{k} (n-2k)^{2j+n} \right) \left(z - \frac{\pi}{2}\right)^{2j} = \right.\right.$$
$$2^{1-n} (-1)^n \left(z - \frac{\pi}{2}\right)^n \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n}{k} (n-2k)^n \left(\frac{1}{n!} \, {}_1F_2\left(1; \frac{n}{2} + \frac{1}{2}, \frac{n}{2} + 1; -\frac{(n-2k)^2}{4} \left(z - \frac{\pi}{2}\right)^2\right) - \right.$$
$$\left.\left.\left. \frac{\left(-(n-2k)^2 \left(z - \frac{\pi}{2}\right)^2\right)^{m+1}}{\Gamma(2m+n+3)} \, {}_1F_2\left(1; \frac{n+3}{2} + m, m + \frac{n}{2} + 2; -\frac{(n-2k)^2}{4} \left(z - \frac{\pi}{2}\right)^2\right)\right)\right) \bigwedge m \in \mathbb{N} \bigwedge n \in \mathbb{N}^+ \right)$$

Summed form of the truncated series expansion.

q-series

01.07.06.0019.01

$$\cos(z) = \frac{1}{2} \left(q + \frac{1}{q}\right) /; q = e^{i \pi z}$$

Exponential Fourier series

01.07.06.0020.01

$$\cos(a x) = \frac{2 a \sin(a \pi)}{\pi} \left(\frac{1}{2 a^2} - \sum_{k=1}^{\infty} \frac{(-1)^k \cos(k x)}{k^2 - a^2} \right) /; a \notin \mathbb{Z} \bigwedge -\pi < x < \pi$$

Asymptotic series expansions

01.07.06.0021.01

$$\cos(z) \propto \cos(z) /; (|z| \to \infty)$$

01.07.06.0022.01

$$\cos(z) \propto \frac{1}{2} e^{-i z} /; \left(z \to e^{i \phi} \infty\right) \bigwedge 0 < \phi < \pi$$

01.07.06.0023.01

$$\cos(z) \propto \frac{1}{2} e^{i z} /; \left(z \to e^{i \phi} \infty\right) \bigwedge -\pi < \phi < 0$$

01.07.06.0063.01

$$\cos(z) \propto \begin{cases} \frac{e^{i z}}{2} & -\pi < \arg(z) < 0 \\ \frac{e^{-i z}}{2} & 0 < \arg(z) < \pi \\ \cos(z) & \text{True} \end{cases} /; (|z| \to \infty)$$

Other series representations

01.07.06.0025.01

$$\log(\cos(z)) = \sum_{k=1}^{\infty} \frac{(-1)^k 2^{2k-1} \left(4^k - 1\right) B_{2k} z^{2k}}{k (2k)!} /; |z| < \frac{\pi}{2}$$

01.07.06.0026.01

$$\cos(z) = J_0(z) + 2 \sum_{k=1}^{\infty} (-1)^k J_{2k}(z)$$

Residue representations

01.07.06.0024.01

$$\cos(z) = \sqrt{\pi} \sum_{j=0}^{\infty} \operatorname{res}_s \left(\frac{\left(\frac{z^2}{4}\right)^{-s}}{\Gamma\left(\frac{1}{2} - s\right)} \Gamma(s) \right) (-j)$$

Dual Taylor series representations

01.07.06.0064.01

$$\cos(x)\, \theta(x) \propto \sum_{k=0}^{\infty} (-1)^k \frac{\partial^{2k+1} \delta(x)}{\partial x^{2k+1}}$$

01.07.06.0065.01

$$\cos(\lambda x)\, \theta(x) \propto \sum_{k=0}^{\infty} (-1)^k \frac{\partial^{2k+1} \delta(x)}{\partial x^{2k+1}} \lambda^{-2k-2} /; (\lambda \to \infty)$$

Integral representations

On the real axis

Of the direct function

01.07.07.0001.01

$$\cos(z) = -\int_{\frac{\pi}{2}}^{z} \sin(t)\, dt$$

01.07.07.0002.01

$$\cos(z) = 1 - z \int_0^1 \sin(z t)\, dt$$

Contour integral representations

01.07.07.0003.01

$$\cos(z) = \frac{\sqrt{\pi}}{2\pi i}\int_{\gamma-i\infty}^{\gamma+i\infty} e^{s-\frac{z^2}{4s}} s^{-\frac{1}{2}}\, ds \,/;\, \gamma > 0$$

01.07.07.0004.01

$$\cos(x) = \frac{\sqrt{\pi}}{2\pi i}\int_{\gamma-i\infty}^{\gamma+i\infty} \frac{\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\left(\frac{x}{2}\right)^{-2s} ds \,/;\, 0 < \gamma < \frac{1}{2} \bigwedge x > 0$$

01.07.07.0005.01

$$\cos(z) = \frac{\sqrt{\pi}}{2 i}\int_{\mathcal{L}} \frac{\Gamma(s)}{\Gamma\left(s+\frac{1}{2}\right)\Gamma\left(\frac{1}{2}-s\right)^2}\left(-\frac{z^2}{4}\right)^{-s} ds$$

Product representations

01.07.08.0001.01

$$\cos(z) = \prod_{k=-\infty}^{\infty}\left(1-\frac{2z}{\pi(2k+1)}\right)\exp\left(\frac{2z}{\pi(2k+1)}\right)$$

01.07.08.0002.01

$$\cos(z) = \prod_{k=1}^{\infty}\left(1-\frac{4z^2}{\pi^2(2k-1)^2}\right)$$

01.07.08.0003.01

$$\cos(n z) = 2^{n-1}\prod_{k=1}^{n}\sin\left(\frac{\pi(2k-1)}{2n}+z\right) /;\, n \in \mathbb{N}$$

Limit representations

01.07.09.0001.01

$$\cos(z) = \sqrt{\pi}\lim_{n\to\infty}\frac{(-1)^n\sqrt{n}}{4^n\, n!} H_{2n}\left(\frac{z}{2\sqrt{n}}\right)$$

01.07.09.0002.01

$$\cos(z) = \lim_{z\to\infty}\frac{(-1)^n n}{2(2n)!}\pi^{2n} E_{2n-1}\left(\frac{z}{\pi}\right)$$

01.07.09.0003.01

$$\cos(z) = \lim_{a\to\infty} \mathrm{Ce}\left(a, q, \frac{z}{\sqrt{a}}\right) /;\, q \in \mathbb{R}$$

01.07.09.0004.01

$$\cos(z) = -\lim_{a\to\infty}\frac{1}{\sqrt{a}} Se'\left(a, q, \frac{z}{\sqrt{a}}\right) /;\, q \in \mathbb{R}$$

Differential equations

Ordinary linear differential equations and wronskians

For the direct function itself

01.07.13.0001.01

$$w''(z) + w(z) = 0 \,/;\, w(z) = \cos(z) \bigwedge w(0) = 1 \bigwedge w'(0) = 0$$

01.07.13.0002.01

$$w''(z) + w(z) = 0 \,/;\, w(z) = c_1 \cos(z) + c_2 \sin(z)$$

01.07.13.0003.01

$$W_z(\cos(z), \sin(z)) = 1$$

01.07.13.0004.01

$$w''(z) + a\, w(z) + b = 0 \,/;\, w(z) = -\frac{b}{a} + c_1 \cos\left(\sqrt{a}\, z\right) + c_2 \sin\left(\sqrt{a}\, z\right)$$

01.07.13.0005.01

$$W_z\left(\cos\left(\sqrt{a}\, z\right), \sin\left(\sqrt{a}\, z\right)\right) = \sqrt{a}$$

01.07.13.0007.01

$$w''(z) - \frac{g''(z)}{g'(z)} w'(z) + g'(z)^2 w(z) = 0 \,/;\, w(z) = c_1 \cos(g(z)) + c_2 \sin(g(z))$$

01.07.13.0008.01

$$W_z(\cos(g(z)), \sin(g(z))) = g'(z)$$

01.07.13.0009.01

$$w''(z) - \left(\frac{2\, h'(z)}{h(z)} + \frac{g''(z)}{g'(z)}\right) w'(z) + \left(g'(z)^2 + \frac{2\, h'(z)^2}{h(z)^2} + \frac{h'(z)\, g''(z)}{h(z)\, g'(z)} - \frac{h''(z)}{h(z)}\right) w(z) = 0 \,/;\, w(z) = c_1 h(z) \cos(g(z)) + c_2 h(z) \sin(g(z))$$

01.07.13.0010.01

$$W_z(h(z) \cos(g(z)), h(z) \sin(g(z))) = h(z)^2 g'(z)$$

01.07.13.0011.01

$$z^2 w''(z) - (r + 2 s - 1)\, z\, w'(z) + \left(a^2 r^2 z^{2 r} + s\, (r + s)\right) w(z) = 0 \,/;\, w(z) = c_1 z^s \cos(a z^r) + c_2 z^s \sin(a z^r)$$

01.07.13.0012.01

$$W_z(z^s \cos(a z^r), z^s \sin(a z^r)) = a\, r\, z^{r+2 s-1}$$

01.07.13.0013.01

$$w''(z) - (\log(r) + 2 \log(s))\, w'(z) + \left(a^2 \log^2(r)\, r^{2 z} + \log(s)\, (\log(r) + \log(s))\right) w(z) = 0 \,/;\, w(z) = c_1 s^z \cos(a r^z) + c_2 s^z \sin(a r^z)$$

01.07.13.0014.01

$$W_z(s^z \cos(a r^z), s^z \sin(a r^z)) = a\, r^z s^{2 z} \log(r)$$

Ordinary nonlinear differential equations

01.07.13.0006.02

$$w'(z) - \sqrt{1 - w(z)^2} = 0 \,/;\, w(z) = \cos(z) \bigwedge w(0) = 1 \bigwedge |\text{Re}(z)| < \frac{\pi}{2}$$

Transformations

Transformations and argument simplifications

Argument involving basic arithmetic operations

01.07.16.0001.01

$$\cos(-z) = \cos(z)$$

01.07.16.0002.01

$$\cos(a\,(b\,z^c)^m) = \cos(a\,b^m\,z^{m\,c})\;/;\;2\,m \in \mathbb{Z}$$

01.07.16.0003.01

$$\cos\left(\sqrt{z^2}\right) = \cos(z)$$

Argument involving inverse trigonometric and hyperbolic functions

Involving $\sin^{-1}$

01.07.16.0004.01

$$\cos\left(\sin^{-1}(z)\right) = \sqrt{1-z^2}$$

01.07.16.0017.01

$$\cos\left(\frac{1}{2}\sin^{-1}(z)\right) = \frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}}$$

01.07.16.0129.01

$$\cos\left(i\sin^{-1}(z)\right) = \frac{1}{2}\left(i\,z+\sqrt{1-z^2}\right)^{-i}\left(\left(i\,z+\sqrt{1-z^2}\right)^{2\,i}+1\right)$$

01.07.16.0130.01

$$\cos\left(a\sin^{-1}(z)\right) = \frac{1}{2}\left(i\,z+\sqrt{1-z^2}\right)^{-a}\left(\left(i\,z+\sqrt{1-z^2}\right)^{2\,a}+1\right)$$

01.07.16.0029.01

$$\cos\left(n\sin^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor \frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{n-2\,k-1}\,(1-z^2)^{\frac{n}{2}-k}}{k!\,(n-2\,k)!}\;/;\;n\in\mathbb{N}$$

01.07.16.0030.01

$$\cos\left(n\sin^{-1}(z)\right) = T_n\left(\sqrt{1-z^2}\right)$$

01.07.16.0055.01

$$\cos\left(\frac{n}{2}\sin^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor \frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{\frac{n}{2}-k-1}}{k!\,(n-2\,k)!}\left(\sqrt{1-z^2}+1\right)^{\frac{n}{2}-k}\;/;\;n\in\mathbb{N}^+$$

01.07.16.0056.01

$$\cos\left(\frac{n}{2}\sin^{-1}(z)\right) = T_n\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}}\right)\;/;\;n\in\mathbb{N}^+$$

Involving $\cos^{-1}$

01.07.16.0005.01

$$\cos\left(\cos^{-1}(z)\right) = z$$

01.07.16.0018.01

$$\cos\left(\frac{1}{2}\cos^{-1}(z)\right) = \frac{\sqrt{z+1}}{\sqrt{2}}$$

01.07.16.0131.01

$$\cos\left(i\cos^{-1}(z)\right) = \frac{1}{2}e^{-\frac{\pi}{2}}\left(i z+\sqrt{1-z^2}\right)^{-i}\left(e^{\pi}\left(i z+\sqrt{1-z^2}\right)^{2i}+1\right)$$

01.07.16.0132.01

$$\cos\left(a\cos^{-1}(z)\right) = \frac{1}{2}e^{-\frac{1}{2}i a\pi}\left(i z+\sqrt{1-z^2}\right)^{-a}\left(\left(i z+\sqrt{1-z^2}\right)^{2a}+e^{i a\pi}\right)$$

01.07.16.0031.01

$$\cos\left(n\cos^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{n-2k-1}\,z^{n-2k}}{k!\,(n-2k)!} \;/;\; n\in\mathbb{N}$$

01.07.16.0032.01

$$\cos\left(n\cos^{-1}(z)\right) = T_n(z)$$

01.07.16.0057.01

$$\cos\left(\frac{n}{2}\cos^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{\frac{n}{2}-k-1}}{k!\,(n-2k)!}(1+z)^{\frac{n}{2}-k} \;/;\; n\in\mathbb{N}^+$$

01.07.16.0058.01

$$\cos\left(\frac{n}{2}\cos^{-1}(z)\right) = T_n\left(\frac{\sqrt{z+1}}{\sqrt{2}}\right) \;/;\; n\in\mathbb{N}^+$$

Involving $\tan^{-1}$

01.07.16.0006.01

$$\cos\left(\tan^{-1}(z)\right) = \frac{1}{\sqrt{1+z^2}}$$

01.07.16.0007.01

$$\cos\left(\tan^{-1}(x, y)\right) = \frac{x}{\sqrt{x^2+y^2}}$$

01.07.16.0019.01

$$\cos\left(\frac{1}{2}\tan^{-1}(z)\right) = \frac{1}{\sqrt{2}}\sqrt{1+\frac{1}{\sqrt{z^2+1}}}$$

01.07.16.0133.01

$$\cos\left(\frac{1}{2}\tan^{-1}(x, y)\right) = \frac{\frac{x+i\,y}{\sqrt{x^2+y^2}}+1}{2\sqrt{\frac{x+i\,y}{\sqrt{x^2+y^2}}}}$$

01.07.16.0134.01

$$\cos\left(i\tan^{-1}(z)\right) = \frac{1}{2}\left((i\,z+1)^{i} + (1-i\,z)^{i}\right)\left(z^2+1\right)^{-\frac{i}{2}}$$

01.07.16.0135.01

$$\cos\left(i\tan^{-1}(x, y)\right) = \frac{1}{2}\left(\frac{x+i\,y}{\sqrt{x^2+y^2}}\right)^{-i}\left(\left(\frac{x+i\,y}{\sqrt{x^2+y^2}}\right)^{2\,i}+1\right)$$

01.07.16.0136.01

$$\cos\left(a\tan^{-1}(z)\right) = \frac{1}{2}\left((i\,z+1)^{a} + (1-i\,z)^{a}\right)\left(z^2+1\right)^{-\frac{a}{2}}$$

01.07.16.0137.01

$$\cos\left(a\tan^{-1}(x, y)\right) = \frac{1}{2}\left(\frac{x+i\,y}{\sqrt{x^2+y^2}}\right)^{-a}\left(\left(\frac{x+i\,y}{\sqrt{x^2+y^2}}\right)^{2\,a}+1\right)$$

01.07.16.0033.01

$$\cos\left(n\tan^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{n-2\,k-1}\left(z^2+1\right)^{k-\frac{n}{2}}}{k!\,(n-2\,k)!} \;/;\; n\in\mathbb{N}$$

01.07.16.0034.01

$$\cos\left(n\tan^{-1}(z)\right) = T_n\left(\frac{1}{\sqrt{1+z^2}}\right)$$

01.07.16.0138.01

$$\cos\left(i\tan^{-1}(x, y)\right) = \frac{1}{2}\left(\frac{x+i\,y}{\sqrt{x^2+y^2}}\right)^{-i}\left(\left(\frac{x+i\,y}{\sqrt{x^2+y^2}}\right)^{2\,i}+1\right)$$

01.07.16.0139.01

$$\cos\left(a\tan^{-1}(x, y)\right) = \frac{1}{2}\left(\frac{x+i\,y}{\sqrt{x^2+y^2}}\right)^{-a}\left(\left(\frac{x+i\,y}{\sqrt{x^2+y^2}}\right)^{2\,a}+1\right)$$

01.07.16.0035.01

$$\cos\left(n\tan^{-1}(x, y)\right) = \frac{n\,x^n}{\left(x^2+y^2\right)^{n/2}}\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{n-2\,k-1}}{k!\,(n-2\,k)!}\left(\frac{x^2+y^2}{x^2}\right)^{k} \;/;\; n\in\mathbb{N}$$

01.07.16.0036.01

$$\cos\left(n\tan^{-1}(x, y)\right) = T_n\left(\frac{x}{\sqrt{x^2+y^2}}\right)$$

01.07.16.0059.01

$$\cos\left(\frac{n}{2}\tan^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{\frac{n}{2}-k-1}}{k!\,(n-2k)!}\left(1+\frac{1}{\sqrt{z^2+1}}\right)^{\frac{n}{2}-k} /;\ n\in\mathbb{N}^+$$

01.07.16.0060.01

$$\cos\left(\frac{n}{2}\tan^{-1}(z)\right) = T_n\left(\frac{1}{\sqrt{2}}\sqrt{1+\frac{1}{\sqrt{z^2+1}}}\right) /;\ n\in\mathbb{N}^+$$

Involving $\cot^{-1}$

01.07.16.0008.01

$$\cos\left(\cot^{-1}(z)\right) = \frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}$$

01.07.16.0020.01

$$\cos\left(\frac{1}{2}\cot^{-1}(z)\right) = \frac{1}{\sqrt{2}}\sqrt{1+\frac{1}{\sqrt{1+\frac{1}{z^2}}}}$$

01.07.16.0140.01

$$\cos\left(i\cot^{-1}(z)\right) = \frac{1}{2}\left(1+\frac{1}{z^2}\right)^{-\frac{i}{2}}\left(\left(\frac{-i+z}{z}\right)^i+\left(\frac{i+z}{z}\right)^i\right)$$

01.07.16.0141.01

$$\cos\left(a\cot^{-1}(z)\right) = \frac{1}{2}\left(1+\frac{1}{z^2}\right)^{-\frac{a}{2}}\left(\left(\frac{-i+z}{z}\right)^a+\left(\frac{i+z}{z}\right)^a\right)$$

01.07.16.0037.01

$$\cos\left(n\cot^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{n-2k-1}}{k!\,(n-2k)!}\left(\frac{1+z^2}{z^2}\right)^{k-\frac{n}{2}} /;\ n\in\mathbb{N}$$

01.07.16.0038.01

$$\cos\left(n\cot^{-1}(z)\right) = T_n\left(\frac{\sqrt{-z^2}}{\sqrt{-1-z^2}}\right)$$

01.07.16.0061.01

$$\cos\left(\frac{n}{2}\cot^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{\frac{n}{2}-k-1}}{k!\,(n-2k)!}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}+1\right)^{\frac{n}{2}-k} /;\ n\in\mathbb{N}^+$$

01.07.16.0062.01

$$\cos\left(\frac{n}{2}\cot^{-1}(z)\right) = T_n\left(\frac{1}{\sqrt{2}}\sqrt{\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}+1}\right) /;\ n\in\mathbb{N}^+$$

Involving $\csc^{-1}$

01.07.16.0009.01

$$\cos(\csc^{-1}(z)) = \sqrt{1-\frac{1}{z^2}}$$

01.07.16.0021.01

$$\cos\left(\frac{1}{2}\csc^{-1}(z)\right) = \frac{1}{\sqrt{2}}\sqrt{\sqrt{1-\frac{1}{z^2}}+1}$$

01.07.16.0142.01

$$\cos(i\csc^{-1}(z)) = \frac{1}{2}\left(\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{2i}+1\right)\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{-i}$$

01.07.16.0143.01

$$\cos(a\csc^{-1}(z)) = \frac{1}{2}\left(\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{2a}+1\right)\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{-a}$$

01.07.16.0039.01

$$\cos(n\csc^{-1}(z)) = n\sum_{k=0}^{\left\lfloor \frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{n-2k-1}}{k!\,(n-2k)!}\left(1-\frac{1}{z^2}\right)^{\frac{n}{2}-k} /;\ n\in\mathbb{N}$$

01.07.16.0040.01

$$\cos(n\csc^{-1}(z)) = T_n\left(\sqrt{1-\frac{1}{z^2}}\right)$$

01.07.16.0063.01

$$\cos\left(\frac{n}{2}\csc^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor \frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{\frac{n}{2}-k-1}}{k!\,(n-2k)!}\left(1+\sqrt{1-\frac{1}{z^2}}\right)^{\frac{n}{2}-k} /;\ n\in\mathbb{N}^+$$

01.07.16.0064.01

$$\cos\left(\frac{n}{2}\csc^{-1}(z)\right) = T_n\left(\frac{1}{\sqrt{2}}\sqrt{\sqrt{1-\frac{1}{z^2}}+1}\right) /;\ n\in\mathbb{N}^+$$

Involving $\sec^{-1}$

01.07.16.0010.01

$$\cos(\sec^{-1}(z)) = \frac{1}{z}$$

01.07.16.0022.01

$$\cos\left(\frac{1}{2}\sec^{-1}(z)\right) == \frac{\sqrt{-z-1}}{\sqrt{-2z}}$$

01.07.16.0144.01

$$\cos(i\sec^{-1}(z)) = \frac{1}{2}e^{-\frac{\pi}{2}}\left(e^{\pi}\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{2i}+1\right)\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{-i}$$

01.07.16.0145.01

$$\cos(a\sec^{-1}(z)) = \frac{1}{2}\left(1+\frac{1}{z^2}\right)^{-\frac{a}{2}}\left(\left(\frac{-i+z}{z}\right)^{a}+\left(\frac{i+z}{z}\right)^{a}\right)$$

01.07.16.0041.01

$$\cos(n\sec^{-1}(z)) == n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{n-2k-1}\,z^{2k-n}}{k!\,(n-2k)!}\;/;\;n\in\mathbb{N}$$

01.07.16.0042.01

$$\cos(n\sec^{-1}(z)) == T_n\left(\frac{1}{z}\right)$$

01.07.16.0065.01

$$\cos\left(\frac{n}{2}\sec^{-1}(z)\right) == n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{\frac{n}{2}-k-1}}{k!\,(n-2k)!}\left(\frac{z+1}{z}\right)^{\frac{n}{2}-k}\;/;\;n\in\mathbb{N}^+$$

01.07.16.0066.01

$$\cos\left(\frac{n}{2}\sec^{-1}(z)\right) == T_n\left(\frac{1}{\sqrt{2}}\sqrt{\frac{z+1}{z}}\right)/;\;n\in\mathbb{N}^+$$

Involving $\sinh^{-1}$

01.07.16.0146.01

$$\cos(\sinh^{-1}(z)) = \frac{1}{2}\left(z+\sqrt{z^2+1}\right)^{-i}\left(\left(z+\sqrt{z^2+1}\right)^{2i}+1\right)$$

01.07.16.0011.01

$$\cos(i\sinh^{-1}(z)) == \sqrt{1+z^2}$$

01.07.16.0023.01

$$\cos\left(\frac{i}{2}\sinh^{-1}(z)\right) == \frac{1}{\sqrt{2}}\sqrt{1+\sqrt{1+z^2}}$$

01.07.16.0147.01

$$\cos(a\sinh^{-1}(z)) = \frac{1}{2}\left(z+\sqrt{z^2+1}\right)^{-ia}\left(\left(z+\sqrt{z^2+1}\right)^{2ia}+1\right)$$

01.07.16.0043.01

$$\cos\left(i\, n \sinh^{-1}(z)\right) = n \sum_{k=0}^{\left\lfloor \frac{n}{2} \right\rfloor} \frac{(-1)^k\, (n-k-1)!\, 2^{n-2k-1} \left(1+z^2\right)^{\frac{n}{2}-k}}{k!\, (n-2k)!} \;/;\; n \in \mathbb{N}$$

01.07.16.0044.01

$$\cos\left(i\, n \sinh^{-1}(z)\right) = T_n\left(\sqrt{1+z^2}\right)$$

01.07.16.0067.01

$$\cos\left(\frac{i\, n}{2} \sinh^{-1}(z)\right) = n \sum_{k=0}^{\left\lfloor \frac{n}{2} \right\rfloor} \frac{(-1)^k\, (n-k-1)!\, 2^{\frac{n}{2}-k-1}}{k!\, (n-2k)!} \left(\sqrt{1+z^2}+1\right)^{\frac{n}{2}-k} \;/;\; n \in \mathbb{N}^+$$

01.07.16.0068.01

$$\cos\left(\frac{i\, n}{2} \sinh^{-1}(z)\right) = T_n\left(\frac{\sqrt{\sqrt{1+z^2}+1}}{\sqrt{2}}\right) /;\; n \in \mathbb{N}^+$$

Involving $\cosh^{-1}$

01.07.16.0148.01

$$\cos\left(\cosh^{-1}(z)\right) = \frac{1}{2}\left(z+\sqrt{z-1}\,\sqrt{z+1}\right)^{-i} \left(\left(z+\sqrt{z-1}\,\sqrt{z+1}\right)^{2i}+1\right)$$

01.07.16.0012.01

$$\cos\left(i \cosh^{-1}(z)\right) = z$$

01.07.16.0024.01

$$\cos\left(\frac{i}{2} \cosh^{-1}(z)\right) = \frac{\sqrt{z+1}}{\sqrt{2}}$$

01.07.16.0149.01

$$\cos\left(a \cosh^{-1}(z)\right) = \frac{1}{2}\left(z+\sqrt{z-1}\,\sqrt{z+1}\right)^{-i a} \left(\left(z+\sqrt{z-1}\,\sqrt{z+1}\right)^{2 i a}+1\right)$$

01.07.16.0045.01

$$\cos\left(i\, n \cosh^{-1}(z)\right) = n \sum_{k=0}^{\left\lfloor \frac{n}{2} \right\rfloor} \frac{(-1)^k\, (n-k-1)!\, 2^{n-2k-1}\, z^{n-2k}}{k!\, (n-2k)!} \;/;\; n \in \mathbb{N}^+$$

01.07.16.0046.01

$$\cos\left(i\, n \cosh^{-1}(z)\right) = T_n(z) \;/;\; n \in \mathbb{N}^+$$

01.07.16.0069.01

$$\cos\left(\frac{i\, n}{2} \cosh^{-1}(z)\right) = n \sum_{k=0}^{\left\lfloor \frac{n}{2} \right\rfloor} \frac{(-1)^k\, (n-k-1)!\, 2^{\frac{n}{2}-k-1}}{k!\, (n-2k)!} (1+z)^{\frac{n}{2}-k} \;/;\; n \in \mathbb{N}^+$$

01.07.16.0070.01

$$\cos\left(\frac{i\, n}{2} \cosh^{-1}(z)\right) = T_n\left(\frac{\sqrt{z+1}}{\sqrt{2}}\right) /;\; n \in \mathbb{N}^+$$

Involving $\tanh^{-1}$

01.07.16.0150.01

$$\cos\left(\tanh^{-1}(z)\right) = \frac{1}{2}\left(1-z^2\right)^{-\frac{i}{2}}\left((1-z)^{i}+(z+1)^{i}\right)$$

01.07.16.0013.01

$$\cos\left(i\sinh^{-1}(z)\right) = \sqrt{1+z^2}$$

01.07.16.0025.01

$$\cos\left(\frac{i}{2}\tanh^{-1}(z)\right) = \frac{1}{\sqrt{2}}\sqrt{1+\frac{1}{\sqrt{1-z^2}}}$$

01.07.16.0151.01

$$\cos\left(a\tanh^{-1}(z)\right) = \frac{1}{2}\left(1-z^2\right)^{-\frac{1}{2}(i a)}\left((1-z)^{i a}+(z+1)^{i a}\right)$$

01.07.16.0047.01

$$\cos\left(i\,n\tanh^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{n-2k-1}\left(1-z^2\right)^{k-\frac{n}{2}}}{k!\,(n-2k)!}\;/;\;n\in\mathbb{N}$$

01.07.16.0048.01

$$\cos\left(i\,n\tanh^{-1}(z)\right) = T_n\left(\frac{1}{\sqrt{1-z^2}}\right)$$

01.07.16.0071.01

$$\cos\left(\frac{i\,n}{2}\tanh^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{\frac{n}{2}-k-1}}{k!\,(n-2k)!}\left(1+\frac{1}{\sqrt{1-z^2}}\right)^{\frac{n}{2}-k}\;/;\;n\in\mathbb{N}^+$$

01.07.16.0072.01

$$\cos\left(\frac{i\,n}{2}\tanh^{-1}(z)\right) = T_n\left(\frac{1}{\sqrt{2}}\sqrt{1+\frac{1}{\sqrt{1-z^2}}}\right)\;/;\;n\in\mathbb{N}^+$$

Involving $\coth^{-1}$

01.07.16.0152.01

$$\cos\left(\coth^{-1}(z)\right) = \frac{1}{2}\left(\left(1+\frac{1}{z}\right)^{i}+\left(1-\frac{1}{z}\right)^{i}\right)\left(1-\frac{1}{z^2}\right)^{-\frac{i}{2}}$$

01.07.16.0014.01

$$\cos\left(i\coth^{-1}(z)\right) = \frac{\sqrt{z^2}}{\sqrt{z^2-1}}$$

01.07.16.0026.01

$$\cos\left(\frac{i}{2}\coth^{-1}(z)\right) = \frac{1}{\sqrt{2}}\sqrt{1+\frac{1}{\sqrt{1-\frac{1}{z^2}}}}$$

01.07.16.0153.01

$$\cos\left(a\coth^{-1}(z)\right) = \frac{1}{2}\left(\left(1+\frac{1}{z}\right)^{i a}+\left(1-\frac{1}{z}\right)^{i a}\right)\left(1-\frac{1}{z^2}\right)^{-\frac{1}{2}(i a)}$$

01.07.16.0049.01

$$\cos\left(i\,n\coth^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{n-2k-1}}{k!\,(n-2k)!}\left(\frac{z^2-1}{z^2}\right)^{k-\frac{n}{2}} /;\, n\in\mathbb{N}$$

01.07.16.0050.01

$$\cos\left(i\,n\coth^{-1}(z)\right) = T_n\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right)$$

01.07.16.0073.01

$$\cos\left(\frac{i\,n}{2}\coth^{-1}(z)\right) = n\sum_{k=0}^{\left\lfloor\frac{n}{2}\right\rfloor}\frac{(-1)^k\,(n-k-1)!\,2^{\frac{n}{2}-k-1}}{k!\,(n-2k)!}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}+1\right)^{\frac{n}{2}-k} /;\, n\in\mathbb{N}^+$$

01.07.16.0074.01

$$\cos\left(\frac{i\,n}{2}\coth^{-1}(z)\right) = T_n\left(\frac{1}{\sqrt{2}}\sqrt{\frac{\sqrt{z^2}}{\sqrt{z^2-1}}+1}\right) /;\, n\in\mathbb{N}^+$$

Involving csch^{-1}

01.07.16.0154.01

$$\cos\left(\operatorname{csch}^{-1}(z)\right) = \frac{1}{2}\left(\left(\sqrt{1+\frac{1}{z^2}}+\frac{1}{z}\right)^{2i}+1\right)\left(\sqrt{1+\frac{1}{z^2}}+\frac{1}{z}\right)^{-i}$$

01.07.16.0015.01

$$\cos\left(i\operatorname{csch}^{-1}(z)\right) = \sqrt{1+\frac{1}{z^2}}$$

01.07.16.0027.01

$$\cos\left(\frac{i}{2}\operatorname{csch}^{-1}(z)\right) = \frac{1}{\sqrt{2}}\sqrt{1+\sqrt{1+\frac{1}{z^2}}}$$

01.07.16.0155.01

$$\cos\left(a\operatorname{csch}^{-1}(z)\right) = \frac{1}{2}\left(\left(\sqrt{1+\frac{1}{z^2}}+\frac{1}{z}\right)^{2 i a}+1\right)\left(\sqrt{1+\frac{1}{z^2}}+\frac{1}{z}\right)^{-i a}$$

01.07.16.0051.01

$$\cos\left(i\, n\, \operatorname{csch}^{-1}(z)\right) = n \sum_{k=0}^{\left\lfloor \frac{n}{2} \right\rfloor} \frac{(-1)^k\, (n-k-1)!\, 2^{n-2k-1}}{k!\, (n-2k)!} \left(1+\frac{1}{z^2}\right)^{\frac{n}{2}-k} \;/;\; n \in \mathbb{N}$$

01.07.16.0052.01

$$\cos\left(i\, n\, \operatorname{csch}^{-1}(z)\right) = T_n\left(\sqrt{1+\frac{1}{z^2}}\right)$$

01.07.16.0075.01

$$\cos\left(\frac{i\, n}{2} \operatorname{csch}^{-1}(z)\right) = n \sum_{k=0}^{\left\lfloor \frac{n}{2} \right\rfloor} \frac{(-1)^k\, (n-k-1)!\, 2^{\frac{n}{2}-k-1}}{k!\, (n-2k)!} \left(1+\sqrt{1+\frac{1}{z^2}}\right)^{\frac{n}{2}-k} \;/;\; n \in \mathbb{N}^+$$

01.07.16.0076.01

$$\cos\left(\frac{i\, n}{2} \operatorname{csch}^{-1}(z)\right)\Big) = T_n\left(\frac{1}{\sqrt{2}} \sqrt{\sqrt{1+\frac{1}{z^2}}+1}\right) \;/;\; n \in \mathbb{N}^+$$

Involving sech^{-1}

01.07.16.0156.01

$$\cos\left(\operatorname{sech}^{-1}(z)\right) = \frac{1}{2}\left(\left(\sqrt{\frac{1}{z}-1}\,\sqrt{1+\frac{1}{z}}+\frac{1}{z}\right)^{2i}+1\right)\left(\sqrt{\frac{1}{z}-1}\,\sqrt{1+\frac{1}{z}}+\frac{1}{z}\right)^{-i}$$

01.07.16.0016.01

$$\cos\left(i\, \operatorname{sech}^{-1}(z)\right) = \frac{1}{z}$$

01.07.16.0028.01

$$\cos\left(\frac{i}{2} \operatorname{sech}^{-1}(z)\right) = \frac{\sqrt{-1-z}}{\sqrt{-2z}}$$

01.07.16.0157.01

$$\cos\left(a\, \operatorname{sech}^{-1}(z)\right) = \frac{1}{2}\left(\left(\sqrt{\frac{1}{z}-1}\,\sqrt{1+\frac{1}{z}}+\frac{1}{z}\right)^{2ia}+1\right)\left(\sqrt{\frac{1}{z}-1}\,\sqrt{1+\frac{1}{z}}+\frac{1}{z}\right)^{-ia}$$

01.07.16.0053.01

$$\cos\left(i\, n\, \operatorname{sech}^{-1}(z)\right) = n \sum_{k=0}^{\left\lfloor \frac{n}{2} \right\rfloor} \frac{(-1)^k\, (n-k-1)!\, 2^{n-2k-1}\, z^{2k-n}}{k!\, (n-2k)!} \;/;\; n \in \mathbb{N}$$

01.07.16.0054.01

$$\cos\left(i\, n\, \operatorname{sech}^{-1}(z)\right) = T_n\left(\frac{1}{z}\right)$$

01.07.16.0077.01

$$\cos\left(\frac{i\, n}{2} \operatorname{sech}^{-1}(z)\right) = n \sum_{k=0}^{\left\lfloor \frac{n}{2} \right\rfloor} \frac{(-1)^k\, (n-k-1)!\, 2^{\frac{n}{2}-k-1}}{k!\, (n-2k)!} \left(\frac{z+1}{z}\right)^{\frac{n}{2}-k} \;/;\; n \in \mathbb{N}^+$$

01.07.16.0078.01

$$\cos\left(\frac{i\, n}{2}\,\mathrm{sech}^{-1}(z)\right) = T_n\left(\frac{1}{\sqrt{2}}\sqrt{\frac{z+1}{z}}\right) /;\ n \in \mathbb{N}^+$$

Argument involving complex components

01.07.16.0079.01

$$\cos(\arg(z)) = \frac{\mathrm{Re}(z)}{|z|}$$

01.07.16.0080.01

$$\cos(\arg(z)) + i\sin(\arg(z)) = \frac{z}{|z|}$$

01.07.16.0081.01

$$\cos(a\arg(z)) = \frac{1}{2}|z|^{-a}\left(\left(\mathrm{Re}(z) - \mathrm{Re}(z)\sqrt{-\frac{\mathrm{Im}(z)^2}{\mathrm{Re}(z)^2}}\right)^a + \left(\mathrm{Re}(z) + \mathrm{Re}(z)\sqrt{-\frac{\mathrm{Im}(z)^2}{\mathrm{Re}(z)^2}}\right)^a\right)$$

01.07.16.0082.01

$$\cos(a\arg(z)) = \frac{1}{2}|z|^{-a}\left(\left(\mathrm{Re}(z) - \frac{i\,|\mathrm{Im}(z)|\,|\mathrm{Re}(z)|}{\mathrm{Re}(z)}\right)^a + \left(\mathrm{Re}(z) + \frac{i\,|\mathrm{Im}(z)|\,|\mathrm{Re}(z)|}{\mathrm{Re}(z)}\right)^a\right)$$

Addition formulas

01.07.16.0083.01

$$\cos(a+b) = \cos(a)\cos(b) - \sin(a)\sin(b)$$

01.07.16.0084.01

$$\cos(a-b) = \cos(b)\cos(a) + \sin(a)\sin(b)$$

01.07.16.0085.01

$$\cos(a + i\,b) = \cos(a)\cosh(b) - i\sin(a)\sinh(b)$$

01.07.16.0086.01

$$\cos(a - i\,b) = \cos(a)\cosh(b) + i\sin(a)\sinh(b)$$

Half-angle formulas

01.07.16.0087.02

$$\cos\left(\frac{z}{2}\right) = \sqrt{\frac{1+\cos(z)}{2}} /;\ |\mathrm{Re}(z)| < \pi \lor \mathrm{Re}(z) = -\pi \land \mathrm{Im}(z) \geq 0 \lor \mathrm{Re}(z) = \pi \land \mathrm{Im}(z) \leq 0$$

01.07.16.0088.01

$$\cos\left(\frac{z}{2}\right) = (-1)^{\left\lfloor\frac{\mathrm{Re}(z)+\pi}{2\pi}\right\rfloor}\sqrt{\frac{1+\cos(z)}{2}}\left(1 - \left(1 + (-1)^{\left\lfloor\frac{\mathrm{Re}(z)+\pi}{2\pi}\right\rfloor + \left\lfloor-\frac{\mathrm{Re}(z)+\pi}{2\pi}\right\rfloor}\right)\theta(-\mathrm{Im}(z))\right)$$

Multiple arguments

Argument involving numeric multiples of variable

01.07.16.0089.01

$$\cos(2\,z) = \cos^2(z) - \sin^2(z)$$

01.07.16.0090.01

$$\cos(2z) = 2\cos^2(z) - 1$$

01.07.16.0091.01

$$\cos(3z) = \cos^3(z) - 3\sin^2(z)\cos(z)$$

01.07.16.0092.01

$$\cos(3z) = 4\cos^3(z) - 3\cos(z)$$

Argument involving symbolic multiples of variable

01.07.16.0093.01

$$\cos(nz) = n\sum_{k=0}^{\left\lfloor \frac{n}{2} \right\rfloor} \frac{(-1)^k (n-k-1)!\, 2^{n-2k-1} \cos^{n-2k}(z)}{k!\,(n-2k)!} \;/;\; n \in \mathbb{N}$$

01.07.16.0094.01

$$\cos(nz) = 2^{n-1}\cos^n(z) + n\sum_{k=1}^{\left\lfloor \frac{n}{2} \right\rfloor} \frac{(-1)^k}{k} \binom{-k+n-1}{k-1} 2^{n-2k-1} \cos^{n-2k}(z) \;/;\; n \in \mathbb{N}$$

01.07.16.0095.01

$$\cos(nz) = \sum_{k=0}^{\left\lfloor \frac{n}{2} \right\rfloor} (-1)^k \binom{n}{2k} \sin^{2k}(z)\cos^{n-2k}(z) \;/;\; n \in \mathbb{N}$$

01.07.16.0096.01

$$\cos(nz) = T_n(\cos(z))$$

01.07.16.0158.01

$$\cos(az) = \frac{1}{2}\left(e^{-2i\pi a \left\lfloor \frac{\pi-\mathrm{Re}(z)}{2\pi} \right\rfloor} (\cos(z) + i\sin(z))^a + e^{-2i\pi a \left\lfloor \frac{\mathrm{Re}(z)+\pi}{2\pi} \right\rfloor} (\cos(z) - i\sin(z))^a\right)$$

Some functions of arguments

01.07.16.0159.01

$$\cos(a (b z^c)^m) = \cos(a b^m z^{mc}) \;/;\; -\pi < \arg(b) + \mathrm{Im}(c\log(z)) \le \pi$$

01.07.16.0160.01

$$\cos\left(\sqrt{z^2}\right) = \cos(z)$$

01.07.16.0161.01

$$\cos\left(a\sqrt{b z^2}\right) = \cos\left(a\sqrt{b}\, z\right)$$

01.07.16.0162.01

$$\cos\left(a\sqrt[3]{b z^3}\right) = \frac{1}{6 b^{2/3} z^2}\left(e^{-i a \sqrt[3]{b}\, z}\left(\left(1 + e^{2 i a \sqrt[3]{b}\, z}\right)\left(\sqrt[3]{b}\, z\sqrt[3]{b z^3} + \left(b z^3\right)^{2/3} + b^{2/3} z^2\right) - e^{\frac{1}{2} i a \sqrt[3]{b}\, z}\left(\sqrt[3]{b z^3} - \sqrt[3]{b}\, z\right)\right.\right.$$
$$\left.\left.\left(\left(1 + e^{i a \sqrt[3]{b}\, z}\right)\left(2z\sqrt[3]{b} + \sqrt[3]{b z^3}\right)\cosh\left(\frac{1}{2}\sqrt{3}\, a\sqrt[3]{b}\, z\right) - i\sqrt{3}\left(-1 + e^{i a \sqrt[3]{b}\, z}\right)\sqrt[3]{b z^3}\,\sinh\left(\frac{1}{2}\sqrt{3}\, a\sqrt[3]{b}\, z\right)\right)\right)\right)$$

01.07.16.0163.01

$$\cos\left(a\sqrt[4]{b z^4}\right) = \frac{1}{2\sqrt{b}\, z^2}\left(\left(\sqrt{b}\, z^2 + \sqrt{b z^4}\right)\cos\left(a\sqrt[4]{b}\, z\right) + \left(\sqrt{b}\, z^2 - \sqrt{b z^4}\right)\cosh\left(a\sqrt[4]{b}\, z\right)\right)$$

01.07.16.0164.01

$$\cos\left(a\,(b\,z^n)^{1/n}\right) = \frac{1}{2}\sum_{i=0}^{n-1}\left(\frac{\left(-i\,a\,(b\,z^n)^{1/n}\right)^i}{i!}\,{}_1F_n\left(1;\frac{i+1}{n},\frac{i+2}{n},\ldots,\frac{i+n}{n};\frac{(-i)^n\,a^n\,b\,z^n}{n^n}\right)+\frac{\left(i\,a\,(b\,z^n)^{1/n}\right)^i}{i!}\,{}_1F_n\left(1;\frac{i+1}{n},\frac{i+2}{n},\ldots,\frac{i+n}{n};\frac{i^n\,a^n\,b\,z^n}{n^n}\right)\right)/;\,n\in\mathbb{N}^+$$

Products, sums, and powers of the direct function

Products of the direct function

01.07.16.0097.01

$$\cos(a)\cos(b) = \frac{1}{2}\left(\cos(a-b)+\cos(a+b)\right)$$

01.07.16.0098.01

$$\prod_{k=1}^{n}\cos(z_k) = 2^{-n}\sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1}\sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1}\ldots\sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1}\cos\left(\sum_{j=1}^{n}k_j\,z_j\right)$$

Products involving the direct function

01.07.16.0099.01

$$\cos(a)\sin(b) = \frac{1}{2}\left(\sin(a+b)-\sin(a-b)\right)$$

01.07.16.0113.01

$$\left(\prod_{k=1}^{m}\cos(z_k)\right)\left(\prod_{k=m+1}^{n}\sin(z_k)\right) = (-1)^{\frac{n-m}{2}\bmod 2}\,2^{-n}\sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1}\sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1}\ldots\sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1}(-1)^{\sum_{j=m+1}^{n}\frac{1}{4}(2k_j+2)}\cos\left(\sum_{j=1}^{n}k_j\,z_j\right)/;\; n\in\mathbb{N}\bigwedge m\in\mathbb{N}\bigwedge m\le n\bigwedge\frac{n-m}{2}\in\mathbb{N}$$

01.07.16.0114.01

$$\left(\prod_{k=1}^{m}\cos(z_k)\right)\left(\prod_{k=m+1}^{n}\sin(z_k)\right) = (-1)^{\left(\frac{n-m-1}{2}\bmod 2\right)+1}\,2^{-n}\sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1}\sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1}\ldots\sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1}(-1)^{\sum_{j=m+1}^{n}\frac{1}{4}(2k_j+2)}\sin\left(\sum_{j=1}^{n}k_j\,z_j\right)/;\; n\in\mathbb{N}\bigwedge m\in\mathbb{N}\bigwedge m\le n\bigwedge\frac{n-m+1}{2}\in\mathbb{N}$$

Sums of the direct function

01.07.16.0100.01

$$\cos(a)+\cos(b) = 2\cos\left(\frac{a-b}{2}\right)\cos\left(\frac{a+b}{2}\right)$$

01.07.16.0101.01

$$\cos(a)-\cos(b) = -2\sin\left(\frac{a+b}{2}\right)\sin\left(\frac{a-b}{2}\right)$$

Sums involving the direct function

Involving other trigonometric functions

Involving sin

01.07.16.0115.01

$$\cos(z)+\sin(z)=\sqrt{2}\,\cos\left(z-\frac{\pi}{4}\right)$$

01.07.16.0116.01

$$\cos(z)-\sin(z)=\sqrt{2}\,\cos\left(z+\frac{\pi}{4}\right)$$

01.07.16.0117.01

$$\cos(a)+\sin(b)=2\cos\left(\frac{a-b}{2}+\frac{\pi}{4}\right)\cos\left(\frac{a+b}{2}-\frac{\pi}{4}\right)$$

01.07.16.0118.01

$$\cos(a)-\sin(b)=2\cos\left(\frac{a+b}{2}+\frac{\pi}{4}\right)\cos\left(\frac{a-b}{2}-\frac{\pi}{4}\right)$$

01.07.16.0119.01

$$a\cos(z)+b\sin(z)=b\sqrt{1+\frac{a^2}{b^2}}\,\sin\left(z+\tan^{-1}\left(\frac{a}{b}\right)\right)$$

Involving hyperbolic functions

Involving sinh

01.07.16.0120.01

$$\cos(z)+i\sinh(z)=2\cos\left(\frac{e^{-\frac{1}{4}(i\pi)}z}{\sqrt{2}}+\frac{\pi}{4}\right)\cos\left(\frac{z\,e^{\frac{i\pi}{4}}}{\sqrt{2}}-\frac{\pi}{4}\right)$$

01.07.16.0121.01

$$\cos(z)-i\sinh(z)=2\cos\left(\frac{z\,e^{-\frac{1}{4}(i\pi)}}{\sqrt{2}}-\frac{\pi}{4}\right)\cos\left(\frac{e^{\frac{i\pi}{4}}z}{\sqrt{2}}+\frac{\pi}{4}\right)$$

01.07.16.0122.01

$$\cos(a)+i\sinh(b)=2\cos\left(\frac{1}{2}(a-i\,b)+\frac{\pi}{4}\right)\cos\left(\frac{1}{2}(a+b\,i)-\frac{\pi}{4}\right)$$

01.07.16.0123.01

$$\cos(a)-i\sinh(b)=2\cos\left(\frac{1}{2}(a+b\,i)+\frac{\pi}{4}\right)\cos\left(\frac{1}{2}(a-i\,b)-\frac{\pi}{4}\right)$$

Involving cosh

01.07.16.0124.01

$$\cos(z)+\cosh(z)=2\cos\left(\frac{z\,e^{-\frac{1}{4}(i\pi)}}{\sqrt{2}}\right)\cos\left(\frac{z\,e^{\frac{i\pi}{4}}}{\sqrt{2}}\right)$$

01.07.16.0125.01

$$\cos(z)-\cosh(z)=-2\sin\left(\frac{z\,e^{-\frac{1}{4}(i\pi)}}{\sqrt{2}}\right)\sin\left(\frac{z\,e^{\frac{i\pi}{4}}}{\sqrt{2}}\right)$$

01.07.16.0126.01

$$\cos(a)+\cosh(b)=2\cos\left(\frac{1}{2}(a-i\,b)\right)\cos\left(\frac{1}{2}(a+b\,i)\right)$$

01.07.16.0127.01

$$\cos(a)-\cosh(b)=-2\sin\left(\frac{1}{2}(a+b\,i)\right)\sin\left(\frac{1}{2}(a-i\,b)\right)$$

Powers of the direct function

01.07.16.0102.01

$$\cos^2(z)=\frac{1+\cos(2\,z)}{2}$$

01.07.16.0103.01

$$\cos^3(z)=\frac{1}{4}(\cos(3\,z)+3\cos(z))$$

01.07.16.0104.01

$$\cos^{2n}(z)=2^{-2n}\binom{2\,n}{n}+2^{1-2n}\sum_{k=0}^{n-1}\binom{2\,n}{k}\cos(2\,(n-k)\,z)\;/;\;n\in\mathbb{N}$$

01.07.16.0128.01

$$\cos^{2n}(z)=2^{1-2n}\sum_{k=0}^{n-1}\binom{2\,n}{k}(\cos(2\,(n-k)\,z)-1)+1\;/;\;n\in\mathbb{N}$$

01.07.16.0105.01

$$\cos^{2n+1}(z)=2^{-2n}\sum_{k=0}^{n}\binom{2\,n+1}{k}\cos((2\,n-2\,k+1)\,z)\;/;\;n\in\mathbb{N}$$

01.07.16.0106.01

$$\cos^n(z)=2^{-n}\binom{n}{\frac{n}{2}}(1-n\bmod 2)+2^{1-n}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}\binom{n}{k}\cos((n-2\,k)\,z)\;/;\;n\in\mathbb{N}^+$$

Powers involving the direct function

01.07.16.0107.01

$$(\cos(z)+i\sin(z))^n=\cos(n\,z)+i\sin(n\,z)\;/;\;n\in\mathbb{N}$$

De Moivre's theorem

01.07.16.0108.01

$$(\cos(z)+i\sin(z))^n=e^{i\,n\,z}\;/;\;n\in\mathbb{N}$$

01.07.16.0109.01

$$(\cos(z) - i \sin(z))^n = \cos(n z) - i \sin(n z) /; n \in \mathbb{N}$$

01.07.16.0110.01

$$(\cos(z) - i \sin(z))^n = e^{-i n z} /; n \in \mathbb{N}$$

Sums of powers involving the direct function

01.07.16.0111.01

$$\cos^2(a) - \cos^2(b) = -\sin(a - b) \sin(a + b)$$

01.07.16.0112.01

$$\cos^2(a) - \sin^2(b) = \cos(a - b) \cos(a + b)$$

Identities

Functional identities

01.07.17.0001.01

$$\cos^2(z_1) - 2 \cos(z_2) \cos(z_1 + z_2) \cos(z_1) + \cos^2(z_2) + \cos^2(z_1 + z_2) = 1$$

Complex characteristics

Real part

01.07.19.0001.01

$$\operatorname{Re}(\cos(x + i y)) = \cos(x) \cosh(y)$$

01.07.19.0008.01

$$\operatorname{Re}(\cos(z)) = \cos(\operatorname{Re}(z)) \cosh(\operatorname{Im}(z))$$

Imaginary part

01.07.19.0002.01

$$\operatorname{Im}(\cos(x + i y)) = -\sin(x) \sinh(y)$$

01.07.19.0009.01

$$\operatorname{Im}(\cos(z)) = -\sin(\operatorname{Re}(z)) \sinh(\operatorname{Im}(z))$$

Absolute value

01.07.19.0003.01

$$|\cos(x + i y)| = \sqrt{\frac{\cos(2 x) + \cosh(2 y)}{2}}$$

01.07.19.0004.01

$$|\cos(x + i y)| = \sqrt{\cos^2(x) \cosh^2(y) + \sin^2(x) \sinh^2(y)}$$

01.07.19.0010.01

$$|\cos(z)| = \sqrt{\frac{1}{2} (\cos(2 \operatorname{Re}(z)) + \cosh(2 \operatorname{Im}(z)))}$$

Argument

01.07.19.0006.01

$$\arg(\cos(x + i\,y)) = \tan^{-1}(\cos(x)\cosh(y),\ -\sin(x)\sinh(y))$$

01.07.19.0005.01

$$\arg(\cos(x + i\,y)) = \frac{\pi}{2}\,(1 - \operatorname{sgn}(\cos(x)\cosh(y)))\operatorname{sgn}\left(\frac{1}{2} - \operatorname{sgn}(\sin(x)\sinh(y))\right) - \tan^{-1}(\tan(x)\tanh(y))$$

01.07.19.0011.01

$$\arg(\cos(z)) = \tan^{-1}(\cos(\operatorname{Re}(z))\cosh(\operatorname{Im}(z)),\ -\sin(\operatorname{Re}(z))\sinh(\operatorname{Im}(z)))$$

01.07.19.0012.01

$$\arg(\cos(z)) = \frac{\pi}{2}\,(1 - \operatorname{sgn}(\cos(\operatorname{Re}(z))\cosh(\operatorname{Im}(z))))\operatorname{sgn}\left(\frac{1}{2} - \operatorname{sgn}(\sin(\operatorname{Re}(z))\sinh(\operatorname{Im}(z)))\right) - \tan^{-1}(\tan(\operatorname{Re}(z))\tanh(\operatorname{Im}(z)))$$

Conjugate value

01.07.19.0007.01

$$\overline{\cos(x + i\,y)} = \cos(x)\cosh(y) + i\sin(x)\sinh(y)$$

01.07.19.0013.01

$$\overline{\cos(z)} = \cos(\operatorname{Re}(z))\cosh(\operatorname{Im}(z)) + i\sin(\operatorname{Re}(z))\sinh(\operatorname{Im}(z))$$

Signum value

01.07.19.0014.01

$$\operatorname{sgn}(\cos(x + i\,y)) = \sqrt{2}\,\frac{\cos(x)\cosh(y) - i\sin(x)\sinh(y)}{\sqrt{\cos(2\,x) + \cosh(2\,y)}}$$

01.07.19.0015.01

$$\operatorname{sgn}(\cos(z)) = \sqrt{2}\,\frac{\cos(\operatorname{Re}(z))\cosh(\operatorname{Im}(z)) - i\sin(\operatorname{Re}(z))\sinh(\operatorname{Im}(z))}{\sqrt{\cos(2\operatorname{Re}(z)) + \cosh(2\operatorname{Im}(z))}}$$

Differentiation

Low-order differentiation

01.07.20.0001.01

$$\frac{\partial\cos(z)}{\partial z} = -\sin(z)$$

01.07.20.0002.01

$$\frac{\partial^2\cos(z)}{\partial z^2} = -\cos(z)$$

Symbolic differentiation

01.07.20.0003.02

$$\frac{\partial^n\cos(z)}{\partial z^n} = \cos\left(z + \frac{\pi\,n}{2}\right) /;\ n \in \mathbb{N}$$

01.07.20.0004.01

$$\frac{\partial^n f(\cos(z))}{\partial z^n} = i^n \sum_{m=1}^{n} \frac{1}{m!}\left(\sum_{j=0}^{m-1}(-1)^j\binom{m}{j}\left(\sum_{l=0}^{m-j} 2^{j-m}\cos^j(z)\,(j + 2\,l - m)^n\,e^{(j+2\,l-m)\,i\,z}\binom{m-j}{l}\right)f^{(m)}(\cos(z))\right) /;\ n \in \mathbb{N}^+$$

01.07.20.0005.02

$$\frac{\partial^n f(\cos(z))}{\partial z^n} = \sum_{m=0}^{n} \frac{f^{(m)}(\cos(z))}{m!} \left(\frac{\partial^n (\cos(y) - \cos(z))^m}{\partial y^n} /. \{y \to z\} \right) /; n \in \mathbb{N}$$

01.07.20.0007.02

$$\frac{\partial^n \cos(a z + b)}{\partial z^n} = a^n \cos\left(a z + b + \frac{n \pi}{2}\right) /; n \in \mathbb{N}$$

01.07.20.0011.01

$$\frac{\partial^n \cos^m(z)}{\partial z^n} = i^n 2^{-m} \sum_{k=0}^{m} \binom{m}{k} (2 k - m)^n e^{(2 k - m) i z} /; m \in \mathbb{N} \bigwedge n \in \mathbb{N}^+$$

01.07.20.0012.01

$$\frac{\partial^n \cos^m(z)}{\partial z^n} = i^n 2^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (m - 2 k)^n \left(e^{(m-2 k) i z} + (-1)^n e^{-(m-2 k) i z}\right) /; m \in \mathbb{N} \bigwedge n \in \mathbb{N}^+$$

01.07.20.0008.02

$$\frac{\partial^n \cos^m(z)}{\partial z^n} = 2^{1-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (m - 2 k)^n \cos\left(\frac{\pi n}{2} + (m - 2 k) z\right) /; m \in \mathbb{N} \bigwedge n \in \mathbb{N}^+$$

01.07.20.0013.01

$$\frac{\partial^n \cos^m(z)}{\partial z^n} = i^n 2^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (2 k - m)^n (((-1)^n + 1) \cos((m - 2 k) z) + ((-1)^n - 1) i \sin((m - 2 k) z)) /; m \in \mathbb{N} \bigwedge n \in \mathbb{N}^+$$

01.07.20.0014.01

$$\frac{\partial^n \cos^m(z)}{\partial z^n} = i^n 2^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (2 k - m)^n \left((1 + (-1)^n) \sum_{j=0}^{\left\lfloor \frac{m}{2} \right\rfloor - k} (-1)^j \binom{m - 2 k}{2 j} \sin^{2 j}(z) \cos^{-2 j - 2 k + m}(z) - \right.$$

$$\left. i (1 - (-1)^n) \sum_{j=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor - k} (-1)^j \binom{m - 2 k}{2 j + 1} \sin^{2 j + 1}(z) \cos^{-2 j - 2 k + m - 1}(z) \right) /; m \in \mathbb{N} \bigwedge n \in \mathbb{N}^+$$

Fractional integro-differentiation

01.07.20.0006.01

$$\frac{\partial^\alpha \cos(z)}{\partial z^\alpha} = 2^\alpha \sqrt{\pi} z^{-\alpha} {}_1\tilde{F}_2\left(1; \frac{1}{2} - \frac{\alpha}{2}, 1 - \frac{\alpha}{2}; -\frac{z^2}{4}\right)$$

01.07.20.0009.01

$$\frac{\partial^\alpha \cos(a z + b)}{\partial z^\alpha} = 2^{\alpha - 1} \sqrt{\pi} z^{-\alpha} \left(2 \cos(b) {}_1\tilde{F}_2\left(1; \frac{1}{2} - \frac{\alpha}{2}, 1 - \frac{\alpha}{2}; -\frac{1}{4} a^2 z^2\right) - a z {}_1\tilde{F}_2\left(1; 1 - \frac{\alpha}{2}, \frac{3}{2} - \frac{\alpha}{2}; -\frac{1}{4} a^2 z^2\right) \sin(b)\right)$$

01.07.20.0010.01

$$\frac{\partial^\alpha \cos^n(z)}{\partial z^\alpha} = 2^{-n + \alpha + 1} \sqrt{\pi} z^{-\alpha} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} \binom{n}{k} {}_1\tilde{F}_2\left(1; \frac{1}{2} - \frac{\alpha}{2}, 1 - \frac{\alpha}{2}; -\frac{1}{4} (n - 2 k)^2 z^2\right) + \frac{2^{-n} z^{-\alpha} (1 - n \bmod 2)}{\Gamma(1 - \alpha)} \binom{n}{\frac{n}{2}} /; n \in \mathbb{N}^+$$

Integration

Indefinite integration

Involving only one direct function

01.07.21.0027.01

$$\int \cos(b + a\,z)\,dz = \frac{\sin(b + a\,z)}{a}$$

01.07.21.0028.01

$$\int \cos(a\,z)\,dz = \frac{\sin(a\,z)}{a}$$

01.07.21.0029.01

$$\int \cos(z)\,dz = \sin(z)$$

Involving one direct function and elementary functions

Involving power function

Involving power

Power arguments

01.07.21.0030.01

$$\int \cos(a\,z^r)\,dz = -\frac{z\left(a^2\,z^{2\,r}\right)^{-1/r}}{2\,r}\left(\Gamma\!\left(\frac{1}{r},\,i\,a\,z^r\right)(-i\,a\,z^r)^{1/r} + (i\,a\,z^r)^{1/r}\,\Gamma\!\left(\frac{1}{r},\,-i\,a\,z^r\right)\right)$$

01.07.21.0031.01

$$\int \cos\!\left(a\,z^2\right)dz = \frac{\sqrt{\frac{\pi}{2}}\;C\!\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{a}}$$

01.07.21.0032.01

$$\int \cos\!\left(a\,\sqrt{z}\right)dz = \frac{2\left(\cos\!\left(a\,\sqrt{z}\right) + a\,\sqrt{z}\,\sin\!\left(a\,\sqrt{z}\right)\right)}{a^2}$$

01.07.21.0033.01

$$\int \cos\!\left(a\,(z^r)^p\right)dz = -\frac{z\left(\Gamma\!\left(\frac{1}{p\,r},\,-i\,a\,(z^r)^p\right)\left(-i\,a\,(z^r)^p\right)^{-\frac{1}{p\,r}} + \left(i\,a\,(z^r)^p\right)^{-\frac{1}{p\,r}}\,\Gamma\!\left(\frac{1}{p\,r},\,i\,a\,(z^r)^p\right)\right)}{2\,p\,r}$$

01.07.21.0034.01

$$\int \cos\!\left(a\,(z^r)^{1/r}\right)dz = \frac{z\,(z^r)^{-1/r}\,\sin\!\left(a\,(z^r)^{1/r}\right)}{a}$$

01.07.21.0035.01

$$\int \cos\!\left(a\,\sqrt{z^2}\right)dz = \frac{\sqrt{z^2}\,\sin\!\left(a\,\sqrt{z^2}\right)}{a\,z}$$

Involving $z^{\alpha-1}$and arguments $a\,z$

01.07.21.0036.01

$$\int z^{\alpha-1}\cos(a\,z)\,dz = \frac{1}{2}\,z^{\alpha}\left(-(-i\,a\,z)^{-\alpha}\,\Gamma(\alpha,\,-i\,a\,z)-(i\,a\,z)^{-\alpha}\,\Gamma(\alpha,\,i\,a\,z)\right)$$

01.07.21.0037.01

$$\int z^{\alpha-1}\cos(z)\,dz = -\frac{1}{2}\,z^{\alpha}\left(z^{2}\right)^{-\alpha}\left(\Gamma(\alpha,\,i\,z)\,(-i\,z)^{\alpha}+(i\,z)^{\alpha}\,\Gamma(\alpha,\,-i\,z)\right)$$

01.07.21.0038.01

$$\int z^{n}\cos(a\,z)\,dz = \frac{1}{2}\,(i\,a)^{-n-1}\left((-1)^{n}\;\Gamma(n+1,\,-i\,a\,z)-\Gamma(n+1,\,i\,a\,z)\right)\,/;\,n\in\mathbb{Z}$$

01.07.21.0039.01

$$\int z^{n}\cos(a\,z)\,dz = -\frac{1}{2}\,i^{n+1}\,a^{-n-1}\left(\frac{(-1)^{n}\,\mathrm{Ei}(i\,a\,z)-\mathrm{Ei}(-i\,a\,z)}{(-n-1)\,!}+\right.$$
$$\left.e^{i\,a\,z}\left(\sum_{k=0}^{n}\frac{(-i\,a\,z)^{k}}{(n+1)_{k-n}}-\sum_{k=n+1}^{-1}\frac{(-i\,a\,z)^{k}}{(n+1)_{k-n}}\right)-(-1)^{n}\,e^{-i\,a\,z}\left(\sum_{k=0}^{n}\frac{(i\,a\,z)^{k}}{(n+1)_{k-n}}-\sum_{k=n+1}^{-1}\frac{(i\,a\,z)^{k}}{(n+1)_{k-n}}\right)\right)\,/;\,n\in\mathbb{Z}$$

01.07.21.0040.01

$$\int z\cos(a\,z)\,dz = \frac{\cos(a\,z)+a\,z\sin(a\,z)}{a^{2}}$$

01.07.21.0041.01

$$\int z^{2}\cos(a\,z)\,dz = \frac{2\,a\,z\cos(a\,z)+\left(a^{2}\,z^{2}-2\right)\sin(a\,z)}{a^{3}}$$

01.07.21.0042.01

$$\int z^{3}\cos(a\,z)\,dz = \frac{3\left(a^{2}\,z^{2}-2\right)\cos(a\,z)+a\,z\left(a^{2}\,z^{2}-6\right)\sin(a\,z)}{a^{4}}$$

01.07.21.0043.01

$$\int z^{4}\cos(a\,z)\,dz = \frac{4\,a\,z\left(a^{2}\,z^{2}-6\right)\cos(a\,z)+\left(a^{4}\,z^{4}-12\,a^{2}\,z^{2}+24\right)\sin(a\,z)}{a^{5}}$$

01.07.21.0044.01

$$\int z^{5}\cos(a\,z)\,dz = \frac{5\left(a^{4}\,z^{4}-12\,a^{2}\,z^{2}+24\right)\cos(a\,z)+a\,z\left(a^{4}\,z^{4}-20\,a^{2}\,z^{2}+120\right)\sin(a\,z)}{a^{6}}$$

01.07.21.0045.01

$$\int z^{6}\cos(a\,z)\,dz = \frac{6\,a\,z\left(a^{4}\,z^{4}-20\,a^{2}\,z^{2}+120\right)\cos(a\,z)+\left(a^{6}\,z^{6}-30\,a^{4}\,z^{4}+360\,a^{2}\,z^{2}-720\right)\sin(a\,z)}{a^{7}}$$

01.07.21.0046.01

$$\int z^{7}\cos(a\,z)\,dz = \frac{1}{a^{8}}\left(7\left(a^{6}\,z^{6}-30\,a^{4}\,z^{4}+360\,a^{2}\,z^{2}-720\right)\cos(a\,z)+a\,z\left(a^{6}\,z^{6}-42\,a^{4}\,z^{4}+840\,a^{2}\,z^{2}-5040\right)\sin(a\,z)\right)$$

01.07.21.0047.01

$$\int z^8 \cos(a z)\, dz = \frac{1}{a^9}\left(8 a z \left(a^6 z^6 - 42 a^4 z^4 + 840 a^2 z^2 - 5040\right)\cos(a z) + \left(a^8 z^8 - 56 a^6 z^6 + 1680 a^4 z^4 - 20\,160 a^2 z^2 + 40\,320\right)\sin(a z)\right)$$

01.07.21.0048.01

$$\int \frac{\cos(a z)}{z}\, dz = \mathrm{Ci}(a z)$$

01.07.21.0049.01

$$\int \frac{\cos(a z)}{z^2}\, dz = -\frac{\cos(a z) + a z\, \mathrm{Si}(a z)}{z}$$

01.07.21.0050.01

$$\int \frac{\cos(a z)}{z^3}\, dz = -\frac{a^2\, \mathrm{Ci}(a z)\, z^2 - a \sin(a z)\, z + \cos(a z)}{2 z^2}$$

01.07.21.0051.01

$$\int \frac{\cos(a z)}{z^4}\, dz = \frac{a^3\, \mathrm{Si}(a z)\, z^3 + a \sin(a z)\, z + \left(a^2 z^2 - 2\right)\cos(a z)}{6 z^3}$$

01.07.21.0052.01

$$\int \frac{\cos(a z)}{z^5}\, dz = \frac{a^4\, \mathrm{Ci}(a z)\, z^4 + a\left(2 - a^2 z^2\right)\sin(a z)\, z + \left(a^2 z^2 - 6\right)\cos(a z)}{24 z^4}$$

01.07.21.0053.01

$$\int z^{n+\frac{1}{2}} \cos(a z)\, dz = \frac{(i a)^{-n-1} \sqrt{z}\left((-1)^n \sqrt{i a z}\, \Gamma\left(n + \frac{3}{2}, -i a z\right) - \sqrt{-i a z}\, \Gamma\left(n + \frac{3}{2}, i a z\right)\right)}{2\sqrt{a^2 z^2}} \;/;\; n \in \mathbb{Z}$$

01.07.21.0054.01

$$\int z^{n+\frac{1}{2}} \cos(a z)\, dz = \frac{1}{2\sqrt{a^2 z^2}}\left((-1)^n (i a)^{-n-1} \sqrt{z}\left(\left(\sqrt{i a z}\, \mathrm{erfc}\left(\sqrt{-i a z}\right) - (-1)^n \sqrt{-i a z}\, \mathrm{erfc}\left(\sqrt{i a z}\right)\right)\Gamma\left(n + \frac{3}{2}\right) + e^{i a z} \sqrt{i a z}\right.\right.$$
$$\left.\left.\left(\sum_{k=0}^{n} \frac{(-i a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(-i a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}}\right) - (-1)^n e^{-i a z} \sqrt{-i a z}\left(\sum_{k=0}^{n} \frac{(i a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(i a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}}\right)\right)\right) \;/;\; n \in \mathbb{Z}$$

01.07.21.0055.01

$$\int \sqrt{z}\, \cos(a z)\, dz = \frac{\sqrt{z}\, \sin(a z)}{a} - \frac{\sqrt{\frac{\pi}{2}}\, S\left(\sqrt{a}\, \sqrt{\frac{2}{\pi}}\, \sqrt{z}\right)}{a^{3/2}}$$

01.07.21.0056.01

$$\int z^{3/2} \cos(a z)\, dz = \frac{2\sqrt{a}\, \sqrt{z}\, (3\cos(a z) + 2 a z \sin(a z)) - 3\sqrt{2\pi}\, C\left(\sqrt{a}\, \sqrt{\frac{2}{\pi}}\, \sqrt{z}\right)}{4 a^{5/2}}$$

01.07.21.0057.01

$$\int z^{5/2}\cos(a\,z)\,dz = \frac{15\sqrt{2\pi}\,S\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)+2\sqrt{a}\,\sqrt{z}\,\left(10\,a\,z\cos(a\,z)+\left(4\,a^2\,z^2-15\right)\sin(a\,z)\right)}{8\,a^{7/2}}$$

01.07.21.0058.01

$$\int z^{7/2}\cos(a\,z)\,dz = \frac{1}{16\,a^{9/2}}\left(105\sqrt{2\pi}\,C\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)+2\sqrt{a}\,\sqrt{z}\,\left(7\left(4\,a^2\,z^2-15\right)\cos(a\,z)+2\,a\,z\left(4\,a^2\,z^2-35\right)\sin(a\,z)\right)\right)$$

01.07.21.0059.01

$$\int z^{9/2}\cos(a\,z)\,dz = \frac{1}{32\,a^{11/2}}\left(2\sqrt{a}\,\sqrt{z}\,\left(18\,a\,z\left(4\,a^2\,z^2-35\right)\cos(a\,z)+\left(16\,a^4\,z^4-252\,a^2\,z^2+945\right)\sin(a\,z)\right)-945\sqrt{2\pi}\,S\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)\right)$$

01.07.21.0060.01

$$\int \frac{\cos(a\,z)}{\sqrt{z}}\,dz = \frac{\sqrt{2\pi}}{\sqrt{a}}\,C\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)$$

01.07.21.0061.01

$$\int \frac{\cos(a\,z)}{z^{3/2}}\,dz = -\frac{2\cos(a\,z)}{\sqrt{z}}-2\sqrt{a}\,\sqrt{2\pi}\,S\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)$$

01.07.21.0062.01

$$\int \frac{\cos(a\,z)}{z^{5/2}}\,dz = -\frac{2\left(2\,a^{3/2}\sqrt{2\pi}\,C\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)z^{3/2}-2\,a\sin(a\,z)\,z+\cos(a\,z)\right)}{3\,z^{3/2}}$$

01.07.21.0063.01

$$\int \frac{\cos(a\,z)}{z^{7/2}}\,dz = \frac{8\,a^{5/2}\sqrt{2\pi}\,S\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)z^{5/2}+4\,a\sin(a\,z)\,z+\left(8\,a^2\,z^2-6\right)\cos(a\,z)}{15\,z^{5/2}}$$

01.07.21.0064.01

$$\int \frac{\cos(a\,z)}{z^{9/2}}\,dz = \frac{1}{105\,z^{7/2}}\left(2\left(8\,a^{7/2}\sqrt{2\pi}\,C\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)z^{7/2}+2\,a\left(3-4\,a^2\,z^2\right)\sin(a\,z)\,z+\left(4\,a^2\,z^2-15\right)\cos(a\,z)\right)\right)$$

Involving $z^{\alpha-1}$and arguments $a\,z+b$

01.07.21.0065.01

$$\int z^{\alpha-1}\cos(b+a\,z)\,dz = -\frac{1}{2}\,z^{\alpha}\left(a^2\,z^2\right)^{-\alpha}\left(e^{-i\,b}\,\Gamma(\alpha,\,i\,a\,z)\,(-i\,a\,z)^{\alpha}+(i\,a\,z)^{\alpha}\,e^{i\,b}\,\Gamma(\alpha,\,-i\,a\,z)\right)$$

01.07.21.0066.01

$$\int z^{n}\cos(b+a\,z)\,dz = \frac{1}{2}\,(i\,a)^{-n-1}\left((-1)^n\,e^{i\,b}\,\Gamma(n+1,\,-i\,a\,z)-e^{-i\,b}\,\Gamma(n+1,\,i\,a\,z)\right)\,/;\,n\in\mathbb{Z}$$

01.07.21.0067.01

$$\int z^n \cos(b+a z)\, dz = -\frac{1}{2} i^{n+1} a^{-n-1} \left(\frac{(-1)^n e^{i b} \operatorname{Ei}(i a z) - e^{-i b} \operatorname{Ei}(-i a z)}{(-n-1)!} + e^{i (b+a z)} \left(\sum_{k=0}^{n} \frac{(-i a z)^k}{(n+1)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(-i a z)^k}{(n+1)_{k-n}} \right) - (-1)^n e^{-i (b+a z)} \left(\sum_{k=0}^{n} \frac{(i a z)^k}{(n+1)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(i a z)^k}{(n+1)_{k-n}} \right) \right) /;\ n \in \mathbb{Z}$$

01.07.21.0068.01

$$\int z \cos(b+a z)\, dz = \frac{\cos(b+a z) + a z \sin(b+a z)}{a^2}$$

01.07.21.0069.01

$$\int z^2 \cos(b+a z)\, dz = \frac{2 a z \cos(b+a z) + \left(a^2 z^2 - 2\right) \sin(b+a z)}{a^3}$$

01.07.21.0070.01

$$\int z^3 \cos(b+a z)\, dz = \frac{3 \left(a^2 z^2 - 2\right) \cos(b+a z) + a z \left(a^2 z^2 - 6\right) \sin(b+a z)}{a^4}$$

01.07.21.0071.01

$$\int z^4 \cos(b+a z)\, dz = \frac{4 a z \left(a^2 z^2 - 6\right) \cos(b+a z) + \left(a^4 z^4 - 12 a^2 z^2 + 24\right) \sin(b+a z)}{a^5}$$

01.07.21.0072.01

$$\int z^5 \cos(b+a z)\, dz = \frac{5 \left(a^4 z^4 - 12 a^2 z^2 + 24\right) \cos(b+a z) + a z \left(a^4 z^4 - 20 a^2 z^2 + 120\right) \sin(b+a z)}{a^6}$$

01.07.21.0073.01

$$\int \frac{\cos(b+a z)}{z}\, dz = \cos(b) \operatorname{Ci}(a z) - \sin(b) \operatorname{Si}(a z)$$

01.07.21.0074.01

$$\int \frac{\cos(b+a z)}{z^2}\, dz = -\frac{\cos(b+a z) + a z \operatorname{Ci}(a z) \sin(b) + a z \cos(b) \operatorname{Si}(a z)}{z}$$

01.07.21.0075.01

$$\int \frac{\cos(b+a z)}{z^3}\, dz = -\frac{a^2 \cos(b) \operatorname{Ci}(a z) z^2 - a^2 \sin(b) \operatorname{Si}(a z) z^2 - a \sin(b+a z) z + \cos(b+a z)}{2 z^2}$$

01.07.21.0076.01

$$\int \frac{\cos(b+a z)}{z^4}\, dz = \frac{1}{6 z^3} \left(a^3 \operatorname{Ci}(a z) \sin(b) z^3 + a^3 \cos(b) \operatorname{Si}(a z) z^3 + a^2 \cos(b+a z) z^2 + a \sin(b+a z) z - 2 \cos(b+a z)\right)$$

01.07.21.0077.01

$$\int \frac{\cos(b+a z)}{z^5}\, dz = \frac{1}{24 z^4} \left(a^4 \cos(b) \operatorname{Ci}(a z) z^4 - a^4 \sin(b) \operatorname{Si}(a z) z^4 - a^3 \sin(b+a z) z^3 + a^2 \cos(b+a z) z^2 + 2 a \sin(b+a z) z - 6 \cos(b+a z)\right)$$

01.07.21.0078.01

$$\int z^{n+\frac{1}{2}} \cos(b + a z) \, dz = \frac{(i a)^{-n-1} \sqrt{z} \left((-1)^n e^{i b} \sqrt{i a z} \, \Gamma\left(n + \frac{3}{2}, -i a z\right) - e^{-i b} \sqrt{-i a z} \, \Gamma\left(n + \frac{3}{2}, i a z\right)\right)}{2 \sqrt{a^2 z^2}} \;/;\; n \in \mathbb{Z}$$

01.07.21.0079.01

$$\int z^{n+\frac{1}{2}} \cos(b + a z) \, dz = \frac{1}{2 \sqrt{a^2 z^2}} \left((-1)^n (i a)^{-n-1} e^{-i b} \sqrt{z} \left(\left(e^{2 i b} \sqrt{i a z} \operatorname{erfc}\left(\sqrt{-i a z}\right) - (-1)^n \sqrt{-i a z} \operatorname{erfc}\left(\sqrt{i a z}\right)\right) \Gamma\left(n + \frac{3}{2}\right) + e^{2 i b + i a z} \sqrt{i a z} \left(\sum_{k=0}^{n} \frac{(-i a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(-i a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}}\right) - (-1)^n e^{-i a z} \sqrt{-i a z} \left(\sum_{k=0}^{n} \frac{(i a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(i a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}}\right)\right)\right) \;/;\; n \in \mathbb{Z}$$

01.07.21.0080.01

$$\int \sqrt{z} \cos(b + a z) \, dz = \frac{1}{2 a^{3/2}} \left(-\sqrt{2 \pi} \cos(b) S\left(\sqrt{a} \sqrt{\frac{2}{\pi}} \sqrt{z}\right) - \sqrt{2 \pi} \, C\left(\sqrt{a} \sqrt{\frac{2}{\pi}} \sqrt{z}\right) \sin(b) + 2 \sqrt{a} \sqrt{z} \sin(b + a z)\right)$$

01.07.21.0081.01

$$\int z^{3/2} \cos(b + a z) \, dz = \frac{1}{4 a^{5/2}} \left(-3 \sqrt{2 \pi} \cos(b) C\left(\sqrt{a} \sqrt{\frac{2}{\pi}} \sqrt{z}\right) + 3 \sqrt{2 \pi} \, S\left(\sqrt{a} \sqrt{\frac{2}{\pi}} \sqrt{z}\right) \sin(b) + 2 \sqrt{a} \sqrt{z} \, (3 \cos(b + a z) + 2 a z \sin(b + a z))\right)$$

01.07.21.0082.01

$$\int z^{5/2} \cos(b + a z) \, dz = \frac{1}{8 a^{7/2}} \left(15 \sqrt{2 \pi} \cos(b) S\left(\sqrt{a} \sqrt{\frac{2}{\pi}} \sqrt{z}\right) + 15 \sqrt{2 \pi} \, C\left(\sqrt{a} \sqrt{\frac{2}{\pi}} \sqrt{z}\right) \sin(b) + 2 \sqrt{a} \sqrt{z} \left(10 a z \cos(b + a z) + \left(4 a^2 z^2 - 15\right) \sin(b + a z)\right)\right)$$

01.07.21.0083.01

$$\int z^{7/2} \cos(b + a z) \, dz = \frac{1}{16 a^{9/2}} \left(105 \sqrt{2 \pi} \cos(b) C\left(\sqrt{a} \sqrt{\frac{2}{\pi}} \sqrt{z}\right) - 105 \sqrt{2 \pi} \, S\left(\sqrt{a} \sqrt{\frac{2}{\pi}} \sqrt{z}\right) \sin(b) + 2 \sqrt{a} \sqrt{z} \left(7 \left(4 a^2 z^2 - 15\right) \cos(b + a z) + 2 a z \left(4 a^2 z^2 - 35\right) \sin(b + a z)\right)\right)$$

01.07.21.0084.01

$$\int z^{9/2} \cos(b + a z) \, dz = \frac{1}{32 a^{11/2}} \left(-945 \sqrt{2 \pi} \cos(b) S\left(\sqrt{a} \sqrt{\frac{2}{\pi}} \sqrt{z}\right) - 945 \sqrt{2 \pi} \, C\left(\sqrt{a} \sqrt{\frac{2}{\pi}} \sqrt{z}\right) \sin(b) + 2 \sqrt{a} \sqrt{z} \left(18 a z \left(4 a^2 z^2 - 35\right) \cos(b + a z) + \left(16 a^4 z^4 - 252 a^2 z^2 + 945\right) \sin(b + a z)\right)\right)$$

01.07.21.0085.01

$$\int \frac{\cos(b + a\,z)}{\sqrt{z}}\,dz = \frac{\sqrt{2\pi}\left(\cos(b)\,C\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right) - S\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)\sin(b)\right)}{\sqrt{a}}$$

01.07.21.0086.01

$$\int \frac{\cos(b + a\,z)}{z^{3/2}}\,dz = -\frac{2\cos(b + a\,z)}{\sqrt{z}} - 2\sqrt{a}\,\sqrt{2\pi}\,\cos(b)\,S\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right) - 2\sqrt{a}\,\sqrt{2\pi}\,C\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)\sin(b)$$

01.07.21.0087.01

$$\int \frac{\cos(b + a\,z)}{z^{5/2}}\,dz = -\frac{1}{3\,z^{3/2}} \left(2\left(2\,a^{3/2}\sqrt{2\pi}\,\cos(b)\,C\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)z^{3/2} - 2\,a^{3/2}\sqrt{2\pi}\,S\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)\sin(b)\,z^{3/2} - 2\,a\sin(b + a\,z)\,z + \cos(b + a\,z)\right)\right)$$

01.07.21.0088.01

$$\int \frac{\cos(b + a\,z)}{z^{7/2}}\,dz = \frac{1}{15\,z^{5/2}}\left(2\left(4\,a^{5/2}\sqrt{2\pi}\,\cos(b)\,S\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)z^{5/2} + 4\,a^{5/2}\sqrt{2\pi}\,C\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)\sin(b)\,z^{5/2} + 4\,a^2\cos(b + a\,z)\,z^2 + 2\,a\sin(b + a\,z)\,z - 3\cos(b + a\,z)\right)\right)$$

01.07.21.0089.01

$$\int \frac{\cos(b + a\,z)}{z^{9/2}}\,dz = \frac{1}{105\,z^{7/2}}\left(2\left(8\,a^{7/2}\sqrt{2\pi}\,\cos(b)\,C\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)z^{7/2} - 8\,a^{7/2}\sqrt{2\pi}\,S\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{z}\right)\sin(b)\,z^{7/2} - 8\,a^3\sin(b + a\,z)\,z^3 + 4\,a^2\cos(b + a\,z)\,z^2 + 6\,a\sin(b + a\,z)\,z - 15\cos(b + a\,z)\right)\right)$$

Involving $z^{\alpha-1}$ and arguments $a\,z^r$

01.07.21.0090.01

$$\int z^{\alpha-1}\cos(a\,z^r)\,dz = -\frac{z^\alpha\left(a^2\,z^{2r}\right)^{-\frac{\alpha}{r}}}{2\,r}\left(\Gamma\left(\frac{\alpha}{r}, i\,a\,z^r\right)(-i\,a\,z^r)^{\alpha/r} + (i\,a\,z^r)^{\alpha/r}\,\Gamma\left(\frac{\alpha}{r}, -i\,a\,z^r\right)\right)$$

01.07.21.0091.01

$$\int \frac{\cos(a\,z^r)}{z}\,dz = \frac{\mathrm{Ci}(a\,z^r)}{r}$$

01.07.21.0092.01

$$\int z^{2n}\cos(a z^2)\,dz = -\frac{1}{4} z \left(\frac{1}{\sqrt{-i a z^2}} \left((-i a)^{-n} \left(\operatorname{erfc}\left(\sqrt{-i a z^2}\right)\Gamma\left(n+\frac{1}{2}\right) + e^{i a z^2} \sum_{k=0}^{n-1} \frac{(-i a z^2)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}} - e^{i a z^2} \sum_{k=n}^{-1} \frac{(-i a z^2)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right)\right) + \frac{1}{\sqrt{i a z^2}} \left((i a)^{-n} \left(\operatorname{erfc}\left(\sqrt{i a z^2}\right)\Gamma\left(n+\frac{1}{2}\right) + e^{-i a z^2} \sum_{k=0}^{n-1} \frac{(i a z^2)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}} - e^{-i a z^2} \sum_{k=n}^{-1} \frac{(i a z^2)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right)\right)\right) /; n \in \mathbb{Z}$$

01.07.21.0093.01

$$\int z^{2n-1}\cos(a z^2)\,dz = -\frac{1}{4} \left(\left(\frac{(-1)^{n-1}\operatorname{Ei}(i a z^2)}{(-n)!} + e^{i a z^2} \sum_{k=0}^{n-1} \frac{(-i a z^2)^k}{(n)_{k-n+1}} - e^{i a z^2} \sum_{k=n}^{-1} \frac{(-i a z^2)^k}{(n)_{k-n+1}}\right)(-i a)^{-n} + (i a)^{-n} \left(\frac{(-1)^{n-1}\operatorname{Ei}(-i a z^2)}{(-n)!} + e^{-i a z^2} \sum_{k=0}^{n-1} \frac{(i a z^2)^k}{(n)_{k-n+1}} - e^{-i a z^2} \sum_{k=n}^{-1} \frac{(i a z^2)^k}{(n)_{k-n+1}}\right)\right) /; n \in \mathbb{Z}$$

01.07.21.0094.01

$$\int z\cos(a z^2)\,dz = \frac{\sin(a z^2)}{2a}$$

01.07.21.0095.01

$$\int z^2\cos(a z^2)\,dz = \frac{1}{4}\left(\frac{2z\sin(a z^2)}{a} - \frac{\sqrt{2\pi}}{a^{3/2}} S\left(\sqrt{a}\sqrt{\frac{2}{\pi}}\, z\right)\right)$$

01.07.21.0096.01

$$\int z^3\cos(a z^2)\,dz = \frac{a\sin(a z^2) z^2 + \cos(a z^2)}{2a^2}$$

01.07.21.0097.01

$$\int z^4\cos(a z^2)\,dz = \frac{1}{8}\left(\frac{4a\sin(a z^2) z^3 + 6\cos(a z^2) z}{a^2} - \frac{3\sqrt{2\pi}}{a^{5/2}} C\left(\sqrt{a}\sqrt{\frac{2}{\pi}}\, z\right)\right)$$

01.07.21.0098.01

$$\int z^5\cos(a z^2)\,dz = \frac{2a\cos(a z^2) z^2 + (a^2 z^4 - 2)\sin(a z^2)}{2a^3}$$

01.07.21.0099.01

$$\int \frac{\cos(a z^2)}{z}\,dz = \frac{1}{2}\operatorname{Ci}(a z^2)$$

01.07.21.0100.01

$$\int \frac{\cos(a z^2)}{z^2}\,dz = -\frac{\cos(a z^2) + \sqrt{a}\sqrt{2\pi}\, z\, S\left(\sqrt{a}\sqrt{\frac{2}{\pi}}\, z\right)}{z}$$

01.07.21.0101.01

$$\int \frac{\cos(a z^2)}{z^3}\,dz = -\frac{a\operatorname{Si}(a z^2) z^2 + \cos(a z^2)}{2z^2}$$

01.07.21.0102.01

$$\int \frac{\cos(a z^2)}{z^4} \, dz = -\frac{2\sqrt{2\pi}\, z^3\, C\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\, z\right) a^{3/2} - 2 z^2 \sin(a z^2)\, a + \cos(a z^2)}{3 z^3}$$

01.07.21.0103.01

$$\int \frac{\cos(a z^2)}{z^5} \, dz = -\frac{a^2 \operatorname{Ci}(a z^2)\, z^4 - a \sin(a z^2)\, z^2 + \cos(a z^2)}{4 z^4}$$

01.07.21.0104.01

$$\int z^n \cos\left(a\sqrt{z}\right) dz = -a^{-2(n+1)} (-1)^{n-1} \left(\frac{\operatorname{Ei}\left(-i a \sqrt{z}\right)}{(-2n-2)!} + e^{i a \sqrt{z}} \sum_{k=0}^{2n+1} \frac{\left(-i a \sqrt{z}\right)^k}{(2n+2)_{k-2n-1}} - e^{i a \sqrt{z}} \sum_{k=2n+2}^{-1} \frac{\left(-i a \sqrt{z}\right)^k}{(2n+2)_{k-2n-1}} + e^{-i a \sqrt{z}} \sum_{k=0}^{2n+1} \frac{\left(i a \sqrt{z}\right)^k}{(2n+2)_{k-2n-1}} + e^{-i a \sqrt{z}} \sum_{k=2n+2}^{-1} \frac{\left(i a \sqrt{z}\right)^k}{(2n+2)_{k-2n-1}} - \frac{\operatorname{Ei}\left(i a \sqrt{z}\right)}{(-2n-2)!} \right) /;\ n \in \mathbb{Z}$$

01.07.21.0105.01

$$\int z \cos\left(a\sqrt{z}\right) dz = \frac{2\left(3\left(a^2 z - 2\right) \cos\left(a\sqrt{z}\right) + a\sqrt{z}\left(a^2 z - 6\right) \sin\left(a\sqrt{z}\right)\right)}{a^4}$$

01.07.21.0106.01

$$\int z^2 \cos\left(a\sqrt{z}\right) dz = \frac{2\left(5\left(z^2 a^4 - 12 z a^2 + 24\right) \cos\left(a\sqrt{z}\right) + a\sqrt{z}\left(z^2 a^4 - 20 z a^2 + 120\right) \sin\left(a\sqrt{z}\right)\right)}{a^6}$$

01.07.21.0107.01

$$\int z^3 \cos\left(a\sqrt{z}\right) dz = \frac{1}{a^8}\left(2\left(7\left(z^3 a^6 - 30 z^2 a^4 + 360 z a^2 - 720\right) \cos\left(a\sqrt{z}\right) + a\sqrt{z}\left(z^3 a^6 - 42 z^2 a^4 + 840 z a^2 - 5040\right) \sin\left(a\sqrt{z}\right)\right)\right)$$

01.07.21.0108.01

$$\int z^4 \cos\left(a\sqrt{z}\right) dz = \frac{1}{a^{10}}\left(2\left(9\left(z^4 a^8 - 56 z^3 a^6 + 1680 z^2 a^4 - 20160 z a^2 + 40320\right) \cos\left(a\sqrt{z}\right) + a\sqrt{z}\left(z^4 a^8 - 72 z^3 a^6 + 3024 z^2 a^4 - 60480 z a^2 + 362880\right) \sin\left(a\sqrt{z}\right)\right)\right)$$

01.07.21.0109.01

$$\int z^5 \cos\left(a\sqrt{z}\right) dz = \frac{1}{a^{12}}\left(2\left(11\left(z^5 a^{10} - 90 z^4 a^8 + 5040 z^3 a^6 - 151200 z^2 a^4 + 1814400 z a^2 - 3628800\right) \cos\left(a\sqrt{z}\right) + a\sqrt{z}\left(z^5 a^{10} - 110 z^4 a^8 + 7920 z^3 a^6 - 332640 z^2 a^4 + 6652800 z a^2 - 39916800\right) \sin\left(a\sqrt{z}\right)\right)\right)$$

01.07.21.0110.01

$$\int \frac{\cos\left(a\sqrt{z}\right)}{z} \, dz = 2 \operatorname{Ci}\left(a\sqrt{z}\right)$$

01.07.21.0111.01

$$\int \frac{\cos\left(a\sqrt{z}\right)}{z^2} \, dz = -\frac{z \operatorname{Ci}\left(a\sqrt{z}\right) a^2 - \sqrt{z}\, \sin\left(a\sqrt{z}\right) a + \cos\left(a\sqrt{z}\right)}{z}$$

01.07.21.0112.01

$$\int \frac{\cos(a\sqrt{z})}{z^3}\,dz = \frac{z^2\,\mathrm{Ci}(a\sqrt{z})\,a^4 + \sqrt{z}\,(2 - a^2 z)\sin(a\sqrt{z})\,a + (a^2 z - 6)\cos(a\sqrt{z})}{12 z^2}$$

01.07.21.0113.01

$$\int \frac{\cos(a\sqrt{z})}{z^4}\,dz = -\frac{1}{360 z^3}\left(z^3\,\mathrm{Ci}(a\sqrt{z})\,a^6 - \sqrt{z}\,(z^2 a^4 - 2 z a^2 + 24)\sin(a\sqrt{z})\,a + (z^2 a^4 - 6 z a^2 + 120)\cos(a\sqrt{z})\right)$$

01.07.21.0114.01

$$\int \frac{\cos(a\sqrt{z})}{z^5}\,dz =$$

$$\frac{1}{20\,160 z^4}\left(z^4\,\mathrm{Ci}(a\sqrt{z})\,a^8 + \sqrt{z}\,(-z^3 a^6 + 2 z^2 a^4 - 24 z a^2 + 720)\sin(a\sqrt{z})\,a + (z^3 a^6 - 6 z^2 a^4 + 120 z a^2 - 5040)\cos(a\sqrt{z})\right)$$

Involving $z^{\alpha-1}$ and arguments $a\, z^r + b$

01.07.21.0115.01

$$\int z^{\alpha-1}\cos(a z^r + b)\,dz = -\frac{z^\alpha\left(e^{i b}\,\Gamma\left(\frac{\alpha}{r}, -i a z^r\right)(-i a z^r)^{-\frac{\alpha}{r}} + e^{-i b}\,(i a z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, i a z^r\right)\right)}{2 r}$$

01.07.21.0116.01

$$\int \frac{\cos(a z^r + b)}{z}\,dz = \frac{\cos(b)\,\mathrm{Ci}(a z^r) - \sin(b)\,\mathrm{Si}(a z^r)}{r}$$

01.07.21.0117.01

$$\int z^n \cos(a z^2 + b)\,dz = -\frac{1}{4} z^{n+1}\left(e^{i b}\,\Gamma\left(\frac{n+1}{2}, -i a z^2\right)(-i a z^2)^{-\frac{n+1}{2}} + e^{-i b}\,(i a z^2)^{-\frac{n+1}{2}}\,\Gamma\left(\frac{n+1}{2}, i a z^2\right)\right) /;\ n \in \mathbb{Z}$$

01.07.21.0118.01

$$\int z^{2n}\cos(a z^2 + b)\,dz =$$

$$-\frac{1}{4} z\left((-i a)^{-n} e^{i b}\left(\mathrm{erfc}\left(\sqrt{-i a z^2}\right)\Gamma\left(n + \frac{1}{2}\right) + e^{i a z^2}\sum_{k=0}^{n-1}\frac{(-i a z^2)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}} - e^{i a z^2}\sum_{k=n}^{-1}\frac{(-i a z^2)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}}\right)(-i a z^2)^{-\frac{1}{2}} +\right.$$

$$\left.(i a)^{-n} e^{-i b}\,(i a z^2)^{-\frac{1}{2}}\left(\mathrm{erfc}\left(\sqrt{i a z^2}\right)\Gamma\left(n + \frac{1}{2}\right) + e^{-i a z^2}\sum_{k=0}^{n-1}\frac{(i a z^2)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}} - e^{-i a z^2}\sum_{k=n}^{-1}\frac{(i a z^2)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}}\right)\right) /;\ n \in \mathbb{Z}$$

01.07.21.0119.01

$$\int z^{2n-1}\cos(a z^2 + b)\,dz = -\frac{1}{4}\left(e^{i b}\left(\frac{(-1)^{n-1}\,\mathrm{Ei}(i a z^2)}{(-n)!} + e^{i a z^2}\sum_{k=0}^{n-1}\frac{(-i a z^2)^k}{(n)_{k-n+1}} - e^{i a z^2}\sum_{k=n}^{-1}\frac{(-i a z^2)^k}{(n)_{k-n+1}}\right)(-i a)^{-n} +\right.$$

$$\left.(i a)^{-n} e^{-i b}\left(\frac{(-1)^{n-1}\,\mathrm{Ei}(-i a z^2)}{(-n)!} + e^{-i a z^2}\sum_{k=0}^{n-1}\frac{(i a z^2)^k}{(n)_{k-n+1}} - e^{-i a z^2}\sum_{k=n}^{-1}\frac{(i a z^2)^k}{(n)_{k-n+1}}\right)\right) /;\ n \in \mathbb{Z}$$

01.07.21.0120.01

$$\int z\cos\left(a z^2+b\right) dz = \frac{\sin\left(a z^2+b\right)}{2 a}$$

01.07.21.0121.01

$$\int z^2\cos\left(a z^2+b\right) dz = \frac{1}{4 a^{3/2}}\left(-\sqrt{2\pi}\cos(b) S\left(\sqrt{a}\sqrt{\frac{2}{\pi}} z\right)-\sqrt{2\pi} C\left(\sqrt{a}\sqrt{\frac{2}{\pi}} z\right)\sin(b)+2\sqrt{a} z\sin\left(a z^2+b\right)\right)$$

01.07.21.0122.01

$$\int z^3\cos\left(a z^2+b\right) dz = \frac{a\sin\left(a z^2+b\right) z^2+\cos\left(a z^2+b\right)}{2 a^2}$$

01.07.21.0123.01

$$\int z^4\cos\left(a z^2+b\right) dz = \frac{1}{8 a^{5/2}}\left(-3\sqrt{2\pi}\cos(b) C\left(\sqrt{a}\sqrt{\frac{2}{\pi}} z\right)+3\sqrt{2\pi} S\left(\sqrt{a}\sqrt{\frac{2}{\pi}} z\right)\sin(b)+2\sqrt{a} z\left(2 a\sin\left(a z^2+b\right) z^2+3\cos\left(a z^2+b\right)\right)\right)$$

01.07.21.0124.01

$$\int z^5\cos\left(a z^2+b\right) dz = \frac{2 a\cos\left(a z^2+b\right) z^2+\left(a^2 z^4-2\right)\sin\left(a z^2+b\right)}{2 a^3}$$

01.07.21.0125.01

$$\int \frac{\cos\left(a z^2+b\right)}{z} dz = \frac{1}{2}\left(\cos(b)\operatorname{Ci}\left(a z^2\right)-\sin(b)\operatorname{Si}\left(a z^2\right)\right)$$

01.07.21.0126.01

$$\int \frac{\cos\left(a z^2+b\right)}{z^2} dz = -\frac{1}{z}\left(\cos\left(a z^2+b\right)+\sqrt{a}\sqrt{2\pi} z\cos(b) S\left(\sqrt{a}\sqrt{\frac{2}{\pi}} z\right)+\sqrt{a}\sqrt{2\pi} z C\left(\sqrt{a}\sqrt{\frac{2}{\pi}} z\right)\sin(b)\right)$$

01.07.21.0127.01

$$\int \frac{\cos\left(a z^2+b\right)}{z^3} dz = -\frac{a\operatorname{Ci}\left(a z^2\right)\sin(b) z^2+a\cos(b)\operatorname{Si}\left(a z^2\right) z^2+\cos\left(a z^2+b\right)}{2 z^2}$$

01.07.21.0128.01

$$\int \frac{\cos\left(a z^2+b\right)}{z^4} dz = \frac{1}{3}\left(-2\sqrt{2\pi}\cos(b) C\left(\sqrt{a}\sqrt{\frac{2}{\pi}} z\right) a^{3/2}+2\sqrt{2\pi} S\left(\sqrt{a}\sqrt{\frac{2}{\pi}} z\right)\sin(b) a^{3/2}+\frac{2\sin\left(a z^2+b\right) a}{z}-\frac{\cos\left(a z^2+b\right)}{z^3}\right)$$

01.07.21.0129.01

$$\int \frac{\cos\left(a z^2+b\right)}{z^5} dz = -\frac{a^2\cos(b)\operatorname{Ci}\left(a z^2\right) z^4-a^2\sin(b)\operatorname{Si}\left(a z^2\right) z^4-a\sin\left(a z^2+b\right) z^2+\cos\left(a z^2+b\right)}{4 z^4}$$

01.07.21.0130.01

$$\int z^{\alpha-1}\cos\left(\sqrt{z} a+b\right) dz = -z^{\alpha}\left(e^{i b}\Gamma\left(2\alpha, -i a\sqrt{z}\right)\left(-i a\sqrt{z}\right)^{-2\alpha}+e^{-i b}\left(i a\sqrt{z}\right)^{-2\alpha}\Gamma\left(2\alpha, i a\sqrt{z}\right)\right)$$

01.07.21.0131.01

$$\int z^n\cos\left(\sqrt{z} a+b\right) dz = -\left(e^{i b}\Gamma\left(2(n+1), -i a\sqrt{z}\right)(-i a)^{-2(n+1)}+(i a)^{-2(n+1)} e^{-i b}\Gamma\left(2(n+1), i a\sqrt{z}\right)\right) /; n\in\mathbb{Z}$$

01.07.21.0132.01

$$\int z^n \cos\left(\sqrt{z}\, a+b\right) dz = (-1)^n a^{-2(n+1)} \left(e^{i b} \left(-\frac{\operatorname{Ei}\left(i a \sqrt{z}\right)}{(-2(n+1))!} + e^{i a \sqrt{z}} \sum_{k=0}^{2(n+1)-1} \frac{\left(-i a \sqrt{z}\right)^k}{(2(n+1))_{k-2(n+1)+1}} - e^{i a \sqrt{z}} \sum_{k=2(n+1)}^{-1} \frac{\left(-i a \sqrt{z}\right)^k}{(2(n+1))_{k-2(n+1)+1}} \right) + e^{-i b} \left(-\frac{\operatorname{Ei}\left(-i a \sqrt{z}\right)}{(-2(n+1))!} + e^{-i a \sqrt{z}} \sum_{k=0}^{2(n+1)-1} \frac{\left(i a \sqrt{z}\right)^k}{(2(n+1))_{k-2(n+1)+1}} - e^{-i a \sqrt{z}} \sum_{k=2(n+1)}^{-1} \frac{\left(i a \sqrt{z}\right)^k}{(2(n+1))_{k-2(n+1)+1}} \right) \right) /; n \in \mathbb{Z}$$

01.07.21.0133.01

$$\int z \cos\left(\sqrt{z}\, a+b\right) dz = \frac{2\left(3\left(a^2 z-2\right)\cos\left(\sqrt{z}\, a+b\right) + a\sqrt{z}\left(a^2 z-6\right)\sin\left(\sqrt{z}\, a+b\right)\right)}{a^4}$$

01.07.21.0134.01

$$\int z^2 \cos\left(\sqrt{z}\, a+b\right) dz = \frac{1}{a^6}\left(2\left(5\left(z^2 a^4-12 z a^2+24\right)\cos\left(\sqrt{z}\, a+b\right) + a\sqrt{z}\left(z^2 a^4-20 z a^2+120\right)\sin\left(\sqrt{z}\, a+b\right)\right)\right)$$

01.07.21.0135.01

$$\int z^3 \cos\left(\sqrt{z}\, a+b\right) dz = \frac{1}{a^8}\left(2\left(7\left(z^3 a^6-30 z^2 a^4+360 z a^2-720\right)\cos\left(\sqrt{z}\, a+b\right) + a\sqrt{z}\left(z^3 a^6-42 z^2 a^4+840 z a^2-5040\right)\sin\left(\sqrt{z}\, a+b\right)\right)\right)$$

01.07.21.0136.01

$$\int z^4 \cos\left(\sqrt{z}\, a+b\right) dz = \frac{1}{a^{10}}\left(2\left(9\left(z^4 a^8-56 z^3 a^6+1680 z^2 a^4-20\,160 z a^2+40\,320\right)\cos\left(\sqrt{z}\, a+b\right) + a\sqrt{z}\left(z^4 a^8-72 z^3 a^6+3024 z^2 a^4-60\,480 z a^2+362\,880\right)\sin\left(\sqrt{z}\, a+b\right)\right)\right)$$

01.07.21.0137.01

$$\int z^5 \cos\left(\sqrt{z}\, a+b\right) dz = \frac{1}{a^{12}}\left(2\left(11\left(z^5 a^{10}-90 z^4 a^8+5040 z^3 a^6-151\,200 z^2 a^4+1\,814\,400 z a^2-3\,628\,800\right)\cos\left(\sqrt{z}\, a+b\right) + a\sqrt{z}\left(z^5 a^{10}-110 z^4 a^8+7920 z^3 a^6-332\,640 z^2 a^4+6\,652\,800 z a^2-39\,916\,800\right)\sin\left(\sqrt{z}\, a+b\right)\right)\right)$$

01.07.21.0138.01

$$\int \frac{\cos\left(\sqrt{z}\, a+b\right)}{z} dz = 2\cos(b)\operatorname{Ci}\left(a\sqrt{z}\right) - 2\sin(b)\operatorname{Si}\left(a\sqrt{z}\right)$$

01.07.21.0139.01

$$\int \frac{\cos\left(\sqrt{z}\, a+b\right)}{z^2} dz = -\cos(b)\operatorname{Ci}\left(a\sqrt{z}\right)a^2 + \sin(b)\operatorname{Si}\left(a\sqrt{z}\right)a^2 + \frac{\sin\left(\sqrt{z}\, a+b\right)a}{\sqrt{z}} - \frac{\cos\left(\sqrt{z}\, a+b\right)}{z}$$

01.07.21.0140.01

$$\int \frac{\cos\left(\sqrt{z}\; a+b\right)}{z^3}\,dz = \frac{1}{12\,z^2}\left(-a^3 \sin\left(\sqrt{z}\; a+b\right) z^{3/2} + a^4 \cos(b)\,\mathrm{Ci}\left(a\sqrt{z}\right) z^2 - a^4 \sin(b)\,\mathrm{Si}\left(a\sqrt{z}\right) z^2 + a^2 \cos\left(\sqrt{z}\; a+b\right) z + 2\,a \sin\left(\sqrt{z}\; a+b\right)\sqrt{z} - 6\cos\left(\sqrt{z}\; a+b\right)\right)$$

01.07.21.0141.01

$$\int \frac{\cos\left(\sqrt{z}\; a+b\right)}{z^4}\,dz = \frac{1}{360\,z^3}\left(-2\,a^3 \sin\left(\sqrt{z}\; a+b\right) z^{3/2} + a^5 \sin\left(\sqrt{z}\; a+b\right) z^{5/2} - a^6 \cos(b)\,\mathrm{Ci}\left(a\sqrt{z}\right) z^3 + a^6 \sin(b)\,\mathrm{Si}\left(a\sqrt{z}\right) z^3 - a^4 \cos\left(\sqrt{z}\; a+b\right) z^2 + 6\,a^2 \cos\left(\sqrt{z}\; a+b\right) z + 24\,a \sin\left(\sqrt{z}\; a+b\right)\sqrt{z} - 120\cos\left(\sqrt{z}\; a+b\right)\right)$$

01.07.21.0142.01

$$\int \frac{\cos\left(\sqrt{z}\; a+b\right)}{z^5}\,dz = \frac{1}{20\,160\,z^4}\left(-24\,a^3 \sin\left(\sqrt{z}\; a+b\right) z^{3/2} + 2\,a^5 \sin\left(\sqrt{z}\; a+b\right) z^{5/2} - a^7 \sin\left(\sqrt{z}\; a+b\right) z^{7/2} + a^8 \cos(b)\,\mathrm{Ci}\left(a\sqrt{z}\right) z^4 - a^8 \sin(b)\,\mathrm{Si}\left(a\sqrt{z}\right) z^4 + a^6 \cos\left(\sqrt{z}\; a+b\right) z^3 - 6\,a^4 \cos\left(\sqrt{z}\; a+b\right) z^2 + 120\,a^2 \cos\left(\sqrt{z}\; a+b\right) z + 720\,a \sin\left(\sqrt{z}\; a+b\right)\sqrt{z} - 5040\cos\left(\sqrt{z}\; a+b\right)\right)$$

Involving rational functions

Involving $(a\,z+b)^{-n}$

01.07.21.0143.01

$$\int \frac{\cos(c\,z)}{a\,z+b}\,dz = \frac{1}{a}\left(\cos\left(\frac{b\,c}{a}\right)\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right) + \sin\left(\frac{b\,c}{a}\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)\right)$$

01.07.21.0144.01

$$\int \frac{\cos(c\,z)}{(a\,z+b)^2}\,dz = \frac{1}{a^2}\left(-\frac{a\cos(c\,z)}{b+a\,z} + c\,\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right)\sin\left(\frac{b\,c}{a}\right) - c\cos\left(\frac{b\,c}{a}\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)\right)$$

01.07.21.0145.01

$$\int \frac{\cos(c\,z)}{(a\,z+b)^3}\,dz = -\frac{1}{2\,a^3}\left(\cos\left(\frac{b\,c}{a}\right)\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right)c^2 + \sin\left(\frac{b\,c}{a}\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)c^2 - \frac{a\,(c\,(b+a\,z)\sin(c\,z) - a\cos(c\,z))}{(b+a\,z)^2}\right)$$

01.07.21.0146.01

$$\int \frac{\cos(c\,z)}{(a\,z+b)^4}\,dz = \frac{1}{6\,a^4}\left(-\left(\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right)\sin\left(\frac{b\,c}{a}\right) - \cos\left(\frac{b\,c}{a}\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)\right)c^3 + \frac{a^2 \sin(c\,z)\,c}{(b+a\,z)^2} + \frac{a\left(\left(c^2 z^2-2\right)a^2 + 2\,b\,c^2\,z\,a + b^2\,c^2\right)\cos(c\,z)}{(b+a\,z)^3}\right)$$

01.07.21.0147.01

$$\int \frac{\cos(c\,z)}{(a\,z+b)^5}\,dz = \frac{1}{24\,a^5}\left(\left(\cos\left(\frac{b\,c}{a}\right)\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right)+\sin\left(\frac{b\,c}{a}\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)\right)c^4 - \frac{a\left(\left(c^2\,z^2-2\right)a^2+2\,b\,c^2\,z\,a+b^2\,c^2\right)\sin(c\,z)\,c}{(b+a\,z)^3}+\frac{a^2\left(\left(c^2\,z^2-6\right)a^2+2\,b\,c^2\,z\,a+b^2\,c^2\right)\cos(c\,z)}{(b+a\,z)^4}\right)$$

01.07.21.0148.01

$$\int \frac{\cos(c\,z)}{(a\,z+b)^6}\,dz = -\frac{1}{120\,a^6}\left(-\left(\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right)\sin\left(\frac{b\,c}{a}\right)-\cos\left(\frac{b\,c}{a}\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)\right)c^5+\frac{a^2\left(\left(c^2\,z^2-6\right)a^2+2\,b\,c^2\,z\,a+b^2\,c^2\right)\sin(c\,z)\,c}{(b+a\,z)^4}+\frac{1}{(b+a\,z)^5}\left(a\left(\left(c^4\,z^4-2\,c^2\,z^2+24\right)a^4+4\,b\,c^2\,z\left(c^2\,z^2-1\right)a^3+2\,b^2\,c^2\left(3\,c^2\,z^2-1\right)a^2+4\,b^3\,c^4\,z\,a+b^4\,c^4\right)\cos(c\,z)\right)\right)$$

01.07.21.0149.01

$$\int \frac{z\cos(c\,z)}{b+a\,z}\,dz = \frac{-b\,c\cos\left(\frac{b\,c}{a}\right)\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right)+a\sin(c\,z)-b\,c\sin\left(\frac{b\,c}{a}\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)}{a^2\,c}$$

01.07.21.0150.01

$$\int \frac{z^2\cos(c\,z)}{b+a\,z}\,dz = \frac{1}{a^3\,c^2}\left(b^2\cos\left(\frac{b\,c}{a}\right)\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right)c^2+b^2\sin\left(\frac{b\,c}{a}\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)c^2+a\left(a\cos(c\,z)+c\left(a\,z-b\right)\sin(c\,z)\right)\right)$$

01.07.21.0151.01

$$\int \frac{z\cos(c\,z)}{(b+a\,z)^2}\,dz = \frac{1}{a^3\,(b+a\,z)}\left(a\,b\cos(c\,z)+(b+a\,z)\,\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right)\left(a\cos\left(\frac{b\,c}{a}\right)-b\,c\sin\left(\frac{b\,c}{a}\right)\right)+(b+a\,z)\left(b\,c\cos\left(\frac{b\,c}{a}\right)+a\sin\left(\frac{b\,c}{a}\right)\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)\right)$$

01.07.21.0152.01

$$\int \frac{z^2\cos(c\,z)}{(b+a\,z)^2}\,dz = \frac{1}{a^4\,c\,(b+a\,z)}\left(b\,c\,(b+a\,z)\,\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right)\left(b\,c\sin\left(\frac{b\,c}{a}\right)-2\,a\cos\left(\frac{b\,c}{a}\right)\right)+a\left(a\,(b+a\,z)\sin(c\,z)-b^2\,c\cos(c\,z)\right)-b\,c\,(b+a\,z)\left(b\,c\cos\left(\frac{b\,c}{a}\right)+2\,a\sin\left(\frac{b\,c}{a}\right)\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)\right)$$

01.07.21.0153.01

$$\int \frac{z^3\cos(c\,z)}{(b+a\,z)^2}\,dz = \frac{1}{a^5\,c^2\,(b+a\,z)}\left(b^2\,(b+a\,z)\,\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right)\left(3\,a\cos\left(\frac{b\,c}{a}\right)-b\,c\sin\left(\frac{b\,c}{a}\right)\right)c^2+b^2\,(b+a\,z)\left(b\,c\cos\left(\frac{b\,c}{a}\right)+3\,a\sin\left(\frac{b\,c}{a}\right)\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)c^2+a\left(\left(z\,a^3+b\,a^2+b^3\,c^2\right)\cos(c\,z)+a\,c\left(-2\,b^2-a\,z\,b+a^2\,z^2\right)\sin(c\,z)\right)\right)$$

01.07.21.0154.01

$$\int \frac{z^4 \cos(c\,z)}{(b+a\,z)^2}\,dz = \frac{1}{a^6\,c^3\,(b+a\,z)} \left(b^3\,(b+a\,z)\,\mathrm{Ci}\left(c\left(\frac{b}{a}+z\right)\right)\left(b\,c\sin\left(\frac{b\,c}{a}\right)-4\,a\cos\left(\frac{b\,c}{a}\right)\right)c^3 - b^3\,(b+a\,z)\left(b\,c\cos\left(\frac{b\,c}{a}\right)+4\,a\sin\left(\frac{b\,c}{a}\right)\right)\mathrm{Si}\left(c\left(\frac{b}{a}+z\right)\right)c^3 + a\left(a\,(b+a\,z)\left(\left(c^2\,z^2-2\right)a^2-2\,b\,c^2\,z\,a+3\,b^2\,c^2\right)\sin(c\,z)-c\left(-2\,z^2\,a^4+2\,b^2\,a^2+b^4\,c^2\right)\cos(c\,z)\right)\right)$$

Involving $\left(a\,z^2+b\right)^{-n}$

01.07.21.0155.01

$$\int \frac{\cos(c\,z)}{a\,z^2+b}\,dz = \frac{1}{2\sqrt{a}\,\sqrt{b}}\left(i\cosh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Ci}\left(c\left(\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right) - i\cosh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Ci}\left(c\left(-\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)+\sinh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\left(\mathrm{Si}\left(\frac{i\sqrt{b}\,c}{\sqrt{a}}-c\,z\right)-\mathrm{Si}\left(c\left(\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)\right)\right)$$

01.07.21.0156.01

$$\int \frac{\cos(z)}{z^2-1}\,dz = \frac{1}{2}\left(\cos(1)\,\mathrm{Ci}(1-z)-\cos(1)\,\mathrm{Ci}(z+1)+\sin(1)\,(\mathrm{Si}(1-z)-\mathrm{Si}(z+1))\right)$$

01.07.21.0157.01

$$\int \frac{z\cos(c\,z)}{a\,z^2+b}\,dz = \frac{1}{2\,a}\left(\cosh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Ci}\left(c\left(\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)+\cosh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Ci}\left(c\left(-\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)+i\sinh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\left(\mathrm{Si}\left(c\left(\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)+\mathrm{Si}\left(\frac{i\sqrt{b}\,c}{\sqrt{a}}-c\,z\right)\right)\right)$$

01.07.21.0158.01

$$\int \frac{\cos(c\,z)}{\left(a\,z^2+b\right)^2}\,dz = \frac{1}{4\,b^{3/2}}\left(\frac{2\sqrt{b}\,z\cos(c\,z)}{a\,z^2+b}+\frac{i\,\mathrm{Ci}\left(c\left(\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)\left(\sqrt{a}\cosh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)-\sqrt{b}\,c\sinh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\right)}{a} - \frac{i\,\mathrm{Ci}\left(c\left(-\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)\left(\sqrt{a}\cosh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)-\sqrt{b}\,c\sinh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\right)}{a}+\frac{\sqrt{b}\,c\cosh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Si}\left(c\left(\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)}{a}+\frac{\sqrt{b}\,c\cosh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Si}\left(c\left(-\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)}{a}+\frac{\sinh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Si}\left(\frac{i\sqrt{b}\,c}{\sqrt{a}}-c\,z\right)}{\sqrt{a}}-\frac{\sinh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Si}\left(c\left(\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)}{\sqrt{a}}\right)$$

01.07.21.0159.01

$$\int \frac{z\cos(c\,z)}{\left(a\,z^2+b\right)^2}\,dz = \frac{1}{4\,a^{3/2}}\left(-\frac{2\sqrt{a}\,\cos(c\,z)}{a\,z^2+b} - \frac{c\left(\text{Ci}\left(c\left(\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)\sinh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)+i\cosh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\text{Si}\left(c\left(\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)\right)}{\sqrt{b}} - \frac{c\left(\text{Ci}\left(c\left(-\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)\sinh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)-i\cosh\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\text{Si}\left(c\left(-\frac{i\sqrt{b}}{\sqrt{a}}+z\right)\right)\right)}{\sqrt{b}}\right)$$

Involving $\left(a\,z^2+b\,z+c\right)^{-n}$

01.07.21.0160.01

$$\int \frac{\cos(d\,z)}{a\,z^2+b\,z+c}\,dz = \frac{1}{\sqrt{b^2-4\,a\,c}}\left(\cos\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\text{Ci}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right) - \cos\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\text{Ci}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right) + \sin\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\text{Si}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right) - \sin\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\text{Si}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right)$$

01.07.21.0161.01

$$\int \frac{z\cos(d\,z)}{a\,z^2+b\,z+c}\,dz = \frac{1}{2\,a\sqrt{b^2-4\,a\,c}}\left(\left(\sqrt{b^2-4\,a\,c}-b\right)\left(\cos\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\text{Ci}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right) + \sin\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\text{Si}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right) + \left(b+\sqrt{b^2-4\,a\,c}\right)\left(\cos\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\text{Ci}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right) + \sin\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\text{Si}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right)\right)$$

01.07.21.0162.01

$$\int \frac{\cos(d\,z)}{\left(a\,z^2+b\,z+c\right)^2}\,dz = -\frac{(b+2\,a\,z)\cos(d\,z)}{\left(b^2-4\,a\,c\right)(c+z\,(b+a\,z))}+\frac{1}{\left(b^2-4\,a\,c\right)^{3/2}}\left(\operatorname{Ci}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right.$$

$$\left.\left(-\left(2\,a\cos\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)-\sqrt{b^2-4\,a\,c}\;d\sin\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\right)\right)+\frac{1}{\left(b^2-4\,a\,c\right)^{3/2}}$$

$$\left(\operatorname{Ci}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\left(2\,a\cos\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)+\sqrt{b^2-4\,a\,c}\;d\sin\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\right)+$$

$$\left(-\frac{d\cos\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)}{b^2-4\,a\,c}-\frac{2\,a\sin\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)}{\left(b^2-4\,a\,c\right)^{3/2}}\right)\operatorname{Si}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)+$$

$$\left(\frac{2\,a\sin\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)}{\left(b^2-4\,a\,c\right)^{3/2}}-\frac{d\cos\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)}{b^2-4\,a\,c}\right)\operatorname{Si}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)$$

01.07.21.0163.01

$$\int \frac{z\cos(d\,z)}{\left(a\,z^2+b\,z+c\right)^2}\,dz = \frac{(2\,c+b\,z)\cos(d\,z)}{\left(b^2-4\,a\,c\right)(c+z\,(b+a\,z))} + \frac{1}{2\,a\left(b^2-4\,a\,c\right)^{3/2}}\left(\left(2\,a\,b\cos\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)+\left(b^2-\sqrt{b^2-4\,a\,c}\;b-4\,a\,c\right)d\sin\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\operatorname{Ci}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right) + \frac{1}{2\,a\left(b^2-4\,a\,c\right)^{3/2}}\left(\left(-2\,a\,b\cos\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)-\left(b^2+\sqrt{b^2-4\,a\,c}\;b-4\,a\,c\right)d\sin\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\operatorname{Ci}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right) + \frac{1}{2\,a\left(b^2-4\,a\,c\right)^{3/2}}\left(\left(\left(-b^2+\sqrt{b^2-4\,a\,c}\;b+4\,a\,c\right)d\cos\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)+2\,a\,b\sin\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\operatorname{Si}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right) + \frac{1}{2\,a\left(b^2-4\,a\,c\right)^{3/2}}\left(\left(\left(b^2+\sqrt{b^2-4\,a\,c}\;b-4\,a\,c\right)d\cos\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)-2\,a\,b\sin\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\operatorname{Si}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right)$$

Involving algebraic functions

Involving $(a\,z+b)^{\beta}$

01.07.21.0164.01

$$\int (b+a\,z)^{\beta}\cos(d+c\,z)\,dz = -\frac{1}{2\,c}\left(i\,(b+a\,z)^{\beta}\left(\frac{c^2\,(b+a\,z)^2}{a^2}\right)^{-\beta}\left(\left(\frac{i\,c\,(b+a\,z)}{a}\right)^{\beta}\Gamma\!\left(\beta+1,-\frac{i\,c\,(b+a\,z)}{a}\right)\left(\cos\!\left(\frac{b\,c}{a}-d\right)-i\sin\!\left(\frac{b\,c}{a}-d\right)\right)-\left(-\frac{i\,c\,(b+a\,z)}{a}\right)^{\beta}\Gamma\!\left(\beta+1,\frac{i\,c\,(b+a\,z)}{a}\right)\left(\cos\!\left(\frac{b\,c}{a}-d\right)+i\sin\!\left(\frac{b\,c}{a}-d\right)\right)\right)\right)$$

01.07.21.0165.01

$$\int (b+a\,z)^{\beta}\cos(c\,z)\,dz = \frac{i\,(b+a\,z)^{\beta}}{2\,c}\left(\frac{c^2\,(b+a\,z)^2}{a^2}\right)^{-\beta}\left(\left(-\frac{i\,c\,(b+a\,z)}{a}\right)^{\beta}\Gamma\!\left(\beta+1,\frac{i\,c\,(b+a\,z)}{a}\right)\left(\cos\!\left(\frac{b\,c}{a}\right)+i\sin\!\left(\frac{b\,c}{a}\right)\right)-\left(\frac{i\,c\,(b+a\,z)}{a}\right)^{\beta}\Gamma\!\left(\beta+1,-\frac{i\,c\,(b+a\,z)}{a}\right)\left(\cos\!\left(\frac{b\,c}{a}\right)-i\sin\!\left(\frac{b\,c}{a}\right)\right)\right)$$

01.07.21.0166.01

$$\int (a\,z+b)^{3/2}\cos(c\,z)\,dz = \frac{1}{4\,c^3}\left(\sqrt{b+a\,z}\,\left(4\,(b+a\,z)\sin(c\,z)\,c^2+6\,a\cos(c\,z)\,c\right)-3\,a^2\sqrt{\frac{c}{a}}\,\sqrt{2\,\pi}\left(\cos\!\left(\frac{b\,c}{a}\right)C\!\left(\sqrt{\frac{c}{a}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{b+a\,z}\right)+S\!\left(\sqrt{\frac{c}{a}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{b+a\,z}\right)\sin\!\left(\frac{b\,c}{a}\right)\right)\right)$$

01.07.21.0167.01

$$\int \sqrt{a\,z+b}\,\cos(c\,z)\,dz = \frac{1}{2\,c\sqrt{\frac{c}{a}}}\left(-\sqrt{2\,\pi}\,\cos\!\left(\frac{b\,c}{a}\right)S\!\left(\sqrt{\frac{c}{a}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{b+a\,z}\right)+\sqrt{2\,\pi}\,C\!\left(\sqrt{\frac{c}{a}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{b+a\,z}\right)\sin\!\left(\frac{b\,c}{a}\right)+2\sqrt{\frac{c}{a}}\,\sqrt{b+a\,z}\,\sin(c\,z)\right)$$

01.07.21.0168.01

$$\int \frac{\cos(c\,z)}{\sqrt{a\,z+b}}\,dz = \frac{1}{c}\left(\sqrt{\frac{c}{a}}\,\sqrt{2\,\pi}\left(\cos\!\left(\frac{b\,c}{a}\right)C\!\left(\sqrt{\frac{c}{a}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{b+a\,z}\right)+S\!\left(\sqrt{\frac{c}{a}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{b+a\,z}\right)\sin\!\left(\frac{b\,c}{a}\right)\right)\right)$$

01.07.21.0169.01

$$\int \frac{\cos(c\,z)}{(a\,z+b)^{3/2}}\,dz = \frac{1}{a}\left(2\left(-\frac{\cos(c\,z)}{\sqrt{b+a\,z}}-\sqrt{\frac{c}{a}}\,\sqrt{2\,\pi}\,\cos\!\left(\frac{b\,c}{a}\right)S\!\left(\sqrt{\frac{c}{a}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{b+a\,z}\right)+\sqrt{\frac{c}{a}}\,\sqrt{2\,\pi}\,C\!\left(\sqrt{\frac{c}{a}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{b+a\,z}\right)\sin\!\left(\frac{b\,c}{a}\right)\right)\right)$$

Involving exponential function

Involving exp

Involving $a^{b\,z}\cos(c\,z)$

01.07.21.0170.01

$$\int a^{b z} \cos(c z) \, dz = \frac{a^{b z} (b \cos(c z) \log(a) + c \sin(c z))}{c^2 + b^2 \log^2(a)}$$

01.07.21.0171.01

$$\int e^{b z} \cos(c z) \, dz = \frac{e^{b z} (b \cos(c z) + c \sin(c z))}{b^2 + c^2}$$

01.07.21.0172.01

$$\int e^{i a z} \cos(a z) \, dz = -\frac{i e^{2 i a z}}{4 a} + \frac{z}{2}$$

01.07.21.0173.01

$$\int e^{-i a z} \cos(a z) \, dz = \frac{i e^{-2 i a z}}{4 a} + \frac{z}{2}$$

01.07.21.0174.01

$$\int e^{-a z} \cos(a z) \, dz = \frac{e^{-a z} (\sin(a z) - \cos(a z))}{2 a}$$

Involving $a^{b z+e} \cos(c z)$

01.07.21.0175.01

$$\int a^{e+b z} \cos(c z) \, dz = \frac{a^{e+b z} (b \cos(c z) \log(a) + c \sin(c z))}{c^2 + b^2 \log^2(a)}$$

01.07.21.0176.01

$$\int e^{e+b z} \cos(c z) \, dz = \frac{e^{e+b z} (b \cos(c z) + c \sin(c z))}{b^2 + c^2}$$

01.07.21.0177.01

$$\int e^{e-i a z} \cos(a z) \, dz = \frac{e^e \left(i e^{-2 i a z} + 2 a z\right)}{4 a}$$

01.07.21.0178.01

$$\int e^{e+i a z} \cos(a z) \, dz = \frac{e^e \left(-i e^{2 i a z} + 2 a z\right)}{4 a}$$

Involving $a^{b z} \cos(c z + d)$

01.07.21.0179.01

$$\int a^{b z} \cos(d + c z) \, dz = \frac{a^{b z} (b \cos(d + c z) \log(a) + c \sin(d + c z))}{c^2 + b^2 \log^2(a)}$$

01.07.21.0180.01

$$\int e^{b z} \cos(d + c z) \, dz = \frac{e^{b z} (b \cos(d + c z) + c \sin(d + c z))}{b^2 + c^2}$$

01.07.21.0181.01

$$\int e^{-i a z} \cos(d + a z) \, dz = \frac{i e^{-i (d+2 a z)} + 2 a e^{i d} z}{4 a}$$

01.07.21.0182.01

$$\int e^{i a z} \cos(d + a z)\, dz = \frac{e^{-i d}\left(-i\, e^{2 i (d + a z)} + 2 a z\right)}{4 a}$$

Involving $a^{b z + e} \cos(c z + d)$

01.07.21.0183.01

$$\int a^{e + b z} \cos(d + c z)\, dz = \frac{a^{e + b z} (b \cos(d + c z) \log(a) + c \sin(d + c z))}{c^2 + b^2 \log^2(a)}$$

01.07.21.0184.01

$$\int e^{e + b z} \cos(d + c z)\, dz = \frac{e^{e + b z} (b \cos(d + c z) + c \sin(d + c z))}{b^2 + c^2}$$

01.07.21.0185.01

$$\int e^{e - i a z} \cos(d + a z)\, dz = \frac{e^{e}\left(i\, e^{-i (d + 2 a z)} + 2 a\, e^{i d} z\right)}{4 a}$$

01.07.21.0186.01

$$\int e^{e + i a z} \cos(d + a z)\, dz = \frac{e^{e - i d}\left(-i\, e^{2 i (d + a z)} + 2 a z\right)}{4 a}$$

Involving $a^{b z^r} \cos(c z)$

01.07.21.0187.01

$$\int a^{b z^2} \cos(c z)\, dz = \frac{e^{\frac{c^2}{4 b \log(a)}} \sqrt{\pi}}{4 \sqrt{b} \log^{\frac{1}{2}}(a)} \left(\operatorname{erfi}\left(\frac{-i c + 2 b z \log(a)}{2 \sqrt{b} \log^{\frac{1}{2}}(a)}\right) - \operatorname{erfi}\left(\frac{-i c - 2 b z \log(a)}{2 \sqrt{b} \log^{\frac{1}{2}}(a)}\right)\right)$$

01.07.21.0188.01

$$\int e^{b z^2} \cos(c z)\, dz = \frac{e^{\frac{c^2}{4 b}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{-i c + 2 b z}{2 \sqrt{b}}\right) + \operatorname{erfi}\left(\frac{i c + 2 b z}{2 \sqrt{b}}\right)\right)}{4 \sqrt{b}}$$

01.07.21.0189.01

$$\int a^{\sqrt{z}\, b} \cos(c z)\, dz = -\frac{1}{4}\left(-\frac{4 a^{b \sqrt{z}} \sin(c z)}{c} + \frac{b\, e^{-\frac{i b^2 \log^2(a)}{4 c}} \sqrt{\pi} \operatorname{erfi}\left(\frac{-2 i c \sqrt{z} + b \log(a)}{2 \sqrt{-i c}}\right) \log(a)}{(-i c)^{3/2}} + \frac{b\, e^{\frac{i b^2 \log^2(a)}{4 c}} \sqrt{\pi} \operatorname{erfi}\left(\frac{2 i c \sqrt{z} + b \log(a)}{2 \sqrt{i c}}\right) \log(a)}{(i c)^{3/2}}\right)$$

01.07.21.0190.01

$$\int e^{\sqrt{z}\, b} \cos(c z)\, dz = -\frac{1}{4}\left(-\frac{4 e^{b \sqrt{z}} \sin(c z)}{c} + \frac{b\, e^{-\frac{i b^2}{4 c}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b - 2 i c \sqrt{z}}{2 \sqrt{-i c}}\right)}{(-i c)^{3/2}} + \frac{b\, e^{\frac{i b^2}{4 c}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b + 2 i c \sqrt{z}}{2 \sqrt{i c}}\right)}{(i c)^{3/2}}\right)$$

Involving $a^{b z^r+e} \cos(c z)$

01.07.21.0191.01

$$\int a^{b z^2+e} \cos(c z) \, dz = \frac{a^e \, e^{\frac{c^2}{4 b \log(a)}} \sqrt{\pi}}{4 \sqrt{b} \log^{\frac{1}{2}}(a)} \left(\operatorname{erfi}\left(\frac{-i c + 2 b z \log(a)}{2 \sqrt{b} \log^{\frac{1}{2}}(a)} \right) - \operatorname{erfi}\left(\frac{-i c - 2 b z \log(a)}{2 \sqrt{b} \log^{\frac{1}{2}}(a)} \right) \right)$$

01.07.21.0192.01

$$\int e^{b z^2+e} \cos(c z) \, dz = \frac{e^{\frac{c^2}{4 b}+e} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{-i c+2 b z}{2 \sqrt{b}} \right) + \operatorname{erfi}\left(\frac{i c+2 b z}{2 \sqrt{b}} \right) \right)}{4 \sqrt{b}}$$

01.07.21.0193.01

$$\int a^{\sqrt{z} \, b+e} \cos(c z) \, dz = -\frac{1}{4} a^e \left(-\frac{4 a^{b \sqrt{z}} \sin(c z)}{c} + \frac{b \, e^{-\frac{i b^2 \log^2(a)}{4 c}} \sqrt{\pi} \operatorname{erfi}\left(\frac{-2 i c \sqrt{z} + b \log(a)}{2 \sqrt{-i c}} \right) \log(a)}{(-i c)^{3/2}} + \frac{b \, e^{\frac{i b^2 \log^2(a)}{4 c}} \sqrt{\pi} \operatorname{erfi}\left(\frac{2 i c \sqrt{z} + b \log(a)}{2 \sqrt{i c}} \right) \log(a)}{(i c)^{3/2}} \right)$$

01.07.21.0194.01

$$\int e^{\sqrt{z} \, b+e} \cos(c z) \, dz = -\frac{1}{4} e^e \left(-\frac{4 e^{b \sqrt{z}} \sin(c z)}{c} + \frac{b \, e^{-\frac{i b^2}{4 c}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b-2 i c \sqrt{z}}{2 \sqrt{-i c}} \right)}{(-i c)^{3/2}} + \frac{b \, e^{\frac{i b^2}{4 c}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+2 i c \sqrt{z}}{2 \sqrt{i c}} \right)}{(i c)^{3/2}} \right)$$

Involving $a^{b z^r+d z} \cos(c z)$

01.07.21.0195.01

$$\int a^{b z^2+d z} \cos(c z) \, dz = \frac{1}{4 \sqrt{b} \log^{\frac{1}{2}}(a)} \left(a^{-\frac{d^2}{4 b}} e^{\frac{c (c-2 i d \log(a))}{4 b \log(a)}} \sqrt{\pi} \left(e^{\frac{i c d}{b}} \operatorname{erfi}\left(\frac{-i c + (d + 2 b z) \log(a)}{2 \sqrt{b} \log^{\frac{1}{2}}(a)} \right) - \operatorname{erfi}\left(\frac{-i c - (d + 2 b z) \log(a)}{2 \sqrt{b} \log^{\frac{1}{2}}(a)} \right) \right) \right)$$

01.07.21.0196.01

$$\int e^{b z^2+d z} \cos(c z) \, dz = \frac{\sqrt{\pi} \, e^{-\frac{(c-i d)^2}{4 b}} \left(e^{\frac{i c d}{b}} \operatorname{erfi}\left(\frac{d-i c+2 b z}{2 \sqrt{b}} \right) + \operatorname{erfi}\left(\frac{d+i c+2 b z}{2 \sqrt{b}} \right) \right)}{4 \sqrt{b}}$$

01.07.21.0197.01

$$\int a^{\sqrt{z}\,b+d\,z}\cos(c\,z)\,dz = -\frac{1}{4}\left(2\,e^{-i\,c\,z}\,i\left(\frac{e^{2\,i\,c\,z}}{c-i\,d\log(a)}-\frac{1}{c+d\,i\log(a)}\right)a^{\sqrt{z}\,b+d\,z}+\frac{b\,e^{-\frac{b^2\log^2(a)}{-4\,i\,c+4\,d\log(a)}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-2\,i\,c\sqrt{z}+\left(b+2\,d\sqrt{z}\right)\log(a)}{2\sqrt{-i\,c+d\log(a)}}\right)\log(a)}{(-i\,c+d\log(a))^{3/2}}+\frac{b\,e^{-\frac{b^2\log^2(a)}{4\,i\,c+4\,d\log(a)}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b\log(a)+2\sqrt{z}\,(i\,c+d\log(a))}{2\sqrt{i\,c+d\log(a)}}\right)\log(a)}{(i\,c+d\log(a))^{3/2}}\right)$$

01.07.21.0198.01

$$\int e^{\sqrt{z}\,b+d\,z}\cos(c\,z)\,dz = -\frac{1}{4}\left(2\,i\,e^{\sqrt{z}\,b-i\,c\,z+d\,z}\left(\frac{e^{2\,i\,c\,z}}{c-i\,d}-\frac{1}{c+i\,d}\right)+\frac{b\,e^{-\frac{b^2}{4\,d-4\,i\,c}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b-2\,i\,c\sqrt{z}+2\,d\sqrt{z}}{2\sqrt{d-i\,c}}\right)}{(d-i\,c)^{3/2}}+\frac{b\,e^{-\frac{b^2}{4\,d+4\,i\,c}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+2\,(d+i\,c)\sqrt{z}}{2\sqrt{d+i\,c}}\right)}{(d+i\,c)^{3/2}}\right)$$

Involving $a^{b\,z^r+d\,z+e}\cos(c\,z)$

01.07.21.0199.01

$$\int a^{b\,z^2+d\,z+e}\cos(c\,z)\,dz = \frac{1}{4\sqrt{b}\,\log^{\frac{1}{2}}(a)}\left(a^{e-\frac{d^2}{4\,b}}\,e^{\frac{c\,(c-2\,i\,d\log(a))}{4\,b\log(a)}}\sqrt{\pi}\left(e^{\frac{i\,c\,d}{b}}\operatorname{erfi}\left(\frac{-i\,c+(d+2\,b\,z)\log(a)}{2\sqrt{b}\,\log^{\frac{1}{2}}(a)}\right)-\operatorname{erfi}\left(\frac{-i\,c-(d+2\,b\,z)\log(a)}{2\sqrt{b}\,\log^{\frac{1}{2}}(a)}\right)\right)\right)$$

01.07.21.0200.01

$$\int e^{b\,z^2+d\,z+e}\cos(c\,z)\,dz = \frac{\sqrt{\pi}\,e^{\frac{(c-i\,d)^2}{4\,b}+e}\left(e^{\frac{i\,c\,d}{b}}\operatorname{erfi}\left(\frac{d-i\,c+2\,b\,z}{2\sqrt{b}}\right)+\operatorname{erfi}\left(\frac{d+i\,c+2\,b\,z}{2\sqrt{b}}\right)\right)}{4\sqrt{b}}$$

01.07.21.0201.01

$$\int a^{\sqrt{z}\,b+d\,z+e}\cos(c\,z)\,dz = -\frac{1}{4}\,a^e\left(2\,e^{-i\,c\,z}\,i\left(\frac{e^{2\,i\,c\,z}}{c-i\,d\log(a)}-\frac{1}{c+d\,i\log(a)}\right)a^{\sqrt{z}\,b+d\,z}+\frac{b\,e^{-\frac{b^2\log^2(a)}{-4\,i\,c+4\,d\log(a)}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-2\,i\,c\sqrt{z}+\left(b+2\,d\sqrt{z}\right)\log(a)}{2\sqrt{-i\,c+d\log(a)}}\right)\log(a)}{(-i\,c+d\log(a))^{3/2}}+\frac{b\,e^{-\frac{b^2\log^2(a)}{4\,i\,c+4\,d\log(a)}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b\log(a)+2\sqrt{z}\,(i\,c+d\log(a))}{2\sqrt{i\,c+d\log(a)}}\right)\log(a)}{(i\,c+d\log(a))^{3/2}}\right)$$

01.07.21.0202.01

$$\int e^{\sqrt{z}\,b+d\,z+e}\cos(c\,z)\,dz = -\frac{1}{4}\,e^{e}\left(2\,i\,e^{\sqrt{z}\,b-i\,c\,z+d\,z}\left(\frac{e^{2\,i\,c\,z}}{c-i\,d}-\frac{1}{c+i\,d}\right)+\frac{b\,e^{-\frac{b^2}{4\,d-4\,i\,c}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{b-2\,i\,c\,\sqrt{z}+2\,d\,\sqrt{z}}{2\,\sqrt{d-i\,c}}\right)}{(d-i\,c)^{3/2}}+\frac{b\,e^{-\frac{b^2}{4\,d+4\,i\,c}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{b+2\,(d+i\,c)\,\sqrt{z}}{2\,\sqrt{d+i\,c}}\right)}{(d+i\,c)^{3/2}}\right)$$

Involving $a^{b\,z^r}\cos(f\,z+g)$

01.07.21.0203.01

$$\int a^{b\,z^2}\cos(f\,z+g)\,dz = \frac{e^{\frac{f^2-4\,i\,b\,g\log(a)}{4\,b\log(a)}}\sqrt{\pi}\left(\mathrm{erfi}\left(\frac{-i\,f+2\,b\,z\log(a)}{2\,\sqrt{b\log(a)}}\right)+e^{2\,i\,g}\,\mathrm{erfi}\left(\frac{i\,f+2\,b\,z\log(a)}{2\,\sqrt{b\log(a)}}\right)\right)}{4\,\sqrt{b\log(a)}}$$

01.07.21.0204.01

$$\int e^{b\,z^2}\cos(f\,z+g)\,dz = \frac{e^{-\frac{-f^2+4\,i\,b\,g}{4\,b}}\sqrt{\pi}\left(\mathrm{erfi}\left(\frac{-i\,f+2\,b\,z}{2\,\sqrt{b}}\right)+e^{2\,i\,g}\,\mathrm{erfi}\left(\frac{i\,f+2\,b\,z}{2\,\sqrt{b}}\right)\right)}{4\,\sqrt{b}}$$

01.07.21.0205.01

$$\int a^{\sqrt{z}\,b}\cos(f\,z+g)\,dz = -\frac{1}{4}\,e^{-i\,g}\left(2\,e^{-i\,f\,z}\left(\frac{e^{2\,i\,(g+f\,z)}}{f}-\frac{1}{f}\right)i\,a^{b\,\sqrt{z}}+\frac{b\,e^{-\frac{i\,b^2\log^2(a)}{4\,f}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{-2\,i\,f\,\sqrt{z}+b\log(a)}{2\,\sqrt{-i\,f}}\right)\log(a)}{(-i\,f)^{3/2}}+\frac{b\,e^{\frac{b^2\,i\log^2(a)}{4\,f}+2\,i\,g}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{2\,i\,f\,\sqrt{z}+b\log(a)}{2\,\sqrt{i\,f}}\right)\log(a)}{(i\,f)^{3/2}}\right)$$

01.07.21.0206.01

$$\int e^{\sqrt{z}\,b}\cos(g+f\,z)\,dz = -\frac{1}{4}\,e^{-i\,g}\left(2\,i\,e^{b\,\sqrt{z}-i\,f\,z}\left(\frac{e^{2\,i\,(g+f\,z)}}{f}-\frac{1}{f}\right)+\frac{b\,e^{-\frac{i\,b^2}{4\,f}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{b-2\,i\,f\,\sqrt{z}}{2\,\sqrt{-i\,f}}\right)}{(-i\,f)^{3/2}}+\frac{b\,e^{\frac{i\,b^2}{4\,f}+2\,i\,g}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{b+2\,i\,f\,\sqrt{z}}{2\,\sqrt{i\,f}}\right)}{(i\,f)^{3/2}}\right)$$

Involving $a^{b\,z^r+e}\cos(f\,z+g)$

01.07.21.0207.01

$$\int a^{b z^2+e} \cos(f z+g)\, dz = \frac{a^e\, e^{\frac{f^2-4 i b g \log(a)}{4 b \log(a)}} \sqrt{\pi} \left(\text{erfi}\left(\frac{-i f+2 b z \log(a)}{2 \sqrt{b \log(a)}}\right)+e^{2 i g}\, \text{erfi}\left(\frac{i f+2 b z \log(a)}{2 \sqrt{b \log(a)}}\right)\right)}{4 \sqrt{b \log(a)}}$$

01.07.21.0208.01

$$\int e^{b z^2+e} \cos(f z+g)\, dz = \frac{e^{-\frac{-f^2-4 b e+4 i b g}{4 b}} \sqrt{\pi} \left(\text{erfi}\left(\frac{-i f+2 b z}{2 \sqrt{b}}\right)+e^{2 i g}\, \text{erfi}\left(\frac{i f+2 b z}{2 \sqrt{b}}\right)\right)}{4 \sqrt{b}}$$

01.07.21.0209.01

$$\int a^{\sqrt{z}\, b+e} \cos(f z+g)\, dz = -\frac{1}{4} a^e\, e^{-i g} \left(2\, e^{-i f z} \left(\frac{e^{2 i (g+f z)}}{f}-\frac{1}{f}\right) i\, a^{b \sqrt{z}} + \frac{b\, e^{-\frac{i b^2 \log^2(a)}{4 f}} \sqrt{\pi}\, \text{erfi}\left(\frac{-2 i f \sqrt{z}+b \log(a)}{2 \sqrt{-i f}}\right) \log(a)}{(-i f)^{3/2}} + \frac{b\, e^{\frac{b^2 i \log^2(a)}{4 f}+2 i g} \sqrt{\pi}\, \text{erfi}\left(\frac{2 i f \sqrt{z}+b \log(a)}{2 \sqrt{i f}}\right) \log(a)}{(i f)^{3/2}}\right)$$

01.07.21.0210.01

$$\int e^{\sqrt{z}\, b+e} \cos(g+f z)\, dz = -\frac{1}{4} e^{e-i g} \left(2 i\, e^{b \sqrt{z}-i f z} \left(\frac{e^{2 i (g+f z)}}{f}-\frac{1}{f}\right) + \frac{b\, e^{-\frac{i b^2}{4 f}} \sqrt{\pi}\, \text{erfi}\left(\frac{b-2 i f \sqrt{z}}{2 \sqrt{-i f}}\right)}{(-i f)^{3/2}} + \frac{b\, e^{\frac{i b^2}{4 f}+2 i g} \sqrt{\pi}\, \text{erfi}\left(\frac{b+2 i f \sqrt{z}}{2 \sqrt{i f}}\right)}{(i f)^{3/2}}\right)$$

Involving $a^{b z^r+d z} \cos(f z+g)$

01.07.21.0211.01

$$\int a^{b z^2+d z} \cos(f z+g)\, dz = \frac{1}{4 \sqrt{b \log(a)}} \left(a^{-\frac{d^2}{4 b}}\, e^{\frac{f^2-2 i (d f+2 b g) \log(a)}{4 b \log(a)}} \sqrt{\pi} \left(e^{\frac{i d f}{b}}\, \text{erfi}\left(\frac{-i f+(d+2 b z) \log(a)}{2 \sqrt{b \log(a)}}\right)+e^{2 i g}\, \text{erfi}\left(\frac{i f+(d+2 b z) \log(a)}{2 \sqrt{b \log(a)}}\right)\right)\right)$$

01.07.21.0212.01

$$\int e^{b z^2+d z} \cos(f z+g)\, dz = \frac{e^{-\frac{d^2+2 i f d-f^2+4 i b g}{4 b}} \sqrt{\pi} \left(e^{2 i g}\, \text{erfi}\left(\frac{d+i f+2 b z}{2 \sqrt{b}}\right)+e^{\frac{i d f}{b}}\, \text{erfi}\left(\frac{d-i f+2 b z}{2 \sqrt{b}}\right)\right)}{4 \sqrt{b}}$$

01.07.21.0213.01

$$\int a^{\sqrt{z}\, b+d\, z} \cos(f\, z+g)\, dz = -\frac{1}{4} e^{-i g} \left(2 e^{-i f z} i \left(\frac{e^{2 i (g+f z)}}{f - i\, d \log(a)} - \frac{1}{f + d\, i \log(a)}\right) a^{\sqrt{z}\, b+d\, z} + \frac{b\, e^{-\frac{b^2 \log^2(a)}{-4 i f+4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-2 i f \sqrt{z} + \left(b+2 d \sqrt{z}\right) \log(a)}{2 \sqrt{-i f+d \log(a)}}\right) \log(a)}{(-i\, f + d \log(a))^{3/2}} + \frac{b\, e^{2 i g-\frac{b^2 \log^2(a)}{4 i f+4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b \log(a)+2 \sqrt{z}\, (i f+d \log(a))}{2 \sqrt{i f+d \log(a)}}\right) \log(a)}{(i\, f + d \log(a))^{3/2}}\right)$$

01.07.21.0214.01

$$\int e^{\sqrt{z}\, b+d\, z} \cos(g+f\, z)\, dz = -\frac{1}{4} e^{-i g} \left(2 i\, e^{\sqrt{z}\, b+d z-i f z} \left(\frac{e^{2 i (g+f z)}}{f - i\, d} - \frac{1}{f + i\, d}\right) + \frac{b\, e^{2 i g-\frac{b^2}{4 d+4 i f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2 (d+i f) \sqrt{z}}{2 \sqrt{d+i f}}\right)}{(d+i\, f)^{3/2}} + \frac{b\, e^{-\frac{b^2}{4 d-4 i f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2 d \sqrt{z} - 2 i f \sqrt{z}}{2 \sqrt{d-i f}}\right)}{(d-i\, f)^{3/2}}\right)$$

Involving $a^{b z^r+d z+e} \cos(f\, z+g)$

01.07.21.0215.01

$$\int a^{b z^2+d z+e} \cos(f\, z+g)\, dz = \frac{1}{4 \sqrt{b \log(a)}} \left(a^{e-\frac{d^2}{4 b}} e^{\frac{f^2-2 i (d f+2 b g) \log(a)}{4 b \log(a)}} \sqrt{\pi} \left(e^{\frac{i d f}{b}} \operatorname{erfi}\left(\frac{-i\, f + (d+2\, b\, z) \log(a)}{2 \sqrt{b \log(a)}}\right) + e^{2 i g} \operatorname{erfi}\left(\frac{i\, f + (d+2\, b\, z) \log(a)}{2 \sqrt{b \log(a)}}\right)\right)\right)$$

01.07.21.0216.01

$$\int e^{b z^2+d z+e} \cos(f\, z+g)\, dz = \frac{e^{-\frac{d^2+2 i f d-f^2-4 b e+4 i b g}{4 b}} \sqrt{\pi} \left(e^{2 i g} \operatorname{erfi}\left(\frac{d+i f+2 b z}{2 \sqrt{b}}\right) + e^{\frac{i d f}{b}} \operatorname{erfi}\left(\frac{d-i f+2 b z}{2 \sqrt{b}}\right)\right)}{4 \sqrt{b}}$$

01.07.21.0217.01

$$\int a^{\sqrt{z}\, b+d\,z+e} \cos(f\,z+g)\,dz = -\frac{1}{4} a^e\, e^{-i\,g} \left(2\, e^{-i\,f\,z}\, i \left(\frac{e^{2\,i\,(g+f\,z)}}{f-i\,d\log(a)} - \frac{1}{f+d\,i\log(a)}\right) a^{\sqrt{z}\, b+d\,z} + \frac{b\, e^{-\frac{b^2 \log^2(a)}{-4\,i\,f+4\,d\log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-2\,i\,f\sqrt{z}+\left(b+2\,d\sqrt{z}\right)\log(a)}{2\sqrt{-i\,f+d\log(a)}}\right)\log(a)}{(-i\,f+d\log(a))^{3/2}} + \frac{b\, e^{2\,i\,g-\frac{b^2\log^2(a)}{4\,i\,f+4\,d\log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b\log(a)+2\sqrt{z}\,(i\,f+d\log(a))}{2\sqrt{i\,f+d\log(a)}}\right)\log(a)}{(i\,f+d\log(a))^{3/2}}\right)$$

01.07.21.0218.01

$$\int e^{\sqrt{z}\, b+d\,z+e} \cos(g+f\,z)\,dz = -\frac{1}{4} e^{e-i\,g} \left(2\,i\, e^{\sqrt{z}\, b+d\,z-i\,f\,z} \left(\frac{e^{2\,i\,(g+f\,z)}}{f-i\,d} - \frac{1}{f+i\,d}\right) + \frac{b\, e^{2\,i\,g-\frac{b^2}{4\,d+4\,i\,f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2\,(d+i\,f)\sqrt{z}}{2\sqrt{d+i\,f}}\right)}{(d+i\,f)^{3/2}} + \frac{b\, e^{-\frac{b^2}{4\,d-4\,i\,f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2\,d\sqrt{z}-2\,i\,f\sqrt{z}}{2\sqrt{d-i\,f}}\right)}{(d-i\,f)^{3/2}}\right)$$

Involving $a^{b\,z} \cos(c\,z^r)$

01.07.21.0219.01

$$\int a^{b\,z} \cos\left(c\,z^2\right) dz = \frac{\sqrt{\pi}}{4\sqrt{i\,c}} \left(e^{-\frac{i\,b^2\log^2(a)}{4\,c}} \operatorname{erf}\left(\frac{2\,i\,c\,z-b\log(a)}{2\sqrt{i\,c}}\right) + e^{\frac{i\,b^2\log^2(a)}{4\,c}} \operatorname{erfi}\left(\frac{2\,i\,c\,z+b\log(a)}{2\sqrt{i\,c}}\right)\right)$$

01.07.21.0220.01

$$\int e^{b\,z} \cos\left(c\,z^2\right) dz = \frac{\sqrt{\pi}}{4\sqrt{i\,c}} \left(e^{-\frac{i\,b^2}{4\,c}} \operatorname{erf}\left(\frac{2\,i\,c\,z-b}{2\sqrt{i\,c}}\right) + e^{\frac{i\,b^2}{4\,c}} \operatorname{erfi}\left(\frac{b+2\,i\,c\,z}{2\sqrt{i\,c}}\right)\right)$$

01.07.21.0221.01

$$\int a^{b\,z} \cos\left(c\sqrt{z}\right) dz = \frac{a^{b\,z}\cos\left(c\sqrt{z}\right)}{b\log(a)} - \frac{i}{4\,(b\log(a))^{3/2}} \left(c\, e^{\frac{c^2}{4\,b\log(a)}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{i\,c+2\,b\sqrt{z}\,\log(a)}{2\sqrt{b\log(a)}}\right) + \operatorname{erfi}\left(\frac{i\,c-2\,b\sqrt{z}\,\log(a)}{2\sqrt{b\log(a)}}\right)\right)\right)$$

01.07.21.0222.01

$$\int e^{b\,z} \cos\left(c\sqrt{z}\right) dz = \frac{e^{b\,z}\cos\left(c\sqrt{z}\right)}{b} - \frac{i\,c\, e^{\frac{c^2}{4\,b}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{2\sqrt{z}\,b+i\,c}{2\sqrt{b}}\right) + \operatorname{erfi}\left(\frac{i\,c-2\,b\sqrt{z}}{2\sqrt{b}}\right)\right)}{4\,b^{3/2}}$$

Involving $a^{b\,z+e} \cos(c\,z^r)$

01.07.21.0223.01

$$\int a^{e+b z} \cos\left(c z^2\right) dz = \frac{\sqrt{\pi}\, a^e}{4\sqrt{i c}} \left(e^{-\frac{i b^2 \log^2(a)}{4 c}} \operatorname{erf}\left(\frac{2 i c z - b \log(a)}{2\sqrt{i c}}\right) + e^{\frac{i b^2 \log^2(a)}{4 c}} \operatorname{erfi}\left(\frac{2 i c z + b \log(a)}{2\sqrt{i c}}\right)\right)$$

01.07.21.0224.01

$$\int e^{e+b z} \cos\left(c z^2\right) dz = \frac{\sqrt{\pi}}{4\sqrt{i c}} \left(e^{e-\frac{i b^2}{4 c}} \operatorname{erf}\left(\frac{2 i c z - b}{2\sqrt{i c}}\right) + e^{\frac{i b^2}{4 c}+e} \operatorname{erfi}\left(\frac{b + 2 i c z}{2\sqrt{i c}}\right)\right)$$

01.07.21.0225.01

$$\int a^{b z+e} \cos\left(c\sqrt{z}\right) dz = \\ \frac{a^{e+b z} \cos\left(c\sqrt{z}\right)}{b \log(a)} - \frac{i}{4 (b \log(a))^{3/2}} \left(a^e\, c\, e^{\frac{c^2}{4 b \log(a)}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{i c + 2 b\sqrt{z} \log(a)}{2\sqrt{b \log(a)}}\right) + \operatorname{erfi}\left(\frac{i c - 2 b\sqrt{z} \log(a)}{2\sqrt{b \log(a)}}\right)\right)\right)$$

01.07.21.0226.01

$$\int e^{b z+e} \cos\left(c\sqrt{z}\right) dz = \frac{e^{e+b z} \cos\left(c\sqrt{z}\right)}{b} - \frac{i c\, e^{\frac{c^2}{4 b}+e} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{2\sqrt{z}\, b + i c}{2\sqrt{b}}\right) + \operatorname{erfi}\left(\frac{i c - 2 b\sqrt{z}}{2\sqrt{b}}\right)\right)}{4 b^{3/2}}$$

Involving $a^{b z^r} \cos\left(c z^r\right)$

01.07.21.0227.01

$$\int a^{b z^r} \cos(c z^r)\, dz = \\ -\frac{1}{2 r}\left(z\left(\Gamma\left(\frac{1}{r}, i z^r (c + b i \log(a))\right) (i z^r (c + b i \log(a)))^{-1/r} + \Gamma\left(\frac{1}{r}, z^r (-i c - b \log(a))\right) (z^r (-i c - b \log(a)))^{-1/r}\right)\right)$$

01.07.21.0228.01

$$\int e^{b z^r} \cos(c z^r)\, dz = -\frac{z}{2 r}\left(\Gamma\left(\frac{1}{r}, i (c + i b) z^r\right) (i (c + i b) z^r)^{-1/r} + (-(b + i c) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, -(b + i c) z^r\right)\right)$$

01.07.21.0229.01

$$\int a^{b z^2} \cos\left(c z^2\right) dz = \frac{1}{4}\sqrt{\pi}\left(\frac{\operatorname{erfi}\left(z\sqrt{-i c + b \log(a)}\right)}{\sqrt{-i c + b \log(a)}} + \frac{\operatorname{erfi}\left(z\sqrt{i c + b \log(a)}\right)}{\sqrt{i c + b \log(a)}}\right)$$

01.07.21.0230.01

$$\int e^{b z^2} \cos\left(c z^2\right) dz = \frac{1}{4}\sqrt{\pi}\left(\frac{\operatorname{erfi}\left(\sqrt{b + i c}\; z\right)}{\sqrt{b + i c}} + \frac{\operatorname{erfi}\left(\sqrt{b - i c}\; z\right)}{\sqrt{b - i c}}\right)$$

01.07.21.0231.01

$$\int a^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c\right) dz = \frac{1}{\left(c^2 + b^2 \log^2(a)\right)^2}\left(2 a^{\sqrt{z}\, b}\right. \\ \left.\left(\cos\left(\sqrt{z}\, c\right)\left(b^3\sqrt{z} \log^3(a) - b^2 \log^2(a) + b c^2\sqrt{z} \log(a) + c^2\right) + c\left(\sqrt{z}\, c^2 + b^2\sqrt{z} \log^2(a) - 2 b \log(a)\right) \sin\left(\sqrt{z}\, c\right)\right)\right)$$

01.07.21.0232.01

$$\int e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c\right) dz = \frac{1}{\left(b^2 + c^2\right)^2}\left(2 e^{\sqrt{z}\, b}\left(\left(\sqrt{z}\, b^3 - b^2 + c^2\sqrt{z}\, b + c^2\right) \cos\left(\sqrt{z}\, c\right) + c\left(\sqrt{z}\, b^2 - 2 b + c^2\sqrt{z}\right) \sin\left(\sqrt{z}\, c\right)\right)\right)$$

Involving $a^{b z^r+e} \cos(c z^r)$

01.07.21.0233.01

$$\int a^{b z^r+e} \cos(c z^r)\, dz = -\frac{1}{2 r}\left(a^e z\left(\Gamma\left(\frac{1}{r}, i z^r (c+b i \log(a))\right)(i z^r (c+b i \log(a)))^{-1/r} + \Gamma\left(\frac{1}{r}, z^r (-i c-b \log(a))\right)(z^r (-i c-b \log(a)))^{-1/r}\right)\right)$$

01.07.21.0234.01

$$\int e^{b z^r+e} \cos(c z^r)\, dz = -\frac{1}{2 r}\left((z e^e)\left(\Gamma\left(\frac{1}{r}, i (c+i b) z^r\right)(i (c+i b) z^r)^{-1/r} + (-(b+i c) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, -(b+i c) z^r\right)\right)\right)$$

01.07.21.0235.01

$$\int a^{b z^2+e} \cos(c z^2)\, dz = \frac{1}{4} a^e \sqrt{\pi}\left(\frac{\operatorname{erfi}\left(z \sqrt{-i c+b \log(a)}\right)}{\sqrt{-i c+b \log(a)}} + \frac{\operatorname{erfi}\left(z \sqrt{i c+b \log(a)}\right)}{\sqrt{i c+b \log(a)}}\right)$$

01.07.21.0236.01

$$\int e^{b z^2+e} \cos(c z^2)\, dz = \frac{1}{4} \sqrt{\pi}\, e^e\left(\frac{\operatorname{erfi}\left(\sqrt{b+i c}\, z\right)}{\sqrt{b+i c}} + \frac{\operatorname{erfi}\left(\sqrt{b-i c}\, z\right)}{\sqrt{b-i c}}\right)$$

01.07.21.0237.01

$$\int a^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c\right) dz = \frac{1}{\left(c^2+b^2 \log^2(a)\right)^2}\left(2 a^{\sqrt{z}\, b+e}\left(\cos\left(\sqrt{z}\, c\right)\left(b^3 \sqrt{z} \log^3(a) - b^2 \log^2(a) + b c^2 \sqrt{z} \log(a) + c^2\right) + c\left(\sqrt{z}\, c^2 + b^2 \sqrt{z} \log^2(a) - 2 b \log(a)\right)\sin\left(\sqrt{z}\, c\right)\right)\right)$$

01.07.21.0238.01

$$\int e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c\right) dz = \frac{1}{\left(b^2+c^2\right)^2}\left(2 e^{\sqrt{z}\, b+e}\left(\left(\sqrt{z}\, b^3 - b^2 + c^2 \sqrt{z}\, b + c^2\right)\cos\left(\sqrt{z}\, c\right) + c\left(\sqrt{z}\, b^2 - 2 b + c^2 \sqrt{z}\right)\sin\left(\sqrt{z}\, c\right)\right)\right)$$

Involving $a^{b z^r+d z} \cos(c z^r)$

01.07.21.0239.01

$$\int a^{b z^2+d z} \cos(c z^2)\, dz = \frac{1}{4\left(c^2+b^2 \log^2(a)\right)}\left(e^{\frac{d^2 \log^2(a)}{-4 i c-4 b \log(a)}} \sqrt{\pi}\left(\operatorname{erfi}\left(\frac{2 i c z+(d+2 b z)\log(a)}{2 \sqrt{i c+b \log(a)}}\right)\sqrt{i c+b \log(a)}\, (-i c+b \log(a)) + e^{-\frac{i c d^2 \log^2(a)}{2\left(c^2+b^2 \log^2(a)\right)}} \operatorname{erfi}\left(\frac{(d+2 b z)\log(a)-2 i c z}{2 \sqrt{-i c+b \log(a)}}\right)(i c+b \log(a))\sqrt{-i c+b \log(a)}\right)\right)$$

01.07.21.0240.01

$$\int e^{b z^2+d z} \cos(c z^2)\, dz = \frac{1}{4(b^2+c^2)} \left(e^{-\frac{b d^2}{2(b^2+c^2)}} \sqrt{\pi} \left(\sqrt{b+i c}\, (b-i c)\, e^{\frac{d^2}{4b-4ic}} \operatorname{erfi}\left(\frac{d+2(b+ic)z}{2\sqrt{b+ic}}\right) + (b+ic)\sqrt{b-ic}\, e^{\frac{d^2}{4b+4ic}} \operatorname{erfi}\left(\frac{d+2(b-ic)z}{2\sqrt{b-ic}}\right)\right)\right)$$

01.07.21.0241.01

$$\int a^{\sqrt{z}\, b+d z} \cos(c\sqrt{z})\, dz = \frac{1}{4(d\log(a))^{3/2}} \left(e^{-i c\sqrt{z}} \left(2\left(1+e^{2 i c\sqrt{z}}\right)\sqrt{d\log(a)}\, a^{\sqrt{z}\, b+d z} + e^{\frac{(c+b i \log(a))^2}{4 d \log(a)}+i c\sqrt{z}}\, i\sqrt{\pi} \operatorname{erfi}\left(\frac{-i c+\left(b+2d\sqrt{z}\right)\log(a)}{2\sqrt{d\log(a)}}\right)(c+b i \log(a)) - i\, e^{\frac{(c-i b\log(a))^2}{4 d\log(a)}+i c\sqrt{z}} \sqrt{\pi} \operatorname{erfi}\left(\frac{i c+\left(b+2d\sqrt{z}\right)\log(a)}{2\sqrt{d\log(a)}}\right)(c-i b\log(a))\right)\right)$$

01.07.21.0242.01

$$\int e^{\sqrt{z}\, b+d z} \cos(c\sqrt{z})\, dz = \frac{1}{4 d^{3/2}} \left(-(b+ic)\, e^{-\frac{(b+ic)^2}{4d}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+ic+2d\sqrt{z}}{2\sqrt{d}}\right) + 2\sqrt{d}\, e^{\sqrt{z}\,(b+ic)+d z} + 2\sqrt{d}\, e^{\sqrt{z}\,(b-ic)+d z} - (b-ic)\, e^{-\frac{(b-ic)^2}{4d}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b-ic+2d\sqrt{z}}{2\sqrt{d}}\right)\right)$$

Involving $a^{b z^r+d z+e} \cos(c z^r)$

01.07.21.0243.01

$$\int a^{b z^2+d z+e} \cos(c z^2)\, dz = \frac{1}{4\left(c^2+b^2\log^2(a)\right)} \left(a^e\, e^{\frac{d^2\log^2(a)}{-4 i c-4 b\log(a)}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{2 i c z+(d+2bz)\log(a)}{2\sqrt{i c+b\log(a)}}\right)\sqrt{i c+b\log(a)}\,(-i c+b\log(a)) + e^{-\frac{i c d^2\log^2(a)}{2\left(c^2+b^2\log^2(a)\right)}} \operatorname{erfi}\left(\frac{(d+2bz)\log(a)-2 i c z}{2\sqrt{-i c+b\log(a)}}\right)(i c+b\log(a))\sqrt{-i c+b\log(a)}\right)\right)$$

01.07.21.0244.01

$$\int e^{b z^2+d z+e} \cos(c z^2)\, dz = \frac{1}{4(b^2+c^2)} \left(e^{-\frac{b d^2}{2(b^2+c^2)}+e} \sqrt{\pi} \left(\sqrt{b+ic}\,(b-ic)\, e^{\frac{d^2}{4b-4ic}} \operatorname{erfi}\left(\frac{d+2(b+ic)z}{2\sqrt{b+ic}}\right) + (b+ic)\sqrt{b-ic}\, e^{\frac{d^2}{4b+4ic}} \operatorname{erfi}\left(\frac{d+2(b-ic)z}{2\sqrt{b-ic}}\right)\right)\right)$$

01.07.21.0245.01

$$\int a^{\sqrt{z}\, b+d\, z+e} \cos\left(c\sqrt{z}\right) dz = \frac{1}{4\, (d\log(a))^{3/2}} \left(a^e\, e^{-i\, c\sqrt{z}} \left(2\left(1+e^{2\, i\, c\sqrt{z}}\right)\sqrt{d\log(a)}\; a^{\sqrt{z}\, b+d\, z} + e^{\frac{(c+b\, i\log(a))^2}{4\, d\log(a)}+i\, c\sqrt{z}}\, i\sqrt{\pi}\, \mathrm{erfi}\left(\frac{-i\, c+\left(b+2\, d\sqrt{z}\right)\log(a)}{2\sqrt{d\log(a)}}\right)(c+b\, i\log(a)) - i\, e^{\frac{(c-i\, b\log(a))^2}{4\, d\log(a)}+i\, c\sqrt{z}}\sqrt{\pi}\, \mathrm{erfi}\left(\frac{i\, c+\left(b+2\, d\sqrt{z}\right)\log(a)}{2\sqrt{d\log(a)}}\right)(c-i\, b\log(a))\right)\right)$$

01.07.21.0246.01

$$\int e^{\sqrt{z}\, b+d\, z+e} \cos\left(c\sqrt{z}\right) dz = \frac{1}{4\, d^{3/2}} \left(e^e \left(-(b+i\, c)\, e^{-\frac{(b+i\, c)^2}{4\, d}}\sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+i\, c+2\, d\sqrt{z}}{2\sqrt{d}}\right) + 2\sqrt{d}\; e^{\sqrt{z}\, (b+i\, c)+d\, z} + 2\sqrt{d}\; e^{\sqrt{z}\, (b-i\, c)+d\, z} - (b-i\, c)\, e^{-\frac{(b-i\, c)^2}{4\, d}}\sqrt{\pi}\, \mathrm{erfi}\left(\frac{b-i\, c+2\, d\sqrt{z}}{2\sqrt{d}}\right)\right)\right)$$

Involving $a^{d\, z} \cos\left(c\, z^r+g\right)$

01.07.21.0247.01

$$\int a^{d\, z} \cos\left(c\, z^2+g\right) dz = \frac{1}{4\, c}\, i \left(e^{-\frac{1}{4} i \left(\frac{d^2 \log^2(a)}{c}+4\, g\right)}\sqrt{\pi} \left(\sqrt{-i\, c}\; \mathrm{erfi}\left(\frac{d\log(a)-2\, i\, c\, z}{2\sqrt{-i\, c}}\right) - \sqrt{i\, c}\; e^{\frac{1}{2} i \left(\frac{d^2 \log^2(a)}{c}+4\, g\right)}\, \mathrm{erfi}\left(\frac{2\, i\, c\, z+d\log(a)}{2\sqrt{i\, c}}\right)\right)\right)$$

01.07.21.0248.01

$$\int e^{d\, z} \cos\left(c\, z^2+g\right) dz = \frac{i \left(e^{-\frac{i\, d^2}{4\, c}-i\, g}\sqrt{\pi} \left(\sqrt{-i\, c}\; \mathrm{erfi}\left(\frac{d-2\, i\, c\, z}{2\sqrt{-i\, c}}\right) - \sqrt{i\, c}\; e^{\frac{i\left(d^2+4\, c\, g\right)}{2\, c}}\, \mathrm{erfi}\left(\frac{d+2\, i\, c\, z}{2\sqrt{i\, c}}\right)\right)\right)}{4\, c}$$

01.07.21.0249.01

$$\int a^{d\, z} \cos\left(\sqrt{z}\; c+g\right) dz = \frac{1}{4\, (d\log(a))^{3/2}} \left(e^{-i\left(\sqrt{z}\; c+g\right)} \left(2\left(1+e^{2\, i\left(\sqrt{z}\; c+g\right)}\right)\sqrt{d\log(a)}\; a^{d\, z} + c\, e^{\frac{1}{4} c \left(\frac{c}{d\log(a)}+4\, i\sqrt{z}\right)}\, i\sqrt{\pi}\, \mathrm{erfi}\left(\frac{-i\, c+2\, d\sqrt{z}\; \log(a)}{2\sqrt{d\log(a)}}\right) - i\, c\, e^{\frac{c^2}{4\, d\log(a)}+i\sqrt{z}\; c+2\, i\, g}\sqrt{\pi}\, \mathrm{erfi}\left(\frac{i\, c+2\, d\sqrt{z}\; \log(a)}{2\sqrt{d\log(a)}}\right)\right)\right)$$

01.07.21.0250.01

$$\int e^{d z}\cos\left(\sqrt{z}\,c+g\right)dz=\frac{1}{4\,d^{3/2}}\left(e^{-i\left(\sqrt{z}\,c+g\right)}\left(2\sqrt{d}\,e^{d z}\left(1+e^{2i\left(\sqrt{z}\,c+g\right)}\right)+c\,e^{\frac{c\left(c+4 i d\sqrt{z}\right)}{4d}}\sqrt{\pi}\,\mathrm{erf}\left(\frac{c+2\,i\,d\sqrt{z}}{2\sqrt{d}}\right)+c\,e^{\frac{c^2}{4d}+i\sqrt{z}\,c+2 i g}\sqrt{\pi}\,\mathrm{erf}\left(\frac{c-2\,i\,d\sqrt{z}}{2\sqrt{d}}\right)\right)\right)$$

Involving $a^{d z+e}\cos(c z^r+g)$

01.07.21.0251.01

$$\int a^{e+d z}\cos\left(c z^2+g\right)dz=\frac{1}{4c}\left(i\left(a^e\,e^{-\frac{1}{4}i\left(\frac{d^2\log^2(a)}{c}+4g\right)}\sqrt{\pi}\left(\sqrt{-i c}\;\mathrm{erfi}\left(\frac{d\log(a)-2\,i\,c\,z}{2\sqrt{-i c}}\right)-\sqrt{i c}\;e^{\frac{1}{2}i\left(\frac{d^2\log^2(a)}{c}+4g\right)}\mathrm{erfi}\left(\frac{2\,i\,c\,z+d\log(a)}{2\sqrt{i c}}\right)\right)\right)\right)$$

01.07.21.0252.01

$$\int e^{e+d z}\cos\left(c z^2+g\right)dz=\frac{i\left(e^{-\frac{i d^2}{4c}+e-i g}\sqrt{\pi}\left(\sqrt{-i c}\;\mathrm{erfi}\left(\frac{d-2 i c z}{2\sqrt{-i c}}\right)-\sqrt{i c}\;e^{\frac{i\left(d^2+4 c g\right)}{2c}}\mathrm{erfi}\left(\frac{d+2 i c z}{2\sqrt{i c}}\right)\right)\right)}{4c}$$

01.07.21.0253.01

$$\int a^{d z+e}\cos\left(\sqrt{z}\,c+g\right)dz=\frac{1}{4\,(d\log(a))^{3/2}}\left(a^e\,e^{-i\left(\sqrt{z}\,c+g\right)}\left(2\left(1+e^{2i\left(\sqrt{z}\,c+g\right)}\right)\sqrt{d\log(a)}\;a^{d z}+c\,e^{\frac{1}{4}c\left(\frac{c}{d\log(a)}+4i\sqrt{z}\right)}\,i\sqrt{\pi}\;\mathrm{erfi}\left(\frac{-i\,c+2\,d\sqrt{z}\,\log(a)}{2\sqrt{d\log(a)}}\right)-\right.\right.$$
$$\left.\left.i\,c\,e^{\frac{c^2}{4d\log(a)}+i\sqrt{z}\,c+2 i g}\sqrt{\pi}\;\mathrm{erfi}\left(\frac{i\,c+2\,d\sqrt{z}\,\log(a)}{2\sqrt{d\log(a)}}\right)\right)\right)$$

01.07.21.0254.01

$$\int e^{d z+e}\cos\left(\sqrt{z}\,c+g\right)dz=\frac{1}{4\,d^{3/2}}\left(e^{e-i\left(\sqrt{z}\,c+g\right)}\left(2\sqrt{d}\,e^{d z}\left(1+e^{2i\left(\sqrt{z}\,c+g\right)}\right)+c\,e^{\frac{c\left(c+4 i d\sqrt{z}\right)}{4d}}\sqrt{\pi}\,\mathrm{erf}\left(\frac{c+2\,i\,d\sqrt{z}}{2\sqrt{d}}\right)+c\,e^{\frac{c^2}{4d}+i\sqrt{z}\,c+2 i g}\sqrt{\pi}\,\mathrm{erf}\left(\frac{c-2\,i\,d\sqrt{z}}{2\sqrt{d}}\right)\right)\right)$$

Involving $a^{b z^r}\cos(c z^r+g)$

01.07.21.0255.01

$$\int a^{b z^r}\cos(c z^r+g)\,dz=-\frac{1}{2r}\left(e^{-i g}\,z\left(\Gamma\left(\frac{1}{r},\,i\,z^r\,(c+b\,i\log(a))\right)(i\,z^r\,(c+b\,i\log(a)))^{-1/r}+e^{2 i g}\,\Gamma\left(\frac{1}{r},\,z^r\,(-i\,c-b\log(a))\right)(z^r\,(-i\,c-b\log(a)))^{-1/r}\right)\right)$$

01.07.21.0256.01

$$\int e^{b z^r}\cos(c z^r+g)\,dz=-\frac{1}{2r}\left(z\left(e^{-i g}\,\Gamma\left(\frac{1}{r},\,i\,(c+i\,b)\,z^r\right)(i\,(c+i\,b)\,z^r)^{-1/r}+e^{i g}\,(-(b+i\,c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,-(b+i\,c)\,z^r\right)\right)\right)$$

01.07.21.0257.01

$$\int a^{b z^2} \cos(c z^2 + g)\, dz = \frac{1}{4} e^{-i g} \sqrt{\pi} \left(\frac{\operatorname{erfi}\left(z \sqrt{-i c + b \log(a)}\right)}{\sqrt{-i c + b \log(a)}} + \frac{e^{2 i g} \operatorname{erfi}\left(z \sqrt{i c + b \log(a)}\right)}{\sqrt{i c + b \log(a)}} \right)$$

01.07.21.0258.01

$$\int e^{b z^2} \cos(c z^2 + g)\, dz = \frac{1}{4} \sqrt{\pi} \left(\frac{e^{i g} \operatorname{erfi}\left(\sqrt{b + i c}\; z\right)}{\sqrt{b + i c}} + \frac{e^{-i g} \operatorname{erfi}\left(\sqrt{b - i c}\; z\right)}{\sqrt{b - i c}} \right)$$

01.07.21.0259.01

$$\int a^{\sqrt{z}\, b} \cos\left(\sqrt{z}\; c + g\right) dz = \frac{1}{\left(c^2 + b^2 \log^2(a)\right)^2} \left(2 a^{\sqrt{z}\, b} \left(\cos\left(\sqrt{z}\; c + g\right) \left(b^3 \sqrt{z}\; \log^3(a) - b^2 \log^2(a) + b c^2 \sqrt{z}\; \log(a) + c^2\right) + c \left(\sqrt{z}\; c^2 + b^2 \sqrt{z}\; \log^2(a) - 2 b \log(a)\right) \sin\left(\sqrt{z}\; c + g\right)\right)\right)$$

01.07.21.0260.01

$$\int e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\; c + g\right) dz = \frac{1}{\left(b^2 + c^2\right)^2} \left(2 e^{\sqrt{z}\, b} \left(\left(\sqrt{z}\; b^3 - b^2 + c^2 \sqrt{z}\; b + c^2\right) \cos\left(\sqrt{z}\; c + g\right) + c \left(\sqrt{z}\; b^2 - 2 b + c^2 \sqrt{z}\right) \sin\left(\sqrt{z}\; c + g\right)\right)\right)$$

Involving $a^{b z^r + e} \cos(c z^r + g)$

01.07.21.0261.01

$$\int a^{b z^r + e} \cos(c z^r + g)\, dz = -\frac{1}{2 r} \left(a^e e^{-i g} z \left(\Gamma\left(\frac{1}{r}, i z^r (c + b i \log(a))\right) (i z^r (c + b i \log(a)))^{-1/r} + e^{2 i g} \Gamma\left(\frac{1}{r}, z^r (-i c - b \log(a))\right) (z^r (-i c - b \log(a)))^{-1/r}\right)\right)$$

01.07.21.0262.01

$$\int e^{b z^r + e} \cos(c z^r + g)\, dz = -\frac{1}{2 r} \left(z \left(e^{e - i g} \Gamma\left(\frac{1}{r}, i (c + i b) z^r\right) (i (c + i b) z^r)^{-1/r} + e^{e + i g} (-(b + i c) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -(b + i c) z^r\right)\right)\right)$$

01.07.21.0263.01

$$\int a^{b z^2 + e} \cos(c z^2 + g)\, dz = \frac{1}{4} a^e e^{-i g} \sqrt{\pi} \left(\frac{\operatorname{erfi}\left(z \sqrt{-i c + b \log(a)}\right)}{\sqrt{-i c + b \log(a)}} + \frac{e^{2 i g} \operatorname{erfi}\left(z \sqrt{i c + b \log(a)}\right)}{\sqrt{i c + b \log(a)}} \right)$$

01.07.21.0264.01

$$\int e^{b z^2 + e} \cos(c z^2 + g)\, dz = \frac{1}{4} \sqrt{\pi} \left(\frac{e^{e + i g} \operatorname{erfi}\left(\sqrt{b + i c}\; z\right)}{\sqrt{b + i c}} + \frac{e^{e - i g} \operatorname{erfi}\left(\sqrt{b - i c}\; z\right)}{\sqrt{b - i c}} \right)$$

01.07.21.0265.01

$$\int a^{\sqrt{z}\, b + e} \cos\left(\sqrt{z}\; c + g\right) dz = \frac{1}{\left(c^2 + b^2 \log^2(a)\right)^2} \left(2 a^{\sqrt{z}\, b + e} \left(\cos\left(\sqrt{z}\; c + g\right) \left(b^3 \sqrt{z}\; \log^3(a) - b^2 \log^2(a) + b c^2 \sqrt{z}\; \log(a) + c^2\right) + c \left(\sqrt{z}\; c^2 + b^2 \sqrt{z}\; \log^2(a) - 2 b \log(a)\right) \sin\left(\sqrt{z}\; c + g\right)\right)\right)$$

01.07.21.0266.01

$$\int e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2+c^2\right)^2} \left(2\, e^{\sqrt{z}\, b+e} \left(\left(\sqrt{z}\, b^3-b^2+c^2 \sqrt{z}\, b+c^2\right) \cos\left(\sqrt{z}\, c+g\right)+c \left(\sqrt{z}\, b^2-2\, b+c^2 \sqrt{z}\right) \sin\left(\sqrt{z}\, c+g\right)\right)\right)$$

Involving $a^{b z^r+d z} \cos\left(c z^r+g\right)$

01.07.21.0267.01

$$\int a^{b z^2+d z} \cos\left(c z^2+g\right) dz = \frac{1}{4\left(c^2+b^2 \log^2(a)\right)} \left(e^{\frac{d^2 \log^2(a)}{-4 i c-4 b \log(a)}-i g} \sqrt{\pi} \left(e^{2 i g} \operatorname{erfi}\left(\frac{2 i c z+(d+2 b z) \log(a)}{2 \sqrt{i c+b \log(a)}}\right) \sqrt{i c+b \log(a)}\, (-i c+b \log(a))+ e^{-\frac{i c d^2 \log^2(a)}{2\left(c^2+b^2 \log^2(a)\right)}} \operatorname{erfi}\left(\frac{(d+2 b z) \log(a)-2 i c z}{2 \sqrt{-i c+b \log(a)}}\right) (i c+b \log(a)) \sqrt{-i c+b \log(a)}\right)\right)$$

01.07.21.0268.01

$$\int e^{b z^2+d z} \cos\left(c z^2+g\right) dz = \frac{1}{4\left(b^2+c^2\right)} \left(e^{-\frac{b d^2}{2\left(b^2+c^2\right)}-i g} \sqrt{\pi} \left(\sqrt{b+i c}\, (b-i c)\, e^{\frac{d^2}{4 b-4 i c}+2 i g} \operatorname{erfi}\left(\frac{d+2 (b+i c) z}{2 \sqrt{b+i c}}\right)+(b+i c) \sqrt{b-i c}\, e^{\frac{d^2}{4 b+4 i c}} \operatorname{erfi}\left(\frac{d+2 (b-i c) z}{2 \sqrt{b-i c}}\right)\right)\right)$$

01.07.21.0269.01

$$\int a^{\sqrt{z}\, b+d z} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{4 (d \log(a))^{3/2}} \left(e^{-i\left(\sqrt{z}\, c+g\right)} \left(2\left(1+e^{2 i\left(\sqrt{z}\, c+g\right)}\right) \sqrt{d \log(a)}\, a^{\sqrt{z}\, b+d z}+e^{\frac{(c+b i \log(a))^2}{4 d \log(a)}+i c \sqrt{z}}\, i \sqrt{\pi} \operatorname{erfi}\left(\frac{-i c+\left(b+2 d \sqrt{z}\right) \log(a)}{2 \sqrt{d \log(a)}}\right) (c+b i \log(a))-i\, e^{\frac{(c-i b \log(a))^2}{4 d \log(a)}+2 i g+i c \sqrt{z}} \sqrt{\pi} \operatorname{erfi}\left(\frac{i c+\left(b+2 d \sqrt{z}\right) \log(a)}{2 \sqrt{d \log(a)}}\right) (c-i b \log(a))\right)\right)$$

01.07.21.0270.01

$$\int e^{\sqrt{z}\, b+d z} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{4 d^{3/2}} \left(e^{-i g} \left(-(b+i c)\, e^{2 i g-\frac{(b+i c)^2}{4 d}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+i c+2 d \sqrt{z}}{2 \sqrt{d}}\right)+2 \sqrt{d}\, e^{\sqrt{z}\,(b+i c)+2 i g+d z}+2 \sqrt{d}\, e^{\sqrt{z}\,(b-i c)+d z}- (b-i c)\, e^{-\frac{(b-i c)^2}{4 d}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b-i c+2 d \sqrt{z}}{2 \sqrt{d}}\right)\right)\right)$$

Involving $a^{b z^r+d z+e} \cos\left(c z^r+g\right)$

01.07.21.0271.01

$$\int a^{b z^2+d z+e} \cos\left(c z^2+g\right) dz = \frac{1}{4\left(c^2+b^2 \log^2(a)\right)} \left(a^e e^{\frac{d^2 \log^2(a)}{-4 i c-4 b \log(a)}-i g} \sqrt{\pi} \left(e^{2 i g} \operatorname{erfi}\left(\frac{2 i c z+(d+2 b z) \log(a)}{2 \sqrt{i c+b \log(a)}}\right) \sqrt{i c+b \log(a)} (-i c+b \log(a))+ e^{-\frac{i c d^2 \log^2(a)}{2\left(c^2+b^2 \log^2(a)\right)}} \operatorname{erfi}\left(\frac{(d+2 b z) \log(a)-2 i c z}{2 \sqrt{-i c+b \log(a)}}\right) (i c+b \log(a)) \sqrt{-i c+b \log(a)}\right)\right)$$

01.07.21.0272.01

$$\int e^{b z^2+d z+e} \cos\left(c z^2+g\right) dz = \frac{1}{4\left(b^2+c^2\right)} \left(e^{-\frac{b d^2}{2\left(b^2+c^2\right)}+e-i g} \sqrt{\pi} \left(\sqrt{b+i c}\, (b-i c)\, e^{\frac{d^2}{4 b-4 i c}+2 i g} \operatorname{erfi}\left(\frac{d+2(b+i c) z}{2 \sqrt{b+i c}}\right)+(b+i c) \sqrt{b-i c}\, e^{\frac{d^2}{4 b+4 i c}} \operatorname{erfi}\left(\frac{d+2(b-i c) z}{2 \sqrt{b-i c}}\right)\right)\right)$$

01.07.21.0273.01

$$\int a^{\sqrt{z}\, b+d z+e} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{4 (d \log(a))^{3/2}} \left(a^e e^{-i\left(\sqrt{z}\, c+g\right)} \left(2\left(1+e^{2 i\left(\sqrt{z}\, c+g\right)}\right) \sqrt{d \log(a)}\, a^{\sqrt{z}\, b+d z}+e^{\frac{(c+b i \log(a))^2}{4 d \log(a)}+i c \sqrt{z}}\, i \sqrt{\pi} \operatorname{erfi}\left(\frac{-i c+\left(b+2 d \sqrt{z}\right) \log(a)}{2 \sqrt{d \log(a)}}\right) (c+b i \log(a))-i e^{\frac{(c-i b \log(a))^2}{4 d \log(a)}+2 i g+i c \sqrt{z}} \sqrt{\pi} \operatorname{erfi}\left(\frac{i c+\left(b+2 d \sqrt{z}\right) \log(a)}{2 \sqrt{d \log(a)}}\right) (c-i b \log(a))\right)\right)$$

01.07.21.0274.01

$$\int e^{\sqrt{z}\, b+d z+e} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{4 d^{3/2}} \left(e^{e-i g} \left(-(b+i c)\, e^{2 i g-\frac{(b+i c)^2}{4 d}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+i c+2 d \sqrt{z}}{2 \sqrt{d}}\right)+2 \sqrt{d}\, e^{\sqrt{z}\, (b+i c)+2 i g+d z}+2 \sqrt{d}\, e^{\sqrt{z}\, (b-i c)+d z}- (b-i c)\, e^{-\frac{(b-i c)^2}{4 d}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b-i c+2 d \sqrt{z}}{2 \sqrt{d}}\right)\right)\right)$$

Involving rational functions of exp

Involving $\left(a+b\, e^{d z}\right)^{-n} \cos(c z+e)$

01.07.21.0275.01

$$\int \frac{\cos(c z)}{\left(a+b\, e^{d z}\right)^n} dz = \frac{i a^{-n} e^{-i c z}}{2 c} \left({}_2F_1\left(-\frac{i c}{d}, n; 1-\frac{i c}{d}; -\frac{b\, e^{d z}}{a}\right)-e^{2 i c z}\, {}_2F_1\left(\frac{i c}{d}, n; 1+\frac{i c}{d}; -\frac{b\, e^{d z}}{a}\right)\right) /; n \in \mathbb{N}^+$$

01.07.21.0276.01

$$\int \frac{\cos(e+cz)}{\left(a+b\,e^{dz}\right)^n}\,dz = \frac{i\,a^{-n}\,e^{-i(e+cz)}}{2c}\left({}_2F_1\left(-\frac{ic}{d},n;1-\frac{ic}{d};-\frac{b\,e^{dz}}{a}\right)-e^{2i(e+cz)}\,{}_2F_1\left(\frac{ic}{d},n;1+\frac{ic}{d};-\frac{b\,e^{dz}}{a}\right)\right)\,/;\,n\in\mathbb{N}^+$$

Involving $e^{pz}\left(a+b\,e^{dz}\right)^{-n}\cos(cz+e)$

01.07.21.0277.01

$$\int \frac{e^{pz}\cos(cz)}{\left(a+b\,e^{dz}\right)^n}\,dz = \frac{a^{-n}}{2(c-ip)(-ic+p)}\left(e^{(-ic+p)z}(c-ip)\,{}_2F_1\left(\frac{-ic+p}{d},n;\frac{d-ic+p}{d};-\frac{b\,e^{dz}}{a}\right)-e^{(ic+p)z}(c+ip)\,{}_2F_1\left(\frac{ic+p}{d},n;\frac{d+ic+p}{d};-\frac{b\,e^{dz}}{a}\right)\right)\,/;\,n\in\mathbb{N}^+$$

01.07.21.0278.01

$$\int \frac{e^{pz}\cos(e+cz)}{\left(a+b\,e^{dz}\right)^n}\,dz = \frac{a^{-n}\,e^{-ie}}{2(c+ip)(ic+p)}\left(e^{2ie+(ic+p)z}(c+ip)\,{}_2F_1\left(\frac{ic+p}{d},n;\frac{d+ic+p}{d};-\frac{b\,e^{dz}}{a}\right)-e^{(-ic+p)z}(c-ip)\,{}_2F_1\left(\frac{-ic+p}{d},n;\frac{d-ic+p}{d};-\frac{b\,e^{dz}}{a}\right)\right)\,/;\,n\in\mathbb{N}^+$$

Involving algebraic functions of exp

Involving $\left(a+b\,e^{dz}\right)^\beta\cos(cz+e)$

01.07.21.0279.01

$$\int \left(a+b\,e^{dz}\right)^\beta\cos(cz)\,dz = \frac{i\,e^{-icz}\left(a+b\,e^{dz}\right)^\beta}{2c}\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\left({}_2F_1\left(-\frac{ic}{d},-\beta;1-\frac{ic}{d};-\frac{b\,e^{dz}}{a}\right)-e^{2icz}\,{}_2F_1\left(\frac{ic}{d},-\beta;1+\frac{ic}{d};-\frac{b\,e^{dz}}{a}\right)\right)$$

01.07.21.0280.01

$$\int \left(a+b\,e^{dz}\right)^\beta\cos(e+cz)\,dz = \frac{i\,e^{-i(e+cz)}\left(a+b\,e^{dz}\right)^\beta}{2c}\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\left({}_2F_1\left(-\frac{ic}{d},-\beta;1-\frac{ic}{d};-\frac{b\,e^{dz}}{a}\right)-e^{2i(e+cz)}\,{}_2F_1\left(\frac{ic}{d},-\beta;1+\frac{ic}{d};-\frac{b\,e^{dz}}{a}\right)\right)$$

Involving $e^{pz}\left(a+b\,e^{dz}\right)^\beta\cos(cz+e)$

01.07.21.0281.01

$$\int e^{pz}\left(a+b\,e^{dz}\right)^\beta\cos(cz)\,dz = \frac{1}{2(c-ip)(-ic+p)}\left(\left(a+b\,e^{dz}\right)^\beta\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\left(e^{(-ic+p)z}(c-ip)\,{}_2F_1\left(\frac{-ic+p}{d},-\beta;\frac{d-ic+p}{d};-\frac{b\,e^{dz}}{a}\right)-e^{(ic+p)z}(c+ip)\,{}_2F_1\left(\frac{ic+p}{d},-\beta;\frac{d+ic+p}{d};-\frac{b\,e^{dz}}{a}\right)\right)\right)$$

01.07.21.0282.01

$$\int e^{p z} \left(a + b e^{d z}\right)^{\beta} \cos(e + c z)\, dz = \frac{1}{2 (c + i p) (i c + p)} \left(e^{-i e} \left(a + b e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} \left(e^{2 i e + (i c + p) z} (c + i p) \, _2F_1\left(\frac{i c + p}{d}, -\beta; \frac{d + i c + p}{d}; -\frac{b e^{d z}}{a}\right) - e^{(-i c + p) z} (c - i p) \, _2F_1\left(\frac{-i c + p}{d}, -\beta; \frac{d - i c + p}{d}; -\frac{b e^{d z}}{a}\right)\right)\right)$$

Involving exponential function and a power function

Involving exp and power

Involving $z^{\alpha-1} e^{b z} \cos(c z)$

01.07.21.0283.01

$$\int z^{\alpha-1} e^{b z} \cos(c z)\, dz = \frac{1}{2} z^{\alpha} \left(-((i c - b) z)^{-\alpha} \Gamma(\alpha, (i c - b) z) - (-(i c + b) z)^{-\alpha} \Gamma(\alpha, -(i c + b) z)\right)$$

01.07.21.0284.01

$$\int z^{\alpha-1} e^{i c z} \cos(c z)\, dz = \frac{1}{2} z^{\alpha} \left(\frac{1}{\alpha} - 2^{-\alpha} (-i c z)^{-\alpha} \Gamma(\alpha, -2 i c z)\right)$$

01.07.21.0285.01

$$\int z^{\alpha-1} e^{-i c z} \cos(c z)\, dz = \frac{z^{\alpha}}{2 \alpha} - 2^{-\alpha-1} z^{\alpha} (i c z)^{-\alpha} \Gamma(\alpha, 2 i c z)$$

01.07.21.0286.01

$$\int z^{n} e^{b z} \cos(c z)\, dz = -\frac{1}{2} z^{n+1} \left(((-i c - b) z)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}((i c + b) z)}{(-n-1)!} + e^{(i c + b) z} \sum_{k=0}^{n} \frac{((-i c - b) z)^k}{(n+1)_{k-n}} - e^{(i c + b) z} \sum_{k=n+1}^{-1} \frac{((-i c - b) z)^k}{(n+1)_{k-n}}\right) + ((i c - b) z)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}((-i c + b) z)}{(-n-1)!} + e^{(-i c + b) z} \sum_{k=0}^{n} \frac{((i c - b) z)^k}{(n+1)_{k-n}} - e^{(-i c + b) z} \sum_{k=n+1}^{-1} \frac{((i c - b) z)^k}{(n+1)_{k-n}}\right)\right) /; n \in \mathbb{Z}$$

01.07.21.0287.01

$$\int z^{n} e^{b z} \cos(c z)\, dz = \frac{1}{2} n! \left(-e^{(i c + b) z} \left(\sum_{k=0}^{n} \frac{(-(i c + b) z)^k}{k!}\right) (-i c - b)^{-n-1} - (i c - b)^{-n-1} e^{(b - i c) z} \sum_{k=0}^{n} \frac{((i c - b) z)^k}{k!}\right) /; n \in \mathbb{N}$$

01.07.21.0288.01

$$\int z e^{b z} \cos(c z)\, dz = \frac{e^{b z} \left(\left(z b^3 - b^2 + c^2 z b + c^2\right) \cos(c z) + c \left(z b^2 - 2 b + c^2 z\right) \sin(c z)\right)}{\left(b^2 + c^2\right)^2}$$

01.07.21.0289.01

$$\int z e^{i c z} \cos(c z)\, dz = \frac{2 c^2 z^2 + e^{2 i c z} (1 - 2 i c z)}{8 c^2}$$

01.07.21.0290.01

$$\int z\, e^{-i c z} \cos(c z)\, dz = \frac{1}{8}\left(2 z^2 + \frac{e^{-2 i c z} (1 + 2 i c z)}{c^2}\right)$$

01.07.21.0291.01

$$\int z^2 e^{b z} \cos(c z)\, dz = \frac{1}{\left(b^2 + c^2\right)^3} \left(e^{b z} \left(\left(z^2 b^5 - 2 z b^4 + 2 \left(c^2 z^2 + 1\right) b^3 + c^2 \left(c^2 z^2 - 6\right) b + 2 c^4 z\right) \cos(c z) + c \left(z^2 b^4 - 4 z b^3 + 2 \left(c^2 z^2 + 3\right) b^2 - 4 c^2 z b + c^2 \left(c^2 z^2 - 2\right)\right) \sin(c z)\right)\right)$$

01.07.21.0292.01

$$\int z^2 e^{i c z} \cos(c z)\, dz = \frac{4 c^3 z^3 + e^{2 i c z} \left(3 i + 6 c z - 6 i c^2 z^2\right)}{24 c^3}$$

01.07.21.0293.01

$$\int z^2 e^{-i c z} \cos(c z)\, dz = \frac{z^3}{6} + \frac{e^{-2 i c z} \left(2 c^2 i z^2 + 2 c z - i\right)}{8 c^3}$$

01.07.21.0294.01

$$\int z^3 e^{b z} \cos(c z)\, dz = \frac{1}{\left(b^2 + c^2\right)^4} \left(e^{b z} \left(\left(z^3 b^7 - 3 z^2 b^6 + 3 z \left(c^2 z^2 + 2\right) b^5 - 3 \left(c^2 z^2 + 2\right) b^4 + 3 c^2 z \left(c^2 z^2 - 4\right) b^3 + 3 c^2 \left(c^2 z^2 + 12\right) b^2 + c^4 z \left(c^2 z^2 - 18\right) b + 3 c^4 \left(c^2 z^2 - 2\right)\right) \cos(c z) + c \left(z^3 b^6 - 6 z^2 b^5 + 3 z \left(c^2 z^2 + 6\right) b^4 - 12 \left(c^2 z^2 + 2\right) b^3 + 3 c^2 z \left(c^2 z^2 + 4\right) b^2 - 6 c^2 \left(c^2 z^2 - 4\right) b + c^4 z \left(c^2 z^2 - 6\right)\right) \sin(c z)\right)\right)$$

01.07.21.0295.01

$$\int z^4 e^{b z} \cos(c z)\, dz = \frac{1}{\left(b^2 + c^2\right)^5} \left(e^{b z} \left(\left(z^4 b^9 - 4 z^3 b^8 + 4 z^2 \left(c^2 z^2 + 3\right) b^7 - 8 z \left(c^2 z^2 + 3\right) b^6 + 6 \left(c^4 z^4 - 2 c^2 z^2 + 4\right) b^5 + 120 c^2 z b^4 + 4 c^2 \left(c^4 z^4 - 15 c^2 z^2 - 60\right) b^3 + 8 c^4 z \left(c^2 z^2 + 15\right) b^2 + c^4 \left(c^4 z^4 - 36 c^2 z^2 + 120\right) b + 4 c^6 z \left(c^2 z^2 - 6\right)\right) \cos(c z) + c \left(z^4 b^8 - 8 z^3 b^7 + 4 z^2 \left(c^2 z^2 + 9\right) b^6 - 24 z \left(c^2 z^2 + 4\right) b^5 + 6 \left(c^4 z^4 + 10 c^2 z^2 + 20\right) b^4 - 24 c^4 z^3 b^3 + 4 c^2 \left(c^4 z^4 + 3 c^2 z^2 - 60\right) b^2 + \left(96 c^4 z - 8 c^6 z^3\right) b + c^4 \left(c^4 z^4 - 12 c^2 z^2 + 24\right)\right) \sin(c z)\right)\right)$$

01.07.21.0296.01

$$\int z^5 e^{b z} \cos(c z)\, dz = \frac{1}{\left(b^2 + c^2\right)^6} \left(e^{b z} \left(\left(z^5 b^{11} - 5 z^4 b^{10} + 5 z^3 \left(c^2 z^2 + 4\right) b^9 - 15 z^2 \left(c^2 z^2 + 4\right) b^8 + 10 z \left(c^4 z^4 + 12\right) b^7 - 10 \left(c^4 z^4 - 24 c^2 z^2 + 12\right) b^6 + 10 c^2 z \left(c^4 z^4 - 12 c^2 z^2 - 108\right) b^5 + 10 c^2 \left(c^4 z^4 + 60 c^2 z^2 + 180\right) b^4 + 5 c^4 z \left(c^4 z^4 - 32 c^2 z^2 - 120\right) b^3 + 15 c^4 \left(c^4 z^4 + 16 c^2 z^2 - 120\right) b^2 + c^6 z \left(c^4 z^4 - 60 c^2 z^2 + 600\right) b + 5 c^6 \left(c^4 z^4 - 12 c^2 z^2 + 24\right)\right) \cos(c z) + c \left(z^5 b^{10} - 10 z^4 b^9 + 5 z^3 \left(c^2 z^2 + 12\right) b^8 - 40 z^2 \left(c^2 z^2 + 6\right) b^7 + 10 z \left(c^4 z^4 + 16 c^2 z^2 + 60\right) b^6 - 60 \left(c^4 z^4 + 4 c^2 z^2 + 12\right) b^5 + 10 c^2 z \left(c^4 z^4 + 12 c^2 z^2 - 60\right) b^4 - 40 c^2 \left(c^4 z^4 - 6 c^2 z^2 - 60\right) b^3 + 5 c^4 z \left(c^4 z^4 - 216\right) b^2 - 10 c^4 \left(c^4 z^4 - 24 c^2 z^2 + 72\right) b + c^6 z \left(c^4 z^4 - 20 c^2 z^2 + 120\right)\right) \sin(c z)\right)\right)$$

01.07.21.0297.01

$$\int z^{-n} e^{b z} \cos(c z)\, dz = -\frac{1}{2\left(b^2+c^2\right)(n-1)!} \left(e^{-2 i c z}\left((b+i c)\, e^{(b+i c) z} (n-1)! \left(\sum_{k=1}^{n-1} \frac{(i c-b)^{k-n} z^{k-n}}{(1-n)_k}\right)(i c-b)^n - (-1)^n e^{2 i c z}\left((b+i c) \operatorname{Ei}((b-i c) z)(i c-b)^n + (-b-i c)^n (b-i c) \operatorname{Ei}((b+i c) z)\right) + (-b-i c)^n (b-i c)\, e^{(b+3 i c) z} (n-1)! \sum_{k=1}^{n-1} \frac{(-b-i c)^{k-n} z^{k-n}}{(1-n)_k}\right)\right) /; n \in \mathbb{N}^+$$

01.07.21.0298.01

$$\int \frac{e^{b z} \cos(c z)}{z}\, dz = \frac{1}{2}(\operatorname{Ei}(b z-i c z)+\operatorname{Ei}(i c z+b z))$$

01.07.21.0299.01

$$\int \frac{e^{i c z} \cos(c z)}{z}\, dz = \frac{1}{2}(\operatorname{Ei}(2 i c z)+\log(z))$$

01.07.21.0300.01

$$\int \frac{e^{-i c z} \cos(c z)}{z}\, dz = \frac{1}{2}(\operatorname{Ei}(-2 i c z)+\log(z))$$

01.07.21.0301.01

$$\int \frac{e^{b z} \cos(c z)}{z^2}\, dz = \frac{-e^{(b-i c) z}\left(1+e^{2 i c z}\right)+(b-i c) z \operatorname{Ei}((b-i c) z)+(i c+b) z \operatorname{Ei}((i c+b) z)}{2 z}$$

01.07.21.0302.01

$$\int \frac{e^{i c z} \cos(c z)}{z^2}\, dz = -\frac{-2 i c z \operatorname{Ei}(2 i c z)+e^{2 i c z}+1}{2 z}$$

01.07.21.0303.01

$$\int \frac{e^{-i c z} \cos(c z)}{z^2}\, dz = -\frac{2 i c z \operatorname{Ei}(-2 i c z)+e^{-2 i c z}+1}{2 z}$$

01.07.21.0304.01

$$\int \frac{e^{b z} \cos(c z)}{z^3}\, dz = \frac{1}{4 z^2}\left((b+i c)^2 \operatorname{Ei}((b+i c) z) z^2+(b-i c)^2 \operatorname{Ei}((b-i c) z) z^2-e^{(b-i c) z}\left(b z-i c z+e^{2 i c z}(b z+i c z+1)+1\right)\right)$$

01.07.21.0305.01

$$\int \frac{e^{b z} \cos(c z)}{z^4}\, dz = \frac{1}{12 z^3}\left((b+i c)^3 \operatorname{Ei}((b+i c) z) z^3+(b-i c)^3 \operatorname{Ei}((b-i c) z) z^3 - e^{(b-i c) z}\left(b^2 z^2-c^2 z^2-i c z+b(1-2 i c z) z+e^{2 i c z}\left(b^2 z^2-c^2 z^2+i c z+b(2 i c z+1) z+2\right)+2\right)\right)$$

01.07.21.0306.01

$$\int \frac{e^{b z} \cos(c z)}{z^5}\, dz = \frac{1}{48} \operatorname{Ei}((b+i c) z)(b+i c)^4-\frac{1}{2} e^{(b+i c) z}\left(\frac{(b+i c)^3}{24 z}+\frac{(b+i c)^2}{24 z^2}+\frac{b+i c}{12 z^3}+\frac{1}{4 z^4}\right) - \frac{1}{2} e^{(b-i c) z}\left(\frac{(b-i c)^3}{24 z}+\frac{(b-i c)^2}{24 z^2}+\frac{b-i c}{12 z^3}+\frac{1}{4 z^4}\right)+\frac{1}{48}(b-i c)^4 \operatorname{Ei}((b-i c) z)$$

01.07.21.0307.01

$$\int z^{n+\frac{1}{2}} e^{b z} \cos(c z)\, dz = -\frac{1}{2} z^{n+\frac{3}{2}} \left(((-i c - b) z)^{-n-\frac{3}{2}} \left(\text{erfc}\left(\sqrt{(-i c - b) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(i c+b) z} \sum_{k=0}^{n} \frac{((-i c - b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(i c+b) z} \sum_{k=n+1}^{-1} \frac{((-i c - b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) + ((i c - b) z)^{-n-\frac{3}{2}} \left(\text{erfc}\left(\sqrt{(i c - b) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(-i c+b) z} \sum_{k=0}^{n} \frac{((i c - b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(-i c+b) z} \sum_{k=n+1}^{-1} \frac{((i c - b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) \right) /; n \in \mathbb{Z}$$

01.07.21.0308.01

$$\int \sqrt{z}\, e^{b z} \cos(c z)\, dz = \frac{1}{4} \sqrt{\pi} \left(\frac{\text{erf}\left(\sqrt{-(b + i c) z}\right)}{(-(b + i c) z)^{3/2}} + \frac{\text{erf}\left(\sqrt{-(b - i c) z}\right)}{(-(b - i c) z)^{3/2}} \right) z^{3/2} + \frac{1}{4} \left(\sqrt{\pi}\, z \left(-\frac{1}{(-(b - i c) z)^{3/2}} - \frac{1}{(-(b + i c) z)^{3/2}} \right) + \frac{2 e^{(b+i c) z}}{b + i c} + \frac{2 e^{(b-i c) z}}{b - i c} \right) \sqrt{z}$$

01.07.21.0309.01

$$\int z^{3/2} e^{b z} \cos(c z)\, dz = \frac{3}{8} \sqrt{\pi} \left(\frac{\text{erfi}\left(\sqrt{b + i c}\, \sqrt{z}\right)}{(b + i c)^{5/2}} + \frac{\text{erfi}\left(\sqrt{b - i c}\, \sqrt{z}\right)}{(b - i c)^{5/2}} \right) + \frac{1}{8} \sqrt{z} \left(3 \sqrt{\pi} \left(-\frac{1}{(-(b - i c) z)^{5/2}} - \frac{1}{(-(b + i c) z)^{5/2}} \right) z^2 + \frac{2 e^{(b+i c) z} (2 b z + 2 i c z - 3)}{(b + i c)^2} + \frac{2 e^{(b-i c) z} (2 b z - 2 i c z - 3)}{(b - i c)^2} \right)$$

01.07.21.0310.01

$$\int z^{5/2} e^{b z} \cos(c z)\, dz = \frac{15}{16} \sqrt{\pi} \left(\frac{\text{erf}\left(\sqrt{-(b + i c) z}\right)}{(-(b + i c) z)^{7/2}} + \frac{\text{erf}\left(\sqrt{-(b - i c) z}\right)}{(-(b - i c) z)^{7/2}} \right) z^{7/2} + \frac{1}{16} \left(15 \sqrt{\pi} \left(-\frac{1}{(-(b - i c) z)^{7/2}} - \frac{1}{(-(b + i c) z)^{7/2}} \right) z^3 + \frac{2 e^{(b+i c) z} \left(4 (b + i c)^2 z^2 - 10 (b + i c) z + 15\right)}{(b + i c)^3} + \frac{2 e^{(b-i c) z} \left(4 (b - i c)^2 z^2 - 10 (b - i c) z + 15\right)}{(b - i c)^3} \right) \sqrt{z}$$

01.07.21.0311.01

$$\int z^{7/2} e^{b z} \cos(c z)\, dz = \frac{105}{32} \sqrt{\pi} \left(\frac{\text{erf}\left(\sqrt{-(b + i c) z}\right)}{(-(b + i c) z)^{9/2}} + \frac{\text{erf}\left(\sqrt{-(b - i c) z}\right)}{(-(b - i c) z)^{9/2}} \right) z^{9/2} + \frac{1}{32} \left(105 \sqrt{\pi} \left(-\frac{1}{(-(b - i c) z)^{9/2}} - \frac{1}{(-(b + i c) z)^{9/2}} \right) z^4 + \frac{2 e^{(b+i c) z} \left(8 (b + i c)^3 z^3 - 28 (b + i c)^2 z^2 + 70 (b + i c) z - 105\right)}{(b + i c)^4} + \frac{2 e^{(b-i c) z} \left(8 (b - i c)^3 z^3 - 28 (b - i c)^2 z^2 + 70 (b - i c) z - 105\right)}{(b - i c)^4} \right) \sqrt{z}$$

01.07.21.0312.01

$$\int z^{9/2} e^{b z} \cos(c z)\, dz = \frac{945}{64}\sqrt{\pi}\left(\frac{\operatorname{erf}\left(\sqrt{-(b+i c) z}\right)}{(-(b+i c) z)^{11/2}}+\frac{\operatorname{erf}\left(\sqrt{-(b-i c) z}\right)}{(-(b-i c) z)^{11/2}}\right) z^{11/2}+\frac{1}{64}\left(945\sqrt{\pi}\left(-\frac{1}{(-(b-i c) z)^{11/2}}-\frac{1}{(-(b+i c) z)^{11/2}}\right) z^5+\frac{1}{(b+i c)^5}\left(2 e^{(b+i c) z}\left(16 (b+i c)^4 z^4-72 (b+i c)^3 z^3+252 (b+i c)^2 z^2-630 (b+i c) z+945\right)\right)+\frac{1}{(b-i c)^5}\left(2 e^{(b-i c) z}\left(16 (b-i c)^4 z^4-72 (b-i c)^3 z^3+252 (b-i c)^2 z^2-630 (b-i c) z+945\right)\right)\right)\sqrt{z}$$

01.07.21.0313.01

$$\int \frac{e^{b z}\cos(c z)}{\sqrt{z}}\, dz = \frac{\sqrt{\pi}\left(\sqrt{b+i c}\,(b-i c)\operatorname{erfi}\left(\sqrt{b+i c}\,\sqrt{z}\right)+(b+i c)\sqrt{b-i c}\,\operatorname{erfi}\left(\sqrt{b-i c}\,\sqrt{z}\right)\right)}{2\left(b^2+c^2\right)}$$

01.07.21.0314.01

$$\int \frac{e^{b z}\cos(c z)}{z^{3/2}}\, dz = \frac{\sqrt{\pi}\left(\sqrt{-(b+i c) z}+\sqrt{-(b-i c) z}\right)-e^{(b+i c) z}-e^{(b-i c) z}}{\sqrt{z}}-\frac{\sqrt{\pi}\left(\sqrt{-(b+i c) z}\,\operatorname{erf}\left(\sqrt{-(b+i c) z}\right)+\sqrt{-(b-i c) z}\,\operatorname{erf}\left(\sqrt{-(b-i c) z}\right)\right)}{\sqrt{z}}$$

01.07.21.0315.01

$$\int \frac{e^{b z}\cos(c z)}{z^{5/2}}\, dz = \frac{1}{3 z^{3/2}}\left(-e^{(b+i c) z}(2 b z+2 i c z+1)+e^{(b-i c) z}(-2 b z+2 i c z-1)+2\sqrt{\pi}\, z\left(c\, i\left(\sqrt{-(b+i c) z}-\sqrt{-(b-i c) z}\right)+b\left(\sqrt{-(b+i c) z}+\sqrt{-(b-i c) z}\right)\right)\right)+\frac{2\sqrt{\pi}\left(\operatorname{erf}\left(\sqrt{-(b+i c) z}\right)(-(b+i c) z)^{3/2}+(-(b-i c) z)^{3/2}\operatorname{erf}\left(\sqrt{i c z-b z}\right)\right)}{3 z^{3/2}}$$

01.07.21.0316.01

$$\int \frac{e^{b z}\cos(c z)}{z^{7/2}}\, dz = \frac{1}{15 z^{5/2}}\left(4\sqrt{\pi}\,(-(b+i c) z)^{5/2}+4\sqrt{\pi}\,(-(b-i c) z)^{5/2}-3 e^{(b+i c) z}-3 e^{(b-i c) z}-4 (b+i c)^2 e^{(b+i c) z} z^2-4 (b-i c)^2 e^{(b-i c) z} z^2-2 (b+i c) e^{(b+i c) z} z-2 (b-i c) e^{(b-i c) z} z\right)+\frac{4\sqrt{\pi}\left(-(-(b+i c) z)^{5/2}\operatorname{erf}\left(\sqrt{-(b+i c) z}\right)-(-(b-i c) z)^{5/2}\operatorname{erf}\left(\sqrt{i c z-b z}\right)\right)}{15 z^{5/2}}$$

01.07.21.0317.01

$$\int \frac{e^{b z} \cos(c z)}{z^{9/2}} \, dz = \frac{1}{105 z^{7/2}} \left(-8 \sqrt{\pi} \, (-(b + i c) z)^{7/2} - 8 \sqrt{\pi} \, (-(b - i c) z)^{7/2} - 15 e^{(b+i c) z} - 15 e^{(b-i c) z} - 8 (b + i c)^3 e^{(b+i c) z} z^3 - 8 (b - i c)^3 e^{(b-i c) z} z^3 - 4 (b + i c)^2 e^{(b+i c) z} z^2 - 4 (b - i c)^2 e^{(b-i c) z} z^2 - 6 (b + i c) e^{(b+i c) z} z - 6 (b - i c) e^{(b-i c) z} z\right) + \frac{8 \sqrt{\pi} \left(\operatorname{erf}\left(\sqrt{-(b + i c) z}\right) (-(b + i c) z)^{7/2} + (-(b - i c) z)^{7/2} \operatorname{erf}\left(\sqrt{i c z - b z}\right)\right)}{105 z^{7/2}}$$

Involving $z^{\alpha-1} e^{b z+e} \cos(c z)$

01.07.21.0318.01

$$\int z^{\alpha-1} e^{e+b z} \cos(c z) \, dz = -\frac{1}{2} z^{\alpha} e^{e} \left(\Gamma(\alpha, -(b + i c) z) (-(b + i c) z)^{-\alpha} + (-(b - i c) z)^{-\alpha} \Gamma(\alpha, -(b - i c) z)\right)$$

01.07.21.0319.01

$$\int z^{n} e^{b z+e} \cos(c z) \, dz = -\frac{1}{2} e^{e} z^{n+1} \left(\left(\frac{(-1)^{-n} \operatorname{Ei}((b + i c) z)}{(-n - 1)!} + e^{(b+i c) z} \sum_{k=0}^{n} \frac{((-b - i c) z)^{k}}{(n + 1)_{k-n}} - e^{(b+i c) z} \sum_{k=n+1}^{-1} \frac{((-b - i c) z)^{k}}{(n + 1)_{k-n}}\right) ((-b - i c) z)^{-n-1} + ((i c - b) z)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}((b - i c) z)}{(-n - 1)!} + e^{(b-i c) z} \sum_{k=0}^{n} \frac{((i c - b) z)^{k}}{(n + 1)_{k-n}} - e^{(b-i c) z} \sum_{k=n+1}^{-1} \frac{((i c - b) z)^{k}}{(n + 1)_{k-n}}\right)\right) /; n \in \mathbb{Z}$$

01.07.21.0320.01

$$\int z^{n+\frac{1}{2}} e^{e+b z} \cos(c z) \, dz = -\frac{1}{2} e^{e} z^{n+\frac{3}{2}} \left(\left(\operatorname{erfc}\left(\sqrt{(-b - i c) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(b+i c) z} \sum_{k=0}^{n} \frac{((-b - i c) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(b+i c) z} \sum_{k=n+1}^{-1} \frac{((-b - i c) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}}\right) ((-b - i c) z)^{-n-\frac{3}{2}} + ((i c - b) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(i c - b) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(b-i c) z} \sum_{k=0}^{n} \frac{((i c - b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(b-i c) z} \sum_{k=n+1}^{-1} \frac{((i c - b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}}\right)\right) /; n \in \mathbb{Z}$$

01.07.21.0321.01

$$\int z \, e^{e+b z} \cos(c z) \, dz = \frac{e^{e+b z} \left(\left(z b^3 - b^2 + c^2 z b + c^2\right) \cos(c z) + c \left(z b^2 - 2 b + c^2 z\right) \sin(c z)\right)}{\left(b^2 + c^2\right)^2}$$

Involving $z^{\alpha-1} e^{b z} \cos(c z + d)$

01.07.21.0322.01

$$\int z^{\alpha-1} e^{b z} \cos(d + c z) \, dz = -\frac{1}{2} z^{\alpha} \left(e^{i d} \, \Gamma(\alpha, -(b + i c) z) (-(b + i c) z)^{-\alpha} + e^{-i d} (-(b - i c) z)^{-\alpha} \Gamma(\alpha, -(b - i c) z)\right)$$

01.07.21.0323.01

$$\int z^n e^{bz}\cos(d+cz)\,dz = -\frac{1}{2}e^{-id}z^{n+1}\left(e^{2id}\left(\frac{(-1)^{-n}\,\mathrm{Ei}((b+ic)z)}{(-n-1)!}+e^{(b+ic)z}\sum_{k=0}^{n}\frac{((-b-ic)z)^k}{(n+1)_{k-n}}-e^{(b+ic)z}\sum_{k=n+1}^{-1}\frac{((-b-ic)z)^k}{(n+1)_{k-n}}\right)((-b-ic)z)^{-n-1}+((ic-b)z)^{-n-1}\left(\frac{(-1)^{-n}\,\mathrm{Ei}((b-ic)z)}{(-n-1)!}+e^{(b-ic)z}\sum_{k=0}^{n}\frac{((ic-b)z)^k}{(n+1)_{k-n}}-e^{(b-ic)z}\sum_{k=n+1}^{-1}\frac{((ic-b)z)^k}{(n+1)_{k-n}}\right)\right)/;\,n\in\mathbb{Z}$$

01.07.21.0324.01

$$\int z^{n+\frac{1}{2}}e^{bz}\cos(d+cz)\,dz = -\frac{1}{2}e^{-id}z^{n+\frac{3}{2}}\left(e^{2id}\left(\mathrm{erfc}\left(\sqrt{(-b-ic)z}\right)\Gamma\left(n+\frac{3}{2}\right)+e^{(b+ic)z}\sum_{k=0}^{n}\frac{((-b-ic)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}-e^{(b+ic)z}\sum_{k=n+1}^{-1}\frac{((-b-ic)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right)((-b-ic)z)^{-n-\frac{3}{2}}+((ic-b)z)^{-n-\frac{3}{2}}\left(\mathrm{erfc}\left(\sqrt{(ic-b)z}\right)\Gamma\left(n+\frac{3}{2}\right)+e^{(b-ic)z}\sum_{k=0}^{n}\frac{((ic-b)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}-e^{(b-ic)z}\sum_{k=n+1}^{-1}\frac{((ic-b)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right)\right)/;\,n\in\mathbb{Z}$$

01.07.21.0325.01

$$\int z\,e^{bz}\cos(d+cz)\,dz = \frac{e^{bz}\left(\left(z\,b^3-b^2+c^2zb+c^2\right)\cos(d+cz)+c\left(z\,b^2-2b+c^2z\right)\sin(d+cz)\right)}{\left(b^2+c^2\right)^2}$$

Involving $z^{\alpha-1}\,e^{bz+e}\cos(cz+d)$

01.07.21.0326.01

$$\int z^{\alpha-1}e^{e+bz}\cos(d+cz)\,dz = -\frac{1}{2}z^{\alpha}\left(e^{e+id}\,\Gamma(\alpha,\,-(b+ic)z)\,(-(b+ic)z)^{-\alpha}+e^{e-id}\,(-(b-ic)z)^{-\alpha}\,\Gamma(\alpha,\,-(b-ic)z)\right)$$

01.07.21.0327.01

$$\int z^n e^{bz+e}\cos(d+cz)\,dz = -\frac{1}{2}e^{e-id}z^{n+1}\left(e^{2id}\left(\frac{(-1)^{-n}\,\mathrm{Ei}((b+ic)z)}{(-n-1)!}+e^{(b+ic)z}\sum_{k=0}^{n}\frac{((-b-ic)z)^k}{(n+1)_{k-n}}-e^{(b+ic)z}\sum_{k=n+1}^{-1}\frac{((-b-ic)z)^k}{(n+1)_{k-n}}\right)((-b-ic)z)^{-n-1}+((ic-b)z)^{-n-1}\left(\frac{(-1)^{-n}\,\mathrm{Ei}((b-ic)z)}{(-n-1)!}+e^{(b-ic)z}\sum_{k=0}^{n}\frac{((ic-b)z)^k}{(n+1)_{k-n}}-e^{(b-ic)z}\sum_{k=n+1}^{-1}\frac{((ic-b)z)^k}{(n+1)_{k-n}}\right)\right)/;\,n\in\mathbb{Z}$$

01.07.21.0328.01

$$\int z^{n+\frac{1}{2}}e^{e+bz}\cos(d+cz)\,dz = -\frac{1}{2}e^{e-id}z^{n+\frac{3}{2}}\left(e^{2id}\left(\mathrm{erfc}\left(\sqrt{(-b-ic)z}\right)\Gamma\left(n+\frac{3}{2}\right)+e^{(b+ic)z}\sum_{k=0}^{n}\frac{((-b-ic)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}-e^{(b+ic)z}\sum_{k=n+1}^{-1}\frac{((-b-ic)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right)((-b-ic)z)^{-n-\frac{3}{2}}+((ic-b)z)^{-n-\frac{3}{2}}\left(\mathrm{erfc}\left(\sqrt{(ic-b)z}\right)\Gamma\left(n+\frac{3}{2}\right)+e^{(b-ic)z}\sum_{k=0}^{n}\frac{((ic-b)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}-e^{(b-ic)z}\sum_{k=n+1}^{-1}\frac{((ic-b)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right)\right)/;\,n\in\mathbb{Z}$$

01.07.21.0329.01

$$\int z\, e^{e+b z} \cos(d+c z)\, dz = \frac{e^{e+b z} \left(\left(z b^3 - b^2 + c^2 z b + c^2\right) \cos(d+c z) + c \left(z b^2 - 2 b + c^2 z\right) \sin(d+c z)\right)}{\left(b^2+c^2\right)^2}$$

Involving $z^n e^{b z^r} \cos(c z)$

01.07.21.0330.01

$$\int z^n e^{b z^2} \cos(c z)\, dz = -\frac{1}{4} b^{-n-1} e^{\frac{c^2}{4 b}} \left(\sum_{q=0}^{n} 2^{q-n} (i c)^{n-q} (-i c + 2 b z)^{q+1} \left(-\frac{(-i c+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i c+2 b z)^2}{4 b}\right) + \sum_{q=0}^{n} 2^{q-n} (-i c)^{n-q} (i c + 2 b z)^{q+1} \left(-\frac{(i c+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i c+2 b z)^2}{4 b}\right)\right) /;\ n \in \mathbb{N}$$

01.07.21.0331.01

$$\int z^n e^{\sqrt{z}\, b} \cos(c z)\, dz = (-1)^{n-1} 2^{-2n-2} c^{-2n-2} \left(e^{\frac{i b^2}{4 c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2 i c \sqrt{z}\right)^{h+k} \left(\frac{i \left(b+2 i c \sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 i c \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b+2 i c \sqrt{z}\right)^2}{4 c}\right) + 2 \sqrt{\frac{i \left(b+2 i c \sqrt{z}\right)^2}{c}}\, c\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b+2 i c \sqrt{z}\right)^2}{4 c}\right)\right) + e^{-\frac{i b^2}{4 c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b - 2 i c \sqrt{z}\right)^{h+k} \left(-\frac{i \left(b-2 i c \sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b - 2 i c \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b-2 i c \sqrt{z}\right)^2}{4 c}\right) - 2 i c \sqrt{-\frac{i \left(b-2 i c \sqrt{z}\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b-2 i c \sqrt{z}\right)^2}{4 c}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n e^{b z^r + e} \cos(c z)$

01.07.21.0332.01

$$\int z^n e^{b z^2+e} \cos(c z)\, dz = -\frac{1}{4} b^{-n-1} e^{\frac{c^2}{4b}+e} \left(\sum_{q=0}^{n} 2^{q-n} (i c)^{n-q} (-i c+2 b z)^{q+1} \left(-\frac{(-i c+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i c+2 b z)^2}{4 b}\right) + \sum_{q=0}^{n} 2^{q-n} (-i c)^{n-q} (i c+2 b z)^{q+1} \left(-\frac{(i c+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i c+2 b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0333.01

$$\int z^n e^{\sqrt{z}\, b+e} \cos(c z)\, dz = (-1)^{n-1} 2^{-2n-2} c^{-2n-2} \left(e^{\frac{i b^2}{4c}+e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2 i c \sqrt{z}\right)^{h+k} \left(\frac{i \left(b+2 i c \sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2 i c \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b+2 i c \sqrt{z}\right)^2}{4 c}\right) + 2 \sqrt{\frac{i \left(b+2 i c \sqrt{z}\right)^2}{c}}\, c\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b+2 i c \sqrt{z}\right)^2}{4 c}\right)\right) + e^{e-\frac{i b^2}{4c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b-2 i c \sqrt{z}\right)^{h+k} \left(-\frac{i \left(b-2 i c \sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b-2 i c \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b-2 i c \sqrt{z}\right)^2}{4 c}\right) - 2 i c \sqrt{-\frac{i \left(b-2 i c \sqrt{z}\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b-2 i c \sqrt{z}\right)^2}{4 c}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z} \cos(c z)$

01.07.21.0334.01

$$\int z^n e^{b z^2+d z} \cos(c z)\, dz = -\frac{1}{4} b^{-n-1} \left(e^{-\frac{(d-i c)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (i c - d)^{n-q} (d - i c + 2 b z)^{q+1} \left(-\frac{(d-i c+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-i c+2 b z)^2}{4 b}\right) + e^{-\frac{(d+i c)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (-d - i c)^{n-q} (d + i c + 2 b z)^{q+1} \left(-\frac{(d+i c+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+i c+2 b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0335.01

$$\int z^n e^{\sqrt{z}\, b+d z} \cos(c z)\, dz = 2^{-2 n-2} \left(e^{\frac{b^2}{4 i c-4 d}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2 n} \left(b + 2 (d - i c) \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2 (d-i c) \sqrt{z}\right)^2}{d - i c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 (d - i c) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2 (d-i c) \sqrt{z}\right)^2}{4 (d-i c)}\right) + 2 \sqrt{-\frac{\left(b+2 (d-i c) \sqrt{z}\right)^2}{d-i c}}\, (d - i c) \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2 (d-i c) \sqrt{z}\right)^2}{4 (d-i c)}\right)\right)\right)\right) (d - i c)^{-2 (n+1)} + (d + i c)^{-2 (n+1)} e^{-\frac{b^2}{4 (d+i c)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2 n} \left(b + 2 (d + i c) \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2 (d+i c) \sqrt{z}\right)^2}{d + i c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 (d + i c) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2 (d+i c) \sqrt{z}\right)^2}{4 (d+i c)}\right) + 2 \sqrt{-\frac{\left(b+2 (d+i c) \sqrt{z}\right)^2}{d+i c}}\, (d + i c) \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2 (d+i c) \sqrt{z}\right)^2}{4 (d+i c)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r+d z+e} \cos(c z)$

01.07.21.0336.01

$$\int z^n e^{b z^2+d z+e} \cos(c z)\, dz = -\frac{1}{4} b^{-n-1} e^e \left(e^{-\frac{(d-i c)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (i c-d)^{n-q} (d-i c+2 b z)^{q+1} \left(-\frac{(d-i c+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-i c+2 b z)^2}{4 b}\right) + e^{-\frac{(d+i c)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (-d-i c)^{n-q} (d+i c+2 b z)^{q+1} \left(-\frac{(d+i c+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+i c+2 b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0337.01

$$\int z^n e^{\sqrt{z}\, b+d z+e} \cos(c z)\, dz = 2^{-2 n-2} \left(e^{\frac{b^2}{4 i c-4 d}+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2 n} \left(b+2 (d-i c) \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2 (d-i c) \sqrt{z}\right)^2}{d-i c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2 (d-i c) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), -\frac{\left(b+2 (d-i c) \sqrt{z}\right)^2}{4 (d-i c)}\right) + 2 \sqrt{-\frac{\left(b+2 (d-i c) \sqrt{z}\right)^2}{d-i c}}\, (d-i c) \Gamma\left(\frac{1}{2} (h+k+2), -\frac{\left(b+2 (d-i c) \sqrt{z}\right)^2}{4 (d-i c)}\right)\right)\right) (d-i c)^{-2 (n+1)} + (d+i c)^{-2 (n+1)} e^{e-\frac{b^2}{4 (d+i c)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2 n} \left(b+2 (d+i c) \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2 (d+i c) \sqrt{z}\right)^2}{d+i c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2 (d+i c) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), -\frac{\left(b+2 (d+i c) \sqrt{z}\right)^2}{4 (d+i c)}\right) + 2 \sqrt{-\frac{\left(b+2 (d+i c) \sqrt{z}\right)^2}{d+i c}}\, (d+i c) \Gamma\left(\frac{1}{2} (h+k+2), -\frac{\left(b+2 (d+i c) \sqrt{z}\right)^2}{4 (d+i c)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r} \cos(f z+g)$

01.07.21.0338.01

$$\int z^n e^{b z^2} \cos(f z + g)\, dz = -\frac{1}{4} b^{-n-1} \left(e^{\frac{f^2}{4b} - i g} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i f + 2 b z)^{q+1} \left(-\frac{(-i f + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i f + 2 b z)^2}{4 b}\right) + e^{\frac{f^2}{4b} + i g} \sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i f + 2 b z)^{q+1} \left(-\frac{(i f + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i f + 2 b z)^2}{4 b}\right)\right) /;\ n \in \mathbb{N}$$

01.07.21.0339.01

$$\int z^n e^{\sqrt{z}\, b} \cos(f z + g)\, dz = (-1)^{n-1} 2^{-2n-2} f^{-2n-2} \left(e^{\frac{i b^2}{4 f} + i g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2 i f \sqrt{z}\right)^{h+k} \left(\frac{i \left(b + 2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 i f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b + 2 i f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{\frac{i \left(b + 2 i f \sqrt{z}\right)^2}{f}}\, f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b + 2 i f \sqrt{z}\right)^2}{4 f}\right)\right) + e^{-\frac{i b^2}{4 f} - i g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b - 2 i f \sqrt{z}\right)^{h+k} \left(-\frac{i \left(b - 2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b - 2 i f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b - 2 i f \sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{-\frac{i \left(b - 2 i f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b - 2 i f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n e^{b z^r + e} \cos(f z + g)$

01.07.21.0340.01

$$\int z^n e^{b z^2+e} \cos(f z+g)\, dz = -\frac{1}{4} b^{-n-1} \left(e^{\frac{f^2}{4b}+e-i g} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i f+2 b z)^{q+1} \left(-\frac{(-i f+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i f+2 b z)^2}{4 b}\right) + e^{\frac{f^2}{4b}+e+i g} \sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i f+2 b z)^{q+1} \left(-\frac{(i f+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i f+2 b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0341.01

$$\int z^n e^{\sqrt{z}\, b+e} \cos(f z+g)\, dz = (-1)^{n-1} 2^{-2n-2} f^{-2n-2} \left(e^{\frac{i b^2}{4 f}+e+i g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2 i f \sqrt{z}\right)^{h+k} \left(\frac{i \left(b+2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2 i f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b+2 i f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{\frac{i \left(b+2 i f \sqrt{z}\right)^2}{f}}\, f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b+2 i f \sqrt{z}\right)^2}{4 f}\right)\right) + e^{-\frac{i b^2}{4 f}+e-i g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b-2 i f \sqrt{z}\right)^{h+k} \left(-\frac{i \left(b-2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b-2 i f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b-2 i f \sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{-\frac{i \left(b-2 i f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b-2 i f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r+d z} \cos(f z+g)$

01.07.21.0342.01

$$\int z^n e^{b z^2+d z} \cos(f z+g)\, dz = -\frac{1}{4} b^{-n-1} \left(e^{-\frac{(d+i f)^2}{4 b}+i g} \sum_{q=0}^{n} 2^{q-n} (-d-i f)^{n-q} (d+i f+2 b z)^{q+1} \left(-\frac{(d+i f+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+i f+2 b z)^2}{4 b}\right) + e^{-\frac{(d-i f)^2}{4 b}-i g} \sum_{q=0}^{n} 2^{q-n} (i f-d)^{n-q} (d-i f+2 b z)^{q+1} \left(-\frac{(d-i f+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-i f+2 b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0343.01

$$\int z^n e^{\sqrt{z}\, b+d z} \cos(f z+g)\, dz = 2^{-2 n-2} \Bigg(e^{-\frac{b^2}{4(d+i f)}+i g} \Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2 n} \left(b+2 (d+i f) \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2 (d+i f) \sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \Bigg(b \left(b+2 (d+i f) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2 (d+i f) \sqrt{z}\right)^2}{4 (d+i f)}\right) + 2 \sqrt{-\frac{\left(b+2 (d+i f) \sqrt{z}\right)^2}{d+i f}}\, (d+i f)\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2 (d+i f) \sqrt{z}\right)^2}{4 (d+i f)}\right) \Bigg) \Bigg) (d+i f)^{-2 n-2} + e^{-\frac{b^2}{4(d-i f)}-i g} (d-i f)^{-2 n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2 n} \left(b+2 (d-i f) \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2 (d-i f) \sqrt{z}\right)^2}{d-i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \Bigg(b \left(b+2 (d-i f) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2 (d-i f) \sqrt{z}\right)^2}{4 (d-i f)}\right) + 2 \sqrt{-\frac{\left(b+2 (d-i f) \sqrt{z}\right)^2}{d-i f}}\, (d-i f)\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2 (d-i f) \sqrt{z}\right)^2}{4 (d-i f)}\right) \Bigg) \Bigg) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r+d z+e} \cos(f z+g)$

01.07.21.0344.01

$$\int z^n e^{b z^2+d z+e} \cos(f z+g)\, dz = -\frac{1}{4} b^{-n-1} \left(e^{-\frac{(d+i f)^2}{4 b}+e+i g} \sum_{q=0}^{n} 2^{q-n} (-d-i f)^{n-q} (d+i f+2 b z)^{q+1} \left(-\frac{(d+i f+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+i f+2 b z)^2}{4 b}\right) + e^{-\frac{(d-i f)^2}{4 b}+e-i g} \sum_{q=0}^{n} 2^{q-n} (i f-d)^{n-q} (d-i f+2 b z)^{q+1} \left(-\frac{(d-i f+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-i f+2 b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0345.01

$$\int z^n e^{\sqrt{z}\, b+d z+e} \cos(f z+g)\, dz = 2^{-2 n-2} \left(e^{-\frac{b^2}{4 (d+i f)}+e+i g} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2 n} \left(b+2 (d+i f) \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2 (d+i f) \sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2 (d+i f) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2 (d+i f) \sqrt{z}\right)^2}{4 (d+i f)}\right) + 2 \sqrt{-\frac{\left(b+2 (d+i f) \sqrt{z}\right)^2}{d+i f}}\, (d+i f) \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2 (d+i f) \sqrt{z}\right)^2}{4 (d+i f)}\right)\right)\right) (d+i f)^{-2 n-2} + e^{-\frac{b^2}{4 (d-i f)}+e-i g} (d-i f)^{-2 n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2 n} \left(b+2 (d-i f) \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2 (d-i f) \sqrt{z}\right)^2}{d-i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2 (d-i f) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2 (d-i f) \sqrt{z}\right)^2}{4 (d-i f)}\right) + 2 \sqrt{-\frac{\left(b+2 (d-i f) \sqrt{z}\right)^2}{d-i f}}\, (d-i f) \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2 (d-i f) \sqrt{z}\right)^2}{4 (d-i f)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z} \cos(c z^r)$

01.07.21.0346.01

$$\int z^n e^{bz}\cos(c z^2)\,dz = -\frac{1}{4}\left(\frac{1}{\sqrt{i c}}\left(e^{\frac{i b^2}{4c}}\sum_{q=0}^{n} 2^{q-n}(-b)^{n-q}(i c)^{-n-\frac{1}{2}}(b+2 i c z)^{q+1}\left(\frac{i(b+2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(b+2 i c z)^2}{4c}\right)\right)+\frac{1}{\sqrt{-i c}}\left(e^{-\frac{i b^2}{4c}}\sum_{q=0}^{n} 2^{q-n}(-b)^{n-q}(-i c)^{-n-\frac{1}{2}}(b-2 i c z)^{q+1}\left(-\frac{i(b-2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(b-2 i c z)^2}{4c}\right)\right)\right)\;/;\; n\in\mathbb{N}$$

01.07.21.0347.01

$$\int z^n e^{bz}\cos(c\sqrt{z})\,dz = 2^{-2n-2}b^{-2n-2}\left(e^{\frac{c^2}{4b}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i c)^{-h-k+2n}\left(2b\sqrt{z}-i c\right)^{h+k}\left(-\frac{\left(2b\sqrt{z}-i c\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2b\sqrt{-\frac{\left(2b\sqrt{z}-i c\right)^2}{b}}\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(2b\sqrt{z}-i c\right)^2}{4b}\right)-i c\left(2b\sqrt{z}-i c\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(2b\sqrt{z}-i c\right)^2}{4b}\right)\right)+e^{\frac{c^2}{4b}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i c)^{-h-k+2n}\left(2\sqrt{z}\,b+i c\right)^{h+k}\left(-\frac{\left(2\sqrt{z}\,b+i c\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\,i\left(2\sqrt{z}\,b+i c\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(2\sqrt{z}\,b+i c\right)^2}{4b}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,b+i c\right)^2}{b}}\,b\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(2\sqrt{z}\,b+i c\right)^2}{4b}\right)\right)\right)\;/;\; n\in\mathbb{N}$$

Involving $z^n e^{bz+e}\cos(c z^r)$

01.07.21.0348.01

$$\int z^n e^{e+b z}\cos(c z^2)\,dz = -\frac{1}{4}\left(\frac{1}{\sqrt{i c}}\left(e^{\frac{i b^2}{4c}+e}\sum_{q=0}^{n}2^{q-n}(-b)^{n-q}(i c)^{-n-\frac{1}{2}}(b+2 i c z)^{q+1}\left(\frac{i(b+2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(b+2 i c z)^2}{4c}\right)\right)+\frac{1}{\sqrt{-i c}}\left(e^{e-\frac{i b^2}{4c}}\sum_{q=0}^{n}2^{q-n}(-b)^{n-q}(-i c)^{-n-\frac{1}{2}}(b-2 i c z)^{q+1}\left(-\frac{i(b-2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(b-2 i c z)^2}{4c}\right)\right)\right)/;\, n\in\mathbb{N}$$

01.07.21.0349.01

$$\int z^n e^{b z+e}\cos(c\sqrt{z})\,dz = 2^{-2n-2}b^{-2n-2}\left(e^{\frac{c^2}{4b}+e}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i c)^{-h-k+2n}\left(2b\sqrt{z}-i c\right)^{h+k}\left(-\frac{\left(2b\sqrt{z}-i c\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2b\sqrt{-\frac{\left(2b\sqrt{z}-i c\right)^2}{b}}\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(2b\sqrt{z}-i c\right)^2}{4b}\right)-i c\left(2b\sqrt{z}-i c\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(2b\sqrt{z}-i c\right)^2}{4b}\right)\right)+e^{\frac{c^2}{4b}+e}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i c)^{-h-k+2n}\left(2\sqrt{z}\,b+i c\right)^{h+k}\left(-\frac{\left(2\sqrt{z}\,b+i c\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\, i\left(2\sqrt{z}\,b+i c\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(2\sqrt{z}\,b+i c\right)^2}{4b}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,b+i c\right)^2}{b}}\,b\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(2\sqrt{z}\,b+i c\right)^2}{4b}\right)\right)\right)/;\, n\in\mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r}\cos(c z^r)$

01.07.21.0350.01

$$\int z^{\alpha-1}e^{b z^r}\cos(c z^r)\,dz = -\frac{1}{2r}\left(z^{\alpha}\left(\Gamma\left(\frac{\alpha}{r},(i c-b)z^r\right)\left((i c-b)z^r\right)^{-\frac{\alpha}{r}}+\left((-b-i c)z^r\right)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(-b-i c)z^r\right)\right)\right)$$

01.07.21.0351.01

$$\int\frac{e^{b z^r}\cos(c z^r)}{z}\,dz = \frac{\mathrm{Ei}((b+i c)z^r)+\mathrm{Ei}((b-i c)z^r)}{2r}$$

01.07.21.0352.01

$$\int z^{2n} e^{b z^2} \cos(c z^2)\, dz = -\frac{1}{4} z \left(((-b - i c) z^2)^{-\frac{1}{2}} (-b - i c)^{-n} \left(\operatorname{erfc}\left(\sqrt{(-b - i c) z^2}\right) \Gamma\left(n + \frac{1}{2}\right) + e^{-(-b-i c) z^2} \sum_{k=0}^{n-1} \frac{((-b - i c) z^2)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}} - e^{-(-b-i c) z^2} \sum_{k=n}^{-1} \frac{((-b - i c) z^2)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}} \right) + ((i c - b) z^2)^{-\frac{1}{2}} (i c - b)^{-n} \left(\operatorname{erfc}\left(\sqrt{(i c - b) z^2}\right) \Gamma\left(n + \frac{1}{2}\right) + e^{-(i c-b) z^2} \sum_{k=0}^{n-1} \frac{((i c - b) z^2)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}} - e^{-(i c-b) z^2} \sum_{k=n}^{-1} \frac{((i c - b) z^2)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}} \right) \right) /;\; n \in \mathbb{Z}$$

01.07.21.0353.01

$$\int z^{2n-1} e^{b z^2} \cos(c z^2)\, dz = -\frac{1}{4} \left((-b - i c)^{-n} \left(\frac{(-1)^{n-1} \operatorname{Ei}(-(-b - i c) z^2)}{(-n)!} + e^{-(-b-i c) z^2} \sum_{k=0}^{n-1} \frac{((-b - i c) z^2)^k}{(n)_{k-n+1}} - e^{-(-b-i c) z^2} \sum_{k=n}^{-1} \frac{((-b - i c) z^2)^k}{(n)_{k-n+1}} \right) + (i c - b)^{-n} \left(\frac{(-1)^{n-1} \operatorname{Ei}(-(i c - b) z^2)}{(-n)!} + e^{-(i c-b) z^2} \sum_{k=0}^{n-1} \frac{((i c - b) z^2)^k}{(n)_{k-n+1}} - e^{-(i c-b) z^2} \sum_{k=n}^{-1} \frac{((i c - b) z^2)^k}{(n)_{k-n+1}} \right) \right) /;\; n \in \mathbb{Z}$$

01.07.21.0354.01

$$\int z\, e^{b z^2} \cos(c z^2)\, dz = \frac{e^{b z^2} \left(b \cos(c z^2) + c \sin(c z^2)\right)}{2 (b^2 + c^2)}$$

01.07.21.0355.01

$$\int z^2 e^{b z^2} \cos(c z^2)\, dz = -\frac{\sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{b + i c}\, z\right)}{8 (b + i c)^{3/2}} + \frac{e^{b z^2} z \left(b \cos(c z^2) + c \sin(c z^2)\right)}{2 (b^2 + c^2)} - \frac{\sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{b - i c}\, z\right)}{8 (b - i c)^{3/2}}$$

01.07.21.0356.01

$$\int z^3 e^{b z^2} \cos(c z^2)\, dz = \frac{e^{b z^2} \left((z^2 b^3 - b^2 + c^2 z^2 b + c^2) \cos(c z^2) + c (b^2 z^2 + c^2 z^2 - 2 b) \sin(c z^2) \right)}{2 (b^2 + c^2)^2}$$

01.07.21.0357.01

$$\int z^4 e^{b z^2} \cos(c z^2)\, dz = \frac{1}{16} \left(\frac{2 e^{(b+i c) z^2} z (2 b z^2 + 2 c i z^2 - 3)}{(b + i c)^2} + \frac{2 e^{(b-i c) z^2} z (2 b z^2 - 2 i c z^2 - 3)}{(b - i c)^2} + \frac{3 \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{b + i c}\, z\right)}{(b + i c)^{5/2}} + \frac{3 \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{b - i c}\, z\right)}{(b - i c)^{5/2}} \right)$$

01.07.21.0358.01

$$\int z^5 e^{b z^2} \cos(c z^2)\, dz = \frac{1}{4} \left(\frac{e^{(b+i c) z^2} \left((b + i c)^2 z^4 - 2 (b + i c) z^2 + 2\right)}{(b + i c)^3} + \frac{e^{(b-i c) z^2} \left((b - i c)^2 z^4 - 2 (b - i c) z^2 + 2\right)}{(b - i c)^3} \right)$$

01.07.21.0359.01

$$\int \frac{e^{b z^2} \cos(c z^2)}{z} \, dz = \frac{1}{4} \left(\text{Ei}\left((b + i c) z^2\right) + \text{Ei}\left((b - i c) z^2\right)\right)$$

01.07.21.0360.01

$$\int \frac{e^{b z^2} \cos(c z^2)}{z^2} \, dz = -\frac{e^{b z^2} \cos(c z^2)}{z} + \frac{1}{2} \sqrt{b + i c} \sqrt{\pi} \, \text{erfi}\left(\sqrt{b + i c} \, z\right) + \frac{1}{2} \sqrt{b - i c} \sqrt{\pi} \, \text{erfi}\left(\sqrt{b - i c} \, z\right)$$

01.07.21.0361.01

$$\int \frac{e^{b z^2} \cos(c z^2)}{z^3} \, dz = -\frac{e^{b z^2} \cos(c z^2)}{2 z^2} + \frac{1}{4} (b + i c) \, \text{Ei}\left((b + i c) z^2\right) + \frac{1}{4} (b - i c) \, \text{Ei}\left((b - i c) z^2\right)$$

01.07.21.0362.01

$$\int \frac{e^{b z^2} \cos(c z^2)}{z^4} \, dz = \frac{1}{3} \sqrt{\pi} \left(\text{erfi}\left(\sqrt{b + i c} \, z\right) (b + i c)^{3/2} + (b - i c)^{3/2} \, \text{erfi}\left(\sqrt{b - i c} \, z\right)\right) +$$
$$\frac{1}{3 z^3} \left(e^{b z^2} \left(2 c z^2 \sin(c z^2) - \left(2 b z^2 + 1\right) \cos(c z^2)\right) - \sqrt{\pi} \left(\left(-(b + i c) z^2\right)^{3/2} + \left(-(b - i c) z^2\right)^{3/2}\right)\right)$$

01.07.21.0363.01

$$\int \frac{e^{b z^2} \cos(c z^2)}{z^5} \, dz = \frac{1}{8} \text{Ei}\left((b + i c) z^2\right) (b + i c)^2 + \frac{1}{8} (b - i c)^2 \, \text{Ei}\left((b - i c) z^2\right) + \frac{e^{b z^2} \left(c \sin(c z^2) z^2 + \left(-b z^2 - 1\right) \cos(c z^2)\right)}{4 z^4}$$

01.07.21.0364.01

$$\int z^n e^{b \sqrt{z}} \cos\left(\sqrt{z} \, c\right) dz = -(i c - b)^{-2(n+1)}$$
$$\left(-\frac{\text{Ei}\left(-(i c - b) \sqrt{z}\right)}{(-2(n+1))!} + e^{-(i c - b)\sqrt{z}} \sum_{k=0}^{2n+1} \frac{\left((i c - b) \sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}} - e^{-(i c - b)\sqrt{z}} \sum_{k=2(n+1)}^{-1} \frac{\left((i c - b) \sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}}\right) - (b + i c)^{-2(n+1)}$$
$$\left(-\frac{\text{Ei}\left(-(-b - i c) \sqrt{z}\right)}{(-2(n+1))!} + e^{-(-b - i c)\sqrt{z}} \sum_{k=0}^{2n+1} \frac{\left((-b - i c) \sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}} - e^{-(-b - i c)\sqrt{z}} \sum_{k=2(n+1)}^{-1} \frac{\left((-b - i c) \sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}}\right) /; n \in \mathbb{Z}$$

01.07.21.0365.01

$$\int z \, e^{\sqrt{z} \, b} \cos\left(c \sqrt{z}\right) dz = \frac{1}{\left(b^2 + c^2\right)^4}$$
$$\left(2 e^{\sqrt{z} \, b} \left(\left(b \left(b^2 + c^2\right)^3 z^{3/2} - 3 (b - c)(b + c) \left(b^2 + c^2\right)^2 z + 6 b \left(b^2 + c^2\right) \left(b^2 - 3 c^2\right) \sqrt{z} - 6 \left(b^4 - 6 c^2 b^2 + c^4\right)\right) \cos\left(c \sqrt{z}\right) + \right.\right.$$
$$\left.\left. c \left(\left(b^2 + c^2\right)^3 z^{3/2} - 6 b \left(b^2 + c^2\right)^2 z + 6 \left(3 b^2 - c^2\right) \left(b^2 + c^2\right) \sqrt{z} - 24 b (b - c)(b + c)\right) \sin\left(c \sqrt{z}\right)\right)\right)$$

01.07.21.0366.01

$$\int z^2 e^{\sqrt{z}\, b} \cos\left(c \sqrt{z}\right) dz = \frac{1}{\left(b^2+c^2\right)^6} \left(2 e^{\sqrt{z}\, b} \left(\left(20\, b \left(b^2+c^2\right)^3 \left(b^2-3\, c^2\right) z^{3/2} + b \left(b^2+c^2\right)^5 z^{5/2} - 5\, (b-c)\, (b+c) \left(b^2+c^2\right)^4 z^2 - 60 \left(b^2+c^2\right)^2 \left(b^4-6\, c^2\, b^2+c^4\right) z + 120\, b \left(b^2+c^2\right) \left(b^4-10\, c^2\, b^2+5\, c^4\right) \sqrt{z} - 120 \left(b^6-15\, c^2\, b^4+15\, c^4\, b^2-c^6\right)\right) \cos\left(c \sqrt{z}\right) + c \left(20 \left(3\, b^2-c^2\right) \left(b^2+c^2\right)^3 z^{3/2} + \left(b^2+c^2\right)^5 z^{5/2} - 10\, b \left(b^2+c^2\right)^4 z^2 - 240\, b\, (b-c)\, (b+c) \left(b^2+c^2\right)^2 z + 120 \left(b^2+c^2\right) \left(5\, b^4-10\, c^2\, b^2+c^4\right) \sqrt{z} - 240\, b \left(3\, b^4-10\, c^2\, b^2+3\, c^4\right)\right) \sin\left(c \sqrt{z}\right)\right)\right)$$

01.07.21.0367.01

$$\int z^3 e^{\sqrt{z}\, b} \cos\left(c \sqrt{z}\right) dz = \frac{1}{\left(b^2+c^2\right)^8} \left(2 e^{\sqrt{z}\, b} \left(\left(840\, b \left(b^2+c^2\right)^3 \left(b^4-10\, c^2\, b^2+5\, c^4\right) z^{3/2} + 42\, b \left(b^2+c^2\right)^5 \left(b^2-3\, c^2\right) z^{5/2} + b \left(b^2+c^2\right)^7 z^{7/2} - 7\, (b-c)\, (b+c) \left(b^2+c^2\right)^6 z^3 - 210 \left(b^2+c^2\right)^4 \left(b^4-6\, c^2\, b^2+c^4\right) z^2 - 2520 \left(b^2+c^2\right)^2 \left(b^6-15\, c^2\, b^4+15\, c^4\, b^2-c^6\right) z + 5040\, b \left(b^2+c^2\right) \left(b^6-21\, c^2\, b^4+35\, c^4\, b^2-7\, c^6\right) \sqrt{z} - 5040 \left(b^8-28\, c^2\, b^6+70\, c^4\, b^4-28\, c^6\, b^2+c^8\right)\right) \cos\left(c \sqrt{z}\right) + c \left(840 \left(b^2+c^2\right)^3 \left(5\, b^4-10\, c^2\, b^2+c^4\right) z^{3/2} + 42 \left(3\, b^2-c^2\right) \left(b^2+c^2\right)^5 z^{5/2} + \left(b^2+c^2\right)^7 z^{7/2} - 14\, b \left(b^2+c^2\right)^6 z^3 - 840\, b\, (b-c)\, (b+c) \left(b^2+c^2\right)^4 z^2 - 5040\, b \left(b^2+c^2\right)^2 \left(3\, b^4-10\, c^2\, b^2+3\, c^4\right) z + 5040 \left(b^2+c^2\right) \left(7\, b^6-35\, c^2\, b^4+21\, c^4\, b^2-c^6\right) \sqrt{z} - 40\,320\, b \left(b^6-7\, c^2\, b^4+7\, c^4\, b^2-c^6\right)\right) \sin\left(c \sqrt{z}\right)\right)\right)$$

01.07.21.0368.01

$$\int z^4 e^{\sqrt{z}\, b} \cos\left(c \sqrt{z}\right) dz = \frac{1}{\left(b^2+c^2\right)^{10}} \left(2 e^{\sqrt{z}\, b} \left(\left(60\,480\, b \left(b^2+c^2\right)^3 \left(b^6-21\, c^2\, b^4+35\, c^4\, b^2-7\, c^6\right) z^{3/2} + 3024\, b \left(b^2+c^2\right)^5 \left(b^4-10\, c^2\, b^2+5\, c^4\right) z^{5/2} + 72\, b \left(b^2+c^2\right)^7 \left(b^2-3\, c^2\right) z^{7/2} + b \left(b^2+c^2\right)^9 z^{9/2} - 9\, (b-c)\, (b+c) \left(b^2+c^2\right)^8 z^4 - 504 \left(b^2+c^2\right)^6 \left(b^4-6\, c^2\, b^2+c^4\right) z^3 - 15\,120 \left(b^2+c^2\right)^4 \left(b^6-15\, c^2\, b^4+15\, c^4\, b^2-c^6\right) z^2 - 181\,440 \left(b^2+c^2\right)^2 \left(b^8-28\, c^2\, b^6+70\, c^4\, b^4-28\, c^6\, b^2+c^8\right) z + 362\,880\, b \left(b^2+c^2\right) \left(b^2-3\, c^2\right) \left(b^6-33\, c^2\, b^4+27\, c^4\, b^2-3\, c^6\right) \sqrt{z} - 362\,880 \left(b^{10}-45\, c^2\, b^8+210\, c^4\, b^6-210\, c^6\, b^4+45\, c^8\, b^2-c^{10}\right)\right) \cos\left(c \sqrt{z}\right) + c \left(60\,480 \left(b^2+c^2\right)^3 \left(7\, b^6-35\, c^2\, b^4+21\, c^4\, b^2-c^6\right) z^{3/2} + 3024 \left(b^2+c^2\right)^5 \left(5\, b^4-10\, c^2\, b^2+c^4\right) z^{5/2} + 72 \left(3\, b^2-c^2\right) \left(b^2+c^2\right)^7 z^{7/2} + \left(b^2+c^2\right)^9 z^{9/2} - 18\, b \left(b^2+c^2\right)^8 z^4 - 2016\, b\, (b-c)\, (b+c) \left(b^2+c^2\right)^6 z^3 - 30\,240\, b \left(b^2+c^2\right)^4 \left(3\, b^4-10\, c^2\, b^2+3\, c^4\right) z^2 - 1\,451\,520\, b \left(b^2+c^2\right)^2 \left(b^6-7\, c^2\, b^4+7\, c^4\, b^2-c^6\right) z + 362\,880 \left(9\, b^{10}-75\, c^2\, b^8+42\, c^4\, b^6+90\, c^6\, b^4-35\, c^8\, b^2+c^{10}\right) \sqrt{z} - 725\,760\, b \left(5\, b^4-10\, c^2\, b^2+c^4\right) \left(b^4-10\, c^2\, b^2+5\, c^4\right)\right) \sin\left(c \sqrt{z}\right)\right)\right)$$

01.07.21.0369.01

$$\int z^5 e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c\right) dz = \frac{1}{\left(b^2+c^2\right)^{12}} \left(2 e^{\sqrt{z}\, b} \left(\left(6\,652\,800\, b \left(b^2+c^2\right)^3 \left(b^8-36 c^2 b^6+126 c^4 b^4-84 c^6 b^2+9 c^8\right) z^{3/2}+332\,640\, b \left(b^2+c^2\right)^5 \left(b^6-21 c^2 b^4+35 c^4 b^2-7 c^6\right) z^{5/2}+7920\, b \left(b^2+c^2\right)^7 \left(b^4-10 c^2 b^2+5 c^4\right) z^{7/2}+110\, b \left(b^2+c^2\right)^9 \left(b^2-3 c^2\right) z^{9/2}+b \left(b^2+c^2\right)^{11} z^{11/2}-11 (b-c) (b+c) \left(b^2+c^2\right)^{10} z^5-990 \left(b^2+c^2\right)^8 \left(b^4-6 c^2 b^2+c^4\right) z^4-55\,440 \left(b^2+c^2\right)^6 \left(b^6-15 c^2 b^4+15 c^4 b^2-c^6\right) z^3-1\,663\,200 \left(b^2+c^2\right)^4 \left(b^8-28 c^2 b^6+70 c^4 b^4-28 c^6 b^2+c^8\right) z^2-19\,958\,400 \left(b^2+c^2\right)^2 \left(b^{10}-45 c^2 b^8+210 c^4 b^6-210 c^6 b^4+45 c^8 b^2-c^{10}\right) z+39\,916\,800\, b \left(b^2+c^2\right) \left(b^{10}-55 c^2 b^8+330 c^4 b^6-462 c^6 b^4+165 c^8 b^2-11 c^{10}\right) \sqrt{z}-39\,916\,800 \left(b^{12}-66 c^2 b^{10}+495 c^4 b^8-924 c^6 b^6+495 c^8 b^4-66 c^{10} b^2+c^{12}\right)\right) \cos\left(c \sqrt{z}\right)+c \left(6\,652\,800 \left(b^2+c^2\right)^3 \left(9 b^8-84 c^2 b^6+126 c^4 b^4-36 c^6 b^2+c^8\right) z^{3/2}+332\,640 \left(b^2+c^2\right)^5 \left(7 b^6-35 c^2 b^4+21 c^4 b^2-c^6\right) z^{5/2}+7920 \left(b^2+c^2\right)^7 \left(5 b^4-10 c^2 b^2+c^4\right) z^{7/2}+110 \left(3 b^2-c^2\right) \left(b^2+c^2\right)^9 z^{9/2}+\left(b^2+c^2\right)^{11} z^{11/2}-22\, b \left(b^2+c^2\right)^{10} z^5-3960\, b (b-c) (b+c) \left(b^2+c^2\right)^8 z^4-110\,880\, b \left(b^2+c^2\right)^6 \left(3 b^4-10 c^2 b^2+3 c^4\right) z^3-13\,305\,600\, b \left(b^2+c^2\right)^4 \left(b^6-7 c^2 b^4+7 c^4 b^2-c^6\right) z^2-39\,916\,800\, b \left(b^2+c^2\right)^2 \left(5 b^4-10 c^2 b^2+c^4\right) \left(b^4-10 c^2 b^2+5 c^4\right) z+39\,916\,800 \left(b^2+c^2\right) \left(11 b^{10}-165 c^2 b^8+462 c^4 b^6-330 c^6 b^4+55 c^8 b^2-c^{10}\right) \sqrt{z}-159\,667\,200\, b \left(3 b^{10}-55 c^2 b^8+198 c^4 b^6-198 c^6 b^4+55 c^8 b^2-3 c^{10}\right)\right) \sin\left(c \sqrt{z}\right)\right)\right)$$

01.07.21.0370.01

$$\int \frac{e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c\right)}{z} dz = \mathrm{Ei}\left((b+i c) \sqrt{z}\right)+\mathrm{Ei}\left((b-i c) \sqrt{z}\right)$$

01.07.21.0371.01

$$\int \frac{e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c\right)}{z^2} dz = \frac{1}{2} \mathrm{Ei}\left((b+i c) \sqrt{z}\right) (b+i c)^2+\frac{1}{2} (b-i c)^2 \mathrm{Ei}\left((b-i c) \sqrt{z}\right)+\frac{e^{\sqrt{z}\, b} \left(\left(-\sqrt{z}\, b-1\right) \cos\left(c \sqrt{z}\right)+c \sqrt{z} \sin\left(c \sqrt{z}\right)\right)}{z}$$

01.07.21.0372.01

$$\int \frac{e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c\right)}{z^3} dz = \frac{1}{24} \mathrm{Ei}\left((b+i c) \sqrt{z}\right) (b+i c)^4+\frac{1}{24 z^2} \left(-e^{(b+i c) \sqrt{z}} \left((b+i c) \sqrt{z} \left(z (b+i c)^2+\sqrt{z}\, (b+i c)+2\right)+6\right)-e^{(b-i c) \sqrt{z}} \left((b-i c) \sqrt{z} \left(z (b-i c)^2+\sqrt{z}\, (b-i c)+2\right)+6\right)\right)+\frac{1}{24} (b-i c)^4 \mathrm{Ei}\left((b-i c) \sqrt{z}\right)$$

01.07.21.0373.01

$$\int \frac{e^{b\sqrt{z}}\cos\left(\sqrt{z}\ c\right)}{z^4}\,dz = \frac{1}{720}\operatorname{Ei}\left((b+i c)\sqrt{z}\right)(b+i c)^6 + \frac{1}{720 z^3}\left(-e^{(b+i c)\sqrt{z}}\left((b+i c)\sqrt{z}\left((b+i c)^3 z^{3/2}+(b+i c)^4 z^2+2(b+i c)^2 z+6(b+i c)\sqrt{z}+24\right)+120\right)- e^{(b-i c)\sqrt{z}}\left((b-i c)\sqrt{z}\left((b-i c)^3 z^{3/2}+(b-i c)^4 z^2+2(b-i c)^2 z+6(b-i c)\sqrt{z}+24\right)+120\right)\right)+ \frac{1}{720}(b-i c)^6\operatorname{Ei}\left((b-i c)\sqrt{z}\right)$$

01.07.21.0374.01

$$\int \frac{e^{b\sqrt{z}}\cos\left(\sqrt{z}\ c\right)}{z^5}\,dz = \frac{\operatorname{Ei}\left((b+i c)\sqrt{z}\right)(b+i c)^8}{40320} + \frac{1}{40320 z^4}\left(-e^{(b+i c)\sqrt{z}}\left((b+i c)\sqrt{z}\left(6(b+i c)^3 z^{3/2}+(b+i c)^5 z^{5/2}+ (b+i c)^6 z^3+2(b+i c)^4 z^2+24(b+i c)^2 z+120(b+i c)\sqrt{z}+720\right)+5040\right)- e^{(b-i c)\sqrt{z}}\left((b-i c)\sqrt{z}\left(6(b-i c)^3 z^{3/2}+(b-i c)^5 z^{5/2}+(b-i c)^6 z^3+2(b-i c)^4 z^2+24(b-i c)^2 z+ 120(b-i c)\sqrt{z}+720\right)+5040\right)\right)+\frac{(b-i c)^8\operatorname{Ei}\left((b-i c)\sqrt{z}\right)}{40320}$$

Involving $z^{\alpha-1}\, e^{b z^r+e}\cos(c z^r)$

01.07.21.0375.01

$$\int z^{\alpha-1} e^{b z^r+e}\cos(c z^r)\,dz = -\frac{1}{2r}\left(z^\alpha\left(e^e\,\Gamma\left(\frac{\alpha}{r},(i c-b)z^r\right)((i c-b)z^r)^{-\frac{\alpha}{r}}+e^e((-b-i c)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(-b-i c)z^r\right)\right)\right)$$

01.07.21.0376.01

$$\int \frac{e^{b z^r+e}\cos(c z^r)}{z}\,dz = \frac{e^e\left(\operatorname{Ei}((b+i c)z^r)+\operatorname{Ei}((b-i c)z^r)\right)}{2r}$$

01.07.21.0377.01

$$\int z^{2n} e^{b z^2+e}\cos\left(c z^2\right)dz = -\frac{1}{4} z\, e^e\left(\left((-b-i c)z^2\right)^{-\frac{1}{2}}(-b-i c)^{-n}\left(\operatorname{erfc}\left(\sqrt{(-b-i c)z^2}\right)\Gamma\left(n+\frac{1}{2}\right)+e^{-(-b-i c)z^2}\sum_{k=0}^{n-1}\frac{\left((-b-i c)z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}- e^{-(-b-i c)z^2}\sum_{k=n}^{-1}\frac{\left((-b-i c)z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right)+\left((i c-b)z^2\right)^{-\frac{1}{2}}(i c-b)^{-n} \left(\operatorname{erfc}\left(\sqrt{(i c-b)z^2}\right)\Gamma\left(n+\frac{1}{2}\right)+e^{-(i c-b)z^2}\sum_{k=0}^{n-1}\frac{\left((i c-b)z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}-e^{-(i c-b)z^2}\sum_{k=n}^{-1}\frac{\left((i c-b)z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right)\right)/;\ n\in\mathbb{Z}$$

01.07.21.0378.01

$$\int z^{2n-1} e^{b z^2+e} \cos(c z^2)\, dz = -\frac{1}{4} e^e \left((-b - i c)^{-n} \left(\frac{(-1)^{n-1} \operatorname{Ei}(-(-b - i c) z^2)}{(-n)!} + e^{-(-b-i c) z^2} \sum_{k=0}^{n-1} \frac{((-b - i c) z^2)^k}{(n)_{k-n+1}} - e^{-(-b-i c) z^2} \sum_{k=n}^{-1} \frac{((-b - i c) z^2)^k}{(n)_{k-n+1}} \right) + (i c - b)^{-n} \left(\frac{(-1)^{n-1} \operatorname{Ei}(-(i c - b) z^2)}{(-n)!} + e^{-(i c-b) z^2} \sum_{k=0}^{n-1} \frac{((i c - b) z^2)^k}{(n)_{k-n+1}} - e^{-(i c-b) z^2} \sum_{k=n}^{-1} \frac{((i c - b) z^2)^k}{(n)_{k-n+1}} \right) \right) /;\, n \in \mathbb{Z}$$

01.07.21.0379.01

$$\int z\, e^{b z^2+e} \cos(c z^2)\, dz = \frac{e^{b z^2+e} (b \cos(c z^2) + c \sin(c z^2))}{2 (b^2 + c^2)}$$

01.07.21.0380.01

$$\int z^2 e^{b z^2+e} \cos(c z^2)\, dz = -\frac{e^e \sqrt{\pi} \operatorname{erfi}\left(\sqrt{b + i c}\, z\right)}{8 (b + i c)^{3/2}} + \frac{e^{b z^2+e} z (b \cos(c z^2) + c \sin(c z^2))}{2 (b^2 + c^2)} - \frac{e^e \sqrt{\pi} \operatorname{erfi}\left(\sqrt{b - i c}\, z\right)}{8 (b - i c)^{3/2}}$$

01.07.21.0381.01

$$\int z^3 e^{b z^2+e} \cos(c z^2)\, dz = \frac{e^{b z^2+e} \left((z^2 b^3 - b^2 + c^2 z^2 b + c^2) \cos(c z^2) + c (b^2 z^2 + c^2 z^2 - 2 b) \sin(c z^2)\right)}{2 (b^2 + c^2)^2}$$

01.07.21.0382.01

$$\int z^4 e^{b z^2+e} \cos(c z^2)\, dz = \frac{1}{16} e^e \left(\frac{2 e^{(b+i c) z^2} z (2 b z^2 + 2 c i z^2 - 3)}{(b + i c)^2} + \frac{2 e^{(b-i c) z^2} z (2 b z^2 - 2 i c z^2 - 3)}{(b - i c)^2} + \frac{3 \sqrt{\pi} \operatorname{erfi}\left(\sqrt{b + i c}\, z\right)}{(b + i c)^{5/2}} + \frac{3 \sqrt{\pi} \operatorname{erfi}\left(\sqrt{b - i c}\, z\right)}{(b - i c)^{5/2}} \right)$$

01.07.21.0383.01

$$\int z^5 e^{b z^2+e} \cos(c z^2)\, dz = \frac{1}{4} e^e \left(\frac{e^{(b+i c) z^2} ((b + i c)^2 z^4 - 2 (b + i c) z^2 + 2)}{(b + i c)^3} + \frac{e^{(b-i c) z^2} ((b - i c)^2 z^4 - 2 (b - i c) z^2 + 2)}{(b - i c)^3} \right)$$

01.07.21.0384.01

$$\int \frac{e^{b z^2+e} \cos(c z^2)}{z}\, dz = \frac{1}{4} e^e \left(\operatorname{Ei}((b + i c) z^2) + \operatorname{Ei}((b - i c) z^2)\right)$$

01.07.21.0385.01

$$\int \frac{e^{b z^2+e} \cos(c z^2)}{z^2}\, dz = -\frac{e^{b z^2+e} \cos(c z^2)}{z} + \frac{1}{2} \sqrt{b + i c}\, e^e \sqrt{\pi} \operatorname{erfi}\left(\sqrt{b + i c}\, z\right) + \frac{1}{2} \sqrt{b - i c}\, e^e \sqrt{\pi} \operatorname{erfi}\left(\sqrt{b - i c}\, z\right)$$

01.07.21.0386.01

$$\int \frac{e^{b z^2+e} \cos(c z^2)}{z^3}\, dz = -\frac{e^{b z^2+e} \cos(c z^2)}{2 z^2} + \frac{1}{4} (b + i c) e^e \operatorname{Ei}((b + i c) z^2) + \frac{1}{4} (b - i c) e^e \operatorname{Ei}((b - i c) z^2)$$

01.07.21.0387.01

$$\int \frac{e^{b z^2+e} \cos(c z^2)}{z^4} \, dz = \frac{1}{3} e^e \sqrt{\pi} \left(\operatorname{erfi}\left(\sqrt{b+i c}\; z\right)(b+i c)^{3/2} + (b-i c)^{3/2} \operatorname{erfi}\left(\sqrt{b-i c}\; z\right)\right) + \frac{1}{3 z^3} \left(e^e \left(e^{b z^2} \left(2 c z^2 \sin(c z^2) - \left(2 b z^2+1\right) \cos(c z^2)\right) - \sqrt{\pi} \left(\left(-(b+i c) z^2\right)^{3/2} + \left(-(b-i c) z^2\right)^{3/2}\right)\right)\right)$$

01.07.21.0388.01

$$\int \frac{e^{b z^2+e} \cos(c z^2)}{z^5} \, dz = \frac{1}{8} e^e \operatorname{Ei}\left((b+i c) z^2\right)(b+i c)^2 + \frac{1}{8} (b-i c)^2 e^e \operatorname{Ei}\left((b-i c) z^2\right) + \frac{e^{b z^2+e} \left(c \sin(c z^2) z^2 + \left(-b z^2-1\right) \cos(c z^2)\right)}{4 z^4}$$

01.07.21.0389.01

$$\int z^n e^{b\sqrt{z}+e} \cos\left(\sqrt{z}\; c\right) dz = -(i c-b)^{-2(n+1)} e^e \left(-\frac{\operatorname{Ei}\left(-(i c-b)\sqrt{z}\right)}{(-2(n+1))!} + e^{-(i c-b)\sqrt{z}} \sum_{k=0}^{2n+1} \frac{\left((i c-b)\sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}} - e^{-(i c-b)\sqrt{z}} \sum_{k=2(n+1)}^{-1} \frac{\left((i c-b)\sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}}\right) - (b+i c)^{-2(n+1)} e^e \left(-\frac{\operatorname{Ei}\left(-(-b-i c)\sqrt{z}\right)}{(-2(n+1))!} + e^{-(-b-i c)\sqrt{z}} \sum_{k=0}^{2n+1} \frac{\left((-b-i c)\sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}} - e^{-(-b-i c)\sqrt{z}} \sum_{k=2(n+1)}^{-1} \frac{\left((-b-i c)\sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}}\right) /;\, n \in \mathbb{Z}$$

01.07.21.0390.01

$$\int z\, e^{\sqrt{z}\, b+e} \cos\left(c\sqrt{z}\right) dz = \frac{1}{\left(b^2+c^2\right)^4} \left(2 e^{\sqrt{z}\, b+e} \left(\left(b \left(b^2+c^2\right)^3 z^{3/2} - 3(b-c)(b+c)\left(b^2+c^2\right)^2 z + 6 b \left(b^2+c^2\right)\left(b^2-3c^2\right)\sqrt{z} - 6\left(b^4-6c^2b^2+c^4\right)\right) \cos\left(c\sqrt{z}\right) + c \left(\left(b^2+c^2\right)^3 z^{3/2} - 6 b \left(b^2+c^2\right)^2 z + 6\left(3b^2-c^2\right)\left(b^2+c^2\right)\sqrt{z} - 24 b (b-c)(b+c)\right) \sin\left(c\sqrt{z}\right)\right)\right)$$

01.07.21.0391.01

$$\int z^2 e^{\sqrt{z}\, b+e} \cos\left(c\sqrt{z}\right) dz = \frac{1}{\left(b^2+c^2\right)^6} \left(2 e^{\sqrt{z}\, b+e} \left(\left(20 b \left(b^2+c^2\right)^3 \left(b^2-3c^2\right) z^{3/2} + b\left(b^2+c^2\right)^5 z^{5/2} - 5(b-c)(b+c)\left(b^2+c^2\right)^4 z^2 - 60\left(b^2+c^2\right)^2 \left(b^4-6c^2b^2+c^4\right) z + 120 b \left(b^2+c^2\right)\left(b^4-10c^2b^2+5c^4\right)\sqrt{z} - 120\left(b^6-15c^2b^4+15c^4b^2-c^6\right)\right) \cos\left(c\sqrt{z}\right) + c\left(20\left(3b^2-c^2\right)\left(b^2+c^2\right)^3 z^{3/2} + \left(b^2+c^2\right)^5 z^{5/2} - 10 b \left(b^2+c^2\right)^4 z^2 - 240 b (b-c)(b+c)\left(b^2+c^2\right)^2 z + 120\left(b^2+c^2\right)\left(5b^4-10c^2b^2+c^4\right)\sqrt{z} - 240 b\left(3b^4-10c^2b^2+3c^4\right)\right) \sin\left(c\sqrt{z}\right)\right)\right)$$

01.07.21.0392.01

$$\int z^3 e^{\sqrt{z}\, b+e} \cos\left(c\sqrt{z}\right) dz = \frac{1}{\left(b^2+c^2\right)^8} \Big(2 e^{\sqrt{z}\, b+e} \Big(\Big(840\, b \left(b^2+c^2\right)^3 \left(b^4-10 c^2 b^2+5 c^4\right) z^{3/2} + 42\, b \left(b^2+c^2\right)^5 \left(b^2-3 c^2\right) z^{5/2} + b \left(b^2+c^2\right)^7 z^{7/2} - 7 (b-c) (b+c) \left(b^2+c^2\right)^6 z^3 - 210 \left(b^2+c^2\right)^4 \left(b^4-6 c^2 b^2+c^4\right) z^2 - 2520 \left(b^2+c^2\right)^2 \left(b^6-15 c^2 b^4+15 c^4 b^2-c^6\right) z + 5040\, b \left(b^2+c^2\right) \left(b^6-21 c^2 b^4+35 c^4 b^2-7 c^6\right) \sqrt{z} - 5040 \left(b^8-28 c^2 b^6+70 c^4 b^4-28 c^6 b^2+c^8\right)\Big) \cos\left(c\sqrt{z}\right) + c \Big(840 \left(b^2+c^2\right)^3 \left(5 b^4-10 c^2 b^2+c^4\right) z^{3/2} + 42 \left(3 b^2-c^2\right) \left(b^2+c^2\right)^5 z^{5/2} + \left(b^2+c^2\right)^7 z^{7/2} - 14\, b \left(b^2+c^2\right)^6 z^3 - 840\, b (b-c) (b+c) \left(b^2+c^2\right)^4 z^2 - 5040\, b \left(b^2+c^2\right)^2 \left(3 b^4-10 c^2 b^2+3 c^4\right) z + 5040 \left(b^2+c^2\right) \left(7 b^6-35 c^2 b^4+21 c^4 b^2-c^6\right) \sqrt{z} - 40\,320\, b \left(b^6-7 c^2 b^4+7 c^4 b^2-c^6\right)\Big) \sin\left(c\sqrt{z}\right)\Big)\Big)$$

01.07.21.0393.01

$$\int z^4 e^{\sqrt{z}\, b+e} \cos\left(c\sqrt{z}\right) dz = \frac{1}{\left(b^2+c^2\right)^{10}} \Big(2 e^{\sqrt{z}\, b+e} \Big(\Big(60\,480\, b \left(b^2+c^2\right)^3 \left(b^6-21 c^2 b^4+35 c^4 b^2-7 c^6\right) z^{3/2} + 3024\, b \left(b^2+c^2\right)^5 \left(b^4-10 c^2 b^2+5 c^4\right) z^{5/2} + 72\, b \left(b^2+c^2\right)^7 \left(b^2-3 c^2\right) z^{7/2} + b \left(b^2+c^2\right)^9 z^{9/2} - 9 (b-c) (b+c) \left(b^2+c^2\right)^8 z^4 - 504 \left(b^2+c^2\right)^6 \left(b^4-6 c^2 b^2+c^4\right) z^3 - 15\,120 \left(b^2+c^2\right)^4 \left(b^6-15 c^2 b^4+15 c^4 b^2-c^6\right) z^2 - 181\,440 \left(b^2+c^2\right)^2 \left(b^8-28 c^2 b^6+70 c^4 b^4-28 c^6 b^2+c^8\right) z + 362\,880\, b \left(b^2+c^2\right) \left(b^2-3 c^2\right) \left(b^6-33 c^2 b^4+27 c^4 b^2-3 c^6\right) \sqrt{z} - 362\,880 \left(b^{10}-45 c^2 b^8+210 c^4 b^6-210 c^6 b^4+45 c^8 b^2-c^{10}\right)\Big) \cos\left(c\sqrt{z}\right) + c \Big(60\,480 \left(b^2+c^2\right)^3 \left(7 b^6-35 c^2 b^4+21 c^4 b^2-c^6\right) z^{3/2} + 3024 \left(b^2+c^2\right)^5 \left(5 b^4-10 c^2 b^2+c^4\right) z^{5/2} + 72 \left(3 b^2-c^2\right) \left(b^2+c^2\right)^7 z^{7/2} + \left(b^2+c^2\right)^9 z^{9/2} - 18\, b \left(b^2+c^2\right)^8 z^4 - 2016\, b (b-c) (b+c) \left(b^2+c^2\right)^6 z^3 - 30\,240\, b \left(b^2+c^2\right)^4 \left(3 b^4-10 c^2 b^2+3 c^4\right) z^2 - 1\,451\,520\, b \left(b^2+c^2\right)^2 \left(b^6-7 c^2 b^4+7 c^4 b^2-c^6\right) z + 362\,880 \left(9 b^{10}-75 c^2 b^8+42 c^4 b^6+90 c^6 b^4-35 c^8 b^2+c^{10}\right) \sqrt{z} - 725\,760\, b \left(5 b^4-10 c^2 b^2+c^4\right) \left(b^4-10 c^2 b^2+5 c^4\right)\Big) \sin\left(c\sqrt{z}\right)\Big)\Big)$$

01.07.21.0394.01

$$\int z^5 e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c\right) dz = \frac{1}{\left(b^2+c^2\right)^{12}} \left(2 e^{\sqrt{z}\, b+e} \left(\left(6\,652\,800\, b \left(b^2+c^2\right)^3 \left(b^8-36 c^2 b^6+126 c^4 b^4-84 c^6 b^2+9 c^8\right) z^{3/2}+332\,640\, b \left(b^2+c^2\right)^5 \left(b^6-21 c^2 b^4+35 c^4 b^2-7 c^6\right) z^{5/2}+7920\, b \left(b^2+c^2\right)^7 \left(b^4-10 c^2 b^2+5 c^4\right) z^{7/2}+110\, b \left(b^2+c^2\right)^9 \left(b^2-3 c^2\right) z^{9/2}+b \left(b^2+c^2\right)^{11} z^{11/2}-11 (b-c)(b+c) \left(b^2+c^2\right)^{10} z^5-990 \left(b^2+c^2\right)^8 \left(b^4-6 c^2 b^2+c^4\right) z^4-55\,440 \left(b^2+c^2\right)^6 \left(b^6-15 c^2 b^4+15 c^4 b^2-c^6\right) z^3-1\,663\,200 \left(b^2+c^2\right)^4 \left(b^8-28 c^2 b^6+70 c^4 b^4-28 c^6 b^2+c^8\right) z^2-19\,958\,400 \left(b^2+c^2\right)^2 \left(b^{10}-45 c^2 b^8+210 c^4 b^6-210 c^6 b^4+45 c^8 b^2-c^{10}\right) z+39\,916\,800\, b \left(b^2+c^2\right) \left(b^{10}-55 c^2 b^8+330 c^4 b^6-462 c^6 b^4+165 c^8 b^2-11 c^{10}\right) \sqrt{z}-39\,916\,800 \left(b^{12}-66 c^2 b^{10}+495 c^4 b^8-924 c^6 b^6+495 c^8 b^4-66 c^{10} b^2+c^{12}\right)\right) \cos\left(c \sqrt{z}\right)+c \left(6\,652\,800 \left(b^2+c^2\right)^3 \left(9 b^8-84 c^2 b^6+126 c^4 b^4-36 c^6 b^2+c^8\right) z^{3/2}+332\,640 \left(b^2+c^2\right)^5 \left(7 b^6-35 c^2 b^4+21 c^4 b^2-c^6\right) z^{5/2}+7920 \left(b^2+c^2\right)^7 \left(5 b^4-10 c^2 b^2+c^4\right) z^{7/2}+110 \left(3 b^2-c^2\right) \left(b^2+c^2\right)^9 z^{9/2}+\left(b^2+c^2\right)^{11} z^{11/2}-22\, b \left(b^2+c^2\right)^{10} z^5-3960\, b (b-c)(b+c) \left(b^2+c^2\right)^8 z^4-110\,880\, b \left(b^2+c^2\right)^6 \left(3 b^4-10 c^2 b^2+3 c^4\right) z^3-13\,305\,600\, b \left(b^2+c^2\right)^4 \left(b^6-7 c^2 b^4+7 c^4 b^2-c^6\right) z^2-39\,916\,800\, b \left(b^2+c^2\right)^2 \left(5 b^4-10 c^2 b^2+c^4\right) \left(b^4-10 c^2 b^2+5 c^4\right) z+39\,916\,800 \left(b^2+c^2\right) \left(11 b^{10}-165 c^2 b^8+462 c^4 b^6-330 c^6 b^4+55 c^8 b^2-c^{10}\right) \sqrt{z}-159\,667\,200\, b \left(3 b^{10}-55 c^2 b^8+198 c^4 b^6-198 c^6 b^4+55 c^8 b^2-3 c^{10}\right)\right) \sin\left(c \sqrt{z}\right)\right)\right)$$

01.07.21.0395.01

$$\int \frac{e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c\right)}{z}\, dz = e^e \operatorname{Ei}\left((b+i c) \sqrt{z}\right)+e^e \operatorname{Ei}\left((b-i c) \sqrt{z}\right)$$

01.07.21.0396.01

$$\int \frac{e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c\right)}{z^2}\, dz = \frac{1}{2} e^e \operatorname{Ei}\left((b+i c) \sqrt{z}\right) (b+i c)^2+\frac{1}{2} (b-i c)^2 e^e \operatorname{Ei}\left((b-i c) \sqrt{z}\right)+\frac{e^{\sqrt{z}\, b+e} \left(\left(-\sqrt{z}\, b-1\right) \cos\left(c \sqrt{z}\right)+c \sqrt{z} \sin\left(c \sqrt{z}\right)\right)}{z}$$

01.07.21.0397.01

$$\int \frac{e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c\right)}{z^3}\, dz = \frac{1}{24} e^e \operatorname{Ei}\left((b+i c) \sqrt{z}\right) (b+i c)^4+\frac{1}{24 z^2} \left(e^e \left(-e^{(b+i c) \sqrt{z}} \left((b+i c) \sqrt{z} \left(z (b+i c)^2+\sqrt{z}\, (b+i c)+2\right)+6\right)-e^{(b-i c) \sqrt{z}} \left((b-i c) \sqrt{z} \left(z (b-i c)^2+\sqrt{z}\, (b-i c)+2\right)+6\right)\right)\right)+\frac{1}{24} (b-i c)^4 e^e \operatorname{Ei}\left((b-i c) \sqrt{z}\right)$$

01.07.21.0398.01

$$\int \frac{e^{b\sqrt{z}+e}\cos\left(\sqrt{z}\,c\right)}{z^4}\,dz = \frac{1}{720}e^e\,\mathrm{Ei}\left((b+i\,c)\sqrt{z}\right)(b+i\,c)^6 + \frac{1}{720\,z^3}\left(e^e\left(-e^{(b+i\,c)\sqrt{z}}\left((b+i\,c)\sqrt{z}\left((b+i\,c)^3 z^{3/2}+(b+i\,c)^4 z^2+2\,(b+i\,c)^2 z+6\,(b+i\,c)\sqrt{z}+24\right)+120\right)-e^{(b-i\,c)\sqrt{z}}\left((b-i\,c)\sqrt{z}\left((b-i\,c)^3 z^{3/2}+(b-i\,c)^4 z^2+2\,(b-i\,c)^2 z+6\,(b-i\,c)\sqrt{z}+24\right)+120\right)\right)\right)+\frac{1}{720}(b-i\,c)^6 e^e\,\mathrm{Ei}\left((b-i\,c)\sqrt{z}\right)$$

01.07.21.0399.01

$$\int \frac{e^{b\sqrt{z}+e}\cos\left(\sqrt{z}\,c\right)}{z^5}\,dz = \frac{e^e\,\mathrm{Ei}\left((b+i\,c)\sqrt{z}\right)(b+i\,c)^8}{40\,320} + \frac{1}{40\,320\,z^4}\left(e^e\left(-e^{(b+i\,c)\sqrt{z}}\left((b+i\,c)\sqrt{z}\left(6\,(b+i\,c)^3 z^{3/2}+(b+i\,c)^5 z^{5/2}+(b+i\,c)^6 z^3+2\,(b+i\,c)^4 z^2+24\,(b+i\,c)^2 z+120\,(b+i\,c)\sqrt{z}+720\right)+5040\right)-e^{(b-i\,c)\sqrt{z}}\left((b-i\,c)\sqrt{z}\left(6\,(b-i\,c)^3 z^{3/2}+(b-i\,c)^5 z^{5/2}+(b-i\,c)^6 z^3+2\,(b-i\,c)^4 z^2+24\,(b-i\,c)^2 z+120\,(b-i\,c)\sqrt{z}+720\right)+5040\right)\right)\right)+\frac{(b-i\,c)^8 e^e\,\mathrm{Ei}\left((b-i\,c)\sqrt{z}\right)}{40\,320}$$

Involving $z^n e^{b z^r + d z} \cos(c z^r)$

01.07.21.0400.01

$$\int z^n e^{b z^2+d z}\cos\left(c z^2\right)dz = -\frac{1}{4}\left(e^{-\frac{d^2}{4(b+i\,c)}}\left(\sum_{q=0}^{n} 2^{q-n}(-d)^{n-q}(d+2\,(b+i\,c)\,z)^{q+1}\left(-\frac{(d+2\,(b+i\,c)\,z)^2}{b+i\,c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{(d+2\,(b+i\,c)\,z)^2}{4\,(b+i\,c)}\right)\right)(b+i\,c)^{-n-1}+(b-i\,c)^{-n-1}e^{-\frac{d^2}{4(b-i\,c)}}\sum_{q=0}^{n}2^{q-n}(-d)^{n-q}(d+2\,b\,z-2\,i\,c\,z)^{q+1}\left(-\frac{(d+2\,b\,z-2\,i\,c\,z)^2}{b-i\,c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{(d+2\,b\,z-2\,i\,c\,z)^2}{4\,(b-i\,c)}\right)\right)\;/;\;n\in\mathbb{N}$$

01.07.21.0401.01

$$\int z^n e^{\sqrt{z}\, b+d z} \cos\left(\sqrt{z}\, c\right) dz = 2^{-2n-2} \left(e^{-\frac{(b+i c)^2}{4 d}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+i c)^{-h-k+2n} \left(b+i c+2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+i c+2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+i c) \left(b+i c+2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+i c+2 d \sqrt{z}\right)^2}{4 d}\right) + 2 \sqrt{-\frac{\left(b+i c+2 d \sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+i c+2 d \sqrt{z}\right)^2}{4 d}\right)\right)\right) d^{-2n-2} + e^{-\frac{(b-i c)^2}{4 d}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-i c)^{-h-k+2n} \left(b-i c+2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b-i c+2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-i c) \left(b-i c+2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-i c+2 d \sqrt{z}\right)^2}{4 d}\right) + 2 \sqrt{-\frac{\left(b-i c+2 d \sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-i c+2 d \sqrt{z}\right)^2}{4 d}\right)\right)\right) d^{-2n-2} \right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \cos(c z^r)$

01.07.21.0402.01

$$\int z^n e^{b z^2 + d z + e} \cos\left(c z^2\right) dz = -\frac{1}{4} \left(e^{-\frac{d^2}{4(b+i c)} + e} \left(\sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2(b+i c) z)^{q+1} \left(-\frac{(d+2(b+i c) z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b+i c) z)^2}{4(b+i c)}\right)\right) (b+i c)^{-n-1} + (b-i c)^{-n-1} e^{-\frac{d^2}{4(b-i c)} + e} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2 b z-2 i c z)^{q+1} \left(-\frac{(d+2 b z-2 i c z)^2}{b-i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2 b z-2 i c z)^2}{4(b-i c)}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0403.01

$$\int z^n e^{\sqrt{z}\, b+d z+e} \cos\left(\sqrt{z}\, c\right) dz = 2^{-2n-2} \left(e^{-\frac{(b+i c)^2}{4d}+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+i c)^{-h-k+2n} \left(b+i c+2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+i c)\left(b+i c+2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{4d}\right) \right) \right) d^{-2n-2} + e^{-\frac{(b-i c)^2}{4d}+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-i c)^{-h-k+2n} \left(b-i c+2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-i c)\left(b-i c+2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{4d}\right) \right) \right) d^{-2n-2} \right) /;\ n \in \mathbb{N}$$

Involving $z^n e^{d z} \cos\left(c z^r + g\right)$

01.07.21.0404.01

$$\int z^n e^{d z} \cos(c z^2 + g)\, dz = -\frac{1}{4}\left(\frac{1}{\sqrt{i c}}\left(e^{\frac{i d^2}{4 c}+i g} \sum_{q=0}^{n} 2^{q-n} (i c)^{-n-\frac{1}{2}} (-d)^{n-q} (d + 2 i c z)^{q+1} \left(\frac{i (d + 2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 i c z)^2}{4 c}\right)\right) + \frac{1}{\sqrt{-i c}}\left(e^{-\frac{i d^2}{4 c}-i g} \sum_{q=0}^{n} 2^{q-n} (-i c)^{-n-\frac{1}{2}} (-d)^{n-q} (d - 2 i c z)^{q+1} \left(-\frac{i (d - 2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d - 2 i c z)^2}{4 c}\right)\right)\right) /; n \in \mathbb{N}$$

01.07.21.0405.01

$$\int z^n e^{d z} \cos(\sqrt{z}\, c + g)\, dz = 2^{-2n-2} d^{-2n-2} \left(e^{\frac{c^2}{4 d}-i g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c)^{-h-k+2n} \left(2 d \sqrt{z} - i c\right)^{h+k} \left(-\frac{\left(2 d \sqrt{z} - i c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2 d \sqrt{-\frac{\left(2 d \sqrt{z} - i c\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2 d \sqrt{z} - i c\right)^2}{4 d}\right) - i c \left(2 d \sqrt{z} - i c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2 d \sqrt{z} - i c\right)^2}{4 d}\right)\right) + e^{\frac{c^2}{4 d}+i g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2n} \left(2 \sqrt{z}\, d + i c\right)^{h+k} \left(-\frac{\left(2 \sqrt{z}\, d + i c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\, i \left(2 \sqrt{z}\, d + i c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2 \sqrt{z}\, d + i c\right)^2}{4 d}\right) + 2 \sqrt{-\frac{\left(2 \sqrt{z}\, d + i c\right)^2}{d}}\; d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2 \sqrt{z}\, d + i c\right)^2}{4 d}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{d z+e} \cos(c z^r + g)$

01.07.21.0406.01

$$\int z^n e^{d z+e} \cos\left(c z^2+g\right) dz = -\frac{1}{4}\left(\frac{1}{\sqrt{i c}}\left(e^{\frac{i d^2}{4 c}+e+i g} \sum_{q=0}^{n} 2^{q-n} (i c)^{-n-\frac{1}{2}} (-d)^{n-q} (d+2 i c z)^{q+1} \left(\frac{i (d+2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d+2 i c z)^2}{4 c}\right)\right)+ \frac{1}{\sqrt{-i c}}\left(e^{-\frac{i d^2}{4 c}+e-i g} \sum_{q=0}^{n} 2^{q-n} (-i c)^{-n-\frac{1}{2}} (-d)^{n-q} (d-2 i c z)^{q+1} \left(-\frac{i (d-2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d-2 i c z)^2}{4 c}\right)\right)\right) /; n \in \mathbb{N}$$

01.07.21.0407.01

$$\int z^n e^{d z+e} \cos\left(\sqrt{z}\, c+g\right) dz = 2^{-2 n-2} d^{-2 n-2} \left(e^{\frac{c^2}{4 d}+e-i g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c)^{-h-k+2 n} \left(2 d \sqrt{z}-i c\right)^{h+k} \left(-\frac{\left(2 d \sqrt{z}-i c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2 d \sqrt{-\frac{\left(2 d \sqrt{z}-i c\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2 d \sqrt{z}-i c\right)^2}{4 d}\right) - i c \left(2 d \sqrt{z}-i c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2 d \sqrt{z}-i c\right)^2}{4 d}\right)\right) + e^{\frac{c^2}{4 d}+e+i g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2 n} \left(2 \sqrt{z}\, d+i c\right)^{h+k} \left(-\frac{\left(2 \sqrt{z}\, d+i c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\, i \left(2 \sqrt{z}\, d+i c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2 \sqrt{z}\, d+i c\right)^2}{4 d}\right) + 2 \sqrt{-\frac{\left(2 \sqrt{z}\, d+i c\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2 \sqrt{z}\, d+i c\right)^2}{4 d}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r} \cos(c z^r + g)$

01.07.21.0408.01

$$\int z^{\alpha-1} e^{b z^r} \cos(c z^r + g)\, dz = -\frac{1}{2r}\left(z^\alpha \left(e^{-i g}\, \Gamma\left(\frac{\alpha}{r}, (i c - b) z^r\right) ((i c - b) z^r)^{-\frac{\alpha}{r}} + e^{i g}\, ((-b - i c) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (-b - i c) z^r\right)\right)\right)$$

01.07.21.0409.01

$$\int \frac{e^{b z^r} \cos(c z^r + g)}{z}\, dz = \frac{(\mathrm{Ei}((b + i c) z^r) (\cos(g) + i \sin(g)) + \mathrm{Ei}((b - i c) z^r) (\cos(g) - i \sin(g)))}{2r}$$

01.07.21.0410.01

$$\int z^{2n} e^{b z^2} \cos(c z^2 + g)\, dz = -\frac{1}{4} z \left(e^{i g} \left((-b - i c) z^2\right)^{-\frac{1}{2}} (-b - i c)^{-n} \left(\mathrm{erfc}\left(\sqrt{(-b - i c) z^2}\right) \Gamma\left(n + \frac{1}{2}\right) + e^{-(-b-i c) z^2} \sum_{k=0}^{n-1} \frac{\left((-b - i c) z^2\right)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}} - e^{-(-b-i c) z^2} \sum_{k=n}^{-1} \frac{\left((-b - i c) z^2\right)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}}\right) + e^{-i g} \left((i c - b) z^2\right)^{-\frac{1}{2}} (i c - b)^{-n} \left(\mathrm{erfc}\left(\sqrt{(i c - b) z^2}\right) \Gamma\left(n + \frac{1}{2}\right) + e^{-(i c-b) z^2} \sum_{k=0}^{n-1} \frac{\left((i c - b) z^2\right)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}} - e^{-(i c-b) z^2} \sum_{k=n}^{-1} \frac{\left((i c - b) z^2\right)^{k+\frac{1}{2}}}{\left(n + \frac{1}{2}\right)_{k-n+1}}\right)\right) /; n \in \mathbb{Z}$$

01.07.21.0411.01

$$\int z^{2n-1} e^{b z^2} \cos(c z^2 + g)\, dz = -\frac{1}{4}\left(e^{i g} (-b - i c)^{-n} \left(\frac{(-1)^{n-1} \mathrm{Ei}\left(-(-b - i c) z^2\right)}{(-n)!} + e^{-(-b-i c) z^2} \sum_{k=0}^{n-1} \frac{\left((-b - i c) z^2\right)^k}{(n)_{k-n+1}} - e^{-(-b-i c) z^2} \sum_{k=n}^{-1} \frac{\left((-b - i c) z^2\right)^k}{(n)_{k-n+1}}\right) + e^{-i g} (i c - b)^{-n} \left(\frac{(-1)^{n-1} \mathrm{Ei}\left(-(i c - b) z^2\right)}{(-n)!} + e^{-(i c-b) z^2} \sum_{k=0}^{n-1} \frac{\left((i c - b) z^2\right)^k}{(n)_{k-n+1}} - e^{-(i c-b) z^2} \sum_{k=n}^{-1} \frac{\left((i c - b) z^2\right)^k}{(n)_{k-n+1}}\right)\right) /; n \in \mathbb{Z}$$

01.07.21.0412.01

$$\int z\, e^{b z^2} \cos\left(c z^2 + g\right) dz = \frac{e^{b z^2} \left(b \cos\left(c z^2 + g\right) + c \sin\left(c z^2 + g\right)\right)}{2\left(b^2 + c^2\right)}$$

01.07.21.0413.01

$$\int z^2 e^{b z^2} \cos\left(c z^2 + g\right) dz = -\frac{e^{i g} \sqrt{\pi}\, \mathrm{erfi}\left(\sqrt{b + i c}\; z\right)}{8 (b + i c)^{3/2}} + \frac{e^{b z^2} z \left(b \cos\left(c z^2 + g\right) + c \sin\left(c z^2 + g\right)\right)}{2\left(b^2 + c^2\right)} - \frac{e^{-i g} \sqrt{\pi}\, \mathrm{erfi}\left(\sqrt{b - i c}\; z\right)}{8 (b - i c)^{3/2}}$$

01.07.21.0414.01

$$\int z^3 e^{b z^2} \cos\left(c z^2 + g\right) dz = \frac{e^{(b+i c) z^2 + i g} \left((b + i c) z^2 - 1\right)}{4 (b + i c)^2} + \frac{e^{(b-i c) z^2 - i g} \left((b - i c) z^2 - 1\right)}{4 (b - i c)^2}$$

01.07.21.0415.01

$$\int z^4 e^{b z^2} \cos(c z^2 + g)\, dz = \frac{e^{(b+i c) z^2 + i g} z (2 (b + i c) z^2 - 3)}{8 (b + i c)^2} + \frac{e^{(b-i c) z^2 - i g} z (2 (b - i c) z^2 - 3)}{8 (b - i c)^2} + \frac{3 e^{i g} \sqrt{\pi} \operatorname{erfi}(\sqrt{b + i c}\, z)}{16 (b + i c)^{5/2}} + \frac{3 e^{-i g} \sqrt{\pi} \operatorname{erfi}(\sqrt{b - i c}\, z)}{16 (b - i c)^{5/2}}$$

01.07.21.0416.01

$$\int z^5 e^{b z^2} \cos(c z^2 + g)\, dz = \frac{1}{2 (b^2 + c^2)^3} \Big(e^{b z^2} \Big(\big(b (b^2 + c^2)^2 z^4 - 2 (b^4 - c^4) z^2 + 2 b (b^2 - 3 c^2)\big) \cos(c z^2 + g) + c \big((b^2 + c^2)^2 z^4 - 4 b (b^2 + c^2) z^2 + 6 b^2 - 2 c^2\big) \sin(c z^2 + g)\Big)\Big)$$

01.07.21.0417.01

$$\int \frac{e^{b z^2} \cos(c z^2 + g)}{z}\, dz = \frac{1}{4} e^{i g} \operatorname{Ei}((b + i c) z^2) + \frac{1}{4} e^{-i g} \operatorname{Ei}((b - i c) z^2)$$

01.07.21.0418.01

$$\int \frac{e^{b z^2} \cos(c z^2 + g)}{z^2}\, dz = -\frac{e^{b z^2} \cos(c z^2 + g)}{z} + \frac{1}{2} \sqrt{b + i c}\, e^{i g} \sqrt{\pi} \operatorname{erfi}(\sqrt{b + i c}\, z) + \frac{1}{2} \sqrt{b - i c}\, e^{-i g} \sqrt{\pi} \operatorname{erfi}(\sqrt{b - i c}\, z)$$

01.07.21.0419.01

$$\int \frac{e^{b z^2} \cos(c z^2 + g)}{z^3}\, dz = -\frac{e^{b z^2} \cos(c z^2 + g)}{2 z^2} + \frac{1}{4} (b + i c) e^{i g} \operatorname{Ei}((b + i c) z^2) + \frac{1}{4} (b - i c) e^{-i g} \operatorname{Ei}((b - i c) z^2)$$

01.07.21.0420.01

$$\int \frac{e^{b z^2} \cos(c z^2 + g)}{z^4}\, dz = \frac{1}{3} e^{i g} \sqrt{\pi} \operatorname{erfi}(\sqrt{b + i c}\, z) (b + i c)^{3/2} + \frac{1}{3} (b - i c)^{3/2} e^{-i g} \sqrt{\pi} \operatorname{erfi}(\sqrt{b - i c}\, z) - \frac{e^{b z^2} ((2 b z^2 + 1) \cos(c z^2 + g) - 2 c z^2 \sin(c z^2 + g))}{3 z^3}$$

01.07.21.0421.01

$$\int \frac{e^{b z^2} \cos(c z^2 + g)}{z^5}\, dz = \frac{1}{8} e^{i g} \operatorname{Ei}((b + i c) z^2) (b + i c)^2 + \frac{1}{8} (b - i c)^2 e^{-i g} \operatorname{Ei}((b - i c) z^2) + \frac{e^{b z^2} (c z^2 \sin(c z^2 + g) - (b z^2 + 1) \cos(c z^2 + g))}{4 z^4}$$

01.07.21.0422.01

$$\int z^n e^{b\sqrt{z}} \cos\left(\sqrt{z}\, c+g\right) dz = -e^{-i g}\left(-\frac{\operatorname{Ei}\left(-(i c-b)\sqrt{z}\right)}{(-2(n+1))!}+e^{-(i c-b)\sqrt{z}}\sum_{k=0}^{2n+1}\frac{\left((i c-b)\sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}}-e^{-(i c-b)\sqrt{z}}\sum_{k=2(n+1)}^{-1}\frac{\left((i c-b)\sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}}\right)(i c-b)^{-2(n+1)} - (b+i c)^{-2(n+1)} e^{i g}\left(-\frac{\operatorname{Ei}\left(-(-b-i c)\sqrt{z}\right)}{(-2(n+1))!}+e^{-(-b-i c)\sqrt{z}}\sum_{k=0}^{2n+1}\frac{\left((-b-i c)\sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}}-e^{-(-b-i c)\sqrt{z}}\sum_{k=2(n+1)}^{-1}\frac{\left((-b-i c)\sqrt{z}\right)^k}{(2(n+1))_{k-2n-1}}\right) /;\, n\in\mathbb{Z}$$

01.07.21.0423.01

$$\int z\, e^{\sqrt{z}\, b}\cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2+c^2\right)^4}\left(2 e^{\sqrt{z}\, b}\left(\left(b\left(b^2+c^2\right)^3 z^{3/2}-3(b-c)(b+c)\left(b^2+c^2\right)^2 z+6 b\left(b^2+c^2\right)\left(b^2-3c^2\right)\sqrt{z}-6\left(b^4-6c^2b^2+c^4\right)\right)\cos\left(\sqrt{z}\, c+g\right)+ c\left(\left(b^2+c^2\right)^3 z^{3/2}-6b\left(b^2+c^2\right)^2 z+6\left(3b^2-c^2\right)\left(b^2+c^2\right)\sqrt{z}-24 b(b-c)(b+c)\right)\sin\left(\sqrt{z}\, c+g\right)\right)\right)$$

01.07.21.0424.01

$$\int z^2 e^{\sqrt{z}\, b}\cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2+c^2\right)^6}\left(2 e^{\sqrt{z}\, b}\left(\left(20 b\left(b^2+c^2\right)^3\left(b^2-3c^2\right)z^{3/2}+b\left(b^2+c^2\right)^5 z^{5/2}-5(b-c)(b+c)\left(b^2+c^2\right)^4 z^2-60\left(b^2+c^2\right)^2\left(b^4-6c^2b^2+c^4\right)z+ 120 b\left(b^2+c^2\right)\left(b^4-10c^2b^2+5c^4\right)\sqrt{z}-120\left(b^6-15c^2b^4+15c^4b^2-c^6\right)\right)\cos\left(\sqrt{z}\, c+g\right)+ c\left(20\left(3b^2-c^2\right)\left(b^2+c^2\right)^3 z^{3/2}+\left(b^2+c^2\right)^5 z^{5/2}-10b\left(b^2+c^2\right)^4 z^2-240 b(b-c)(b+c)\left(b^2+c^2\right)^2 z+ 120\left(b^2+c^2\right)\left(5b^4-10c^2b^2+c^4\right)\sqrt{z}-240 b\left(3b^4-10c^2b^2+3c^4\right)\right)\sin\left(\sqrt{z}\, c+g\right)\right)\right)$$

01.07.21.0425.01

$$\int z^3 e^{b\sqrt{z}}\cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2+c^2\right)^8}\left(2 e^{\sqrt{z}\, b}\left(\left(840 b\left(b^2+c^2\right)^3\left(b^4-10c^2b^2+5c^4\right)z^{3/2}+42 b\left(b^2+c^2\right)^5\left(b^2-3c^2\right)z^{5/2}+b\left(b^2+c^2\right)^7 z^{7/2}-7(b-c) (b+c)\left(b^2+c^2\right)^6 z^3-210\left(b^2+c^2\right)^4\left(b^4-6c^2b^2+c^4\right)z^2-2520\left(b^2+c^2\right)^2\left(b^6-15c^2b^4+15c^4b^2-c^6\right)z+ 5040 b\left(b^2+c^2\right)\left(b^6-21c^2b^4+35c^4b^2-7c^6\right)\sqrt{z}-5040\left(b^8-28c^2b^6+70c^4b^4-28c^6b^2+c^8\right)\right) \cos\left(\sqrt{z}\, c+g\right)+c\left(840\left(b^2+c^2\right)^3\left(5b^4-10c^2b^2+c^4\right)z^{3/2}+42\left(3b^2-c^2\right)\left(b^2+c^2\right)^5 z^{5/2}+\left(b^2+c^2\right)^7 z^{7/2}- 14 b\left(b^2+c^2\right)^6 z^3-840 b(b-c)(b+c)\left(b^2+c^2\right)^4 z^2-5040 b\left(b^2+c^2\right)^2\left(3b^4-10c^2b^2+3c^4\right)z+ 5040\left(b^2+c^2\right)\left(7b^6-35c^2b^4+21c^4b^2-c^6\right)\sqrt{z}-40320 b\left(b^6-7c^2b^4+7c^4b^2-c^6\right)\right)\sin\left(\sqrt{z}\, c+g\right)\right)\right)$$

01.07.21.0426.01

$$\int z^4\, e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2+c^2\right)^{10}} \Big(2\, e^{\sqrt{z}\, b} \Big(\Big(60\,480\, b \left(b^2+c^2\right)^3 \left(b^6-21\, c^2\, b^4+35\, c^4\, b^2-7\, c^6\right) z^{3/2}+3024\, b \left(b^2+c^2\right)^5 \left(b^4-10\, c^2\, b^2+5\, c^4\right) z^{5/2}+$$
$$72\, b \left(b^2+c^2\right)^7 \left(b^2-3\, c^2\right) z^{7/2}+b \left(b^2+c^2\right)^9 z^{9/2}-9\, (b-c)\, (b+c) \left(b^2+c^2\right)^8 z^4-$$
$$504 \left(b^2+c^2\right)^6 \left(b^4-6\, c^2\, b^2+c^4\right) z^3-15\,120 \left(b^2+c^2\right)^4 \left(b^6-15\, c^2\, b^4+15\, c^4\, b^2-c^6\right) z^2-181\,440 \left(b^2+c^2\right)^2$$
$$\left(b^8-28\, c^2\, b^6+70\, c^4\, b^4-28\, c^6\, b^2+c^8\right) z+362\,880\, b \left(b^2+c^2\right) \left(b^2-3\, c^2\right) \left(b^6-33\, c^2\, b^4+27\, c^4\, b^2-3\, c^6\right)$$
$$\sqrt{z}-362\,880 \left(b^{10}-45\, c^2\, b^8+210\, c^4\, b^6-210\, c^6\, b^4+45\, c^8\, b^2-c^{10}\right)\Big) \cos\left(\sqrt{z}\, c+g\right)+$$
$$c\, \Big(60\,480 \left(b^2+c^2\right)^3 \left(7\, b^6-35\, c^2\, b^4+21\, c^4\, b^2-c^6\right) z^{3/2}+3024 \left(b^2+c^2\right)^5 \left(5\, b^4-10\, c^2\, b^2+c^4\right) z^{5/2}+$$
$$72 \left(3\, b^2-c^2\right) \left(b^2+c^2\right)^7 z^{7/2}+\left(b^2+c^2\right)^9 z^{9/2}-18\, b \left(b^2+c^2\right)^8 z^4-2016\, b\, (b-c)\, (b+c) \left(b^2+c^2\right)^6 z^3-$$
$$30\,240\, b \left(b^2+c^2\right)^4 \left(3\, b^4-10\, c^2\, b^2+3\, c^4\right) z^2-1\,451\,520\, b \left(b^2+c^2\right)^2 \left(b^6-7\, c^2\, b^4+7\, c^4\, b^2-c^6\right) z+$$
$$362\,880 \left(9\, b^{10}-75\, c^2\, b^8+42\, c^4\, b^6+90\, c^6\, b^4-35\, c^8\, b^2+c^{10}\right) \sqrt{z}-$$
$$725\,760\, b \left(5\, b^4-10\, c^2\, b^2+c^4\right) \left(b^4-10\, c^2\, b^2+5\, c^4\right)\Big) \sin\left(\sqrt{z}\, c+g\right)\Big)\Big)$$

01.07.21.0427.01

$$\int z^5\, e^{b \sqrt{z}} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2+c^2\right)^{12}} \Big(2\, e^{b \sqrt{z}} \Big(\Big(6\,652\,800\, b \left(b^2+c^2\right)^3 \left(b^8-36\, c^2\, b^6+126\, c^4\, b^4-84\, c^6\, b^2+9\, c^8\right) z^{3/2}+332\,640\, b \left(b^2+c^2\right)^5$$
$$\left(b^6-21\, c^2\, b^4+35\, c^4\, b^2-7\, c^6\right) z^{5/2}+7920\, b \left(b^2+c^2\right)^7 \left(b^4-10\, c^2\, b^2+5\, c^4\right) z^{7/2}+110\, b \left(b^2+c^2\right)^9 \left(b^2-3\, c^2\right)$$
$$z^{9/2}+b \left(b^2+c^2\right)^{11} z^{11/2}-11\, (b-c)\, (b+c) \left(b^2+c^2\right)^{10} z^5-990 \left(b^2+c^2\right)^8 \left(b^4-6\, c^2\, b^2+c^4\right) z^4-55\,440$$
$$\left(b^2+c^2\right)^6 \left(b^6-15\, c^2\, b^4+15\, c^4\, b^2-c^6\right) z^3-1\,663\,200 \left(b^2+c^2\right)^4 \left(b^8-28\, c^2\, b^6+70\, c^4\, b^4-28\, c^6\, b^2+c^8\right) z^2-$$
$$19\,958\,400 \left(b^2+c^2\right)^2 \left(b^{10}-45\, c^2\, b^8+210\, c^4\, b^6-210\, c^6\, b^4+45\, c^8\, b^2-c^{10}\right) z+$$
$$39\,916\,800\, b \left(b^2+c^2\right) \left(b^{10}-55\, c^2\, b^8+330\, c^4\, b^6-462\, c^6\, b^4+165\, c^8\, b^2-11\, c^{10}\right) \sqrt{z}-$$
$$39\,916\,800 \left(b^{12}-66\, c^2\, b^{10}+495\, c^4\, b^8-924\, c^6\, b^6+495\, c^8\, b^4-66\, c^{10}\, b^2+c^{12}\right)\Big) \cos\left(\sqrt{z}\, c+g\right)+$$
$$c\, \Big(6\,652\,800 \left(b^2+c^2\right)^3 \left(9\, b^8-84\, c^2\, b^6+126\, c^4\, b^4-36\, c^6\, b^2+c^8\right) z^{3/2}+$$
$$332\,640 \left(b^2+c^2\right)^5 \left(7\, b^6-35\, c^2\, b^4+21\, c^4\, b^2-c^6\right) z^{5/2}+7920 \left(b^2+c^2\right)^7 \left(5\, b^4-10\, c^2\, b^2+c^4\right) z^{7/2}+$$
$$110 \left(3\, b^2-c^2\right) \left(b^2+c^2\right)^9 z^{9/2}+\left(b^2+c^2\right)^{11} z^{11/2}-22\, b \left(b^2+c^2\right)^{10} z^5-3960\, b\, (b-c)\, (b+c) \left(b^2+c^2\right)^8 z^4-$$
$$110\,880\, b \left(b^2+c^2\right)^6 \left(3\, b^4-10\, c^2\, b^2+3\, c^4\right) z^3-13\,305\,600\, b \left(b^2+c^2\right)^4 \left(b^6-7\, c^2\, b^4+7\, c^4\, b^2-c^6\right) z^2-$$
$$39\,916\,800\, b \left(b^2+c^2\right)^2 \left(5\, b^4-10\, c^2\, b^2+c^4\right) \left(b^4-10\, c^2\, b^2+5\, c^4\right) z+$$
$$39\,916\,800 \left(b^2+c^2\right) \left(11\, b^{10}-165\, c^2\, b^8+462\, c^4\, b^6-330\, c^6\, b^4+55\, c^8\, b^2-c^{10}\right) \sqrt{z}-$$
$$159\,667\,200\, b \left(3\, b^{10}-55\, c^2\, b^8+198\, c^4\, b^6-198\, c^6\, b^4+55\, c^8\, b^2-3\, c^{10}\right)\Big) \sin\left(\sqrt{z}\, c+g\right)\Big)\Big)$$

01.07.21.0428.01

$$\int \frac{e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c+g\right)}{z}\, dz = e^{i g}\, \mathrm{Ei}\left((b+i\, c) \sqrt{z}\right)+e^{-i g}\, \mathrm{Ei}\left((b-i\, c) \sqrt{z}\right)$$

01.07.21.0429.01

$$\int \frac{e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c + g\right)}{z^2} \, dz = \frac{1}{2} e^{i g} \operatorname{Ei}\left((b + i c) \sqrt{z}\right) (b + i c)^2 + \frac{1}{2} (b - i c)^2 e^{-i g} \operatorname{Ei}\left((b - i c) \sqrt{z}\right) + \frac{e^{\sqrt{z}\, b} \left(c \sqrt{z} \sin\left(\sqrt{z}\, c + g\right) - \left(\sqrt{z}\, b + 1\right) \cos\left(\sqrt{z}\, c + g\right)\right)}{z}$$

01.07.21.0430.01

$$\int \frac{e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c + g\right)}{z^3} \, dz = \frac{1}{24} e^{i g} \operatorname{Ei}\left((b + i c) \sqrt{z}\right) (b + i c)^4 + \frac{1}{24 z^2} \left(e^{-i g} \left(-e^{\sqrt{z}\, (b + i c) + 2 i g} \left((b + i c) \sqrt{z} \left(z (b + i c)^2 + \sqrt{z}\, (b + i c) + 2\right) + 6\right) - e^{(b - i c) \sqrt{z}} \left((b - i c) \sqrt{z} \left(z (b - i c)^2 + \sqrt{z}\, (b - i c) + 2\right) + 6\right)\right)\right) + \frac{1}{24} (b - i c)^4 e^{-i g} \operatorname{Ei}\left((b - i c) \sqrt{z}\right)$$

01.07.21.0431.01

$$\int \frac{e^{b \sqrt{z}} \cos\left(\sqrt{z}\, c + g\right)}{z^4} \, dz = \frac{1}{720} e^{i g} \operatorname{Ei}\left((b + i c) \sqrt{z}\right) (b + i c)^6 + \frac{1}{720 z^3} \left(e^{-i g} \left(-e^{\sqrt{z}\, (b + i c) + 2 i g} \left((b + i c) \sqrt{z} \left((b + i c)^3 z^{3/2} + (b + i c)^4 z^2 + 2 (b + i c)^2 z + 6 (b + i c) \sqrt{z} + 24\right) + 120\right) - e^{(b - i c) \sqrt{z}} \left((b - i c) \sqrt{z} \left((b - i c)^3 z^{3/2} + (b - i c)^4 z^2 + 2 (b - i c)^2 z + 6 (b - i c) \sqrt{z} + 24\right) + 120\right)\right)\right) + \frac{1}{720} (b - i c)^6 e^{-i g} \operatorname{Ei}\left((b - i c) \sqrt{z}\right)$$

01.07.21.0432.01

$$\int \frac{e^{b \sqrt{z}} \cos\left(\sqrt{z}\, c + g\right)}{z^5} \, dz = \frac{e^{i g} \operatorname{Ei}\left((b + i c) \sqrt{z}\right) (b + i c)^8}{40320} + \frac{1}{40320 z^4} \left(e^{-i g} \left(-e^{\sqrt{z}\, (b + i c) + 2 i g} \left((b + i c) \sqrt{z} \left(6 (b + i c)^3 z^{3/2} + (b + i c)^5 z^{5/2} + (b + i c)^6 z^3 + 2 (b + i c)^4 z^2 + 24 (b + i c)^2 z + 120 (b + i c) \sqrt{z} + 720\right) + 5040\right) - e^{(b - i c) \sqrt{z}} \left((b - i c) \sqrt{z} \left(6 (b - i c)^3 z^{3/2} + (b - i c)^5 z^{5/2} + (b - i c)^6 z^3 + 2 (b - i c)^4 z^2 + 24 (b - i c)^2 z + 120 (b - i c) \sqrt{z} + 720\right) + 5040\right)\right)\right) + \frac{(b - i c)^8 e^{-i g} \operatorname{Ei}\left((b - i c) \sqrt{z}\right)}{40320}$$

Involving $z^{\alpha-1} e^{b z^r + e} \cos\left(c z^r + g\right)$

01.07.21.0433.01

$$\int z^{\alpha-1} e^{b z^r + e} \cos(c z^r + g) \, dz = -\frac{1}{2 r} \left(z^\alpha \left(e^{e - i g} \Gamma\left(\frac{\alpha}{r}, (i c - b) z^r\right) ((i c - b) z^r)^{-\frac{\alpha}{r}} + e^{e + i g} \left((-b - i c) z^r\right)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b - i c) z^r\right)\right)\right)$$

01.07.21.0434.01

$$\int \frac{e^{b z^r + e} \cos(c z^r + g)}{z} \, dz = \frac{e^e \left(\operatorname{Ei}((b + i c) z^r) (\cos(g) + i \sin(g)) + \operatorname{Ei}((b - i c) z^r) (\cos(g) - i \sin(g))\right)}{2 r}$$

01.07.21.0435.01

$$\int z^{2n}\, e^{b z^2+e} \cos\left(c z^2+g\right) dz = -\frac{1}{4} z\, e^e \left(e^{i g} \left((-b-i c) z^2\right)^{-\frac{1}{2}} (-b-i c)^{-n} \left(\operatorname{erfc}\left(\sqrt{(-b-i c) z^2}\right) \Gamma\left(n+\frac{1}{2}\right) + e^{-(-b-i c) z^2} \sum_{k=0}^{n-1} \frac{\left((-b-i c) z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}} - e^{-(-b-i c) z^2} \sum_{k=n}^{-1} \frac{\left((-b-i c) z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right) + e^{-i g} \left((i c-b) z^2\right)^{-\frac{1}{2}} (i c-b)^{-n} \left(\operatorname{erfc}\left(\sqrt{(i c-b) z^2}\right) \Gamma\left(n+\frac{1}{2}\right) + e^{-(i c-b) z^2} \sum_{k=0}^{n-1} \frac{\left((i c-b) z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}} - e^{-(i c-b) z^2} \sum_{k=n}^{-1} \frac{\left((i c-b) z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right)\right) /;\ n \in \mathbb{Z}$$

01.07.21.0436.01

$$\int z^{2n-1}\, e^{b z^2+e} \cos\left(c z^2+g\right) dz = -\frac{1}{4} e^e \left(e^{i g} (-b-i c)^{-n} \left(\frac{(-1)^{n-1} \operatorname{Ei}\left(-(-b-i c) z^2\right)}{(-n)!} + e^{-(-b-i c) z^2} \sum_{k=0}^{n-1} \frac{\left((-b-i c) z^2\right)^k}{(n)_{k-n+1}} - e^{-(-b-i c) z^2} \sum_{k=n}^{-1} \frac{\left((-b-i c) z^2\right)^k}{(n)_{k-n+1}}\right) + e^{-i g} (i c-b)^{-n} \left(\frac{(-1)^{n-1} \operatorname{Ei}\left(-(i c-b) z^2\right)}{(-n)!} + e^{-(i c-b) z^2} \sum_{k=0}^{n-1} \frac{\left((i c-b) z^2\right)^k}{(n)_{k-n+1}} - e^{-(i c-b) z^2} \sum_{k=n}^{-1} \frac{\left((i c-b) z^2\right)^k}{(n)_{k-n+1}}\right)\right) /;\ n \in \mathbb{Z}$$

01.07.21.0437.01

$$\int z\, e^{b z^2+e} \cos\left(c z^2+g\right) dz = \frac{e^{b z^2+e} \left(b \cos\left(c z^2+g\right) + c \sin\left(c z^2+g\right)\right)}{2\left(b^2+c^2\right)}$$

01.07.21.0438.01

$$\int z^2\, e^{b z^2+e} \cos\left(c z^2+g\right) dz = -\frac{e^{e+i g} \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{b+i c}\, z\right)}{8 (b+i c)^{3/2}} + \frac{e^{b z^2+e} z \left(b \cos\left(c z^2+g\right) + c \sin\left(c z^2+g\right)\right)}{2\left(b^2+c^2\right)} - \frac{e^{e-i g} \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{b-i c}\, z\right)}{8 (b-i c)^{3/2}}$$

01.07.21.0439.01

$$\int z^3\, e^{b z^2+e} \cos\left(c z^2+g\right) dz = \frac{e^{(b+i c) z^2+e+i g} \left((b+i c) z^2-1\right)}{4 (b+i c)^2} + \frac{e^{(b-i c) z^2+e-i g} \left((b-i c) z^2-1\right)}{4 (b-i c)^2}$$

01.07.21.0440.01

$$\int z^4\, e^{b z^2+e} \cos\left(c z^2+g\right) dz = \frac{e^{(b+i c) z^2+e+i g} z \left(2 (b+i c) z^2-3\right)}{8 (b+i c)^2} + \frac{e^{(b-i c) z^2+e-i g} z \left(2 (b-i c) z^2-3\right)}{8 (b-i c)^2} + \frac{3 e^{e+i g} \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{b+i c}\, z\right)}{16 (b+i c)^{5/2}} + \frac{3 e^{e-i g} \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{b-i c}\, z\right)}{16 (b-i c)^{5/2}}$$

01.07.21.0441.01

$$\int z^5 e^{b z^2+e} \cos(c z^2+g)\, dz = \frac{1}{2 (b^2+c^2)^3} \left(e^{b z^2+e} \left(\left(b (b^2+c^2)^2 z^4 - 2 (b^4-c^4) z^2 + 2 b (b^2-3 c^2)\right) \cos(c z^2+g) + c \left((b^2+c^2)^2 z^4 - 4 b (b^2+c^2) z^2 + 6 b^2 - 2 c^2\right) \sin(c z^2+g)\right)\right)$$

01.07.21.0442.01

$$\int \frac{e^{b z^2+e} \cos(c z^2+g)}{z}\, dz = \frac{1}{4} e^{e+i g} \operatorname{Ei}((b+i c) z^2) + \frac{1}{4} e^{e-i g} \operatorname{Ei}((b-i c) z^2)$$

01.07.21.0443.01

$$\int \frac{e^{b z^2+e} \cos(c z^2+g)}{z^2}\, dz = -\frac{e^{b z^2+e} \cos(c z^2+g)}{z} + \frac{1}{2} \sqrt{b+i c}\; e^{e+i g} \sqrt{\pi} \operatorname{erfi}\left(\sqrt{b+i c}\; z\right) + \frac{1}{2} \sqrt{b-i c}\; e^{e-i g} \sqrt{\pi} \operatorname{erfi}\left(\sqrt{b-i c}\; z\right)$$

01.07.21.0444.01

$$\int \frac{e^{b z^2+e} \cos(c z^2+g)}{z^3}\, dz = -\frac{e^{b z^2+e} \cos(c z^2+g)}{2 z^2} + \frac{1}{4} (b+i c) e^{e+i g} \operatorname{Ei}((b+i c) z^2) + \frac{1}{4} (b-i c) e^{e-i g} \operatorname{Ei}((b-i c) z^2)$$

01.07.21.0445.01

$$\int \frac{e^{b z^2+e} \cos(c z^2+g)}{z^4}\, dz = \frac{1}{3} e^{e+i g} \sqrt{\pi} \operatorname{erfi}\left(\sqrt{b+i c}\; z\right) (b+i c)^{3/2} + \frac{1}{3} (b-i c)^{3/2} e^{e-i g} \sqrt{\pi} \operatorname{erfi}\left(\sqrt{b-i c}\; z\right) - \frac{e^{b z^2+e} \left((2 b z^2+1) \cos(c z^2+g) - 2 c z^2 \sin(c z^2+g)\right)}{3 z^3}$$

01.07.21.0446.01

$$\int \frac{e^{b z^2+e} \cos(c z^2+g)}{z^5}\, dz = \frac{1}{8} e^{e+i g} \operatorname{Ei}((b+i c) z^2) (b+i c)^2 + \frac{1}{8} (b-i c)^2 e^{e-i g} \operatorname{Ei}((b-i c) z^2) + \frac{e^{b z^2+e} \left(c z^2 \sin(c z^2+g) - (b z^2+1) \cos(c z^2+g)\right)}{4 z^4}$$

01.07.21.0447.01

$$\int z^n e^{b \sqrt{z}+e} \cos\left(\sqrt{z}\; c+g\right) dz = -e^{e-i g} \left(-\frac{\operatorname{Ei}\left(-(i c-b) \sqrt{z}\right)}{(-2 (n+1))!} + e^{-(i c-b) \sqrt{z}} \sum_{k=0}^{2 n+1} \frac{\left((i c-b) \sqrt{z}\right)^k}{(2 (n+1))_{k-2 n-1}} - e^{-(i c-b) \sqrt{z}} \sum_{k=2 (n+1)}^{-1} \frac{\left((i c-b) \sqrt{z}\right)^k}{(2 (n+1))_{k-2 n-1}}\right) (i c-b)^{-2 (n+1)} - (b+i c)^{-2 (n+1)} e^{e+i g} \left(-\frac{\operatorname{Ei}\left(-(-b-i c) \sqrt{z}\right)}{(-2 (n+1))!} + e^{-(-b-i c) \sqrt{z}} \sum_{k=0}^{2 n+1} \frac{\left((-b-i c) \sqrt{z}\right)^k}{(2 (n+1))_{k-2 n-1}} - e^{-(-b-i c) \sqrt{z}} \sum_{k=2 (n+1)}^{-1} \frac{\left((-b-i c) \sqrt{z}\right)^k}{(2 (n+1))_{k-2 n-1}}\right) /; n \in \mathbb{Z}$$

01.07.21.0448.01

$$\int z\, e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2+c^2\right)^4} \left(2\, e^{\sqrt{z}\, b+e} \left(\left(b\left(b^2+c^2\right)^3 z^{3/2} - 3\,(b-c)\,(b+c)\left(b^2+c^2\right)^2 z + 6\, b\left(b^2+c^2\right)\left(b^2-3\,c^2\right)\sqrt{z} - 6\left(b^4-6\,c^2\,b^2+c^4\right)\right) \cos\left(\sqrt{z}\, c+g\right) + c\left(\left(b^2+c^2\right)^3 z^{3/2} - 6\, b\left(b^2+c^2\right)^2 z + 6\left(3\,b^2-c^2\right)\left(b^2+c^2\right)\sqrt{z} - 24\, b\,(b-c)\,(b+c)\right) \sin\left(\sqrt{z}\, c+g\right)\right)\right)$$

01.07.21.0449.01

$$\int z^2\, e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2+c^2\right)^6} \left(2\, e^{\sqrt{z}\, b+e} \left(\left(20\, b\left(b^2+c^2\right)^3\left(b^2-3\,c^2\right) z^{3/2} + b\left(b^2+c^2\right)^5 z^{5/2} - 5\,(b-c)\,(b+c)\left(b^2+c^2\right)^4 z^2 - 60\left(b^2+c^2\right)^2\left(b^4-6\,c^2\,b^2+c^4\right) z + 120\, b\left(b^2+c^2\right)\left(b^4-10\,c^2\,b^2+5\,c^4\right)\sqrt{z} - 120\left(b^6-15\,c^2\,b^4+15\,c^4\,b^2-c^6\right)\right) \cos\left(\sqrt{z}\, c+g\right) + c\left(20\left(3\,b^2-c^2\right)\left(b^2+c^2\right)^3 z^{3/2} + \left(b^2+c^2\right)^5 z^{5/2} - 10\, b\left(b^2+c^2\right)^4 z^2 - 240\, b\,(b-c)\,(b+c)\left(b^2+c^2\right)^2 z + 120\left(b^2+c^2\right)\left(5\,b^4-10\,c^2\,b^2+c^4\right)\sqrt{z} - 240\, b\left(3\,b^4-10\,c^2\,b^2+3\,c^4\right)\right) \sin\left(\sqrt{z}\, c+g\right)\right)\right)$$

01.07.21.0450.01

$$\int z^3\, e^{b\sqrt{z}+e} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2+c^2\right)^8} \left(2\, e^{\sqrt{z}\, b+e} \left(\left(840\, b\left(b^2+c^2\right)^3\left(b^4-10\,c^2\,b^2+5\,c^4\right) z^{3/2} + 42\, b\left(b^2+c^2\right)^5\left(b^2-3\,c^2\right) z^{5/2} + b\left(b^2+c^2\right)^7 z^{7/2} - 7\,(b-c)\,(b+c)\left(b^2+c^2\right)^6 z^3 - 210\left(b^2+c^2\right)^4\left(b^4-6\,c^2\,b^2+c^4\right) z^2 - 2520\left(b^2+c^2\right)^2\left(b^6-15\,c^2\,b^4+15\,c^4\,b^2-c^6\right) z + 5040\, b\left(b^2+c^2\right)\left(b^6-21\,c^2\,b^4+35\,c^4\,b^2-7\,c^6\right)\sqrt{z} - 5040\left(b^8-28\,c^2\,b^6+70\,c^4\,b^4-28\,c^6\,b^2+c^8\right)\right) \cos\left(\sqrt{z}\, c+g\right) + c\left(840\left(b^2+c^2\right)^3\left(5\,b^4-10\,c^2\,b^2+c^4\right) z^{3/2} + 42\left(3\,b^2-c^2\right)\left(b^2+c^2\right)^5 z^{5/2} + \left(b^2+c^2\right)^7 z^{7/2} - 14\, b\left(b^2+c^2\right)^6 z^3 - 840\, b\,(b-c)\,(b+c)\left(b^2+c^2\right)^4 z^2 - 5040\, b\left(b^2+c^2\right)^2\left(3\,b^4-10\,c^2\,b^2+3\,c^4\right) z + 5040\left(b^2+c^2\right)\left(7\,b^6-35\,c^2\,b^4+21\,c^4\,b^2-c^6\right)\sqrt{z} - 40\,320\, b\left(b^6-7\,c^2\,b^4+7\,c^4\,b^2-c^6\right)\right) \sin\left(\sqrt{z}\, c+g\right)\right)\right)$$

01.07.21.0451.01

$$\int z^4\, e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2+c^2\right)^{10}} \left(2\, e^{\sqrt{z}\, b+e} \left(\left(60\,480\, b\left(b^2+c^2\right)^3\left(b^6-21\,c^2\,b^4+35\,c^4\,b^2-7\,c^6\right) z^{3/2} + 3024\, b\left(b^2+c^2\right)^5\left(b^4-10\,c^2\,b^2+5\,c^4\right) z^{5/2} + 72\, b\left(b^2+c^2\right)^7\left(b^2-3\,c^2\right) z^{7/2} + b\left(b^2+c^2\right)^9 z^{9/2} - 9\,(b-c)\,(b+c)\left(b^2+c^2\right)^8 z^4 - 504\left(b^2+c^2\right)^6\left(b^4-6\,c^2\,b^2+c^4\right) z^3 - 15\,120\left(b^2+c^2\right)^4\left(b^6-15\,c^2\,b^4+15\,c^4\,b^2-c^6\right) z^2 - 181\,440\left(b^2+c^2\right)^2\left(b^8-28\,c^2\,b^6+70\,c^4\,b^4-28\,c^6\,b^2+c^8\right) z + 362\,880\, b\left(b^2+c^2\right)\left(b^2-3\,c^2\right)\left(b^6-33\,c^2\,b^4+27\,c^4\,b^2-3\,c^6\right)\sqrt{z} - 362\,880\left(b^{10}-45\,c^2\,b^8+210\,c^4\,b^6-210\,c^6\,b^4+45\,c^8\,b^2-c^{10}\right)\right) \cos\left(\sqrt{z}\, c+g\right) + c\left(60\,480\left(b^2+c^2\right)^3\left(7\,b^6-35\,c^2\,b^4+21\,c^4\,b^2-c^6\right) z^{3/2} + 3024\left(b^2+c^2\right)^5\left(5\,b^4-10\,c^2\,b^2+c^4\right) z^{5/2} + 72\left(3\,b^2-c^2\right)\left(b^2+c^2\right)^7 z^{7/2} + \left(b^2+c^2\right)^9 z^{9/2} - 18\, b\left(b^2+c^2\right)^8 z^4 - 2016\, b\,(b-c)\,(b+c)\left(b^2+c^2\right)^6 z^3 - 30\,240\, b\left(b^2+c^2\right)^4\left(3\,b^4-10\,c^2\,b^2+3\,c^4\right) z^2 - 1\,451\,520\, b\left(b^2+c^2\right)^2\left(b^6-7\,c^2\,b^4+7\,c^4\,b^2-c^6\right) z + 362\,880\left(9\,b^{10}-75\,c^2\,b^8+42\,c^4\,b^6+90\,c^6\,b^4-35\,c^8\,b^2+c^{10}\right)\sqrt{z} - 725\,760\, b\left(5\,b^4-10\,c^2\,b^2+c^4\right)\left(b^4-10\,c^2\,b^2+5\,c^4\right)\right) \sin\left(\sqrt{z}\, c+g\right)\right)\right)$$

01.07.21.0452.01

$$\int z^5\, e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2+c^2\right)^{12}} \left(2\, e^{\sqrt{z}\, b+e} \left(\left(6\,652\,800\, b \left(b^2+c^2\right)^3 \left(b^8-36\, c^2\, b^6+126\, c^4\, b^4-84\, c^6\, b^2+9\, c^8\right) z^{3/2}+332\,640\, b \left(b^2+c^2\right)^5 \left(b^6-21\, c^2\, b^4+35\, c^4\, b^2-7\, c^6\right) z^{5/2}+7920\, b \left(b^2+c^2\right)^7 \left(b^4-10\, c^2\, b^2+5\, c^4\right) z^{7/2}+110\, b \left(b^2+c^2\right)^9 \left(b^2-3\, c^2\right) z^{9/2}+b \left(b^2+c^2\right)^{11} z^{11/2}-11\, (b-c)\, (b+c) \left(b^2+c^2\right)^{10} z^5-990 \left(b^2+c^2\right)^8 \left(b^4-6\, c^2\, b^2+c^4\right) z^4-55\,440 \left(b^2+c^2\right)^6 \left(b^6-15\, c^2\, b^4+15\, c^4\, b^2-c^6\right) z^3-1\,663\,200 \left(b^2+c^2\right)^4 \left(b^8-28\, c^2\, b^6+70\, c^4\, b^4-28\, c^6\, b^2+c^8\right) z^2-19\,958\,400 \left(b^2+c^2\right)^2 \left(b^{10}-45\, c^2\, b^8+210\, c^4\, b^6-210\, c^6\, b^4+45\, c^8\, b^2-c^{10}\right) z+39\,916\,800\, b \left(b^2+c^2\right) \left(b^{10}-55\, c^2\, b^8+330\, c^4\, b^6-462\, c^6\, b^4+165\, c^8\, b^2-11\, c^{10}\right) \sqrt{z}-39\,916\,800 \left(b^{12}-66\, c^2\, b^{10}+495\, c^4\, b^8-924\, c^6\, b^6+495\, c^8\, b^4-66\, c^{10}\, b^2+c^{12}\right)\right) \cos\left(\sqrt{z}\, c+g\right)+c \left(6\,652\,800 \left(b^2+c^2\right)^3 \left(9\, b^8-84\, c^2\, b^6+126\, c^4\, b^4-36\, c^6\, b^2+c^8\right) z^{3/2}+332\,640 \left(b^2+c^2\right)^5 \left(7\, b^6-35\, c^2\, b^4+21\, c^4\, b^2-c^6\right) z^{5/2}+7920 \left(b^2+c^2\right)^7 \left(5\, b^4-10\, c^2\, b^2+c^4\right) z^{7/2}+110 \left(3\, b^2-c^2\right) \left(b^2+c^2\right)^9 z^{9/2}+\left(b^2+c^2\right)^{11} z^{11/2}-22\, b \left(b^2+c^2\right)^{10} z^5-3960\, b\, (b-c)\, (b+c) \left(b^2+c^2\right)^8 z^4-110\,880\, b \left(b^2+c^2\right)^6 \left(3\, b^4-10\, c^2\, b^2+3\, c^4\right) z^3-13\,305\,600\, b \left(b^2+c^2\right)^4 \left(b^6-7\, c^2\, b^4+7\, c^4\, b^2-c^6\right) z^2-39\,916\,800\, b \left(b^2+c^2\right)^2 \left(5\, b^4-10\, c^2\, b^2+c^4\right) \left(b^4-10\, c^2\, b^2+5\, c^4\right) z+39\,916\,800 \left(b^2+c^2\right) \left(11\, b^{10}-165\, c^2\, b^8+462\, c^4\, b^6-330\, c^6\, b^4+55\, c^8\, b^2-c^{10}\right) \sqrt{z}-159\,667\,200\, b \left(3\, b^{10}-55\, c^2\, b^8+198\, c^4\, b^6-198\, c^6\, b^4+55\, c^8\, b^2-3\, c^{10}\right)\right) \sin\left(\sqrt{z}\, c+g\right)\right)\right)$$

01.07.21.0453.01

$$\int \frac{e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c+g\right)}{z}\, dz = e^{e+i g}\, \mathrm{Ei}\left((b+i c) \sqrt{z}\right)+e^{e-i g}\, \mathrm{Ei}\left((b-i c) \sqrt{z}\right)$$

01.07.21.0454.01

$$\int \frac{e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c+g\right)}{z^2}\, dz = \frac{1}{2}\, e^{e+i g}\, \mathrm{Ei}\left((b+i c) \sqrt{z}\right) (b+i c)^2+\frac{1}{2}\, (b-i c)^2\, e^{e-i g}\, \mathrm{Ei}\left((b-i c) \sqrt{z}\right)+\frac{e^{\sqrt{z}\, b+e} \left(c \sqrt{z}\, \sin\left(\sqrt{z}\, c+g\right)-\left(\sqrt{z}\, b+1\right) \cos\left(\sqrt{z}\, c+g\right)\right)}{z}$$

01.07.21.0455.01

$$\int \frac{e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c+g\right)}{z^3}\, dz = \frac{1}{24}\, e^{e+i g}\, \mathrm{Ei}\left((b+i c) \sqrt{z}\right) (b+i c)^4+\frac{1}{24\, z^2} \left(e^{e-i g} \left(-e^{\sqrt{z}\, (b+i c)+2 i g} \left((b+i c) \sqrt{z} \left(z\, (b+i c)^2+\sqrt{z}\, (b+i c)+2\right)+6\right)-e^{(b-i c) \sqrt{z}} \left((b-i c) \sqrt{z} \left(z\, (b-i c)^2+\sqrt{z}\, (b-i c)+2\right)+6\right)\right)\right)+\frac{1}{24}\, (b-i c)^4\, e^{e-i g}\, \mathrm{Ei}\left((b-i c) \sqrt{z}\right)$$

01.07.21.0456.01

$$\int \frac{e^{b\sqrt{z}+e}\cos(\sqrt{z}\,c+g)}{z^4}\,dz = \frac{1}{720} e^{e+i g}\,\mathrm{Ei}\left((b+i c)\sqrt{z}\right)(b+i c)^6 + \frac{1}{720 z^3}\left(e^{e-i g}\left(-e^{\sqrt{z}\,(b+i c)+2 i g}\left((b+i c)\sqrt{z}\left((b+i c)^3 z^{3/2}+(b+i c)^4 z^2+2(b+i c)^2 z+6(b+i c)\sqrt{z}+24\right)+120\right) - e^{(b-i c)\sqrt{z}}\left((b-i c)\sqrt{z}\left((b-i c)^3 z^{3/2}+(b-i c)^4 z^2+2(b-i c)^2 z+6(b-i c)\sqrt{z}+24\right)+120\right)\right)\right) + \frac{1}{720}(b-i c)^6 e^{e-i g}\,\mathrm{Ei}\left((b-i c)\sqrt{z}\right)$$

01.07.21.0457.01

$$\int \frac{e^{b\sqrt{z}+e}\cos(\sqrt{z}\,c+g)}{z^5}\,dz = \frac{e^{e+i g}\,\mathrm{Ei}\left((b+i c)\sqrt{z}\right)(b+i c)^8}{40\,320} + \frac{1}{40\,320 z^4}\left(e^{e-i g}\left(-e^{\sqrt{z}\,(b+i c)+2 i g}\left((b+i c)\sqrt{z}\left(6(b+i c)^3 z^{3/2}+(b+i c)^5 z^{5/2}+(b+i c)^6 z^3+2(b+i c)^4 z^2+24(b+i c)^2 z+120(b+i c)\sqrt{z}+720\right)+5040\right) - e^{(b-i c)\sqrt{z}}\left((b-i c)\sqrt{z}\left(6(b-i c)^3 z^{3/2}+(b-i c)^5 z^{5/2}+(b-i c)^6 z^3+2(b-i c)^4 z^2+24(b-i c)^2 z+120(b-i c)\sqrt{z}+720\right)+5040\right)\right)\right) + \frac{(b-i c)^8 e^{e-i g}\,\mathrm{Ei}\left((b-i c)\sqrt{z}\right)}{40\,320}$$

Involving $z^n e^{b z^r + d z} \cos(c z^r + g)$

01.07.21.0458.01

$$\int z^n e^{b z^2+d z}\cos(c z^2+g)\,dz = -\frac{1}{4}\left(e^{-\frac{d^2}{4(b+i c)}+i g}\left(\sum_{q=0}^{n} 2^{q-n}(-d)^{n-q}(d+2(b+i c)z)^{q+1}\left(-\frac{(d+2(b+i c)z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b+i c)z)^2}{4(b+i c)}\right)\right)(b+i c)^{-n-1} + (b-i c)^{-n-1} e^{-\frac{d^2}{4(b-i c)}-i g}\sum_{q=0}^{n} 2^{q-n}(-d)^{n-q}(d+2 b z-2 i c z)^{q+1}\left(-\frac{(d+2 b z-2 i c z)^2}{b-i c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(d+2 b z-2 i c z)^2}{4(b-i c)}\right)\right) /; n\in\mathbb{N}$$

01.07.21.0459.01

$$\int z^n e^{\sqrt{z}\, b+d\,z} \cos\left(\sqrt{z}\, c+g\right) dz = 2^{-2n-2} \left(e^{-\frac{(b+i c)^2}{4d}+i g} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (b+i c)^{-h-k+2n} \left(b+i c+2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+i c)\left(b+i c+2 d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + e^{-\frac{(b-i c)^2}{4d}-i g} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (b-i c)^{-h-k+2n} \left(b-i c+2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-i c)\left(b-i c+2 d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} \right) /;\, n \in \mathbb{N}$$

Involving $z^n e^{b z^r+d z+e} \cos(c z^r+g)$

01.07.21.0460.01

$$\int z^n e^{b z^2+d z+e} \cos\left(c z^2+g\right) dz = -\frac{1}{4} \left(e^{-\frac{d^2}{4(b+i c)}+e+i g} \left(\sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2(b+i c) z)^{q+1} \left(-\frac{(d+2(b+i c) z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b+i c) z)^2}{4(b+i c)}\right)\right) (b+i c)^{-n-1} + (b-i c)^{-n-1} e^{-\frac{d^2}{4(b-i c)}+e-i g} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2 b z-2 i c z)^{q+1} \left(-\frac{(d+2 b z-2 i c z)^2}{b-i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2 b z-2 i c z)^2}{4(b-i c)}\right)\right) /;\, n \in \mathbb{N}$$

01.07.21.0461.01

$$\int z^n e^{\sqrt{z}\, b+d\, z+e} \cos\left(\sqrt{z}\, c+g\right) dz = 2^{-2n-2} \left(e^{-\frac{(b+i c)^2}{4d}+e+i g} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (b+i c)^{-h-k+2n} \left(b+i c+2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b+i c)\left(b+i c+2 d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+i c+2 d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + e^{-\frac{(b-i c)^2}{4d}+e-i g} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (b-i c)^{-h-k+2n} \left(b-i c+2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b-i c)\left(b-i c+2 d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-i c+2 d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} \right) /;\, n \in \mathbb{N}$$

Involving exponential and algebraic functions

Involving exp and algebraic functions

Involving $(a\, z+b)^\beta\, d^z$

01.07.21.0462.01

$$\int (b+a\, z)^\beta\, d^z \cos(e+c\, z)\, dz = -\frac{1}{2a}\left(d^{-\frac{b}{a}}\, e^{-\frac{i(b c+a e)}{a}}\, (b+a\, z)^{\beta+1} \left(e^{\frac{2 i b c}{a}}\, E_{-\beta}\left(\frac{i\,(b+a\, z)\,(c+i \log(d))}{a}\right) + e^{2 i e}\, E_{-\beta}\left(-\frac{i\,(b+a\, z)\,(c-i \log(d))}{a}\right)\right)\right)$$

01.07.21.0463.01

$$\int (b+a z)^{\beta} e^{p z} \cos(e+c z)\, dz = -\frac{1}{2 a}\left(e^{-\frac{i (b c+a e)+b p}{a}} (b+a z)^{\beta+1} \left(e^{\frac{2 i b c}{a}} E_{-\beta}\left(\frac{i (c+i p) (b+a z)}{a}\right)+e^{2 i e} E_{-\beta}\left(-\frac{i (c-i p) (b+a z)}{a}\right)\right)\right)$$

01.07.21.0464.01

$$\int (b+a z)^{\beta} d^z \cos(c z)\, dz = -\frac{1}{2 a}\left(d^{-\frac{b}{a}} e^{-\frac{i b c}{a}} (b+a z)^{\beta+1} \left(e^{\frac{2 i b c}{a}} E_{-\beta}\left(\frac{i (b+a z) (c+i \log(d))}{a}\right)+E_{-\beta}\left(-\frac{i (b+a z) (c-i \log(d))}{a}\right)\right)\right)$$

01.07.21.0465.01

$$\int (b+a z)^{\beta} e^{p z} \cos(c z)\, dz = -\frac{e^{-\frac{b (i c+p)}{a}} (b+a z)^{\beta+1} \left(e^{\frac{2 i b c}{a}} E_{-\beta}\left(\frac{i (c+i p) (b+a z)}{a}\right)+E_{-\beta}\left(-\frac{i (c-i p) (b+a z)}{a}\right)\right)}{2 a}$$

01.07.21.0466.01

$$\int \frac{e^{p z} \cos(c z)}{\sqrt{a z+b}}\, dz = -\frac{e^{-\frac{b (-i c+p)}{a}} \sqrt{\pi} \sqrt{b+a z} \left(1-\operatorname{erf}\left(\sqrt{-\frac{(-i c+p) (b+a z)}{a}}\right)\right)}{2 a \sqrt{-\frac{(-i c+p) (b+a z)}{a}}}-\frac{e^{-\frac{b (i c+p)}{a}} \sqrt{\pi} \sqrt{b+a z} \left(1-\operatorname{erf}\left(\sqrt{-\frac{(i c+p) (b+a z)}{a}}\right)\right)}{2 a \sqrt{-\frac{(i c+p) (b+a z)}{a}}}$$

Arguments involving polynomials

Involving $a z^2 + b z + c$

01.07.21.0467.01

$$\int \cos\left(a z^2+b z+c\right) dz = \frac{1}{\sqrt{a}} \sqrt{\frac{\pi}{2}} \left(\cos\left(\frac{b^2}{4 a}-c\right) C\left(\frac{b+2 a z}{\sqrt{a} \sqrt{2 \pi}}\right)+S\left(\frac{b+2 a z}{\sqrt{a} \sqrt{2 \pi}}\right) \sin\left(\frac{b^2}{4 a}-c\right)\right)$$

Involving $a z^2 + b z$

01.07.21.0468.01

$$\int \cos\left(a z^2+b z\right) dz = \frac{1}{\sqrt{a}} \sqrt{\frac{\pi}{2}} \left(\cos\left(\frac{b^2}{4 a}\right) C\left(\frac{b+2 a z}{\sqrt{a} \sqrt{2 \pi}}\right)+S\left(\frac{b+2 a z}{\sqrt{a} \sqrt{2 \pi}}\right) \sin\left(\frac{b^2}{4 a}\right)\right)$$

Involving $a z^2 + c$

01.07.21.0469.01

$$\int \cos\left(a z^2+c\right) dz = \frac{1}{\sqrt{a}} \sqrt{\frac{\pi}{2}} \left(\cos(c)\, C\left(\sqrt{a} \sqrt{\frac{2}{\pi}}\, z\right)-S\left(\sqrt{a} \sqrt{\frac{2}{\pi}}\, z\right) \sin(c)\right)$$

Arguments involving rational functions

Involving $a z^2 + \frac{b}{z^2}$

01.07.21.0470.01

$$\int \cos\left(a z^2 + \frac{b}{z^2}\right) dz = \frac{1}{8}\sqrt{\pi}\left(\frac{1}{\sqrt{-i a}}\left(e^{-2\sqrt{-i a}\sqrt{-i b}}\left(e^{4\sqrt{-i a}\sqrt{-i b}}\left(\operatorname{erf}\left(\sqrt{-i a}\, z + \frac{\sqrt{-i b}}{z}\right) - 1\right) - \operatorname{erf}\left(\frac{\sqrt{-i b}}{z} - \sqrt{-i a}\, z\right) + 1\right)\right) - \frac{e^{-2\sqrt{i a}\sqrt{i b}}\left(-e^{4\sqrt{i a}\sqrt{i b}}\left(\operatorname{erf}\left(\sqrt{i a}\, z + \frac{\sqrt{i b}}{z}\right) - 1\right) + \operatorname{erf}\left(\frac{\sqrt{i b}}{z} - \sqrt{i a}\, z\right) - 1\right)}{\sqrt{i a}}\right)$$

Involving $a z^2 + \frac{b}{z^2} + c$

01.07.21.0471.01

$$\int \cos\left(a z^2 + \frac{b}{z^2} + c\right) dz = \frac{1}{8} e^{-i c}\sqrt{\pi}\left(\frac{1}{\sqrt{-i a}}\left(e^{-2\sqrt{-i a}\sqrt{-i b} + 2 i c}\left(e^{4\sqrt{-i a}\sqrt{-i b}}\left(\operatorname{erf}\left(\sqrt{-i a}\, z + \frac{\sqrt{-i b}}{z}\right) - 1\right) - \operatorname{erf}\left(\frac{\sqrt{-i b}}{z} - \sqrt{-i a}\, z\right) + 1\right)\right) - \frac{e^{-2\sqrt{i a}\sqrt{i b}}\left(-e^{4\sqrt{i a}\sqrt{i b}}\left(\operatorname{erf}\left(\sqrt{i a}\, z + \frac{\sqrt{i b}}{z}\right) - 1\right) + \operatorname{erf}\left(\frac{\sqrt{i b}}{z} - \sqrt{i a}\, z\right) - 1\right)}{\sqrt{i a}}\right)$$

Arguments involving algebraic functions

Involving $a z + b\sqrt{z} + c$

01.07.21.0472.01

$$\int \cos\left(a z + b\sqrt{z} + c\right) dz = \frac{1}{2 a^{3/2}}\left(-b\sqrt{2\pi}\cos\left(\frac{b^2}{4 a} - c\right) C\left(\frac{2\sqrt{z}\, a + b}{\sqrt{a}\sqrt{2\pi}}\right) - b\sqrt{2\pi}\, S\left(\frac{2\sqrt{z}\, a + b}{\sqrt{a}\sqrt{2\pi}}\right)\sin\left(\frac{b^2}{4 a} - c\right) + 2\sqrt{a}\sin\left(\sqrt{z}\, b + c + a z\right)\right)$$

Involving $a z + b\sqrt{z}$

01.07.21.0473.01

$$\int \cos\left(a z + \sqrt{z}\, b\right) dz = \frac{\sin\left(\sqrt{z}\, b + a z\right)}{a} - \frac{b}{a^{3/2}} \sqrt{\frac{\pi}{2}} \left(\cos\left(\frac{b^2}{4 a}\right) C\left(\frac{2 \sqrt{z}\, a + b}{\sqrt{a} \sqrt{2 \pi}}\right) + S\left(\frac{2 \sqrt{z}\, a + b}{\sqrt{a} \sqrt{2 \pi}}\right) \sin\left(\frac{b^2}{4 a}\right)\right)$$

Involving $a z^r + c$

01.07.21.0474.01

$$\int \cos(a z^r + c)\, dz = -\frac{z \left(a^2 z^{2 r}\right)^{-1/r}}{2 r} \left(\Gamma\left(\frac{1}{r}, i a z^r\right) (\cos(c) - i \sin(c)) (-i a z^r)^{1/r} + (i a z^r)^{1/r}\, \Gamma\left(\frac{1}{r}, -i a z^r\right) (\cos(c) + i \sin(c))\right)$$

01.07.21.0475.01

$$\int \cos\left(a z^2 + c\right) dz = \frac{1}{\sqrt{a}} \sqrt{\frac{\pi}{2}} \left(\cos(c)\, C\left(\sqrt{a} \sqrt{\frac{2}{\pi}}\, z\right) - S\left(\sqrt{a} \sqrt{\frac{2}{\pi}}\, z\right) \sin(c)\right)$$

01.07.21.0476.01

$$\int \cos\left(\sqrt{z}\, a + c\right) dz = \frac{2 \left(\cos\left(\sqrt{z}\, a + c\right) + a \sqrt{z} \sin\left(\sqrt{z}\, a + c\right)\right)}{a^2}$$

Arguments involving exponential functions

01.07.21.0477.01

$$\int \cos(a^z)\, dz = \frac{\mathrm{Ci}(a^z)}{\log(a)}$$

01.07.21.0478.01

$$\int \cos(e^z)\, dz = \mathrm{Ci}(e^z)$$

Arguments involving trigonometric functions

Involving tan

01.07.21.0479.01

$$\int \cos(\tan(z))\, dz = \frac{-i \left(1 + e^2\right) \mathrm{Ci}(i - \tan(z)) + \left(1 + e^2\right) i\, \mathrm{Ci}(i + \tan(z)) + \left(-1 + e^2\right) (\mathrm{Si}(i - \tan(z)) - \mathrm{Si}(i + \tan(z)))}{4 e}$$

01.07.21.0480.01

$$\int \cos(a \tan(z))\, dz = \frac{1}{2} (-i \cosh(a)\, \mathrm{Ci}(-a (-i + \tan(z))) + i \cosh(a)\, \mathrm{Ci}(a (i + \tan(z))) + \sinh(a) (\mathrm{Si}(i a - a \tan(z)) - \mathrm{Si}(a (i + \tan(z)))))$$

Involving cot

01.07.21.0481.01

$$\int \cos(\cot(z))\, dz = -\frac{-i \left(1 + e^2\right) \mathrm{Ci}(i - \cot(z)) + \left(1 + e^2\right) i\, \mathrm{Ci}(i + \cot(z)) + \left(-1 + e^2\right) (\mathrm{Si}(i - \cot(z)) - \mathrm{Si}(i + \cot(z)))}{4 e}$$

01.07.21.0482.01

$$\int \cos(a\cot(z))\,dz = \frac{1}{2}\left(i\cosh(a)\,\mathrm{Ci}(-a\,(-i+\cot(z))) - i\cosh(a)\,\mathrm{Ci}(a\,(i+\cot(z))) + \sinh(a)\,(\mathrm{Si}(a\,(i+\cot(z))) - \mathrm{Si}(i\,a - a\cot(z)))\right)$$

Arguments involving hyperbolic functions

Involving tanh

01.07.21.0483.01

$$\int \cos(\tanh(z))\,dz = \frac{1}{2}\left(-\cos(1)\,\mathrm{Ci}(1-\tanh(z)) + \cos(1)\,\mathrm{Ci}(\tanh(z)+1) + \sin(1)\,(\mathrm{Si}(\tanh(z)+1) - \mathrm{Si}(1-\tanh(z)))\right)$$

01.07.21.0484.01

$$\int \cos(a\tanh(z))\,dz = \frac{1}{2}\left(\cos(a)\,\mathrm{Ci}(\tanh(z)\,a+a) - \cos(a)\,\mathrm{Ci}(a-a\tanh(z)) + \sin(a)\,(\mathrm{Si}(\tanh(z)\,a+a) - \mathrm{Si}(a-a\tanh(z)))\right)$$

Involving coth

01.07.21.0485.01

$$\int \cos(\coth(z))\,dz = \frac{1}{2}\left(-\cos(1)\,\mathrm{Ci}(1-\coth(z)) + \cos(1)\,\mathrm{Ci}(\coth(z)+1) + \sin(1)\,(\mathrm{Si}(\coth(z)+1) - \mathrm{Si}(1-\coth(z)))\right)$$

01.07.21.0486.01

$$\int \cos(a\coth(z))\,dz = \frac{1}{2}\left(\cos(a)\,\mathrm{Ci}(\coth(z)\,a+a) - \cos(a)\,\mathrm{Ci}(a-a\coth(z)) + \sin(a)\,(\mathrm{Si}(\coth(z)\,a+a) - \mathrm{Si}(a-a\coth(z)))\right)$$

Arguments involving inverse trigonometric functions

Involving $\sin^{-1}$

01.07.21.0487.01

$$\int \cos\left(\sin^{-1}(z)\right)dz = \frac{1}{2}\left(\sqrt{1-z^2}\,z + \sin^{-1}(z)\right)$$

01.07.21.0488.01

$$\int \cos\left(a\sin^{-1}(z)\right)dz = \frac{1}{2}\left(\frac{\sin\left((a-1)\sin^{-1}(z)\right)}{a-1} + \frac{\sin\left((a+1)\sin^{-1}(z)\right)}{a+1}\right)$$

Involving $\cos^{-1}$

01.07.21.0489.01

$$\int \cos\left(\cos^{-1}(z)\right)dz = \frac{z^2}{2}$$

01.07.21.0490.01

$$\int \cos\left(a\cos^{-1}(z)\right)dz = \frac{1}{2}\left(\frac{\cos\left((a+1)\cos^{-1}(z)\right)}{a+1} - \frac{\cos\left((a-1)\cos^{-1}(z)\right)}{a-1}\right)$$

Involving $\tan^{-1}$

01.07.21.0491.01

$$\int \cos\left(\tan^{-1}(z)\right) dz = \sinh^{-1}(z)$$

01.07.21.0492.01

$$\int \cos\left(a\tan^{-1}(z)\right) dz = \frac{1}{2\left(a^2-4\right)} \left(e^{-i a \tan^{-1}(z)} \left((a-2)\left((a+2)\left(e^{2 i a \tan^{-1}(z)} z + z - i\, e^{2 i a \tan^{-1}(z)}\, {}_2F_1\left(\frac{a}{2}, 1; \frac{a}{2}+1; -e^{2 i \tan^{-1}(z)}\right)\right) - i\, {}_2F_1\left(-\frac{a}{2}, 1; 1-\frac{a}{2}; -e^{2 i \tan^{-1}(z)}\right)\right) + a\, e^{2 i (a+1) \tan^{-1}(z)}\, i\, {}_2F_1\left(\frac{a}{2}+1, 1; \frac{a}{2}+2; -e^{2 i \tan^{-1}(z)}\right)\right) + a\,(a+2)\, e^{2 i \tan^{-1}(z)}\, i\, {}_2F_1\left(1-\frac{a}{2}, 1; 2-\frac{a}{2}; -e^{2 i \tan^{-1}(z)}\right)\right)\right)$$

Involving $\cot^{-1}$

01.07.21.0493.01

$$\int \cos\left(\cot^{-1}(z)\right) dz = \sqrt{1+\frac{1}{z^2}}\; z$$

01.07.21.0494.01

$$\int \cos\left(a\cot^{-1}(z)\right) dz = \frac{1}{2\left(a^2-4\right)} \left(e^{-i a \cot^{-1}(z)} \left((a-2)\left((a+2)\left(e^{2 i a \cot^{-1}(z)} z + z + e^{2 i a \cot^{-1}(z)}\, i\, {}_2F_1\left(\frac{a}{2}, 1; \frac{a}{2}+1; e^{2 i \cot^{-1}(z)}\right)\right) + i\, {}_2F_1\left(-\frac{a}{2}, 1; 1-\frac{a}{2}; e^{2 i \cot^{-1}(z)}\right)\right) + a\, e^{2 i (a+1) \cot^{-1}(z)}\, i\, {}_2F_1\left(\frac{a}{2}+1, 1; \frac{a}{2}+2; e^{2 i \cot^{-1}(z)}\right)\right) + a\,(a+2)\, e^{2 i \cot^{-1}(z)}\, i\, {}_2F_1\left(1-\frac{a}{2}, 1; 2-\frac{a}{2}; e^{2 i \cot^{-1}(z)}\right)\right)\right)$$

Involving $\csc^{-1}$

01.07.21.0495.01

$$\int \cos\left(\csc^{-1}(z)\right) dz = \frac{\sqrt{1-\frac{1}{z^2}}\; z \left(\tan^{-1}\left(\frac{1}{\sqrt{z^2-1}}\right) + \sqrt{z^2-1}\right)}{\sqrt{z^2-1}}$$

01.07.21.0496.01

$$\int \cos\left(a\csc^{-1}(z)\right) dz = \frac{1}{2\left(a^2-1\right)} \left(e^{-i a \csc^{-1}(z)} \left((a-1)\left((a+1)\left(1+e^{2 i a \csc^{-1}(z)}\right) z + 2 a\, e^{i (2a+1) \csc^{-1}(z)}\, i\, {}_2F_1\left(\frac{a+1}{2}, 1; \frac{a+3}{2}; e^{2 i \csc^{-1}(z)}\right)\right) + 2 a\,(a+1)\, e^{i \csc^{-1}(z)}\, i\, {}_2F_1\left(\frac{1}{2}-\frac{a}{2}, 1; \frac{3}{2}-\frac{a}{2}; e^{2 i \csc^{-1}(z)}\right)\right)\right)$$

Involving $\sec^{-1}$

01.07.21.0497.01

$$\int \cos\left(\sec^{-1}(z)\right) dz = \log(z)$$

01.07.21.0498.01

$$\int \cos\left(a \sec^{-1}(z)\right) dz = \frac{1}{2\left(a^2-1\right)}\left(e^{-i a \sec^{-1}(z)}\left((a-1)\left((a+1)\left(1+e^{2 i a \sec^{-1}(z)}\right) z-2 a e^{i(2a+1)\sec^{-1}(z)}\, {}_2F_1\left(\frac{a+1}{2}, 1; \frac{a+3}{2}; -e^{2 i \sec^{-1}(z)}\right)\right)- 2 a (a+1) e^{i \sec^{-1}(z)}\, {}_2F_1\left(\frac{1}{2}-\frac{a}{2}, 1; \frac{3}{2}-\frac{a}{2}; -e^{2 i \sec^{-1}(z)}\right)\right)\right)$$

Arguments involving inverse hyperbolic functions

Involving $\sinh^{-1}$

01.07.21.0499.01

$$\int \cos\left(\sinh^{-1}(z)\right) dz = \frac{1}{2}\left(z \cos\left(\sinh^{-1}(z)\right)+\sqrt{z^2+1}\, \sin\left(\sinh^{-1}(z)\right)\right)$$

01.07.21.0500.01

$$\int \cos\left(a \sinh^{-1}(z)\right) dz = \frac{z \cos\left(a \sinh^{-1}(z)\right)+a \sqrt{z^2+1}\, \sin\left(a \sinh^{-1}(z)\right)}{a^2+1}$$

Involving $\cosh^{-1}$

01.07.21.0501.01

$$\int \cos\left(\cosh^{-1}(z)\right) dz = \frac{1}{2}\left(z \cos\left(\cosh^{-1}(z)\right)+\sqrt{\frac{z-1}{z+1}}\, (z+1) \sin\left(\cosh^{-1}(z)\right)\right)$$

01.07.21.0502.01

$$\int \cos\left(a \cosh^{-1}(z)\right) dz = \frac{z \cos\left(a \cosh^{-1}(z)\right)+a \sqrt{\frac{z-1}{z+1}}\, (z+1) \sin\left(a \cosh^{-1}(z)\right)}{a^2+1}$$

Involving $\tanh^{-1}$

01.07.21.0503.01

$$\int \cos\left(\tanh^{-1}(z)\right) dz = \frac{1}{10} e^{-i \tanh^{-1}(z)}\left(5 e^{2 i \tanh^{-1}(z)} z+5 z+5 e^{2 i \tanh^{-1}(z)}\, {}_2F_1\left(\frac{i}{2}, 1; 1+\frac{i}{2}; -e^{2 \tanh^{-1}(z)}\right)+5\, {}_2F_1\left(-\frac{i}{2}, 1; 1-\frac{i}{2}; -e^{2 \tanh^{-1}(z)}\right)- (1+2 i) e^{(2+2 i) \tanh^{-1}(z)}\, {}_2F_1\left(1+\frac{i}{2}, 1; 2+\frac{i}{2}; -e^{2 \tanh^{-1}(z)}\right)-(1-2 i) e^{2 \tanh^{-1}(z)}\, {}_2F_1\left(1-\frac{i}{2}, 1; 2-\frac{i}{2}; -e^{2 \tanh^{-1}(z)}\right)\right)$$

01.07.21.0504.01

$$\int \cos\left(a \tanh^{-1}(z)\right) dz = \frac{1}{2\left(a^2+4\right)} \left(e^{-i a \tanh^{-1}(z)} \left((a+2i)\left((a-2i)\left(e^{2 i a \tanh^{-1}(z)} z + z + e^{2 i a \tanh^{-1}(z)} {}_2F_1\left(\frac{i a}{2}, 1; 1+\frac{i a}{2}; -e^{2 \tanh^{-1}(z)}\right) + {}_2F_1\left(-\frac{1}{2}(i a), 1; 1-\frac{i a}{2}; -e^{2 \tanh^{-1}(z)}\right)\right) - a\, e^{2(1+i a) \tanh^{-1}(z)} {}_2F_1\left(1+\frac{i a}{2}, 1; 2+\frac{i a}{2}; -e^{2 \tanh^{-1}(z)}\right)\right) - a(a-2i)\, e^{2 \tanh^{-1}(z)} {}_2F_1\left(1-\frac{i a}{2}, 1; 2-\frac{i a}{2}; -e^{2 \tanh^{-1}(z)}\right)\right)\right)$$

Involving $\coth^{-1}$

01.07.21.0505.01

$$\int \cos\left(\coth^{-1}(z)\right) dz = \frac{1}{10} e^{-i \coth^{-1}(z)} \left(5 e^{2 i \coth^{-1}(z)} z + 5 z + 5 e^{2 i \coth^{-1}(z)} {}_2F_1\left(\frac{i}{2}, 1; 1+\frac{i}{2}; e^{2 \coth^{-1}(z)}\right) + 5\, {}_2F_1\left(-\frac{i}{2}, 1; 1-\frac{i}{2}; e^{2 \coth^{-1}(z)}\right) + e^{(2+2i) \coth^{-1}(z)} (1+2i)\, {}_2F_1\left(1+\frac{i}{2}, 1; 2+\frac{i}{2}; e^{2 \coth^{-1}(z)}\right) + e^{2 \coth^{-1}(z)} (1-2i)\, {}_2F_1\left(1-\frac{i}{2}, 1; 2-\frac{i}{2}; e^{2 \coth^{-1}(z)}\right)\right)$$

01.07.21.0506.01

$$\int \cos\left(a \coth^{-1}(z)\right) dz = \frac{1}{2\left(a^2+4\right)} \left(e^{-i a \coth^{-1}(z)} \left((a+2i)\left((a-2i)\left(e^{2 i a \coth^{-1}(z)} z + z + e^{2 i a \coth^{-1}(z)} {}_2F_1\left(\frac{i a}{2}, 1; 1+\frac{i a}{2}; e^{2 \coth^{-1}(z)}\right) + {}_2F_1\left(-\frac{1}{2}(i a), 1; 1-\frac{i a}{2}; e^{2 \coth^{-1}(z)}\right)\right) + a\, e^{2(1+i a) \coth^{-1}(z)} {}_2F_1\left(1+\frac{i a}{2}, 1; 2+\frac{i a}{2}; e^{2 \coth^{-1}(z)}\right)\right) + a(a-2i)\, e^{2 \coth^{-1}(z)} {}_2F_1\left(1-\frac{i a}{2}, 1; 2-\frac{i a}{2}; e^{2 \coth^{-1}(z)}\right)\right)\right)$$

Involving csch^{-1}

01.07.21.0507.01

$$\int \cos\left(\operatorname{csch}^{-1}(z)\right) dz = z \cos\left(\operatorname{csch}^{-1}(z)\right) + \left(\frac{1}{2}+\frac{i}{2}\right) e^{(1+i) \operatorname{csch}^{-1}(z)} {}_2F_1\left(\frac{1}{2}+\frac{i}{2}, 1; \frac{3}{2}+\frac{i}{2}; e^{2 \operatorname{csch}^{-1}(z)}\right) + \left(\frac{1}{2}-\frac{i}{2}\right) e^{(1-i) \operatorname{csch}^{-1}(z)} {}_2F_1\left(\frac{1}{2}-\frac{i}{2}, 1; \frac{3}{2}-\frac{i}{2}; e^{2 \operatorname{csch}^{-1}(z)}\right)$$

01.07.21.0508.01

$$\int \cos\left(a \operatorname{csch}^{-1}(z)\right) dz = \frac{1}{2\left(a^2+1\right)} \left(e^{-i a \operatorname{csch}^{-1}(z)} \left((a+i)\left((a-i)\left(1+e^{2 i a \operatorname{csch}^{-1}(z)}\right) z + 2 a\, e^{2 a i \operatorname{csch}^{-1}(z)+\operatorname{csch}^{-1}(z)} {}_2F_1\left(\frac{1}{2}+\frac{i a}{2}, 1; \frac{3}{2}+\frac{i a}{2}; e^{2 \operatorname{csch}^{-1}(z)}\right)\right) + 2 a (a-i)\, e^{\operatorname{csch}^{-1}(z)} {}_2F_1\left(\frac{1}{2}-\frac{i a}{2}, 1; \frac{3}{2}-\frac{i a}{2}; e^{2 \operatorname{csch}^{-1}(z)}\right)\right)\right)$$

Involving sech^{-1}

01.07.21.0509.01

$$\int \cos\left(\operatorname{sech}^{-1}(z)\right) dz = z\cos\left(\operatorname{sech}^{-1}(z)\right) - \left(\frac{1}{2}+\frac{i}{2}\right) e^{(1+i)\operatorname{sech}^{-1}(z)}\, {}_2F_1\left(\frac{1}{2}+\frac{i}{2}, 1; \frac{3}{2}+\frac{i}{2}; -e^{2\operatorname{sech}^{-1}(z)}\right) - \left(\frac{1}{2}-\frac{i}{2}\right) e^{(1-i)\operatorname{sech}^{-1}(z)}\, {}_2F_1\left(\frac{1}{2}-\frac{i}{2}, 1; \frac{3}{2}-\frac{i}{2}; -e^{2\operatorname{sech}^{-1}(z)}\right)$$

01.07.21.0510.01

$$\int \cos\left(a\operatorname{sech}^{-1}(z)\right) dz = \frac{1}{2\left(a^2+1\right)}\left(e^{-i a\operatorname{sech}^{-1}(z)}\left((a+i)\left((a-i)\left(1+e^{2 i a\operatorname{sech}^{-1}(z)}\right)z - 2a\, e^{2 a i\operatorname{sech}^{-1}(z)+\operatorname{sech}^{-1}(z)}\, {}_2F_1\left(\frac{1}{2}+\frac{i a}{2}, 1; \frac{3}{2}+\frac{i a}{2}; -e^{2\operatorname{sech}^{-1}(z)}\right)\right) - 2a(a-i)\, e^{\operatorname{sech}^{-1}(z)}\, {}_2F_1\left(\frac{1}{2}-\frac{i a}{2}, 1; \frac{3}{2}-\frac{i a}{2}; -e^{2\operatorname{sech}^{-1}(z)}\right)\right)\right)$$

Arguments involving polynomials or algebraic functions and power factors

Involving power

Involving $z^n \cos\left(a z^r + b z\right)$

01.07.21.0511.01

$$\int z^n \cos\left(a z^2 + b z\right) dz = -\frac{1}{4\sqrt{a^2}}\left(e^{-\frac{i b^2}{4a}}\left(\sqrt{i a}\; e^{\frac{i b^2}{2a}} \sum_{j=0}^{n} 2^{j-n} (-i a)^{-n-\frac{1}{2}} (i b)^{n-j} (-i(b+2az))^{j+1} \left(\frac{i(b+2az)^2}{a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(b+2az)^2}{4a}\right) + \sqrt{-i a} \sum_{j=0}^{n} 2^{j-n} (i a)^{-n-\frac{1}{2}} (-i b)^{n-j} (i(b+2az))^{j+1} \left(-\frac{i(b+2az)^2}{a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(b+2az)^2}{4a}\right)\right)\right) /; n \in \mathbb{N}$$

01.07.21.0512.01

$$\int z^n \cos\left(\sqrt{z}\, a + b\, z\right) dz = 4^{-n-1} a^{2n} b^{-2n-2} e^{-\frac{i a^2}{4 b}} \left(e^{\frac{i a^2}{2 b}} \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j \left(-\frac{a + 2 b \sqrt{z}}{a}\right)^{h+j} \left(\frac{i \left(a + 2 b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(a \left(a + 2 b \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{i \left(a + 2 b \sqrt{z}\right)^2}{4 b}\right) + 2 \sqrt{\frac{i \left(a + 2 b \sqrt{z}\right)^2}{b}}\, b\, i\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{i \left(a + 2 b \sqrt{z}\right)^2}{4 b}\right)\right) + \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j \left(-\frac{a + 2 b \sqrt{z}}{a}\right)^{h+j} \left(-\frac{i \left(a + 2 b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(a \left(a + 2 b \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{i \left(a + 2 b \sqrt{z}\right)^2}{4 b}\right) - 2\, i\, b \sqrt{-\frac{i \left(a + 2 b \sqrt{z}\right)^2}{b}}\, \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{i \left(a + 2 b \sqrt{z}\right)^2}{4 b}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \cos\left(a\, z^r + b\, z + c\right)$

01.07.21.0513.01

$$\int z^n \cos\left(a\, z^2 + b\, z + c\right) dz = -\frac{1}{2^{n+2} a^{n+1}} \left(((-b)^n (b + 2 a z))\, e^{-\frac{i \left(b^2 + 4 a c\right)}{4 a}} \left(e^{\frac{i b^2}{2 a}} \sum_{j=0}^{n} \left(-\frac{2 b + 4 a z}{b}\right)^j \left(\frac{i (b + 2 a z)^2}{a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (b + 2 a z)^2}{4 a}\right) + e^{2 i c} \sum_{j=0}^{n} \left(-\frac{2 b + 4 a z}{b}\right)^j \left(-\frac{i (b + 2 a z)^2}{a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (b + 2 a z)^2}{4 a}\right)\right)\right) /; n \in \mathbb{N}$$

01.07.21.0514.01

$$\int z^n \cos\left(\sqrt{z}\, a + b\, z + c\right) dz = 4^{-n-1} a^{2n} b^{-2n-2} e^{-\frac{i a^2}{4b} - i c} \left(e^{\frac{i a^2}{2b}} \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j \left(-\frac{a + 2b\sqrt{z}}{a}\right)^{h+j} \left(\frac{i\left(a + 2b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(a\left(a + 2b\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(a+2b\sqrt{z}\right)^2}{4b}\right) + 2\sqrt{\frac{i\left(a+2b\sqrt{z}\right)^2}{b}}\, b\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(a+2b\sqrt{z}\right)^2}{4b}\right)\right) + e^{2 i c} \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j \left(-\frac{a + 2b\sqrt{z}}{a}\right)^{h+j} \left(-\frac{i\left(a + 2b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(a\left(a + 2b\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(a+2b\sqrt{z}\right)^2}{4b}\right) - 2\, i\, b \sqrt{-\frac{i\left(a+2b\sqrt{z}\right)^2}{b}}\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(a+2b\sqrt{z}\right)^2}{4b}\right)\right)\right) /;\, n \in \mathbb{N}$$

Arguments involving polynomials or algebraic functions and factors involving exponential functions

Involving exp

Involving $a^{d z} \cos\left(c\, z^r + f\, z\right)$

01.07.21.0515.01

$$\int a^{d z} \cos\left(c\, z^2 + f\, z\right) dz = \frac{1}{4 c^2} \left(e^{\frac{i\left(i f + d \log(a)\right)^2}{4c}} \sqrt{\pi} \left(\frac{c^2 \operatorname{erfi}\left(\frac{i(f + 2 c z) + d \log(a)}{2\sqrt{i c}}\right)}{\sqrt{i c}} - (-i c)^{3/2} e^{\frac{i\left(f^2 - d^2 \log^2(a)\right)}{2c}} \operatorname{erfi}\left(\frac{d \log(a) - i(f + 2 c z)}{2\sqrt{-i c}}\right)\right)\right)$$

01.07.21.0516.01

$$\int e^{d z} \cos\left(c\, z^2 + f\, z\right) dz = \frac{1}{4 c} \left(i\, e^{-\frac{i (d - i f)^2}{4c}} \sqrt{\pi} \left(\sqrt{-i c}\, \operatorname{erfi}\left(\frac{d - i(f + 2 c z)}{2\sqrt{-i c}}\right) - \sqrt{i c}\, e^{\frac{i\left(d^2 - f^2\right)}{2c}} \operatorname{erfi}\left(\frac{d + i(f + 2 c z)}{2\sqrt{i c}}\right)\right)\right)$$

01.07.21.0517.01

$$\int a^{d z} \cos\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4}\left(\frac{i\, c\, e^{\frac{c^2}{-4 i f + 4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 d \sqrt{z}\, \log(a) - i\left(c + 2 f \sqrt{z}\right)}{2\sqrt{-i f + d \log(a)}}\right)}{(-i f + d \log(a))^{3/2}} - i\left(2\, e^{-i\left(\sqrt{z}\, c + f z\right)}\left(\frac{e^{2 i\left(\sqrt{z}\, c + f z\right)}}{f - i\, d \log(a)} - \frac{1}{f + d\, i \log(a)}\right) a^{d z} + \frac{c\, e^{\frac{c^2}{4 i f + 4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i c + 2\sqrt{z}\, (i f + d \log(a))}{2\sqrt{i f + d \log(a)}}\right)}{(i f + d \log(a))^{3/2}}\right)\right)$$

01.07.21.0518.01

$$\int e^{d z} \cos\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4}\left(2\, e^{-i c \sqrt{z} + d z - i f z}\left(\frac{1}{d - i f} - \frac{i\, e^{2 i\left(\sqrt{z}\, c + f z\right)}}{f - i d}\right) + \frac{c\, e^{\frac{c^2}{4 d - 4 i f}} \sqrt{\pi}\, \operatorname{erf}\left(\frac{c + 2 (f + i d)\sqrt{z}}{2\sqrt{d - i f}}\right)}{(d - i f)^{3/2}} - \frac{i\, c\, e^{\frac{c^2}{4 d + 4 i f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2\sqrt{z}\, (d + i f) + i c}{2\sqrt{d + i f}}\right)}{(d + i f)^{3/2}}\right)$$

Involving $a^{d z+e} \cos\left(c z^r + f z\right)$

01.07.21.0519.01

$$\int a^{e + d z} \cos\left(c z^2 + f z\right) dz = \frac{1}{4 c^2}\left(a^e\, e^{\frac{i (i f + d \log(a))^2}{4 c}} \sqrt{\pi}\left(\frac{c^2 \operatorname{erfi}\left(\frac{i (f + 2 c z) + d \log(a)}{2\sqrt{i c}}\right)}{\sqrt{i c}} - (-i c)^{3/2}\, e^{\frac{i\left(f^2 - d^2 \log^2(a)\right)}{2 c}} \operatorname{erfi}\left(\frac{d \log(a) - i (f + 2 c z)}{2\sqrt{-i c}}\right)\right)\right)$$

01.07.21.0520.01

$$\int e^{d z + e} \cos\left(c z^2 + f z\right) dz = \frac{1}{4 c}\left(i\, e^{-\frac{i (d - i f)^2}{4 c} + e} \sqrt{\pi}\left(\sqrt{-i c}\, \operatorname{erfi}\left(\frac{d - i (f + 2 c z)}{2\sqrt{-i c}}\right) - \sqrt{i c}\, e^{\frac{i\left(d^2 - f^2\right)}{2 c}} \operatorname{erfi}\left(\frac{d + i (f + 2 c z)}{2\sqrt{i c}}\right)\right)\right)$$

01.07.21.0521.01

$$\int a^{e + d z} \cos\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4} a^e\left(\frac{i\, c\, e^{\frac{c^2}{-4 i f + 4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 d \sqrt{z}\, \log(a) - i\left(c + 2 f \sqrt{z}\right)}{2\sqrt{-i f + d \log(a)}}\right)}{(-i f + d \log(a))^{3/2}} - i\left(2\, e^{-i\left(\sqrt{z}\, c + f z\right)}\left(\frac{e^{2 i\left(\sqrt{z}\, c + f z\right)}}{f - i\, d \log(a)} - \frac{1}{f + d\, i \log(a)}\right) a^{d z} + \frac{c\, e^{\frac{c^2}{4 i f + 4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i c + 2\sqrt{z}\, (i f + d \log(a))}{2\sqrt{i f + d \log(a)}}\right)}{(i f + d \log(a))^{3/2}}\right)\right)$$

01.07.21.0522.01

$$\int e^{d z+e} \cos\left(\sqrt{z}\, c+f z\right) dz = \frac{1}{4} e^e \left(2 e^{-i c \sqrt{z}+d z-i f z} \left(\frac{1}{d-i f} - \frac{i e^{2 i \left(\sqrt{z}\, c+f z\right)}}{f-i d}\right) + \frac{c\, e^{\frac{c^2}{4 d-4 i f}} \sqrt{\pi}\, \operatorname{erf}\left(\frac{c+2 (f+i d) \sqrt{z}}{2 \sqrt{d-i f}}\right)}{(d-i f)^{3/2}} - \frac{i c\, e^{\frac{c^2}{4 d+4 i f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 \sqrt{z}\, (d+i f)+i c}{2 \sqrt{d+i f}}\right)}{(d+i f)^{3/2}}\right)$$

Involving $a^{b z^r} \cos\left(c z^r + f z\right)$

01.07.21.0523.01

$$\int a^{b z^2} \cos\left(c z^2 + f z\right) dz = \frac{1}{4 \left(c^2+b^2 \log^2(a)\right)} \left(e^{\frac{f^2}{4 i c+4 b \log(a)}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{i (f+2 c z)+2 b z \log(a)}{2 \sqrt{i c+b \log(a)}}\right) \sqrt{i c+b \log(a)}\, (-i c+b \log(a)) + e^{\frac{i c f^2}{2 \left(c^2+b^2 \log^2(a)\right)}} \operatorname{erfi}\left(\frac{2 b z \log(a) - i (f+2 c z)}{2 \sqrt{-i c+b \log(a)}}\right) (i c+b \log(a)) \sqrt{-i c+b \log(a)}\right)\right)$$

01.07.21.0524.01

$$\int e^{b z^2} \cos\left(c z^2 + f z\right) dz = \frac{1}{4 \left(b^2+c^2\right)} \left(\sqrt{\pi} \left((c-i b) \sqrt{b-i c}\, e^{\frac{f^2}{4 b-4 i c}} \operatorname{erf}\left(\frac{f+2 (c+i b) z}{2 \sqrt{b-i c}}\right) + \sqrt{b+i c}\, (b-i c)\, e^{\frac{f^2}{4 b+4 i c}} \operatorname{erfi}\left(\frac{i f+2 (b+i c) z}{2 \sqrt{b+i c}}\right)\right)\right)$$

01.07.21.0525.01

$$\int a^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c + f z\right) dz = -\frac{1}{4} \left(\frac{2 e^{-i \left(\sqrt{z}\, c+f z\right)} \left(-1+e^{2 i \left(\sqrt{z}\, c+f z\right)}\right) i\, a^{b \sqrt{z}}}{f} + \frac{e^{\frac{i (c+b i \log(a))^2}{4 f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b \log(a) - i \left(c+2 f \sqrt{z}\right)}{2 \sqrt{-i f}}\right) (-i c+b \log(a))}{(-i f)^{3/2}} + \frac{e^{-\frac{i (c-i b \log(a))^2}{4 f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i \left(c+2 f \sqrt{z}\right)+b \log(a)}{2 \sqrt{i f}}\right) (i c+b \log(a))}{(i f)^{3/2}}\right)$$

01.07.21.0526.01

$$\int e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4}\left(\frac{2\, i\, e^{(b - i c)\sqrt{z} - i f z}}{f} - \frac{2\, i\, e^{\sqrt{z}\,(b + i c) + i f z}}{f} - \frac{(b - i c)\, e^{-\frac{i (b - i c)^2}{4 f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b - i\left(c + 2 f \sqrt{z}\right)}{2\sqrt{-i f}}\right)}{(-i f)^{3/2}} - \frac{(b + i c)\, e^{\frac{i (b + i c)^2}{4 f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b + i\left(c + 2 f \sqrt{z}\right)}{2\sqrt{i f}}\right)}{(i f)^{3/2}}\right)$$

Involving $a^{b z^r + e} \cos\left(c z^r + f z\right)$

01.07.21.0527.01

$$\int a^{b z^2 + e} \cos\left(c z^2 + f z\right) dz = \frac{1}{4\left(c^2 + b^2 \log^2(a)\right)}\left(a^e\, e^{\frac{f^2}{4 i c + 4 b \log(a)}} \sqrt{\pi}\left(\operatorname{erfi}\left(\frac{i (f + 2 c z) + 2 b z \log(a)}{2\sqrt{i c + b \log(a)}}\right)\sqrt{i c + b \log(a)}\,(-i c + b \log(a)) + e^{\frac{i c f^2}{2\left(c^2 + b^2 \log^2(a)\right)}} \operatorname{erfi}\left(\frac{2 b z \log(a) - i (f + 2 c z)}{2\sqrt{-i c + b \log(a)}}\right)(i c + b \log(a))\sqrt{-i c + b \log(a)}\right)\right)$$

01.07.21.0528.01

$$\int e^{b z^2 + e} \cos\left(c z^2 + f z\right) dz = \frac{1}{4\left(b^2 + c^2\right)}\left(e^e \sqrt{\pi}\left((c - i b)\sqrt{b - i c}\; e^{\frac{f^2}{4 b - 4 i c}} \operatorname{erf}\left(\frac{f + 2 (c + i b) z}{2\sqrt{b - i c}}\right) + \sqrt{b + i c}\;(b - i c)\, e^{\frac{f^2}{4 b + 4 i c}} \operatorname{erfi}\left(\frac{i f + 2 (b + i c) z}{2\sqrt{b + i c}}\right)\right)\right)$$

01.07.21.0529.01

$$\int a^{\sqrt{z}\, b + e} \cos\left(\sqrt{z}\, c + f z\right) dz = -\frac{1}{4} a^e \left(\frac{2\, e^{-i\left(\sqrt{z}\, c + f z\right)}\left(-1 + e^{2 i\left(\sqrt{z}\, c + f z\right)}\right) i\, a^{b\sqrt{z}}}{f} + \frac{e^{\frac{i (c + b i \log(a))^2}{4 f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b \log(a) - i\left(c + 2 f \sqrt{z}\right)}{2\sqrt{-i f}}\right)(-i c + b \log(a))}{(-i f)^{3/2}} + \frac{e^{-\frac{i (c - i b \log(a))^2}{4 f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i\left(c + 2 f \sqrt{z}\right) + b \log(a)}{2\sqrt{i f}}\right)(i c + b \log(a))}{(i f)^{3/2}}\right)$$

01.07.21.0530.01

$$\int e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4} e^{e} \left(\frac{2 i e^{(b-i c)\sqrt{z} - i f z}}{f} - \frac{2 i e^{\sqrt{z}\,(b+i c)+i f z}}{f} - \frac{(b-i c)\, e^{-\frac{i (b-i c)^2}{4 f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b - i\left(c + 2 f \sqrt{z}\right)}{2\sqrt{-i f}}\right)}{(-i f)^{3/2}} - \frac{(b+i c)\, e^{\frac{i (b+i c)^2}{4 f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b + i\left(c + 2 f \sqrt{z}\right)}{2\sqrt{i f}}\right)}{(i f)^{3/2}} \right)$$

Involving $a^{b z^r + d z} \cos\left(c z^r + f z\right)$

01.07.21.0531.01

$$\int a^{b z^2 + d z} \cos\left(c z^2 + f z\right) dz = \frac{1}{4\left(c^2 + b^2 \log^2(a)\right)} \left(e^{-\frac{(i f + d \log(a))^2}{4 (i c + b \log(a))}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{i (f + 2 c z) + (d + 2 b z) \log(a)}{2 \sqrt{i c + b \log(a)}} \right) \sqrt{i c + b \log(a)}\, (-i c + b \log(a)) + e^{\frac{i \left(c f^2 + d (2 b f - c d) \log^2(a)\right)}{2 \left(c^2 + b^2 \log^2(a)\right)}} \operatorname{erfi}\left(\frac{(d + 2 b z) \log(a) - i (f + 2 c z)}{2 \sqrt{-i c + b \log(a)}} \right) (i c + b \log(a)) \sqrt{-i c + b \log(a)} \right) \right)$$

01.07.21.0532.01

$$\int e^{b z^2 + d z} \cos\left(c z^2 + f z\right) dz = \frac{1}{4\left(b^2 + c^2\right)} \left(\sqrt{\pi} \left(\sqrt{b + i c}\, (b - i c)\, e^{-\frac{(d + i f)^2}{4 (b + i c)}} \operatorname{erfi}\left(\frac{d + i f + 2 (b + i c) z}{2 \sqrt{b + i c}} \right) + (b + i c) \sqrt{b - i c}\, e^{-\frac{(d - i f)^2}{4 (b - i c)}} \operatorname{erfi}\left(\frac{d - i f + 2 b z - 2 i c z}{2 \sqrt{b - i c}} \right) \right) \right)$$

01.07.21.0533.01

$$\int a^{\sqrt{z}\, b + d z} \cos\left(\sqrt{z}\, c + f z\right) dz = -\frac{1}{4} \left(2 e^{-i\left(\sqrt{z}\, c + f z\right)} i \left(\frac{e^{2 i \left(\sqrt{z}\, c + f z\right)}}{f - i d \log(a)} - \frac{1}{f + d i \log(a)} \right) a^{\sqrt{z}\, b + d z} + \frac{e^{\frac{(c + b i \log(a))^2}{-4 i f + 4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{\left(b + 2 d \sqrt{z}\right) \log(a) - i \left(c + 2 f \sqrt{z}\right)}{2 \sqrt{-i f + d \log(a)}} \right) (-i c + b \log(a))}{(-i f + d \log(a))^{3/2}} + \frac{e^{\frac{(c - i b \log(a))^2}{4 i f + 4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i c + b \log(a) + 2 \sqrt{z}\, (i f + d \log(a))}{2 \sqrt{i f + d \log(a)}} \right) (i c + b \log(a))}{(i f + d \log(a))^{3/2}} \right)$$

01.07.21.0534.01

$$\int e^{\sqrt{z}\, b+d z} \cos\left(\sqrt{z}\, c+f z\right) dz = \frac{1}{4}\left(-\frac{(b+i c)\, e^{-\frac{(b+i c)^2}{4 (d+i f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+i c+2 (d+i f) \sqrt{z}}{2 \sqrt{d+i f}}\right)}{(d+i f)^{3/2}} + \frac{2 e^{\sqrt{z}\, (b+i c)+(d+i f) z}}{d+i f} + \frac{2 e^{\sqrt{z}\, (b-i c)+(d-i f) z}}{d-i f} - \frac{(b-i c)\, e^{-\frac{(b-i c)^2}{4 (d-i f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-i c+2 (d-i f) \sqrt{z}}{2 \sqrt{d-i f}}\right)}{(d-i f)^{3/2}}\right)$$

Involving $a^{b z^r+d z+e} \cos\left(c z^r+f z\right)$

01.07.21.0535.01

$$\int a^{b z^2+d z+e} \cos\left(c z^2+f z\right) dz = \frac{1}{4 \left(c^2+b^2 \log^2(a)\right)} \left(a^e\, e^{-\frac{(i f+d \log(a))^2}{4 (i c+b \log(a))}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{i (f+2 c z)+(d+2 b z) \log(a)}{2 \sqrt{i c+b \log(a)}}\right) \sqrt{i c+b \log(a)}\, (-i c+b \log(a)) + e^{\frac{i \left(c f^2+d (2 b f-c d) \log^2(a)\right)}{2 \left(c^2+b^2 \log^2(a)\right)}} \operatorname{erfi}\left(\frac{(d+2 b z) \log(a)-i (f+2 c z)}{2 \sqrt{-i c+b \log(a)}}\right) (i c+b \log(a)) \sqrt{-i c+b \log(a)}\right)\right)$$

01.07.21.0536.01

$$\int e^{b z^2+d z+e} \cos\left(c z^2+f z\right) dz = \frac{1}{4 \left(b^2+c^2\right)} \left(\sqrt{\pi} \left(\sqrt{b+i c}\, (b-i c)\, e^{-\frac{(d+i f)^2-4 (b+i c) e}{4 (b+i c)}} \operatorname{erfi}\left(\frac{d+i f+2 (b+i c) z}{2 \sqrt{b+i c}}\right) + (b+i c) \sqrt{b-i c}\, e^{-\frac{(d-i f)^2-4 (b-i c) e}{4 (b-i c)}} \operatorname{erfi}\left(\frac{d-i f+2 b z-2 i c z}{2 \sqrt{b-i c}}\right)\right)\right)$$

01.07.21.0537.01

$$\int a^{\sqrt{z}\,b+d\,z+e}\cos\left(\sqrt{z}\,c+f\,z\right)dz = -\frac{1}{4}a^e\left(2\,e^{-i\left(\sqrt{z}\,c+f\,z\right)}\,i\left(\frac{e^{2\,i\left(\sqrt{z}\,c+f\,z\right)}}{f-i\,d\log(a)}-\frac{1}{f+d\,i\log(a)}\right)a^{\sqrt{z}\,b+d\,z}+\frac{e^{\frac{(c+b\,i\log(a))^2}{-4\,i\,f+4\,d\log(a)}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{\left(b+2\,d\sqrt{z}\right)\log(a)-i\left(c+2\,f\sqrt{z}\right)}{2\sqrt{-i\,f+d\log(a)}}\right)(-i\,c+b\log(a))}{(-i\,f+d\log(a))^{3/2}}+\frac{e^{\frac{(c-i\,b\log(a))^2}{4\,i\,f+4\,d\log(a)}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{i\,c+b\log(a)+2\sqrt{z}\,(i\,f+d\log(a))}{2\sqrt{i\,f+d\log(a)}}\right)(i\,c+b\log(a))}{(i\,f+d\log(a))^{3/2}}\right)$$

01.07.21.0538.01

$$\int e^{\sqrt{z}\,b+d\,z+e}\cos\left(\sqrt{z}\,c+f\,z\right)dz = \frac{1}{4}e^e\left(-\frac{(b+i\,c)\,e^{-\frac{(b+i\,c)^2}{4(d+i\,f)}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{b+i\,c+2(d+i\,f)\sqrt{z}}{2\sqrt{d+i\,f}}\right)}{(d+i\,f)^{3/2}}+\frac{2\,e^{\sqrt{z}\,(b+i\,c)+(d+i\,f)\,z}}{d+i\,f}+\frac{2\,e^{\sqrt{z}\,(b-i\,c)+(d-i\,f)\,z}}{d-i\,f}-\frac{(b-i\,c)\,e^{-\frac{(b-i\,c)^2}{4(d-i\,f)}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{b-i\,c+2(d-i\,f)\sqrt{z}}{2\sqrt{d-i\,f}}\right)}{(d-i\,f)^{3/2}}\right)$$

Involving $a^{d\,z}\cos\left(c\,z^r+f\,z+g\right)$

01.07.21.0539.01

$$\int a^{d\,z}\cos\left(c\,z^2+f\,z+g\right)dz = \frac{1}{4\,c^2}\left(e^{\frac{i(i\,f+d\log(a))^2}{4\,c}-i\,g}\sqrt{\pi}\left(\frac{c^2\,e^{2\,i\,g}\,\mathrm{erfi}\left(\frac{i(f+2\,c\,z)+d\log(a)}{2\sqrt{i\,c}}\right)}{\sqrt{i\,c}}-(-i\,c)^{3/2}\,e^{\frac{i\left(f^2-d^2\log^2(a)\right)}{2\,c}}\,\mathrm{erfi}\left(\frac{d\log(a)-i(f+2\,c\,z)}{2\sqrt{-i\,c}}\right)\right)\right)$$

01.07.21.0540.01

$$\int e^{d\,z}\cos\left(c\,z^2+f\,z+g\right)dz = \frac{1}{4\,c}\left(i\,e^{-\frac{i(d-i\,f)^2}{4\,c}-i\,g}\sqrt{\pi}\left(\sqrt{-i\,c}\,\mathrm{erfi}\left(\frac{d-i(f+2\,c\,z)}{2\sqrt{-i\,c}}\right)-\sqrt{i\,c}\,e^{\frac{i\left(d^2-f^2+4\,c\,g\right)}{2\,c}}\,\mathrm{erfi}\left(\frac{d+i(f+2\,c\,z)}{2\sqrt{i\,c}}\right)\right)\right)$$

01.07.21.0541.01

$$\int a^{d z} \cos\left(\sqrt{z}\, c + f z + g\right) dz = \frac{1}{4} e^{-i g} \left(\frac{i c\, e^{\frac{c^2}{-4 i f + 4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 d \sqrt{z} \log(a) - i\left(c + 2 f \sqrt{z}\right)}{2\sqrt{-i f + d \log(a)}}\right)}{(-i f + d \log(a))^{3/2}} - i \left(2 e^{-i\left(\sqrt{z}\, c + f z\right)} \left(\frac{e^{2 i\left(\sqrt{z}\, c + g + f z\right)}}{f - i d \log(a)} - \frac{1}{f + d i \log(a)} \right) a^{d z} + \frac{c\, e^{\frac{c^2}{4 i f + 4 d \log(a)} + 2 i g} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i c + 2\sqrt{z}\, (i f + d \log(a))}{2\sqrt{i f + d \log(a)}}\right)}{(i f + d \log(a))^{3/2}} \right) \right)$$

01.07.21.0542.01

$$\int e^{d z} \cos\left(\sqrt{z}\, c + f z + g\right) dz = \frac{1}{4} e^{-i g} \left(2 e^{-i c \sqrt{z} + d z - i f z} \left(\frac{1}{d - i f} - \frac{i e^{2 i\left(\sqrt{z}\, c + g + f z\right)}}{f - i d} \right) + \frac{c\, e^{\frac{c^2}{4 d - 4 i f}} \sqrt{\pi}\, \operatorname{erf}\left(\frac{c + 2 (f + i d) \sqrt{z}}{2\sqrt{d - i f}}\right)}{(d - i f)^{3/2}} - \frac{i c\, e^{\frac{c^2}{4 d + 4 i f} + 2 i g} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2\sqrt{z}\, (d + i f) + i c}{2\sqrt{d + i f}}\right)}{(d + i f)^{3/2}} \right)$$

Involving $a^{d z + e} \cos(c z^r + f z + g)$

01.07.21.0543.01

$$\int a^{e + d z} \cos\left(c z^2 + f z + g\right) dz = \frac{1}{4 c^2} \left(a^e e^{\frac{i (i f + d \log(a))^2}{4 c} - i g} \sqrt{\pi} \left(\frac{c^2 e^{2 i g} \operatorname{erfi}\left(\frac{i (f + 2 c z) + d \log(a)}{2\sqrt{i c}}\right)}{\sqrt{i c}} - (-i c)^{3/2} e^{\frac{i\left(f^2 - d^2 \log^2(a)\right)}{2 c}} \operatorname{erfi}\left(\frac{d \log(a) - i (f + 2 c z)}{2\sqrt{-i c}}\right) \right) \right)$$

01.07.21.0544.01

$$\int e^{d z + e} \cos\left(c z^2 + f z + g\right) dz = \frac{1}{4 c} \left(i e^{-\frac{i (d - i f)^2}{4 c} + e - i g} \sqrt{\pi} \left(\sqrt{-i c}\, \operatorname{erfi}\left(\frac{d - i (f + 2 c z)}{2\sqrt{-i c}}\right) - \sqrt{i c}\, e^{\frac{i\left(d^2 - f^2 + 4 c g\right)}{2 c}} \operatorname{erfi}\left(\frac{d + i (f + 2 c z)}{2\sqrt{i c}}\right) \right) \right)$$

01.07.21.0545.01

$$\int a^{d z + e} \cos\left(\sqrt{z}\, c + f z + g\right) dz = \frac{1}{4} a^e e^{-i g} \left(\frac{i c\, e^{\frac{c^2}{-4 i f + 4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 d \sqrt{z} \log(a) - i\left(c + 2 f \sqrt{z}\right)}{2\sqrt{-i f + d \log(a)}}\right)}{(-i f + d \log(a))^{3/2}} - i \left(2 e^{-i\left(\sqrt{z}\, c + f z\right)} \left(\frac{e^{2 i\left(\sqrt{z}\, c + g + f z\right)}}{f - i d \log(a)} - \frac{1}{f + d i \log(a)} \right) a^{d z} + \frac{c\, e^{\frac{c^2}{4 i f + 4 d \log(a)} + 2 i g} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i c + 2\sqrt{z}\, (i f + d \log(a))}{2\sqrt{i f + d \log(a)}}\right)}{(i f + d \log(a))^{3/2}} \right) \right)$$

01.07.21.0546.01

$$\int e^{d z+e} \cos\left(\sqrt{z}\, c + f z + g\right) dz = \frac{1}{4} e^{e-i g} \left(2 e^{-i c \sqrt{z} + d z - i f z} \left(\frac{1}{d - i f} - \frac{i e^{2 i \left(\sqrt{z}\, c + g + f z\right)}}{f - i d}\right) + \frac{c e^{\frac{c^2}{4 d - 4 i f}} \sqrt{\pi} \operatorname{erf}\left(\frac{c + 2 (f + i d) \sqrt{z}}{2 \sqrt{d - i f}}\right)}{(d - i f)^{3/2}} - \frac{i c e^{\frac{c^2}{4 d + 4 i f} + 2 i g} \sqrt{\pi} \operatorname{erfi}\left(\frac{2 \sqrt{z}\, (d + i f) + i c}{2 \sqrt{d + i f}}\right)}{(d + i f)^{3/2}}\right)$$

Involving $a^{b z^r} \cos\left(c z^r + f z + g\right)$

01.07.21.0547.01

$$\int a^{b z^2} \cos\left(c z^2 + f z + g\right) dz = \frac{1}{4 \left(c^2 + b^2 \log^2(a)\right)} \left(e^{\frac{f^2}{4 i c + 4 b \log(a)} - i g} \sqrt{\pi} \left(e^{2 i g} \operatorname{erfi}\left(\frac{i (f + 2 c z) + 2 b z \log(a)}{2 \sqrt{i c + b \log(a)}}\right) \sqrt{i c + b \log(a)}\, (-i c + b \log(a)) + e^{\frac{i c f^2}{2 \left(c^2 + b^2 \log^2(a)\right)}} \operatorname{erfi}\left(\frac{2 b z \log(a) - i (f + 2 c z)}{2 \sqrt{-i c + b \log(a)}}\right) (i c + b \log(a)) \sqrt{-i c + b \log(a)}\right)\right)$$

01.07.21.0548.01

$$\int e^{b z^2} \cos\left(c z^2 + f z + g\right) dz = \frac{1}{4 \left(b^2 + c^2\right)} \left(e^{-i g} \sqrt{\pi} \left((c - i b) \sqrt{b - i c}\, e^{\frac{f^2}{4 b - 4 i c}} \operatorname{erf}\left(\frac{f + 2 (c + i b) z}{2 \sqrt{b - i c}}\right) + \sqrt{b + i c}\, (b - i c) e^{\frac{f^2}{4 b + 4 i c} + 2 i g} \operatorname{erfi}\left(\frac{i f + 2 (b + i c) z}{2 \sqrt{b + i c}}\right)\right)\right)$$

01.07.21.0549.01

$$\int a^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c + f z + g\right) dz = -\frac{1}{4} e^{-i g} \left(\frac{2 e^{-i \left(\sqrt{z}\, c + f z\right)} \left(-1 + e^{2 i \left(\sqrt{z}\, c + g + f z\right)}\right) i a^{b \sqrt{z}}}{f} + \frac{e^{\frac{i (c + b i \log(a))^2}{4 f}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b \log(a) - i \left(c + 2 f \sqrt{z}\right)}{2 \sqrt{-i f}}\right) (-i c + b \log(a))}{(-i f)^{3/2}} + \frac{e^{2 i g - \frac{i (c - i b \log(a))^2}{4 f}} \sqrt{\pi} \operatorname{erfi}\left(\frac{i \left(c + 2 f \sqrt{z}\right) + b \log(a)}{2 \sqrt{i f}}\right) (i c + b \log(a))}{(i f)^{3/2}}\right)$$

01.07.21.0550.01

$$\int e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c + f\, z + g\right) dz = \frac{1}{4} e^{-i g} \left(\frac{2\, i\, e^{(b - i\, c) \sqrt{z} - i\, f\, z}}{f} - \frac{2\, i\, e^{\sqrt{z}\, (b + i\, c) + 2\, i\, g + i\, f\, z}}{f} - \frac{(b - i\, c)\, e^{-\frac{i (b - i\, c)^2}{4 f}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b - i\left(c + 2\, f \sqrt{z}\right)}{2 \sqrt{-i\, f}}\right)}{(-i\, f)^{3/2}} - \frac{(b + i\, c)\, e^{\frac{1}{4} i\left(\frac{(b + i\, c)^2}{f} + 8\, g\right)} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b + i\left(c + 2\, f \sqrt{z}\right)}{2 \sqrt{i\, f}}\right)}{(i\, f)^{3/2}}\right)$$

Involving $a^{b z^r + e} \cos\left(c\, z^r + f\, z + g\right)$

01.07.21.0551.01

$$\int a^{b z^2 + e} \cos\left(c\, z^2 + f\, z + g\right) dz = \frac{1}{4\left(c^2 + b^2 \log^2(a)\right)} \left(a^e\, e^{\frac{f^2}{4 i c + 4 b \log(a)} - i g} \sqrt{\pi} \left(e^{2 i g}\, \mathrm{erfi}\left(\frac{i\, (f + 2\, c\, z) + 2\, b\, z \log(a)}{2 \sqrt{i\, c + b \log(a)}}\right) \sqrt{i\, c + b \log(a)}\, (-i\, c + b \log(a)) + e^{\frac{i c f^2}{2\left(c^2 + b^2 \log^2(a)\right)}}\, \mathrm{erfi}\left(\frac{2\, b\, z \log(a) - i\, (f + 2\, c\, z)}{2 \sqrt{-i\, c + b \log(a)}}\right) (i\, c + b \log(a)) \sqrt{-i\, c + b \log(a)}\right)\right)$$

01.07.21.0552.01

$$\int e^{b z^2 + e} \cos\left(c\, z^2 + f\, z + g\right) dz = \frac{1}{4\left(b^2 + c^2\right)} \left(e^{e - i g} \sqrt{\pi} \left((c - i\, b) \sqrt{b - i\, c}\; e^{\frac{f^2}{4 b - 4 i c}}\, \mathrm{erf}\left(\frac{f + 2\, (c + i\, b)\, z}{2 \sqrt{b - i\, c}}\right) + \sqrt{b + i\, c}\; (b - i\, c)\, e^{\frac{f^2}{4 b + 4 i c} + 2 i g}\, \mathrm{erfi}\left(\frac{i\, f + 2\, (b + i\, c)\, z}{2 \sqrt{b + i\, c}}\right)\right)\right)$$

01.07.21.0553.01

$$\int a^{\sqrt{z}\, b + e} \cos\left(\sqrt{z}\, c + f\, z + g\right) dz = -\frac{1}{4} a^e\, e^{-i g} \left(\frac{2\, e^{-i\left(\sqrt{z}\, c + f\, z\right)} \left(-1 + e^{2 i\left(\sqrt{z}\, c + g + f\, z\right)}\right) i\, a^{b \sqrt{z}}}{f} + \frac{e^{\frac{i (c + b\, i \log(a))^2}{4 f}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b \log(a) - i\left(c + 2\, f \sqrt{z}\right)}{2 \sqrt{-i\, f}}\right) (-i\, c + b \log(a))}{(-i\, f)^{3/2}} + \frac{e^{2 i g - \frac{i (c - i\, b \log(a))^2}{4 f}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{i\left(c + 2\, f \sqrt{z}\right) + b \log(a)}{2 \sqrt{i\, f}}\right) (i\, c + b \log(a))}{(i\, f)^{3/2}}\right)$$

01.07.21.0554.01

$$\int e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c + f z + g\right) dz = \frac{1}{4} e^{e-i g} \left(\frac{2 i e^{(b-i c)\sqrt{z} - i f z}}{f} - \frac{2 i e^{\sqrt{z}\,(b+i c)+2 i g + i f z}}{f} - \frac{(b-i c)\, e^{-\frac{i (b-i c)^2}{4 f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-i\left(c+2 f \sqrt{z}\right)}{2\sqrt{-i f}}\right)}{(-i f)^{3/2}} - \frac{(b+i c)\, e^{\frac{1}{4} i \left(\frac{(b+i c)^2}{f}+8 g\right)} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+i\left(c+2 f \sqrt{z}\right)}{2\sqrt{i f}}\right)}{(i f)^{3/2}} \right)$$

Involving $a^{b z^r + d z} \cos\left(c z^r + f z + g\right)$

01.07.21.0555.01

$$\int a^{b z^2+d z} \cos\left(c z^2 + f z + g\right) dz = -\frac{1}{4\left(c^2+b^2 \log^2(a)\right)} \left(i\, a^{\frac{d f}{2 i b \log(a) - 2 c}} e^{-\frac{b d^2 \log^3(a)}{2\left(c^2+b^2 \log^2(a)\right)}} \sqrt{\pi} \left(e^{\frac{1}{4}\left(\frac{f^2}{-i c + b \log(a)} + \frac{d^2 \log^2(a)}{i c + b\log(a)}\right)} \operatorname{erfi}\left(\frac{(d+2 b z)\log(a) - i (f + 2 c z)}{2\sqrt{-i c + b \log(a)}}\right) \sqrt{-i c + b \log(a)}\, (i c + b \log(a)) (i \cos(g) + \sin(g))\, a^{\frac{i b d f \log(a)}{c^2+b^2 \log^2(a)}} + e^{\frac{1}{4}\left(\frac{f^2}{i c + b \log(a)} + \frac{d^2 \log^2(a)}{-i c + b\log(a)}\right)} \operatorname{erfi}\left(\frac{i (f + 2 c z) + (d + 2 b z)\log(a)}{2\sqrt{i c + b \log(a)}}\right) \sqrt{i c + b \log(a)}\, (c + b\, i \log(a)) (\cos(g) + i \sin(g)) \right)\right)$$

01.07.21.0556.01

$$\int e^{b z^2+d z} \cos\left(c z^2 + f z + g\right) dz = \frac{1}{4\left(b^2+c^2\right)} \left(e^{-\frac{c i (d-i f)^2 + 2 b d (d+i f)}{4\left(b^2+c^2\right)}} \sqrt{\pi} \left(\sqrt{b+i c}\, (b-i c)\, e^{\frac{b\left(d^2+f^2\right)+2 c\left(d^2-f^2\right) i}{4\left(b^2+c^2\right)}} \operatorname{erfi}\left(\frac{d + i f + 2 (b + i c) z}{2\sqrt{b+i c}}\right) (\cos(g) + i \sin(g)) + (b + i c) \sqrt{b - i c}\, e^{\frac{b\left(d^2+4 i f d+f^2\right)}{4\left(b^2+c^2\right)}} \operatorname{erfi}\left(\frac{d - i (f + 2 (c + i b) z)}{2\sqrt{b-i c}}\right) (\cos(g) - i \sin(g)) \right)\right)$$

01.07.21.0557.01

$$\int a^{\sqrt{z}\, b+d z} \cos\left(\sqrt{z}\, c+f z+g\right) dz = -\frac{1}{4} e^{-i g} \left(2 e^{-i\left(\sqrt{z}\, c+f z\right)} i \left(\frac{e^{2 i\left(\sqrt{z}\, c+g+f z\right)}}{f-i d \log(a)}-\frac{1}{f+d i \log(a)}\right) a^{\sqrt{z}\, b+d z}+\frac{e^{\frac{(c+b i \log(a))^2}{-4 i f+4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{\left(b+2 d \sqrt{z}\right) \log(a)-i\left(c+2 f \sqrt{z}\right)}{2 \sqrt{-i f+d \log(a)}}\right)(-i c+b \log(a))}{(-i f+d \log(a))^{3/2}}+\frac{e^{\frac{(c-i b \log(a))^2}{4 i f+4 d \log(a)}+2 i g} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i c+b \log(a)+2 \sqrt{z}\,(i f+d \log(a))}{2 \sqrt{i f+d \log(a)}}\right)(i c+b \log(a))}{(i f+d \log(a))^{3/2}}\right)$$

01.07.21.0558.01

$$\int e^{\sqrt{z}\, b+d z} \cos\left(\sqrt{z}\, c+f z+g\right) dz = \frac{1}{4} e^{-i g}\left(-\frac{(b+i c)\, e^{2 i g-\frac{(b+i c)^2}{4(d+i f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+i c+2(d+i f) \sqrt{z}}{2 \sqrt{d+i f}}\right)}{(d+i f)^{3/2}}+\frac{2 e^{\sqrt{z}\,(b+i c)+2 i g+(d+i f) z}}{d+i f}+\frac{2 e^{\sqrt{z}\,(b-i c)+(d-i f) z}}{d-i f}-\frac{(b-i c)\, e^{-\frac{(b-i c)^2}{4(d-i f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-i c+2(d-i f) \sqrt{z}}{2 \sqrt{d-i f}}\right)}{(d-i f)^{3/2}}\right)$$

Involving $a^{b z^r+d z+e} \cos\left(c z^r+f z+g\right)$

01.07.21.0559.01

$$\int a^{b z^2+d z+e} \cos\left(c z^2+f z+g\right) dz = \frac{1}{4\left(c^2+b^2 \log^2(a)\right)}\left(a^e e^{-\frac{(i f+d \log(a))^2}{4(i c+b \log(a))}-i g} \sqrt{\pi}\left(e^{2 i g} \operatorname{erfi}\left(\frac{i(f+2 c z)+(d+2 b z) \log(a)}{2 \sqrt{i c+b \log(a)}}\right) \sqrt{i c+b \log(a)}\,(-i c+b \log(a))+e^{\frac{i\left(c f^2+d(2 b f-c d) \log^2(a)\right)}{2\left(c^2+b^2 \log^2(a)\right)}} \operatorname{erfi}\left(\frac{(d+2 b z) \log(a)-i(f+2 c z)}{2 \sqrt{-i c+b \log(a)}}\right)(i c+b \log(a)) \sqrt{-i c+b \log(a)}\right)\right)$$

01.07.21.0560.01

$$\int e^{b z^2+d z+e} \cos\left(c z^2+f z+g\right) dz = \frac{1}{4\left(b^2+c^2\right)} \left(\sqrt{\pi} \left(\sqrt{b+i c}\, (b-i c)\, e^{-\frac{(d+i f)^2-4 (b+i c) (e+i g)}{4 (b+i c)}} \operatorname{erfi}\left(\frac{d+i f+2 (b+i c) z}{2 \sqrt{b+i c}}\right)+(b+i c) \sqrt{b-i c}\, e^{-\frac{(d-i f)^2-4 (b-i c) (e-i g)}{4 (b-i c)}} \operatorname{erfi}\left(\frac{d-i f+2 b z-2 i c z}{2 \sqrt{b-i c}}\right)\right)\right)$$

01.07.21.0561.01

$$\int a^{\sqrt{z}\, b+d z+e} \cos\left(\sqrt{z}\, c+f z+g\right) dz = -\frac{1}{4} a^e e^{-i g} \left(2 i e^{-i\left(\sqrt{z}\, c+f z\right)} \left(\frac{e^{2 i\left(\sqrt{z}\, c+g+f z\right)}}{f-i d \log(a)}-\frac{1}{f+d i \log(a)}\right) a^{\sqrt{z}\, b+d z}+\frac{e^{\frac{(c+b i \log(a))^2}{-4 i f+4 d \log(a)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{\left(b+2 d \sqrt{z}\right) \log(a)-i\left(c+2 f \sqrt{z}\right)}{2 \sqrt{-i f+d \log(a)}}\right) (-i c+b \log(a))}{(-i f+d \log(a))^{3/2}}+\frac{e^{\frac{(c-i b \log(a))^2}{4 i f+4 d \log(a)}+2 i g} \sqrt{\pi} \operatorname{erfi}\left(\frac{i c+b \log(a)+2 \sqrt{z}\, (i f+d \log(a))}{2 \sqrt{i f+d \log(a)}}\right) (i c+b \log(a))}{(i f+d \log(a))^{3/2}}\right)$$

01.07.21.0562.01

$$\int e^{\sqrt{z}\, b+d z+e} \cos\left(\sqrt{z}\, c+f z+g\right) dz = \frac{1}{4} e^{e-i g} \left(-\frac{(b+i c)\, e^{2 i g-\frac{(b+i c)^2}{4 (d+i f)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+i c+2 (d+i f) \sqrt{z}}{2 \sqrt{d+i f}}\right)}{(d+i f)^{3/2}}+\frac{2 e^{\sqrt{z}\, (b+i c)+2 i g+(d+i f) z}}{d+i f}+\frac{2 e^{\sqrt{z}\, (b-i c)+(d-i f) z}}{d-i f}-\frac{(b-i c)\, e^{-\frac{(b-i c)^2}{4 (d-i f)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b-i c+2 (d-i f) \sqrt{z}}{2 \sqrt{d-i f}}\right)}{(d-i f)^{3/2}}\right)$$

Arguments involving polynomials or algebraic functions and factors involving exponential function and a power function

Involving exp and power

Involving $z^n e^{d z} \cos\left(c z^r+f z\right)$

01.07.21.0563.01

$$\int z^n e^{d z} \cos\left(c z^2 + f z\right) dz = -\frac{1}{4}\left(e^{\frac{i (f+i d)^2}{4 c}}\left(\sum_{q=0}^{n} 2^{q-n} (i f - d)^{n-q} (d - i f - 2 i c z)^{q+1}\left(-\frac{i (d - i f - 2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i (d - i f - 2 i c z)^2}{4 c}\right)\right)(-i c)^{-n-1} + (i c)^{-n-1} e^{-\frac{i (i d - f)^2}{4 c}} \sum_{q=0}^{n} 2^{q-n} (-d - i f)^{n-q} (d + i f + 2 i c z)^{q+1}\left(\frac{i (d + i f + 2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i (d + i f + 2 i c z)^2}{4 c}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0564.01

$$\int z^n e^{d z} \cos\left(\sqrt{z}\, c + f z\right) dz = 2^{-2 n-2}\left(e^{\frac{c^2}{4 (d+i f)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2 n}\left(2\sqrt{z}\,(d + i f) + i c\right)^{h+k}\left(-\frac{\left(2\sqrt{z}\,(d + i f) + i c\right)^2}{d + i f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\, i\left(2\sqrt{z}\,(d + i f) + i c\right)\Gamma\left(\frac{1}{2}(h + k + 1), -\frac{\left(2\sqrt{z}\,(d + i f) + i c\right)^2}{4 (d + i f)}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\,(d + i f) + i c\right)^2}{d + i f}}\,(d + i f)\,\Gamma\left(\frac{1}{2}(h + k + 2), -\frac{\left(2\sqrt{z}\,(d + i f) + i c\right)^2}{4 (d + i f)}\right)\right)\right)(d + i f)^{-2 (n+1)} + e^{\frac{c^2}{4 (d-i f)}} (d - i f)^{-2 (n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c)^{-h-k+2 n}\left(2 (d - i f)\sqrt{z} - i c\right)^{h+k}\left(-\frac{\left(2 (d - i f)\sqrt{z} - i c\right)^2}{d - i f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2 (d - i f)\sqrt{-\frac{\left(2 (d - i f)\sqrt{z} - i c\right)^2}{d - i f}}\;\Gamma\left(\frac{1}{2}(h + k + 2), -\frac{\left(2 (d - i f)\sqrt{z} - i c\right)^2}{4 (d - i f)}\right) - i c\left(2 (d - i f)\sqrt{z} - i c\right)\Gamma\left(\frac{1}{2}(h + k + 1), -\frac{\left(2 (d - i f)\sqrt{z} - i c\right)^2}{4 (d - i f)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{d z+e} \cos\left(c z^r + f z\right)$

01.07.21.0565.01

$$\int z^n e^{d z+e} \cos\left(c z^2 + f z\right) dz = -\frac{1}{4}\left(e^{\frac{i(f+i d)^2}{4c}+e}\left(\sum_{q=0}^{n} 2^{q-n} (i f - d)^{n-q} (d - i f - 2 i c z)^{q+1} \left(-\frac{i(d - i f - 2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d - i f - 2 i c z)^2}{4c}\right)\right) (-i c)^{-n-1} + (i c)^{-n-1} e^{-\frac{i(i d-f)^2}{4c}+e} \sum_{q=0}^{n} 2^{q-n} (-d - i f)^{n-q} (d + i f + 2 i c z)^{q+1} \left(\frac{i(d + i f + 2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d + i f + 2 i c z)^2}{4c}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0566.01

$$\int z^n e^{d z+e} \cos\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-2}\left(e^{\frac{c^2}{4(d+i f)}+e}\left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2n} \left(2\sqrt{z}\,(d + i f) + i c\right)^{h+k} \left(-\frac{\left(2\sqrt{z}\,(d + i f) + i c\right)^2}{d + i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(c\, i\left(2\sqrt{z}\,(d + i f) + i c\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2\sqrt{z}\,(d + i f) + i c\right)^2}{4(d + i f)}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\,(d + i f) + i c\right)^2}{d + i f}}\,(d + i f)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2\sqrt{z}\,(d + i f) + i c\right)^2}{4(d + i f)}\right)\right)\right)(d + i f)^{-2(n+1)} + e^{\frac{c^2}{4(d-i f)}+e} (d - i f)^{-2(n+1)} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c)^{-h-k+2n} \left(2(d - i f)\sqrt{z} - i c\right)^{h+k} \left(-\frac{\left(2(d - i f)\sqrt{z} - i c\right)^2}{d - i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(2(d - i f)\sqrt{-\frac{\left(2(d - i f)\sqrt{z} - i c\right)^2}{d - i f}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2(d - i f)\sqrt{z} - i c\right)^2}{4(d - i f)}\right) - i c\left(2(d - i f)\sqrt{z} - i c\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2(d - i f)\sqrt{z} - i c\right)^2}{4(d - i f)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r} \cos\left(c z^r + f z\right)$

01.07.21.0567.01

$$\int z^n e^{b z^2} \cos\left(c z^2 + f z\right) dz = -\frac{1}{4}\left(e^{\frac{f^2}{4(b+i c)}}\left(\sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i f + 2(b+i c) z)^{q+1} \left(-\frac{(i f + 2(b+i c) z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i f + 2(b+i c) z)^2}{4(b+i c)}\right)\right) (b+i c)^{-n-1} + (b-i c)^{-n-1} e^{\frac{f^2}{4(b-i c)}} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i f + 2 b z - 2 i c z)^{q+1} \left(-\frac{(-i f + 2 b z - 2 i c z)^2}{b-i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i f + 2 b z - 2 i c z)^2}{4(b-i c)}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0568.01

$$\int z^n e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-2}\left(e^{-\frac{i(b-i c)^2}{4 f}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b-i c)^{-h-k+2n} \left(b - i c - 2 i f \sqrt{z}\right)^{h+k} \left(-\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left((b-i c)\left(b - i c - 2 i f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{-\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{4 f}\right)\right)\right)(-i f)^{-2(n+1)} + e^{\frac{i(b+i c)^2}{4 f}} (i f)^{-2(n+1)} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b+i c)^{-h-k+2n} \left(b + i c + 2 i f \sqrt{z}\right)^{h+k} \left(\frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left((b+i c)\left(b + i c + 2 i f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{4 f}\right) + 2\sqrt{\frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + e} \cos\left(c z^r + f z\right)$

01.07.21.0569.01

$$\int z^n e^{b z^2+e} \cos(c z^2 + f z) \, dz = -\frac{1}{4}\left(e^{\frac{f^2}{4(b+i c)}+e}\left(\sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i f + 2(b+i c) z)^{q+1} \left(-\frac{(i f + 2(b+i c) z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i f + 2(b+i c) z)^2}{4(b+i c)}\right)\right) (b+i c)^{-n-1} + (b - i c)^{-n-1} e^{\frac{f^2}{4(b-i c)}+e} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i f + 2 b z - 2 i c z)^{q+1} \left(-\frac{(-i f + 2 b z - 2 i c z)^2}{b - i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i f + 2 b z - 2 i c z)^2}{4(b - i c)}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0570.01

$$\int z^n e^{\sqrt{z}\, b+e} \cos(\sqrt{z}\, c + f z) \, dz = 2^{-2n-2}\left(e^{-\frac{i(b-i c)^2}{4 f}+e}\left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b - i c)^{-h-k+2n} \left(b - i c - 2 i f \sqrt{z}\right)^{h+k} \left(-\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left((b - i c)\left(b - i c - 2 i f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{-\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{4 f}\right)\right)\right)(-i f)^{-2(n+1)} + e^{\frac{i(b+i c)^2}{4 f}+e} (i f)^{-2(n+1)} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b + i c)^{-h-k+2n} \left(b + i c + 2 i f \sqrt{z}\right)^{h+k} \left(\frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left((b + i c)\left(b + i c + 2 i f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{4 f}\right) + 2\sqrt{\frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{f}}\, f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z} \cos(c z^r + f z)$

01.07.21.0571.01

$$\int z^n e^{b z^2+d z} \cos(c z^2 + f z)\, dz = -\frac{1}{4}\Bigg((b+i c)^{-n-1} e^{\frac{(i d-f)^2}{4(b+i c)}} \sum_{q=0}^{n} 2^{q-n} (-d-i f)^{n-q} (d+i f+2(b+i c) z)^{q+1} \left(-\frac{(d+i f+2(b+i c) z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+i f+2(b+i c) z)^2}{4(b+i c)}\right) + (b-i c)^{-n-1} e^{\frac{(f+i d)^2}{4(b-i c)}} \sum_{q=0}^{n} 2^{q-n} (i f-d)^{n-q} (d-i f+2 b z-2 i c z)^{q+1} \left(-\frac{(d-i f+2 b z-2 i c z)^2}{b-i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-i f+2 b z-2 i c z)^2}{4(b-i c)}\right)\Bigg) /; n \in \mathbb{N}$$

01.07.21.0572.01

$$\int z^n e^{\sqrt{z}\, b+d z} \cos(\sqrt{z}\, c+f z)\, dz = 2^{-2n-2}\Bigg(e^{-\frac{(b+i c)^2}{4(d+i f)}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (b+i c)^{-h-k+2n} \left(b+i c+2(d+i f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg((b+i c)\left(b+i c+2(d+i f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right) + 2\sqrt{-\frac{\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}}\,(d+i f)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)\Bigg)\Bigg)(d+i f)^{-2(n+1)} + e^{-\frac{(b-i c)^2}{4(d-i f)}} (d-i f)^{-2(n+1)} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (b-i c)^{-h-k+2n} \left(b-i c+2(d-i f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-i c+2(d-i f)\sqrt{z}\right)^2}{d-i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \Bigg((b-i c)\left(b-i c+2(d-i f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-i c+2(d-i f)\sqrt{z}\right)^2}{4(d-i f)}\right) + 2\sqrt{-\frac{\left(b-i c+2(d-i f)\sqrt{z}\right)^2}{d-i f}}\,(d-i f)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-i c+2(d-i f)\sqrt{z}\right)^2}{4(d-i f)}\right)\Bigg)\Bigg) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \cos(c z^r + f z)$

01.07.21.0573.01

$$\int z^n e^{b z^2 + d z + e} \cos(c z^2 + f z)\, dz = -\frac{1}{4}\Bigg((b + i c)^{-n-1} e^{\frac{(i d - f)^2}{4 (b + i c)} + e} \sum_{q=0}^{n} 2^{q-n} (-d - i f)^{n-q} (d + i f + 2 (b + i c) z)^{q+1} \left(-\frac{(d + i f + 2 (b + i c) z)^2}{b + i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + i f + 2 (b + i c) z)^2}{4 (b + i c)}\right) + (b - i c)^{-n-1} e^{\frac{(f + i d)^2}{4 (b - i c)} + e} \sum_{q=0}^{n} 2^{q-n} (i f - d)^{n-q} (d - i f + 2 b z - 2 i c z)^{q+1} \left(-\frac{(d - i f + 2 b z - 2 i c z)^2}{b - i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d - i f + 2 b z - 2 i c z)^2}{4 (b - i c)}\right)\Bigg) /; n \in \mathbb{N}$$

01.07.21.0574.01

$$\int z^n e^{\sqrt{z}\, b+e+d\, z} \cos\left(\sqrt{z}\, c+f\, z\right) dz = =$$

$$2^{-2n-2}\left(e^{e-\frac{(b+i\, c)^2}{4(d+i\, f)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (b+i\, c)^{-h-k+2n}\left(b+i\, c+2\,(d+i\, f)\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+i\, c+2\,(d+i\, f)\sqrt{z}\right)^2}{d+i\, f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left((b+i\, c)\left(b+i\, c+2\,(d+i\, f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{\left(b+i\, c+2\,(d+i\, f)\sqrt{z}\right)^2}{4\,(d+i\, f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(b+i\, c+2\,(d+i\, f)\sqrt{z}\right)^2}{d+i\, f}}\,(d+i\, f)\,\Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{\left(b+i\, c+2\,(d+i\, f)\sqrt{z}\right)^2}{4\,(d+i\, f)}\right)\right)\right)$$

$$(d+i\, f)^{-2(n+1)}+e^{e-\frac{(b-i\, c)^2}{4(d-i\, f)}}\,(d-i\, f)^{-2(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\,(b-i\, c)^{-h-k+2n}\left(b-i\, c+2\,(d-i\, f)\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b-i\, c+2\,(d-i\, f)\sqrt{z}\right)^2}{d-i\, f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((b-i\, c)\left(b-i\, c+2\,(d-i\, f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{\left(b-i\, c+2\,(d-i\, f)\sqrt{z}\right)^2}{4\,(d-i\, f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(b-i\, c+2\,(d-i\, f)\sqrt{z}\right)^2}{d-i\, f}}\,(d-i\, f)\,\Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{\left(b-i\, c+2\,(d-i\, f)\sqrt{z}\right)^2}{4\,(d-i\, f)}\right)\right)\right)\;/;\; n\in\mathbb{N}$$

Involving $z^n\, e^{d\, z} \cos\left(c\, z^r+f\, z+g\right)$

01.07.21.0575.01

$$\int z^n e^{d z} \cos(c z^2 + f z + g)\, dz = -\frac{1}{4}$$

$$\left(e^{\frac{i(f+i d)^2}{4c} - i g} \left(\sum_{q=0}^{n} 2^{q-n} (i f - d)^{n-q} (d - i f - 2 i c z)^{q+1} \left(-\frac{i(d - i f - 2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d - i f - 2 i c z)^2}{4c}\right)\right)\right.$$

$$(-i c)^{-n-1} + (i c)^{-n-1} e^{-\frac{i(i d - f)^2}{4c} + i g}$$

$$\left.\sum_{q=0}^{n} 2^{q-n} (-d - i f)^{n-q} (d + i f + 2 i c z)^{q+1} \left(\frac{i(d + i f + 2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d + i f + 2 i c z)^2}{4c}\right)\right) /;\, n \in \mathbb{N}$$

01.07.21.0576.01

$$\int z^n e^{d z} \cos(\sqrt{z}\, c + f z + g)\, dz =$$

$$2^{-2n-2} \left(e^{\frac{c^2}{4(d+i f)} + i g} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2n} \left(2\sqrt{z}\, (d + i f) + i c\right)^{h+k} \left(-\frac{\left(2\sqrt{z}\, (d + i f) + i c\right)^2}{d + i f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h} \binom{n}{k} \left(c\, i \left(2\sqrt{z}\, (d + i f) + i c\right) \Gamma\left(\frac{1}{2}(h + k + 1), -\frac{\left(2\sqrt{z}\, (d + i f) + i c\right)^2}{4(d + i f)}\right) +\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\, (d + i f) + i c\right)^2}{d + i f}}\, (d + i f)\, \Gamma\left(\frac{1}{2}(h + k + 2), -\frac{\left(2\sqrt{z}\, (d + i f) + i c\right)^2}{4(d + i f)}\right)\right)\right) (d + i f)^{-2(n+1)} +$$

$$e^{\frac{c^2}{4(d-i f)} - i g} (d - i f)^{-2(n+1)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c)^{-h-k+2n} \left(2(d - i f)\sqrt{z} - i c\right)^{h+k} \left(-\frac{\left(2(d - i f)\sqrt{z} - i c\right)^2}{d - i f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(2(d - i f)\sqrt{-\frac{\left(2(d - i f)\sqrt{z} - i c\right)^2}{d - i f}}\, \Gamma\left(\frac{1}{2}(h + k + 2), -\frac{\left(2(d - i f)\sqrt{z} - i c\right)^2}{4(d - i f)}\right) -\right.$$

$$\left.\left.i c \left(2(d - i f)\sqrt{z} - i c\right) \Gamma\left(\frac{1}{2}(h + k + 1), -\frac{\left(2(d - i f)\sqrt{z} - i c\right)^2}{4(d - i f)}\right)\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^n e^{d z + e} \cos(c z^r + f z + g)$

01.07.21.0577.01

$$\int z^n e^{d z+e} \cos\left(c z^2 + f z + g\right) dz = -\frac{1}{4} \left(e^{\frac{i(f+i d)^2}{4c}+e-i g} \left(\sum_{q=0}^{n} 2^{q-n} (i f - d)^{n-q} (d - i f - 2 i c z)^{q+1} \left(-\frac{i (d - i f - 2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d - i f - 2 i c z)^2}{4c}\right)\right) (-i c)^{-n-1} + (i c)^{-n-1} e^{-\frac{i(i d-f)^2}{4c}+e+i g} \sum_{q=0}^{n} 2^{q-n} (-d - i f)^{n-q} (d + i f + 2 i c z)^{q+1} \left(\frac{i (d + i f + 2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + i f + 2 i c z)^2}{4c}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0578.01

$$\int z^n e^{d z+e} \cos\left(\sqrt{z}\, c + f z + g\right) dz = 2^{-2n-2} \left(e^{\frac{c^2}{4(d+i f)}+e+i g} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2n} \left(2 \sqrt{z} (d + i f) + i c\right)^{h+k} \left(-\frac{\left(2 \sqrt{z} (d + i f) + i c\right)^2}{d + i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\, i \left(2 \sqrt{z} (d + i f) + i c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2 \sqrt{z} (d + i f) + i c\right)^2}{4 (d + i f)}\right) + 2 \sqrt{-\frac{\left(2 \sqrt{z} (d + i f) + i c\right)^2}{d + i f}} (d + i f) \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2 \sqrt{z} (d + i f) + i c\right)^2}{4 (d + i f)}\right)\right)\right) (d + i f)^{-2(n+1)} + e^{\frac{c^2}{4(d-i f)}+e-i g} (d - i f)^{-2(n+1)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c)^{-h-k+2n} \left(2 (d - i f) \sqrt{z} - i c\right)^{h+k} \left(-\frac{\left(2 (d - i f) \sqrt{z} - i c\right)^2}{d - i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2 (d - i f) \sqrt{-\frac{\left(2 (d - i f) \sqrt{z} - i c\right)^2}{d - i f}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2 (d - i f) \sqrt{z} - i c\right)^2}{4 (d - i f)}\right) - i c \left(2 (d - i f) \sqrt{z} - i c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2 (d - i f) \sqrt{z} - i c\right)^2}{4 (d - i f)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r} \cos\left(c z^r + f z + g\right)$

01.07.21.0579.01

$$\int z^n e^{b z^2} \cos(c z^2 + f z + g)\, dz = -\frac{1}{4}$$
$$\left(e^{\frac{f^2}{4(b+i c)}+i g} \left(\sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i f + 2(b + i c) z)^{q+1} \left(-\frac{(i f + 2(b+ic)z)^2}{b + i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i f + 2(b + i c) z)^2}{4(b + i c)}\right)\right)\right.$$
$$(b + i c)^{-n-1} + (b - i c)^{-n-1} e^{\frac{f^2}{4(b-ic)}-i g} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i f + 2 b z - 2 i c z)^{q+1}$$
$$\left.\left(-\frac{(-i f + 2 b z - 2 i c z)^2}{b - i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i f + 2 b z - 2 i c z)^2}{4(b - i c)}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0580.01

$$\int z^n e^{\sqrt{z}\, b} \cos\left(\sqrt{z}\, c + f z + g\right) dz =$$
$$2^{-2n-2} \left(e^{-\frac{i(b-ic)^2}{4f}-i g} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b - i c)^{-h-k+2n} \left(b - i c - 2 i f \sqrt{z}\right)^{h+k} \left(-\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$
$$\binom{k}{h} \binom{n}{k} \left((b - i c)\left(b - i c - 2 i f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1), -\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{4 f}\right) -\right.$$
$$\left.\left.2 i f \sqrt{-\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{f}}\ \Gamma\left(\frac{1}{2}(h + k + 2), -\frac{i\left(b - i c - 2 i f \sqrt{z}\right)^2}{4 f}\right)\right)\right) (-i f)^{-2(n+1)} +$$
$$e^{\frac{i(b+ic)^2}{4f}+i g} (i f)^{-2(n+1)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b + i c)^{-h-k+2n} \left(b + i c + 2 i f \sqrt{z}\right)^{h+k} \left(\frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$
$$\binom{k}{h} \binom{n}{k} \left((b + i c)\left(b + i c + 2 i f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1), \frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{4 f}\right) +\right.$$
$$\left.\left.2\sqrt{\frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{f}}\ f\, i\, \Gamma\left(\frac{1}{2}(h + k + 2), \frac{i\left(b + i c + 2 i f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + e} \cos(c z^r + f z + g)$

01.07.21.0581.01

$$\int z^n e^{b z^2+e} \cos\left(c z^2 + f z + g\right) dz = -\frac{1}{4}\left(e^{\frac{f^2}{4(b+i c)}+e+i g}\left(\sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i f + 2(b+i c) z)^{q+1} \left(-\frac{(i f + 2(b+i c) z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i f + 2(b+i c) z)^2}{4(b+i c)}\right)\right)(b+i c)^{-n-1} + (b-i c)^{-n-1} e^{\frac{f^2}{4(b-i c)}+e-i g} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i f + 2 b z - 2 i c z)^{q+1} \left(-\frac{(-i f + 2 b z - 2 i c z)^2}{b-i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i f + 2 b z - 2 i c z)^2}{4(b-i c)}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0582.01

$$\int z^n e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, c + f z + g\right) dz = 2^{-2n-2}\left(e^{-\frac{i(b-i c)^2}{4 f}+e-i g}\left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b-i c)^{-h-k+2n} \left(b - i c - 2 i f \sqrt{z}\right)^{h+k} \left(-\frac{i\left(b-i c-2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left((b-i c)\left(b-i c-2 i f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b-i c-2 i f \sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{-\frac{i\left(b-i c-2 i f \sqrt{z}\right)^2}{f}}\ \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b-i c-2 i f \sqrt{z}\right)^2}{4 f}\right)\right)\right)(-i f)^{-2(n+1)} + e^{\frac{i(b+i c)^2}{4 f}+e+i g} (i f)^{-2(n+1)} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b+i c)^{-h-k+2n} \left(b + i c + 2 i f \sqrt{z}\right)^{h+k} \left(\frac{i\left(b+i c+2 i f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left((b+i c)\left(b+i c+2 i f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+i c+2 i f \sqrt{z}\right)^2}{4 f}\right) + 2\sqrt{\frac{i\left(b+i c+2 i f \sqrt{z}\right)^2}{f}}\ f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+i c+2 i f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z} \cos\left(c z^r + f z + g\right)$

01.07.21.0583.01

$$\int z^n e^{b z^2+d z} \cos\left(c z^2 + f z + g\right) dz = -\frac{1}{4}\left((b+i c)^{-n-1} e^{\frac{(i d-f)^2}{4(b+i c)}+i g} \sum_{q=0}^{n} 2^{q-n} (-d-i f)^{n-q} (d+i f+2(b+i c) z)^{q+1} \left(-\frac{(d+i f+2(b+i c) z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+i f+2(b+i c) z)^2}{4(b+i c)}\right) + (b-i c)^{-n-1} e^{\frac{(f+i d)^2}{4(b-i c)}-i g} \sum_{q=0}^{n} 2^{q-n} (i f-d)^{n-q} (d-i f+2 b z-2 i c z)^{q+1} \left(-\frac{(d-i f+2 b z-2 i c z)^2}{b-i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-i f+2 b z-2 i c z)^2}{4(b-i c)}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0584.01

$$\int z^n e^{\sqrt{z}\, b+d z} \cos\left(\sqrt{z}\, c + f z + g\right) dz = 2^{-2n-2}\left(e^{-\frac{(b+i c)^2}{4(d+i f)}+i g} \left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b+i c)^{-h-k+2n} \left(b+i c+2(d+i f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b+i c)\left(b+i c+2(d+i f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right) + 2\sqrt{-\frac{\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}}\,(d+i f)\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)\right)\right) (d+i f)^{-2(n+1)} + e^{-\frac{(b-i c)^2}{4(d-i f)}-i g} (d-i f)^{-2(n+1)} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b-i c)^{-h-k+2n} \left(b-i c+2(d-i f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-i c+2(d-i f)\sqrt{z}\right)^2}{d-i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b-i c)\left(b-i c+2(d-i f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-i c+2(d-i f)\sqrt{z}\right)^2}{4(d-i f)}\right) + 2\sqrt{-\frac{\left(b-i c+2(d-i f)\sqrt{z}\right)^2}{d-i f}}\,(d-i f)\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-i c+2(d-i f)\sqrt{z}\right)^2}{4(d-i f)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \cos(c z^r + f z + g)$

01.07.21.0585.01

$$\int z^n e^{b z^2 + d z + e} \cos(c z^2 + f z + g)\, dz = -\frac{1}{4}\left((b + i c)^{-n-1} e^{\frac{(i d - f)^2}{4(b + i c)} + e + i g} \sum_{q=0}^{n} 2^{q-n} (-d - i f)^{n-q} (d + i f + 2(b + i c) z)^{q+1} \left(-\frac{(d + i f + 2(b + i c) z)^2}{b + i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + i f + 2(b + i c) z)^2}{4(b + i c)}\right) + (b - i c)^{-n-1} e^{\frac{(f + i d)^2}{4(b - i c)} + e - i g} \sum_{q=0}^{n} 2^{q-n} (i f - d)^{n-q} (d - i f + 2 b z - 2 i c z)^{q+1} \left(-\frac{(d - i f + 2 b z - 2 i c z)^2}{b - i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d - i f + 2 b z - 2 i c z)^2}{4(b - i c)}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0586.01

$$\int z^n e^{\sqrt{z}\,b+d\,z+e}\cos\left(\sqrt{z}\,c+f\,z+g\right)dz = 2^{-2n-2}\Bigg(e^{-\frac{(b+i\,c)^2}{4(d+i\,f)}+e+i\,g}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b+i\,c)^{-h-k+2n}\left(b+i\,c+2\,(d+i\,f)\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+i\,c+2\,(d+i\,f)\sqrt{z}\right)^2}{d+i\,f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((b+i\,c)\left(b+i\,c+2\,(d+i\,f)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\,-\frac{\left(b+i\,c+2\,(d+i\,f)\sqrt{z}\right)^2}{4\,(d+i\,f)}\right)+$$

$$2\sqrt{-\frac{\left(b+i\,c+2\,(d+i\,f)\sqrt{z}\right)^2}{d+i\,f}}\,(d+i\,f)\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{\left(b+i\,c+2\,(d+i\,f)\sqrt{z}\right)^2}{4\,(d+i\,f)}\right)\Bigg)\Bigg)$$

$$(d+i\,f)^{-2(n+1)}+e^{-\frac{(b-i\,c)^2}{4(d-i\,f)}+e-i\,g}\,(d-i\,f)^{-2(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b-i\,c)^{-h-k+2n}$$

$$\left(b-i\,c+2\,(d-i\,f)\sqrt{z}\right)^{h+k}\left(-\frac{\left(b-i\,c+2\,(d-i\,f)\sqrt{z}\right)^2}{d-i\,f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((b-i\,c)\left(b-i\,c+2\,(d-i\,f)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\,-\frac{\left(b-i\,c+2\,(d-i\,f)\sqrt{z}\right)^2}{4\,(d-i\,f)}\right)+$$

$$2\sqrt{-\frac{\left(b-i\,c+2\,(d-i\,f)\sqrt{z}\right)^2}{d-i\,f}}\,(d-i\,f)\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{\left(b-i\,c+2\,(d-i\,f)\sqrt{z}\right)^2}{4\,(d-i\,f)}\right)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}$$

Involving trigonometric functions

Involving sin

Involving sin(*c z*) cos(*a z*)

01.07.21.0587.01

$$\int \sin(c\,z)\cos(a\,z)\,dz = \frac{(c-a)\cos((a+c)\,z)+(a+c)\cos(a\,z-c\,z)}{2\,(a-c)\,(a+c)}$$

01.07.21.0588.01

$$\int \sin(c\,z)\cos(c\,z)\,dz = -\frac{\cos^2(c\,z)}{2\,c}$$

Involving $\sin(c\,z+d)\cos(a\,z)$

01.07.21.0589.01

$$\int \sin(d+c\,z)\cos(a\,z)\,dz = \frac{(c-a)\cos(d+(a+c)\,z)+(a+c)\cos(-d+a\,z-c\,z)}{2\,(a-c)\,(a+c)}$$

Involving $\sin(c\,z)\cos(a\,z+b)$

01.07.21.0590.01

$$\int \sin(c\,z)\cos(b+a\,z)\,dz = \frac{(c-a)\cos(b+(a+c)\,z)+(a+c)\cos(b+a\,z-c\,z)}{2\,(a-c)\,(a+c)}$$

Involving $\sin(c\,z+d)\cos(a\,z+b)$

01.07.21.0591.01

$$\int \sin(d+c\,z)\cos(b+a\,z)\,dz = \frac{(c-a)\cos(b+d+(a+c)\,z)+(a+c)\cos(b-d+a\,z-c\,z)}{2\,(a-c)\,(a+c)}$$

Involving $\sin(b\,z^r)\cos(c\,z)$

01.07.21.0592.01

$$\int \sin(b\,z^2)\cos(c\,z)\,dz = -\frac{1}{2\sqrt{-b}} \left(\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4\,b}\right)S\left(\frac{c-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)+\cos\left(\frac{c^2}{4\,b}\right)S\left(\frac{b\,(c+2\,b\,z)}{(-b)^{3/2}\,\sqrt{2\,\pi}}\right)+\left(C\left(\frac{c-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)+C\left(\frac{b\,(c+2\,b\,z)}{(-b)^{3/2}\,\sqrt{2\,\pi}}\right)\right)\sin\left(\frac{c^2}{4\,b}\right)\right)\right)$$

01.07.21.0593.01

$$\int \sin\left(\sqrt{z}\,b\right)\cos(c\,z)\,dz =$$

$$\frac{1}{4}\left(\frac{1}{c^{3/2}}\left(2\sqrt{c}\,\cos\left(b\sqrt{z}-c\,z\right)-b\sqrt{2\,\pi}\,\cos\left(\frac{b^2}{4\,c}\right)S\left(\frac{2\,c\sqrt{z}-b}{\sqrt{c}\,\sqrt{2\,\pi}}\right)+b\sqrt{2\,\pi}\,C\left(\frac{2\,c\sqrt{z}-b}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{b^2}{4\,c}\right)\right)-\right.$$

$$\left.\frac{1}{(-c)^{3/2}}\left(-2\sqrt{-c}\,\cos\left(\sqrt{z}\,b+c\,z\right)+b\sqrt{2\,\pi}\,\cos\left(\frac{b^2}{4\,c}\right)S\left(\frac{c\left(b+2\,c\sqrt{z}\right)}{(-c)^{3/2}\sqrt{2\,\pi}}\right)+b\sqrt{2\,\pi}\,C\left(\frac{c\left(b+2\,c\sqrt{z}\right)}{(-c)^{3/2}\sqrt{2\,\pi}}\right)\sin\left(\frac{b^2}{4\,c}\right)\right)\right)$$

Involving $\sin(b\,z^r+e)\cos(c\,z)$

01.07.21.0594.01

$$\int \sin(b\,z^2+e)\cos(c\,z)\,dz = -\frac{1}{2\sqrt{-b}}\left(\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4\,b}-e\right)S\left(\frac{c-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)+\right.\right.$$

$$\left.\left.\cos\left(\frac{c^2}{4\,b}-e\right)S\left(\frac{b\,(c+2\,b\,z)}{(-b)^{3/2}\,\sqrt{2\,\pi}}\right)+\left(C\left(\frac{c-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)+C\left(\frac{b\,(c+2\,b\,z)}{(-b)^{3/2}\,\sqrt{2\,\pi}}\right)\right)\sin\left(\frac{c^2}{4\,b}-e\right)\right)\right)$$

01.07.21.0595.01

$$\int \sin\left(\sqrt{z}\, b + e\right) \cos(c\, z)\, dz = \frac{1}{4}\left(\frac{1}{c^{3/2}}\left(2\sqrt{c}\, \cos\left(\sqrt{z}\, b + e - c\, z\right) - b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, c} + e\right) S\left(\frac{2\, c\sqrt{z} - b}{\sqrt{c}\, \sqrt{2\pi}}\right) + b\sqrt{2\pi}\, C\left(\frac{2\, c\sqrt{z} - b}{\sqrt{c}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, c} + e\right)\right) - \frac{1}{(-c)^{3/2}} \left(-2\sqrt{-c}\, \cos\left(\sqrt{z}\, b + e + c\, z\right) + b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, c} - e\right) S\left(\frac{c\left(b + 2\, c\sqrt{z}\right)}{(-c)^{3/2}\sqrt{2\pi}}\right) + b\sqrt{2\pi}\, C\left(\frac{c\left(b + 2\, c\sqrt{z}\right)}{(-c)^{3/2}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, c} - e\right)\right)\right)$$

Involving $\sin\left(b\, z^r + d\, z\right) \cos(c\, z)$

01.07.21.0596.01

$$\int \sin\left(b\, z^2 + d\, z\right) \cos(c\, z)\, dz = -\frac{1}{2\sqrt{-b}} \left(\sqrt{\frac{\pi}{2}} \left(\cos\left(\frac{(c-d)^2}{4\, b}\right) S\left(\frac{c - d - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) + \cos\left(\frac{c^2 + 2\, d\, c + d^2}{4\, b}\right) S\left(\frac{b\,(c + d + 2\, b\, z)}{(-b)^{3/2}\sqrt{2\pi}}\right) + C\left(\frac{c - d - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(\frac{(c-d)^2}{4\, b}\right) + C\left(\frac{b\,(c + d + 2\, b\, z)}{(-b)^{3/2}\sqrt{2\pi}}\right) \sin\left(\frac{c^2 + 2\, d\, c + d^2}{4\, b}\right)\right)\right)$$

01.07.21.0597.01

$$\int \sin\left(\sqrt{z}\, b + d\, z\right) \cos(c\, z)\, dz = \frac{1}{4}\left(\frac{1}{(c-d)^{3/2}}\left(2\sqrt{c-d}\, \cos\left(\sqrt{z}\, b - c\, z + d\, z\right) - b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, c - 4\, d}\right) S\left(\frac{2\,(c-d)\sqrt{z} - b}{\sqrt{c-d}\, \sqrt{2\pi}}\right) + b\sqrt{2\pi}\, C\left(\frac{2\,(c-d)\sqrt{z} - b}{\sqrt{c-d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, c - 4\, d}\right)\right) - \frac{1}{(-c-d)^{3/2}} \left(-2\sqrt{-c-d}\, \cos\left(\sqrt{z}\, b + (c+d)\, z\right) + b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\,(c+d)}\right) S\left(\frac{-b - 2\,(c+d)\sqrt{z}}{\sqrt{-c-d}\, \sqrt{2\pi}}\right) + b\sqrt{2\pi}\, C\left(\frac{-b - 2\,(c+d)\sqrt{z}}{\sqrt{-c-d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\,(c+d)}\right)\right)\right)$$

Involving $\sin\left(b\, z^r + d\, z + e\right) \cos(c\, z)$

01.07.21.0598.01

$$\int \sin\left(b\, z^2 + d\, z + e\right) \cos(c\, z)\, dz = -\frac{1}{2\sqrt{-b}} \left(\sqrt{\frac{\pi}{2}} \left(\cos\left(\frac{(c-d)^2}{4\, b} - e\right) S\left(\frac{c - d - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) + \cos\left(\frac{c^2 + 2\, d\, c + d^2 - 4\, b\, e}{4\, b}\right) S\left(\frac{b\,(c + d + 2\, b\, z)}{(-b)^{3/2}\sqrt{2\pi}}\right) + C\left(\frac{b\,(c + d + 2\, b\, z)}{(-b)^{3/2}\sqrt{2\pi}}\right) \sin\left(\frac{c^2 + 2\, d\, c + d^2 - 4\, b\, e}{4\, b}\right) + C\left(\frac{c - d - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(\frac{(c-d)^2}{4\, b} - e\right)\right)\right)$$

01.07.21.0599.01

$$\int \sin\left(\sqrt{z}\, b + d\, z + e\right) \cos(c\, z)\, dz = $$
$$\frac{1}{4}\left(\frac{1}{(c-d)^{3/2}}\left(2\sqrt{c-d}\, \cos\left(\sqrt{z}\, b + e - c\, z + d\, z\right) - b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4c-4d} + e\right) S\left(\frac{2(c-d)\sqrt{z} - b}{\sqrt{c-d}\,\sqrt{2\pi}}\right) + b\sqrt{2\pi}\, C\left(\frac{2(c-d)\sqrt{z} - b}{\sqrt{c-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{b^2}{4c-4d} + e\right)\right) - \frac{1}{(-c-d)^{3/2}}\left(-2\sqrt{-c-d}\, \cos\left(\sqrt{z}\, b + e + (c+d)z\right) + b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4(c+d)} - e\right) S\left(\frac{-b-2(c+d)\sqrt{z}}{\sqrt{-c-d}\,\sqrt{2\pi}}\right) + b\sqrt{2\pi}\, C\left(\frac{-b-2(c+d)\sqrt{z}}{\sqrt{-c-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{b^2}{4(c+d)} - e\right)\right)\right)$$

Involving $\sin(b\, z^r)\cos(f\, z + g)$

01.07.21.0600.01

$$\int \sin(b\, z^2)\cos(g + f\, z)\, dz = $$
$$\frac{1}{2\sqrt{-b}}\left(\sqrt{\frac{\pi}{2}}\left(-\cos\left(\frac{f^2}{4b} + g\right) S\left(\frac{f - 2b\, z}{\sqrt{-b}\,\sqrt{2\pi}}\right) - \cos\left(g - \frac{f^2}{4b}\right) S\left(\frac{b(f + 2b\, z)}{(-b)^{3/2}\sqrt{2\pi}}\right) - C\left(\frac{f - 2b\, z}{\sqrt{-b}\,\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4b} + g\right) + C\left(\frac{b(f + 2b\, z)}{(-b)^{3/2}\sqrt{2\pi}}\right)\sin\left(g - \frac{f^2}{4b}\right)\right)\right)$$

01.07.21.0601.01

$$\int \sin\left(b\sqrt{z}\right)\cos(f\, z + g)\, dz = $$
$$\frac{1}{4}\left(\frac{1}{f^{3/2}}\left(2\sqrt{f}\, \cos\left(\sqrt{z}\, b - g - f\, z\right) + b\sqrt{2\pi}\left(C\left(\frac{2f\sqrt{z} - b}{\sqrt{f}\,\sqrt{2\pi}}\right)\sin\left(\frac{b^2}{4f} - g\right) - \cos\left(\frac{b^2}{4f} - g\right) S\left(\frac{2f\sqrt{z} - b}{\sqrt{f}\,\sqrt{2\pi}}\right)\right)\right) + \frac{1}{(-f)^{3/2}}\left(2\sqrt{-f}\, \cos\left(\sqrt{z}\, b + g + f\, z\right) + b\sqrt{2\pi}\left(C\left(\frac{f\left(b + 2f\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right)\sin\left(g - \frac{b^2}{4f}\right) - \cos\left(g - \frac{b^2}{4f}\right) S\left(\frac{f\left(b + 2f\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right)\right)\right)\right)$$

Involving $\sin(b\, z^r + e)\cos(f\, z + g)$

01.07.21.0602.01

$$\int \sin(b\, z^2 + e)\cos(f\, z + g)\, dz = $$
$$\frac{1}{2\sqrt{-b}}\left(\sqrt{\frac{\pi}{2}}\left(-\cos\left(-\frac{f^2}{4b} + e - g\right) S\left(\frac{f - 2b\, z}{\sqrt{-b}\,\sqrt{2\pi}}\right) - \cos\left(-\frac{f^2}{4b} + e + g\right) S\left(\frac{b(f + 2b\, z)}{(-b)^{3/2}\sqrt{2\pi}}\right) + C\left(\frac{f - 2b\, z}{\sqrt{-b}\,\sqrt{2\pi}}\right)\sin\left(-\frac{f^2}{4b} + e - g\right) + C\left(\frac{b(f + 2b\, z)}{(-b)^{3/2}\sqrt{2\pi}}\right)\sin\left(-\frac{f^2}{4b} + e + g\right)\right)\right)$$

01.07.21.0603.01

$$\int \sin\left(\sqrt{z}\, b+e\right)\cos(g+f\,z)\,dz = \frac{1}{4}\left(\frac{1}{f^{3/2}}\left(2\sqrt{f}\,\cos\left(\sqrt{z}\,b+e-g-f\,z\right)+b\sqrt{2\pi}\left(C\left(\frac{2\,f\sqrt{z}-b}{\sqrt{f}\,\sqrt{2\pi}}\right)\sin\left(\frac{b^2}{4\,f}+e-g\right)-\cos\left(\frac{b^2}{4\,f}+e-g\right)S\left(\frac{2\,f\sqrt{z}-b}{\sqrt{f}\,\sqrt{2\pi}}\right)\right)\right)+\frac{1}{(-f)^{3/2}}\left(2\sqrt{-f}\,\cos\left(\sqrt{z}\,b+e+g+f\,z\right)+b\sqrt{2\pi}\left(C\left(\frac{f\left(b+2\,f\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right)\sin\left(-\frac{b^2}{4\,f}+e+g\right)-\cos\left(-\frac{b^2}{4\,f}+e+g\right)S\left(\frac{f\left(b+2\,f\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right)\right)\right)\right)$$

Involving $\sin\left(b\,z^r+d\,z\right)\cos(f\,z+g)$

01.07.21.0604.01

$$\int \sin\left(b\,z^2+d\,z\right)\cos(f\,z+g)\,dz = \frac{1}{2\sqrt{-b}}\left(\sqrt{\frac{\pi}{2}}\left(-\cos\left(\frac{(d-f)^2}{4\,b}+g\right)S\left(\frac{-d+f-2\,b\,z}{\sqrt{-b}\,\sqrt{2\pi}}\right)-\cos\left(-\frac{(d+f)^2}{4\,b}+g\right)S\left(\frac{b\,(d+f+2\,b\,z)}{(-b)^{3/2}\sqrt{2\pi}}\right)-C\left(\frac{-d+f-2\,b\,z}{\sqrt{-b}\,\sqrt{2\pi}}\right)\sin\left(\frac{(d-f)^2}{4\,b}+g\right)+C\left(\frac{b\,(d+f+2\,b\,z)}{(-b)^{3/2}\sqrt{2\pi}}\right)\sin\left(-\frac{(d+f)^2}{4\,b}+g\right)\right)\right)$$

01.07.21.0605.01

$$\int \sin\left(\sqrt{z}\,b+d\,z\right)\cos(f\,z+g)\,dz = \frac{1}{4}\left(\frac{1}{(f-d)^{3/2}}\left(2\sqrt{f-d}\,\cos\left(\sqrt{z}\,b-g+d\,z-f\,z\right)+b\sqrt{2\pi}\left(C\left(\frac{2\,(f-d)\sqrt{z}-b}{\sqrt{f-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{b^2}{4\,f-4\,d}-g\right)-\cos\left(\frac{b^2}{4\,f-4\,d}-g\right)S\left(\frac{2\,(f-d)\sqrt{z}-b}{\sqrt{f-d}\,\sqrt{2\pi}}\right)\right)\right)+\frac{1}{(-d-f)^{3/2}}\left(2\sqrt{-d-f}\,\cos\left(\sqrt{z}\,b+g+d\,z+f\,z\right)-b\sqrt{2\pi}\,\cos\left(-\frac{b^2}{4\,(d+f)}+g\right)S\left(\frac{-b-2\,(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\pi}}\right)+b\sqrt{2\pi}\,C\left(\frac{-b-2\,(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\pi}}\right)\sin\left(-\frac{b^2}{4\,(d+f)}+g\right)\right)\right)$$

Involving $\sin\left(b\,z^r+d\,z+e\right)\cos(f\,z+g)$

01.07.21.0606.01

$$\int \sin\left(b z^2 + d z + e\right) \cos(f z + g) \, dz = \frac{1}{2\sqrt{-b}} \left(\sqrt{\frac{\pi}{2}} \left(-\cos\left(-\frac{(d-f)^2}{4b} + e - g\right) S\left(\frac{-d+f-2bz}{\sqrt{-b}\sqrt{2\pi}}\right) - \cos\left(-\frac{(d+f)^2}{4b} + e + g\right) S\left(\frac{b(d+f+2bz)}{(-b)^{3/2}\sqrt{2\pi}}\right) + C\left(\frac{-d+f-2bz}{\sqrt{-b}\sqrt{2\pi}}\right) \sin\left(-\frac{(d-f)^2}{4b} + e - g\right) + C\left(\frac{b(d+f+2bz)}{(-b)^{3/2}\sqrt{2\pi}}\right) \sin\left(-\frac{(d+f)^2}{4b} + e + g\right)\right)\right)$$

01.07.21.0607.01

$$\int \sin\left(\sqrt{z}\, b + d z + e\right) \cos(f z + g) \, dz = \frac{1}{4} \left(\frac{1}{(f-d)^{3/2}} \left(2\sqrt{f-d} \cos\left(\sqrt{z}\, b + e - g + d z - f z\right) + b\sqrt{2\pi} \left(C\left(\frac{2(f-d)\sqrt{z} - b}{\sqrt{f-d}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4f-4d} + e - g\right) - \cos\left(\frac{b^2}{4f-4d} + e - g\right) S\left(\frac{2(f-d)\sqrt{z} - b}{\sqrt{f-d}\sqrt{2\pi}}\right)\right)\right) + \frac{1}{(-d-f)^{3/2}} \left(2\sqrt{-d-f} \cos\left(\sqrt{z}\, b + e + g + d z + f z\right) - b\sqrt{2\pi} \cos\left(-\frac{b^2}{4(d+f)} + e + g\right) S\left(\frac{-b-2(d+f)\sqrt{z}}{\sqrt{-d-f}\sqrt{2\pi}}\right) + b\sqrt{2\pi}\, C\left(\frac{-b-2(d+f)\sqrt{z}}{\sqrt{-d-f}\sqrt{2\pi}}\right) \sin\left(-\frac{b^2}{4(d+f)} + e + g\right)\right)\right)$$

Involving $\sin(b z) \cos\left(c z^r\right)$

01.07.21.0608.01

$$\int \sin(b z) \cos\left(c z^2\right) dz = -\frac{1}{2\sqrt{-c^2}} \left(\sqrt{\frac{\pi}{2}} \left(\sqrt{c} \cos\left(\frac{b^2}{4c}\right) S\left(\frac{c(b+2cz)}{(-c)^{3/2}\sqrt{2\pi}}\right) + \sqrt{-c} \cos\left(\frac{b^2}{4c}\right) S\left(\frac{2cz-b}{\sqrt{c}\sqrt{2\pi}}\right) + \left(\sqrt{c}\, C\left(\frac{c(b+2cz)}{(-c)^{3/2}\sqrt{2\pi}}\right) - \sqrt{-c}\, C\left(\frac{2cz-b}{\sqrt{c}\sqrt{2\pi}}\right)\right) \sin\left(\frac{b^2}{4c}\right)\right)\right)$$

01.07.21.0609.01

$$\int \sin(b z) \cos\left(c\sqrt{z}\right) dz = \frac{1}{4(-b)^{3/2}} \left(4\sqrt{-b} \cos\left(c\sqrt{z}\right) \cos(b z) + c\sqrt{2\pi} \cos\left(\frac{c^2}{4b}\right) S\left(\frac{c-2b\sqrt{z}}{\sqrt{-b}\sqrt{2\pi}}\right) - c\sqrt{2\pi} \cos\left(\frac{c^2}{4b}\right) S\left(\frac{b\left(2\sqrt{z}\, b + c\right)}{(-b)^{3/2}\sqrt{2\pi}}\right) + c\sqrt{2\pi}\, C\left(\frac{c-2b\sqrt{z}}{\sqrt{-b}\sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4b}\right) - c\sqrt{2\pi}\, C\left(\frac{b\left(2\sqrt{z}\, b + c\right)}{(-b)^{3/2}\sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4b}\right)\right)$$

Involving $\sin(d z + e) \cos\left(c z^r\right)$

01.07.21.0610.01

$$\int \sin(d\,z+e)\cos\left(c\,z^2\right)dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{C\left(\frac{2\,c\,z-d}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{d^2}{4\,c}+e\right)-\cos\left(\frac{d^2}{4\,c}+e\right)S\left(\frac{2\,c\,z-d}{\sqrt{c}\,\sqrt{2\,\pi}}\right)}{\sqrt{c}}-\frac{\cos\left(\frac{d^2-4\,c\,e}{4\,c}\right)S\left(\frac{c\,(d+2\,c\,z)}{(-c)^{3/2}\,\sqrt{2\,\pi}}\right)+C\left(\frac{c\,(d+2\,c\,z)}{(-c)^{3/2}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{d^2-4\,c\,e}{4\,c}\right)}{\sqrt{-c}}\right)$$

01.07.21.0611.01

$$\int \sin(d\,z+e)\cos\left(\sqrt{z}\,c\right)dz = \frac{1}{4\,(-d)^{3/2}}\left(2\sqrt{-d}\,\cos\left(\sqrt{z}\,c+e+d\,z\right)+2\sqrt{-d}\,\cos\left(-\sqrt{z}\,c+e+d\,z\right)+c\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,d}-e\right)S\left(\frac{c-2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)-\right.$$
$$c\sqrt{2\,\pi}\,\cos\left(\frac{c^2-4\,d\,e}{4\,d}\right)S\left(\frac{d\left(c+2\,d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\,\pi}}\right)-c\sqrt{2\,\pi}\,C\left(\frac{d\left(c+2\,d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2-4\,d\,e}{4\,d}\right)+$$
$$\left.c\sqrt{2\,\pi}\,C\left(\frac{c-2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,d}-e\right)\right)$$

Involving $\sin(b\,z^r)\cos(c\,z^r)$

01.07.21.0612.01

$$\int \sin(b\,z^r)\cos(c\,z^r)\,dz = -\frac{1}{4\,r}\left(i\,z\left(\Gamma\left(\frac{1}{r},\,i\,(b-c)\,z^r\right)(i\,(b-c)\,z^r)^{-1/r}-(i\,(c-b)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,i\,(c-b)\,z^r\right)-(-i\,(b+c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,-i\,(b+c)\,z^r\right)+\right.\right.$$
$$\left.\left.(i\,(b+c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,i\,(b+c)\,z^r\right)\right)\right)$$

01.07.21.0613.01

$$\int \sin\left(b\,z^2\right)\cos\left(c\,z^2\right)dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{S\left(\sqrt{b-c}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{b-c}}+\frac{S\left(\sqrt{b+c}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{b+c}}\right)$$

01.07.21.0614.01

$$\int \sin\left(b\sqrt{z}\right)\cos\left(c\sqrt{z}\right)dz = -\frac{\sqrt{z}\,\cos\left((b-c)\sqrt{z}\right)}{b-c}+\frac{\sin\left((b-c)\sqrt{z}\right)}{(b-c)^2}+\frac{\sin\left((b+c)\sqrt{z}\right)}{(b+c)^2}-\frac{\sqrt{z}\,\cos\left((b+c)\sqrt{z}\right)}{b+c}$$

Involving $\sin(b\,z^r+e)\cos(c\,z^r)$

01.07.21.0615.01

$$\int \sin(b z^r + e)\cos(c z^r)\, dz = -\frac{1}{4r}\left(i e^{-ie} z \left(\Gamma\left(\frac{1}{r}, i(b-c) z^r\right)(i(b-c)z^r)^{-1/r} - e^{2ie}(i(c-b)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i(c-b)z^r\right) - e^{2ie}(-i(b+c)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, -i(b+c)z^r\right) + (i(b+c)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i(b+c)z^r\right)\right)\right)$$

01.07.21.0616.01

$$\int \sin(b z^2 + e)\cos(c z^2)\, dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{C\left(\sqrt{c-b}\,\sqrt{\frac{2}{\pi}}\, z\right)\sin(e) - \cos(e)\, S\left(\sqrt{c-b}\,\sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{c-b}} + \frac{C\left(\sqrt{-b-c}\,\sqrt{\frac{2}{\pi}}\, z\right)\sin(e) - \cos(e)\, S\left(\sqrt{-b-c}\,\sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{-b-c}}\right)$$

01.07.21.0617.01

$$\int \sin\left(\sqrt{z}\, b + e\right)\cos\left(\sqrt{z}\, c\right) dz = \frac{\sin\left(\sqrt{z}\,(b-c)+e\right) - (b-c)\sqrt{z}\,\cos\left(\sqrt{z}\,(b-c)+e\right)}{(b-c)^2} + \frac{\sin\left(\sqrt{z}\,(b+c)+e\right) - (b+c)\sqrt{z}\,\cos\left(\sqrt{z}\,(b+c)+e\right)}{(b+c)^2}$$

Involving $\sin(b z^r + d z)\cos(c z^r)$

01.07.21.0618.01

$$\int \sin(b z^2 + d z)\cos(c z^2)\, dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{\cos\left(\frac{d^2}{4(b+c)}\right) S\left(\frac{d+2(b+c)z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right) + C\left(\frac{d+2(b+c)z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right)\sin\left(\frac{d^2}{4(b+c)}\right)}{\sqrt{-b-c}} + \frac{\cos\left(\frac{d^2}{4c-4b}\right) S\left(\frac{d+2(b-c)z}{\sqrt{c-b}\,\sqrt{2\pi}}\right) - C\left(\frac{d+2(b-c)z}{\sqrt{c-b}\,\sqrt{2\pi}}\right)\sin\left(\frac{d^2}{4c-4b}\right)}{\sqrt{c-b}}\right)$$

01.07.21.0619.01

$$\int \sin\left(\sqrt{z}\, b + d z\right)\cos\left(c\sqrt{z}\right) dz = \frac{1}{4(-d)^{3/2}}\left(2\sqrt{-d}\,\cos\left(\left(b+c+d\sqrt{z}\right)\sqrt{z}\right) + 2\sqrt{-d}\,\cos\left(\sqrt{z}\,(b-c)+d z\right) - (b-c)\sqrt{2\pi}\left(\cos\left(\frac{(b-c)^2}{4d}\right) S\left(\frac{-b+c-2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) + C\left(\frac{-b+c-2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{(b-c)^2}{4d}\right)\right) - (b+c)\sqrt{2\pi}\left(\cos\left(\frac{(b+c)^2}{4d}\right) S\left(\frac{d\left(b+c+2d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\pi}}\right) + C\left(\frac{d\left(b+c+2d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\pi}}\right)\sin\left(\frac{(b+c)^2}{4d}\right)\right)\right)$$

Involving $\sin(b z^r + d z + e)\cos(c z^r)$

01.07.21.0620.01

$$\int \sin\left(b z^2 + d z + e\right) \cos\left(c z^2\right) dz = \frac{1}{2}\sqrt{\frac{\pi}{2}} \left(\frac{C\left(-\frac{d+2(b-c)z}{\sqrt{c-b}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4c-4b}+e\right) - \cos\left(\frac{d^2}{4c-4b}+e\right) S\left(-\frac{d+2(b-c)z}{\sqrt{c-b}\sqrt{2\pi}}\right)}{\sqrt{c-b}} - \frac{\cos\left(\frac{d^2}{4(b+c)}-e\right) S\left(-\frac{d+2(b+c)z}{\sqrt{-b-c}\sqrt{2\pi}}\right) + C\left(-\frac{d+2(b+c)z}{\sqrt{-b-c}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4(b+c)}-e\right)}{\sqrt{-b-c}} \right)$$

01.07.21.0621.01

$$\int \sin\left(\sqrt{z}\, b + d z + e\right) \cos\left(c\sqrt{z}\right) dz = \frac{1}{4(-d)^{3/2}} \left(2\sqrt{-d}\, \cos\left(e + \left(b + c + d\sqrt{z}\right)\sqrt{z}\right) + 2\sqrt{-d}\, \cos\left(\sqrt{z}\,(b-c) + e + d z\right) - (b+c)\sqrt{2\pi} \left(\cos\left(\frac{b^2 + 2cb + c^2 - 4de}{4d}\right) S\left(\frac{d\left(b+c+2d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\pi}}\right) + C\left(\frac{d\left(b+c+2d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\pi}}\right) \sin\left(\frac{b^2+2cb+c^2-4de}{4d}\right) \right) - (b-c)\sqrt{2\pi} \left(\cos\left(\frac{(b-c)^2}{4d} - e\right) S\left(\frac{-b+c-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) + C\left(\frac{-b+c-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{(b-c)^2}{4d} - e\right) \right) \right)$$

Involving $\sin(d z) \cos(c z^r + g)$

01.07.21.0622.01

$$\int \sin(d z) \cos\left(c z^2 + g\right) dz = \frac{1}{2}\sqrt{\frac{\pi}{2}} \left(\frac{C\left(\frac{2cz-d}{\sqrt{c}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4c} - g\right) - \cos\left(\frac{d^2}{4c} - g\right) S\left(\frac{2cz-d}{\sqrt{c}\sqrt{2\pi}}\right)}{\sqrt{c}} - \frac{\cos\left(\frac{d^2-4cg}{4c}\right) S\left(\frac{c(d+2cz)}{(-c)^{3/2}\sqrt{2\pi}}\right) + C\left(\frac{c(d+2cz)}{(-c)^{3/2}\sqrt{2\pi}}\right) \sin\left(\frac{d^2-4cg}{4c}\right)}{\sqrt{-c}} \right)$$

01.07.21.0623.01

$$\int \sin(d z) \cos\left(\sqrt{z}\, c + g\right) dz = \frac{1}{4(-d)^{3/2}} \left(2\sqrt{-d}\, \cos\left(\sqrt{z}\, c + g + d z\right) + 2\sqrt{-d}\, \cos\left(-\sqrt{z}\, c - g + d z\right) + c\sqrt{2\pi}\, \cos\left(\frac{c^2}{4d} + g\right) S\left(\frac{c - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) - c\sqrt{2\pi}\, \cos\left(\frac{c^2 - 4dg}{4d}\right) S\left(\frac{d\left(c + 2d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\pi}}\right) - c\sqrt{2\pi}\, C\left(\frac{d\left(c + 2d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\pi}}\right) \sin\left(\frac{c^2 - 4dg}{4d}\right) + c\sqrt{2\pi}\, C\left(\frac{c - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4d} + g\right) \right)$$

Involving $\sin(d z + e) \cos(c z^r + g)$

01.07.21.0624.01

$$\int \sin(d\,z+e)\cos\left(c\,z^2+g\right)dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{C\left(\frac{2\,c\,z-d}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{d^2}{4\,c}+e-g\right)-\cos\left(\frac{d^2}{4\,c}+e-g\right)S\left(\frac{2\,c\,z-d}{\sqrt{c}\,\sqrt{2\,\pi}}\right)}{\sqrt{c}} - \frac{\cos\left(\frac{d^2-4\,c\,(e+g)}{4\,c}\right)S\left(\frac{c\,(d+2\,c\,z)}{(-c)^{3/2}\,\sqrt{2\,\pi}}\right)+C\left(\frac{c\,(d+2\,c\,z)}{(-c)^{3/2}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{d^2-4\,c\,(e+g)}{4\,c}\right)}{\sqrt{-c}}\right)$$

01.07.21.0625.01

$$\int \sin(d\,z+e)\cos\left(\sqrt{z}\,c+g\right)dz = \frac{1}{4\,(-d)^{3/2}}\left(2\sqrt{-d}\,\cos\left(\sqrt{z}\,c+e+g+d\,z\right)+2\sqrt{-d}\,\cos\left(-\sqrt{z}\,c+e-g+d\,z\right)+c\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,d}-e+g\right)S\left(\frac{c-2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\,\pi}}\right) - c\sqrt{2\,\pi}\,\cos\left(\frac{c^2-4\,d\,(e+g)}{4\,d}\right)S\left(\frac{d\left(c+2\,d\sqrt{z}\right)}{(-d)^{3/2}\,\sqrt{2\,\pi}}\right)-c\sqrt{2\,\pi}\,C\left(\frac{d\left(c+2\,d\sqrt{z}\right)}{(-d)^{3/2}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2-4\,d\,(e+g)}{4\,d}\right)+ c\sqrt{2\,\pi}\,C\left(\frac{c-2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,d}-e+g\right)\right)$$

Involving $\sin\left(b\,z^r\right)\cos\left(c\,z^r+g\right)$

01.07.21.0626.01

$$\int \sin(b\,z^r)\cos(c\,z^r+g)\,dz = -\frac{1}{4\,r}\left(i\,e^{-i\,g}\,z\left(e^{2\,i\,g}\,\Gamma\left(\frac{1}{r},\,i\,(b-c)\,z^r\right)(i\,(b-c)\,z^r)^{-1/r} - (i\,(c-b)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,i\,(c-b)\,z^r\right)-e^{2\,i\,g}\,(-i\,(b+c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,-i\,(b+c)\,z^r\right)+(i\,(b+c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,i\,(b+c)\,z^r\right)\right)\right)$$

01.07.21.0627.01

$$\int \sin\left(b\,z^2\right)\cos\left(c\,z^2+g\right)dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{C\left(\sqrt{-b-c}\,\sqrt{\frac{2}{\pi}}\,z\right)\sin(g)-\cos(g)\,S\left(\sqrt{-b-c}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{-b-c}} - \frac{\cos(g)\,S\left(\sqrt{c-b}\,\sqrt{\frac{2}{\pi}}\,z\right)+C\left(\sqrt{c-b}\,\sqrt{\frac{2}{\pi}}\,z\right)\sin(g)}{\sqrt{c-b}}\right)$$

01.07.21.0628.01

$$\int \sin\left(\sqrt{z}\,b\right)\cos\left(\sqrt{z}\,c+g\right)dz = \frac{\sin\left(\sqrt{z}\,(b-c)-g\right)-(b-c)\sqrt{z}\,\cos\left(\sqrt{z}\,(b-c)-g\right)}{(b-c)^2}+\frac{\sin\left(\sqrt{z}\,(b+c)+g\right)-(b+c)\sqrt{z}\,\cos\left(\sqrt{z}\,(b+c)+g\right)}{(b+c)^2}$$

Involving $\sin(b z^r + e) \cos(c z^r + g)$

01.07.21.0629.01

$$\int \sin(b z^r + e) \cos(c z^r + g)\, dz = -\frac{1}{4r} i\, e^{-i(e+g)} z \left(e^{2 i g} \Gamma\left(\frac{1}{r}, i (b-c) z^r\right) (i (b-c) z^r)^{-1/r} - e^{2 i e} (i (c-b) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i (c-b) z^r\right) - e^{2 i (e+g)} (-i (b+c) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -i (b+c) z^r\right) + (i (b+c) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i (b+c) z^r\right)\right)$$

01.07.21.0630.01

$$\int \sin(b z^2 + e) \cos(c z^2 + g)\, dz = \frac{1}{2} \sqrt{\frac{\pi}{2}} \left(\frac{C\left(\sqrt{c-b} \sqrt{\frac{2}{\pi}}\, z\right) \sin(e-g) - \cos(e-g)\, S\left(\sqrt{c-b} \sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{c-b}} + \frac{C\left(\sqrt{-b-c} \sqrt{\frac{2}{\pi}}\, z\right) \sin(e+g) - \cos(e+g)\, S\left(\sqrt{-b-c} \sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{-b-c}}\right)$$

01.07.21.0631.01

$$\int \sin\left(\sqrt{z}\, b + e\right) \cos\left(\sqrt{z}\, c + g\right) dz = \frac{\sin\left(\sqrt{z}\, (b-c) + e - g\right) - (b-c) \sqrt{z} \cos\left(\sqrt{z}\, (b-c) + e - g\right)}{(b-c)^2} + \frac{\sin\left(\sqrt{z}\, (b+c) + e + g\right) - (b+c) \sqrt{z} \cos\left(\sqrt{z}\, (b+c) + e + g\right)}{(b+c)^2}$$

Involving $\sin(b z^r + d z) \cos(c z^r + g)$

01.07.21.0632.01

$$\int \sin(b z^2 + d z) \cos(c z^2 + g)\, dz = \frac{1}{2} \sqrt{\frac{\pi}{2}} \left(-\frac{C\left(\frac{d + 2 (b-c) z}{\sqrt{c-b} \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4c - 4b} - g\right) - \cos\left(\frac{d^2}{4c - 4b} - g\right) S\left(\frac{d + 2 (b-c) z}{\sqrt{c-b} \sqrt{2\pi}}\right)}{\sqrt{c-b}} + \frac{\cos\left(\frac{d^2}{4(b+c)} - g\right) S\left(\frac{d + 2 (b+c) z}{\sqrt{-b-c} \sqrt{2\pi}}\right) + C\left(\frac{d + 2 (b+c) z}{\sqrt{-b-c} \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4(b+c)} - g\right)}{\sqrt{-b-c}}\right)$$

01.07.21.0633.01

$$\int \sin\left(\sqrt{z}\, b + d\, z\right) \cos\left(\sqrt{z}\, c + g\right) dz = \frac{1}{4\,(-d)^{3/2}} \left(2\sqrt{-d}\, \left(\cos\left(\sqrt{z}\,(b+c) + g + d\, z\right) + \cos\left(\sqrt{z}\,(c-b) + g - d\, z\right)\right) - (b+c)\sqrt{2\pi} \left(\cos\left(\frac{b^2 + 2\,c\,b + c^2 - 4\,d\,g}{4\,d}\right) S\left(\frac{d\left(b + c + 2\,d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\pi}}\right) + C\left(\frac{d\left(b + c + 2\,d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\pi}}\right) \sin\left(\frac{b^2 + 2\,c\,b + c^2 - 4\,d\,g}{4\,d}\right)\right) - (b-c)\sqrt{2\pi} \left(\cos\left(\frac{(b-c)^2}{4\,d} + g\right) S\left(\frac{-b + c - 2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) + C\left(\frac{-b + c - 2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) \sin\left(\frac{(b-c)^2}{4\,d} + g\right)\right)\right)$$

Involving $\sin\left(b\, z^r + d\, z + e\right) \cos\left(c\, z^r + g\right)$

01.07.21.0634.01

$$\int \sin\left(b\, z^2 + d\, z + e\right) \cos\left(c\, z^2 + g\right) dz = \frac{1}{2}\sqrt{\frac{\pi}{2}} \left(\frac{C\left(-\frac{d + 2\,(b-c)\,z}{\sqrt{c-b}\,\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4\,c - 4\,b} + e - g\right) - \cos\left(\frac{d^2}{4\,c - 4\,b} + e - g\right) S\left(-\frac{d + 2\,(b-c)\,z}{\sqrt{c-b}\,\sqrt{2\pi}}\right)}{\sqrt{c-b}} - \frac{\cos\left(\frac{d^2}{4\,(b+c)} - e - g\right) S\left(-\frac{d + 2\,(b+c)\,z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right) + C\left(-\frac{d + 2\,(b+c)\,z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4\,(b+c)} - e - g\right)}{\sqrt{-b-c}}\right)$$

01.07.21.0635.01

$$\int \sin\left(\sqrt{z}\, b + d\, z + e\right) \cos\left(\sqrt{z}\, c + g\right) dz = \frac{1}{4\,(-d)^{3/2}} \left(2\sqrt{-d}\, \cos\left(e + g + \left(b + c + d\sqrt{z}\right)\sqrt{z}\right) + 2\sqrt{-d}\, \cos\left(\sqrt{z}\,(b-c) + e - g + d\, z\right) - (b+c)\sqrt{2\pi} \left(\cos\left(\frac{b^2 + 2\,c\,b + c^2 - 4\,d\,(e+g)}{4\,d}\right) S\left(\frac{d\left(b + c + 2\,d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\pi}}\right) + C\left(\frac{d\left(b + c + 2\,d\sqrt{z}\right)}{(-d)^{3/2}\sqrt{2\pi}}\right) \sin\left(\frac{b^2 + 2\,c\,b + c^2 - 4\,d\,(e+g)}{4\,d}\right)\right) - (b-c)\sqrt{2\pi} \left(\cos\left(\frac{(b-c)^2}{4\,d} - e + g\right) S\left(\frac{-b + c - 2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) + C\left(\frac{-b + c - 2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) \sin\left(\frac{(b-c)^2}{4\,d} - e + g\right)\right)\right)$$

Involving $\sin(d\, z) \cos\left(c\, z^r + f\, z\right)$

01.07.21.0636.01

$$\int \sin(d\,z)\cos\left(c\,z^2+f\,z\right)dz = \frac{1}{2\sqrt{-c^2}}\left(\sqrt{\frac{\pi}{2}}\left(-\sqrt{c}\,\cos\left(\frac{(d+f)^2}{4\,c}\right)S\left(\frac{c\,(d+f+2\,c\,z)}{(-c)^{3/2}\sqrt{2\,\pi}}\right)-\sqrt{-c}\,\cos\left(\frac{(d-f)^2}{4\,c}\right)S\left(\frac{-d+f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)+\sqrt{-c}\,C\left(\frac{-d+f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(d-f)^2}{4\,c}\right)-\sqrt{c}\,C\left(\frac{c\,(d+f+2\,c\,z)}{(-c)^{3/2}\sqrt{2\,\pi}}\right)\sin\left(\frac{(d+f)^2}{4\,c}\right)\right)\right)$$

01.07.21.0637.01

$$\int \sin(d\,z)\cos\left(\sqrt{z}\,c+f\,z\right)dz = \frac{1}{4}\left(\frac{1}{(-d-f)^{3/2}}\left(2\sqrt{-d-f}\,\cos\left(\sqrt{z}\,c+(d+f)\,z\right)-c\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,(d+f)}\right)S\left(\frac{-c-2\,(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\,\pi}}\right)-c\sqrt{2\,\pi}\,C\left(\frac{-c-2\,(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(d+f)}\right)\right)+\frac{1}{(f-d)^{3/2}}\left(2\sqrt{f-d}\,\cos\left(-\sqrt{z}\,c+(d-f)\,z\right)+c\sqrt{2\,\pi}\left(\cos\left(\frac{c^2}{4\,f-4\,d}\right)S\left(\frac{c+2\,(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\,\pi}}\right)-C\left(\frac{c+2\,(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,f-4\,d}\right)\right)\right)\right)$$

Involving $\sin(d\,z+e)\cos\left(c\,z^r+f\,z\right)$

01.07.21.0638.01

$$\int \sin(d\,z+e)\cos\left(c\,z^2+f\,z\right)dz = \frac{1}{2\sqrt{-c^2}}\left(\sqrt{\frac{\pi}{2}}\left(-\sqrt{c}\,\cos\left(e-\frac{(d+f)^2}{4\,c}\right)S\left(\frac{c\,(d+f+2\,c\,z)}{(-c)^{3/2}\sqrt{2\,\pi}}\right)-\sqrt{-c}\,\cos\left(\frac{(d-f)^2}{4\,c}+e\right)S\left(\frac{-d+f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)+\sqrt{-c}\,C\left(\frac{-d+f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(d-f)^2}{4\,c}+e\right)+\sqrt{c}\,C\left(\frac{c\,(d+f+2\,c\,z)}{(-c)^{3/2}\sqrt{2\,\pi}}\right)\sin\left(e-\frac{(d+f)^2}{4\,c}\right)\right)\right)$$

01.07.21.0639.01

$$\int \sin(d\,z+e)\cos\left(\sqrt{z}\,c+f\,z\right)dz = \frac{1}{4}\left(\frac{1}{(-d-f)^{3/2}}\left(2\sqrt{-d-f}\,\cos\left(\sqrt{z}\,c+e+(d+f)\,z\right)-c\sqrt{2\,\pi}\,\cos\left(e-\frac{c^2}{4\,(d+f)}\right)S\left(\frac{-c-2\,(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\,\pi}}\right)+c\sqrt{2\,\pi}\,C\left(\frac{-c-2\,(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\,\pi}}\right)\sin\left(e-\frac{c^2}{4\,(d+f)}\right)\right)+\frac{1}{(f-d)^{3/2}}\left(2\sqrt{f-d}\,\cos\left(-\sqrt{z}\,c+e+(d-f)\,z\right)+c\sqrt{2\,\pi}\left(\cos\left(\frac{c^2}{4\,f-4\,d}+e\right)S\left(\frac{c+2\,(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\,\pi}}\right)-C\left(\frac{c+2\,(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,f-4\,d}+e\right)\right)\right)\right)$$

Involving $\sin(b z^r)\cos(c z^r + f z)$

01.07.21.0640.01

$$\int \sin(b z^2)\cos(c z^2 + f z)\,dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{\cos\left(\frac{f^2}{4(b+c)}\right) S\left(\frac{f+2(b+c)z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right) + C\left(\frac{f+2(b+c)z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4(b+c)}\right)}{\sqrt{-b-c}} + \frac{C\left(\frac{f+2(c-b)z}{\sqrt{c-b}\,\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4c-4b}\right) - \cos\left(\frac{f^2}{4c-4b}\right) S\left(\frac{f+2(c-b)z}{\sqrt{c-b}\,\sqrt{2\pi}}\right)}{\sqrt{c-b}}\right)$$

01.07.21.0641.01

$$\int \sin(\sqrt{z}\, b)\cos(\sqrt{z}\, c + f z)\,dz = \frac{1}{4}\left(\frac{1}{f^{3/2}}\left(2\sqrt{f}\,\cos(\sqrt{z}\,(b-c) - f z) + (b-c)\sqrt{2\pi}\left(C\left(\frac{-b+c+2f\sqrt{z}}{\sqrt{f}\,\sqrt{2\pi}}\right)\sin\left(\frac{(b-c)^2}{4f}\right) - \cos\left(\frac{(b-c)^2}{4f}\right) S\left(\frac{-b+c+2f\sqrt{z}}{\sqrt{f}\,\sqrt{2\pi}}\right)\right)\right) + \frac{1}{(-f)^{3/2}}\left(2\sqrt{-f}\,\cos\left(\left(b+c+f\sqrt{z}\right)\sqrt{z}\right) - (b+c)\sqrt{2\pi}\,\cos\left(\frac{(b+c)^2}{4f}\right) S\left(\frac{f\left(b+c+2f\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right) - (b+c)\sqrt{2\pi}\,C\left(\frac{f\left(b+c+2f\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right)\sin\left(\frac{(b+c)^2}{4f}\right)\right)\right)$$

Involving $\sin(b z^r + e)\cos(c z^r + f z)$

01.07.21.0642.01

$$\int \sin(b z^2 + e)\cos(c z^2 + f z)\,dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{C\left(\frac{f+2(c-b)z}{\sqrt{c-b}\,\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4c-4b} + e\right) - \cos\left(\frac{f^2}{4c-4b} + e\right) S\left(\frac{f+2(c-b)z}{\sqrt{c-b}\,\sqrt{2\pi}}\right)}{\sqrt{c-b}} + \frac{C\left(-\frac{f+2(b+c)z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right)\sin\left(-\frac{f^2}{4(b+c)} + e\right) - \cos\left(-\frac{f^2}{4(b+c)} + e\right) S\left(-\frac{f+2(b+c)z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right)}{\sqrt{-b-c}}\right)$$

01.07.21.0643.01

$$\int \sin\left(\sqrt{z}\, b+e\right)\cos\left(\sqrt{z}\, c+f\, z\right)dz = \frac{1}{4}\left(\frac{1}{f^{3/2}}\left(2\sqrt{f}\,\cos\left(\sqrt{z}\,(b-c)+e-f\,z\right)+ (b-c)\sqrt{2\pi}\left(C\left(\frac{-b+c+2\,f\,\sqrt{z}}{\sqrt{f}\,\sqrt{2\pi}}\right)\sin\left(\frac{(b-c)^2}{4\,f}+e\right)-\cos\left(\frac{(b-c)^2}{4\,f}+e\right)S\left(\frac{-b+c+2\,f\,\sqrt{z}}{\sqrt{f}\,\sqrt{2\pi}}\right)\right)\right)+ \frac{1}{(-f)^{3/2}}\left(2\sqrt{-f}\,\cos\left(e+\left(b+c+f\,\sqrt{z}\right)\sqrt{z}\right)-(b+c)\sqrt{2\pi}\,\cos\left(-\frac{(b+c)^2}{4\,f}+e\right)S\left(\frac{f\left(b+c+2\,f\,\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right)+ (b+c)\sqrt{2\pi}\,C\left(\frac{f\left(b+c+2\,f\,\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right)\sin\left(-\frac{(b+c)^2}{4\,f}+e\right)\right)\right)$$

Involving $\sin\left(b\,z^r+d\,z\right)\cos\left(c\,z^r+f\,z\right)$

01.07.21.0644.01

$$\int \sin\left(b\,z^2+d\,z\right)\cos\left(c\,z^2+f\,z\right)dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{C\left(\frac{-d+f-2\,b\,z+2\,c\,z}{\sqrt{c-b}\,\sqrt{2\pi}}\right)\sin\left(\frac{(d-f)^2}{4\,(c-b)}\right)-\cos\left(\frac{(d-f)^2}{4\,(c-b)}\right)S\left(\frac{-d+f-2\,b\,z+2\,c\,z}{\sqrt{c-b}\,\sqrt{2\pi}}\right)}{\sqrt{c-b}}+\frac{C\left(\frac{d+f+2\,(b+c)\,z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right)\sin\left(\frac{(d+f)^2}{4\,(b+c)}\right)+\cos\left(\frac{(d+f)^2}{4\,(b+c)}\right)S\left(\frac{d+f+2\,(b+c)\,z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right)}{\sqrt{-b-c}}\right)$$

01.07.21.0645.01

$$\int \sin\left(\sqrt{z}\, b+d\,z\right)\cos\left(\sqrt{z}\, c+f\,z\right)dz = \frac{1}{4}\left(\frac{1}{(f-d)^{3/2}}\left(2\sqrt{f-d}\,\cos\left(\sqrt{z}\,b+d\,z-f\,z-c\,\sqrt{z}\right)+ (b-c)\sqrt{2\pi}\left(C\left(\frac{-b+c+2\,(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{(b-c)^2}{4\,(f-d)}\right)-\cos\left(\frac{(b-c)^2}{4\,(f-d)}\right)S\left(\frac{-b+c+2\,(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\pi}}\right)\right)\right)+ \frac{1}{(-d-f)^{3/2}}\left(2\sqrt{-d-f}\,\cos\left(\sqrt{z}\,b+d\,z+f\,z+c\,\sqrt{z}\right)-(b+c)\sqrt{2\pi}\,\cos\left(\frac{(b+c)^2}{4\,(d+f)}\right)S\left(\frac{-b-c-2\,(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\pi}}\right)- (b+c)\sqrt{2\pi}\,C\left(\frac{-b-c-2\,(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\pi}}\right)\sin\left(\frac{(b+c)^2}{4\,(d+f)}\right)\right)\right)$$

Involving $\sin\left(b\,z^r+d\,z+e\right)\cos\left(c\,z^r+f\,z\right)$

01.07.21.0646.01

$$\int \sin\left(b z^2 + d z + e\right) \cos\left(c z^2 + f z\right) \, dz = \frac{1}{2} \sqrt{\frac{\pi}{2}} \left(\frac{C\left(\frac{-d+f-2 b z+2 c z}{\sqrt{c-b} \sqrt{2 \pi}}\right) \sin\left(\frac{(d-f)^2}{4 (c-b)} + e\right) - \cos\left(\frac{(d-f)^2}{4 (c-b)} + e\right) S\left(\frac{-d+f-2 b z+2 c z}{\sqrt{c-b} \sqrt{2 \pi}}\right)}{\sqrt{c-b}} + \frac{C\left(-\frac{d+f+2 (b+c) z}{\sqrt{-b-c} \sqrt{2 \pi}}\right) \sin\left(-\frac{(d+f)^2}{4 (b+c)} + e\right) - \cos\left(-\frac{(d+f)^2}{4 (b+c)} + e\right) S\left(-\frac{d+f+2 (b+c) z}{\sqrt{-b-c} \sqrt{2 \pi}}\right)}{\sqrt{-b-c}} \right)$$

01.07.21.0647.01

$$\int \sin\left(\sqrt{z}\, b + d z + e\right) \cos\left(\sqrt{z}\, c + f z\right) \, dz = \frac{1}{4} \left(\frac{1}{(f-d)^{3/2}} \left(2 \sqrt{f-d} \cos\left(\sqrt{z}\, b + e + d z - f z - c \sqrt{z}\right) + (b-c) \sqrt{2\pi} \left(C\left(\frac{-b+c+2 (f-d) \sqrt{z}}{\sqrt{f-d} \sqrt{2\pi}}\right) \sin\left(\frac{(b-c)^2}{4 (f-d)} + e\right) - \cos\left(\frac{(b-c)^2}{4 (f-d)} + e\right) S\left(\frac{-b+c+2 (f-d) \sqrt{z}}{\sqrt{f-d} \sqrt{2\pi}}\right) \right) \right) + \frac{1}{(-d-f)^{3/2}} \left(2 \sqrt{-d-f} \cos\left(\sqrt{z}\, b + e + d z + f z + c \sqrt{z}\right) - (b+c) \sqrt{2\pi} \cos\left(-\frac{(b+c)^2}{4 (d+f)} + e\right) S\left(\frac{-b-c-2 (d+f) \sqrt{z}}{\sqrt{-d-f} \sqrt{2\pi}}\right) + (b+c) \sqrt{2\pi}\, C\left(\frac{-b-c-2 (d+f) \sqrt{z}}{\sqrt{-d-f} \sqrt{2\pi}}\right) \sin\left(-\frac{(b+c)^2}{4 (d+f)} + e\right) \right) \right)$$

Involving $\sin(d z) \cos\left(c z^r + f z + g\right)$

01.07.21.0648.01

$$\int \sin(d z) \cos\left(c z^2 + f z + g\right) \, dz = \frac{1}{2 \sqrt{-c^2}} \left(\sqrt{\frac{\pi}{2}} \left(-\sqrt{c} \cos\left(-\frac{(d+f)^2}{4 c} + g\right) S\left(\frac{c (d+f+2 c z)}{(-c)^{3/2} \sqrt{2\pi}}\right) - \sqrt{-c} \cos\left(\frac{(d-f)^2}{4 c} - g\right) S\left(\frac{-d+f+2 c z}{\sqrt{c} \sqrt{2\pi}}\right) + \sqrt{-c}\, C\left(\frac{-d+f+2 c z}{\sqrt{c} \sqrt{2\pi}}\right) \sin\left(\frac{(d-f)^2}{4 c} - g\right) + \sqrt{c}\, C\left(\frac{c (d+f+2 c z)}{(-c)^{3/2} \sqrt{2\pi}}\right) \sin\left(-\frac{(d+f)^2}{4 c} + g\right) \right) \right)$$

01.07.21.0649.01

$$\int \sin(d\,z)\cos\left(\sqrt{z}\,c+f\,z+g\right)dz = \frac{1}{4}\left(\frac{1}{(f-d)^{3/2}}\left(2\sqrt{f-d}\,\cos\left(-\sqrt{z}\,c-g+d\,z-f\,z\right)+ c\sqrt{2\pi}\left(\cos\left(\frac{c^2}{4f-4d}-g\right)S\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\pi}}\right)-C\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4f-4d}-g\right)\right)\right)+ \frac{1}{(-d-f)^{3/2}}\left(2\sqrt{-d-f}\,\cos\left(\sqrt{z}\,c+g+d\,z+f\,z\right)-c\sqrt{2\pi}\,\cos\left(-\frac{c^2}{4(d+f)}+g\right)S\left(\frac{-c-2(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\pi}}\right)+ c\sqrt{2\pi}\,C\left(\frac{-c-2(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4(d+f)}+g\right)\right)\right)$$

Involving $\sin(d\,z+e)\cos\left(c\,z^r+f\,z+g\right)$

01.07.21.0650.01

$$\int \sin(d\,z+e)\cos\left(c\,z^2+f\,z+g\right)dz = \frac{1}{2\sqrt{-c^2}}\left(\sqrt{\frac{\pi}{2}}\left(-\sqrt{c}\,\cos\left(-\frac{(d+f)^2}{4c}+e+g\right)S\left(\frac{c(d+f+2c\,z)}{(-c)^{3/2}\sqrt{2\pi}}\right)-\sqrt{-c}\,\cos\left(\frac{(d-f)^2}{4c}+e-g\right)S\left(\frac{-d+f+2c\,z}{\sqrt{c}\,\sqrt{2\pi}}\right)+ \sqrt{-c}\,C\left(\frac{-d+f+2c\,z}{\sqrt{c}\,\sqrt{2\pi}}\right)\sin\left(\frac{(d-f)^2}{4c}+e-g\right)+\sqrt{c}\,C\left(\frac{c(d+f+2c\,z)}{(-c)^{3/2}\sqrt{2\pi}}\right)\sin\left(-\frac{(d+f)^2}{4c}+e+g\right)\right)\right)$$

01.07.21.0651.01

$$\int \sin(d\,z+e)\cos\left(\sqrt{z}\,c+f\,z+g\right)dz = \frac{1}{4}\left(\frac{1}{(f-d)^{3/2}}\left(2\sqrt{f-d}\,\cos\left(-\sqrt{z}\,c+e-g+d\,z-f\,z\right)+ c\sqrt{2\pi}\left(\cos\left(\frac{c^2}{4f-4d}+e-g\right)S\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\pi}}\right)-C\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4f-4d}+e-g\right)\right)\right)+ \frac{1}{(-d-f)^{3/2}}\left(2\sqrt{-d-f}\,\cos\left(\sqrt{z}\,c+e+g+d\,z+f\,z\right)-c\sqrt{2\pi}\,\cos\left(-\frac{c^2}{4(d+f)}+e+g\right)S\left(\frac{-c-2(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\pi}}\right)+ c\sqrt{2\pi}\,C\left(\frac{-c-2(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4(d+f)}+e+g\right)\right)\right)$$

Involving $\sin\left(b\,z^r\right)\cos\left(c\,z^r+f\,z+g\right)$

01.07.21.0652.01

$$\int \sin\left(b z^2\right) \cos\left(c z^2 + f z + g\right) dz = \frac{1}{2}\sqrt{\frac{\pi}{2}} \left(\frac{C\left(\frac{f+2(c-b)z}{\sqrt{c-b}\sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4c-4b} - g\right) - \cos\left(\frac{f^2}{4c-4b} - g\right) S\left(\frac{f+2(c-b)z}{\sqrt{c-b}\sqrt{2\pi}}\right)}{\sqrt{c-b}} + \frac{C\left(-\frac{f+2(b+c)z}{\sqrt{-b-c}\sqrt{2\pi}}\right) \sin\left(-\frac{f^2}{4(b+c)} + g\right) - \cos\left(-\frac{f^2}{4(b+c)} + g\right) S\left(-\frac{f+2(b+c)z}{\sqrt{-b-c}\sqrt{2\pi}}\right)}{\sqrt{-b-c}} \right)$$

01.07.21.0653.01

$$\int \sin\left(b\sqrt{z}\right) \cos\left(\sqrt{z}\, c + f z + g\right) dz = \frac{1}{4}\left(\frac{1}{f^{3/2}}\left(2\sqrt{f}\cos\left(\sqrt{z}\,(b-c) - g - f z\right) + (b-c)\sqrt{2\pi}\left(C\left(\frac{-b+c+2 f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)\sin\left(\frac{(b-c)^2}{4 f} - g\right) - \cos\left(\frac{(b-c)^2}{4 f} - g\right) S\left(\frac{-b+c+2 f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)\right)\right) + \frac{1}{(-f)^{3/2}}\left(2\sqrt{-f}\cos\left(g + \left(b+c+f\sqrt{z}\right)\sqrt{z}\right) - (b+c)\sqrt{2\pi}\cos\left(g - \frac{(b+c)^2}{4 f}\right) S\left(\frac{f\left(b+c+2 f\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right) + (b+c)\sqrt{2\pi}\, C\left(\frac{f\left(b+c+2 f\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right)\sin\left(g - \frac{(b+c)^2}{4 f}\right)\right)\right)$$

Involving $\sin\left(b z^r + e\right)\cos\left(c z^r + f z + g\right)$

01.07.21.0654.01

$$\int \sin\left(b z^2 + e\right) \cos\left(c z^2 + f z + g\right) dz = \frac{1}{2}\sqrt{\frac{\pi}{2}} \left(\frac{C\left(\frac{f+2(c-b)z}{\sqrt{c-b}\sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4c-4b} + e - g\right) - \cos\left(\frac{f^2}{4c-4b} + e - g\right) S\left(\frac{f+2(c-b)z}{\sqrt{c-b}\sqrt{2\pi}}\right)}{\sqrt{c-b}} + \frac{C\left(-\frac{f+2(b+c)z}{\sqrt{-b-c}\sqrt{2\pi}}\right) \sin\left(-\frac{f^2}{4(b+c)} + e + g\right) - \cos\left(-\frac{f^2}{4(b+c)} + e + g\right) S\left(-\frac{f+2(b+c)z}{\sqrt{-b-c}\sqrt{2\pi}}\right)}{\sqrt{-b-c}} \right)$$

01.07.21.0655.01

$$\int \sin\left(\sqrt{z}\, b+e\right)\cos\left(\sqrt{z}\, c+f\,z+g\right)dz = \frac{1}{4}\left(\frac{1}{f^{3/2}}\left(2\sqrt{f}\,\cos\left(\sqrt{z}\,(b-c)+e-g-f\,z\right)+\right.\right.$$
$$(b-c)\sqrt{2\pi}\left(C\left(\frac{-b+c+2\,f\sqrt{z}}{\sqrt{f}\,\sqrt{2\pi}}\right)\sin\left(\frac{(b-c)^2}{4\,f}+e-g\right)-\cos\left(\frac{(b-c)^2}{4\,f}+e-g\right)S\left(\frac{-b+c+2\,f\sqrt{z}}{\sqrt{f}\,\sqrt{2\pi}}\right)\right)\Bigg)+$$
$$\frac{1}{(-f)^{3/2}}\left(2\sqrt{-f}\,\cos\left(e+g+\left(b+c+f\sqrt{z}\right)\sqrt{z}\right)-(b+c)\sqrt{2\pi}\,\cos\left(-\frac{(b+c)^2}{4\,f}+e+g\right)S\left(\frac{f\left(b+c+2\,f\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right)+\right.$$
$$\left.\left.(b+c)\sqrt{2\pi}\;C\left(\frac{f\left(b+c+2\,f\sqrt{z}\right)}{(-f)^{3/2}\sqrt{2\pi}}\right)\sin\left(-\frac{(b+c)^2}{4\,f}+e+g\right)\right)\right)$$

Involving $\sin(b\,z^r+d\,z)\cos(c\,z^r+f\,z+g)$

01.07.21.0656.01

$$\int \sin\left(b\,z^2+d\,z\right)\cos\left(c\,z^2+f\,z+g\right)dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{C\left(\frac{-d+f-2\,b\,z+2\,c\,z}{\sqrt{c-b}\,\sqrt{2\pi}}\right)\sin\left(\frac{(d-f)^2}{4\,(c-b)}-g\right)-\cos\left(\frac{(d-f)^2}{4\,(c-b)}-g\right)S\left(\frac{-d+f-2\,b\,z+2\,c\,z}{\sqrt{c-b}\,\sqrt{2\pi}}\right)}{\sqrt{c-b}}+\right.$$
$$\left.\frac{C\left(-\frac{d+f+2\,(b+c)\,z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(d+f)^2}{4\,(b+c)}+g\right)-\cos\left(-\frac{(d+f)^2}{4\,(b+c)}+g\right)S\left(-\frac{d+f+2\,(b+c)\,z}{\sqrt{-b-c}\,\sqrt{2\pi}}\right)}{\sqrt{-b-c}}\right)$$

01.07.21.0657.01

$$\int \sin\left(\sqrt{z}\, b+d\,z\right)\cos\left(\sqrt{z}\, c+f\,z+g\right)dz = \frac{1}{4}\left(\frac{1}{(f-d)^{3/2}}\left(2\sqrt{f-d}\,\cos\left(\sqrt{z}\,b-g+d\,z-f\,z-c\sqrt{z}\right)+\right.\right.$$
$$(b-c)\sqrt{2\pi}\left(C\left(\frac{-b+c+2\,(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{(b-c)^2}{4\,(f-d)}-g\right)-\cos\left(\frac{(b-c)^2}{4\,(f-d)}-g\right)S\left(\frac{-b+c+2\,(f-d)\sqrt{z}}{\sqrt{f-d}\,\sqrt{2\pi}}\right)\right)\Bigg)+$$
$$\frac{1}{(-d-f)^{3/2}}\left(2\sqrt{-d-f}\,\cos\left(\sqrt{z}\,b+g+d\,z+f\,z+c\sqrt{z}\right)-(b+c)\sqrt{2\pi}\,\cos\left(-\frac{(b+c)^2}{4\,(d+f)}+g\right)\right.$$
$$\left.\left.S\left(\frac{-b-c-2\,(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\pi}}\right)+(b+c)\sqrt{2\pi}\;C\left(\frac{-b-c-2\,(d+f)\sqrt{z}}{\sqrt{-d-f}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(b+c)^2}{4\,(d+f)}+g\right)\right)\right)$$

Involving $\sin(b\,z^r+d\,z+e)\cos(c\,z^r+f\,z+g)$

01.07.21.0658.01

$$\int \sin\left(b z^2 + d z + e\right) \cos\left(c z^2 + f z + g\right) dz = \frac{1}{2} \sqrt{\frac{\pi}{2}} \left(\frac{C\left(\frac{-d+f-2 b z+2 c z}{\sqrt{c-b} \sqrt{2\pi}}\right) \sin\left(\frac{(d-f)^2}{4(c-b)} + e - g\right) - \cos\left(\frac{(d-f)^2}{4(c-b)} + e - g\right) S\left(\frac{-d+f-2 b z+2 c z}{\sqrt{c-b} \sqrt{2\pi}}\right)}{\sqrt{c-b}} + \frac{C\left(-\frac{d+f+2(b+c) z}{\sqrt{-b-c} \sqrt{2\pi}}\right) \sin\left(-\frac{(d+f)^2}{4(b+c)} + e + g\right) - \cos\left(-\frac{(d+f)^2}{4(b+c)} + e + g\right) S\left(-\frac{d+f+2(b+c) z}{\sqrt{-b-c} \sqrt{2\pi}}\right)}{\sqrt{-b-c}} \right)$$

01.07.21.0659.01

$$\int \sin\left(\sqrt{z}\, b + d z + e\right) \cos\left(\sqrt{z}\, c + f z + g\right) dz = \frac{1}{4} \left(\frac{1}{(f-d)^{3/2}} \left(2 \sqrt{f-d} \cos\left(\sqrt{z}\, b + e - g + d z - f z - c \sqrt{z}\right) + (b-c) \sqrt{2\pi} \left(C\left(\frac{-b+c+2(f-d)\sqrt{z}}{\sqrt{f-d} \sqrt{2\pi}}\right) \sin\left(\frac{(b-c)^2}{4(f-d)} + e - g\right) - \cos\left(\frac{(b-c)^2}{4(f-d)} + e - g\right) S\left(\frac{-b+c+2(f-d)\sqrt{z}}{\sqrt{f-d} \sqrt{2\pi}}\right)\right)\right) + \frac{1}{(-d-f)^{3/2}} \left(2 \sqrt{-d-f} \cos\left(\sqrt{z}\, b + e + g + d z + f z + c \sqrt{z}\right) - (b+c) \sqrt{2\pi} \cos\left(-\frac{(b+c)^2}{4(d+f)} + e + g\right) S\left(\frac{-b-c-2(d+f)\sqrt{z}}{\sqrt{-d-f} \sqrt{2\pi}}\right) + (b+c) \sqrt{2\pi}\, C\left(\frac{-b-c-2(d+f)\sqrt{z}}{\sqrt{-d-f} \sqrt{2\pi}}\right) \sin\left(-\frac{(b+c)^2}{4(d+f)} + e + g\right)\right)\right)$$

Involving powers of sin

Involving $\sin^{\mu}(c z) \sin(a z)$

01.07.21.0660.01

$$\int \sin^{\mu}(c z) \cos(a z)\, dz = -\frac{1}{2\left(a^2 - c^2 \mu^2\right)} \left(i\, e^{-i a z} \left(1 - e^{2 i c z}\right)^{-\mu} \left(e^{2 i a z} (a + c\mu)\, {}_2F_1\left(\frac{a - c\mu}{2c}, -\mu; \frac{1}{2}\left(\frac{a}{c} - \mu + 2\right); e^{2 i c z}\right) + (c\mu - a)\, {}_2F_1\left(-\frac{a + c\mu}{2c}, -\mu; -\frac{a + c(\mu - 2)}{2c}; e^{2 i c z}\right)\right) \sin^{\mu}(c z)\right)$$

01.07.21.0661.01

$$\int \sin^m(c\,z)\cos(a\,z)\,dz = \frac{1}{a}\left(i^{-m}\,2^{-m-1}\left(2\,i^m\binom{m}{\frac{m}{2}}\sin(a\,z) - 2\,i^m\binom{m}{\frac{m}{2}}(m \bmod 2)\sin(a\,z) + a\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} -\left(i\,(-1)^k\,e^{-i\,(a+2\,c\,k+c\,m)\,z}\left(a\left(-1+e^{2\,i\,a\,z}\right)\left(e^{2\,i\,c\,m\,z}+e^{i\,(\pi\,m+4\,c\,k\,z)}\right) - c\left(1+e^{2\,i\,a\,z}\right)\left(e^{2\,i\,c\,m\,z}-e^{i\,(\pi\,m+4\,c\,k\,z)}\right)(m-2\,k)\right)\binom{m}{k}\right)\Big/\left((a+2\,c\,k-c\,m)\,(a-2\,c\,k+c\,m)\right)\right)\right)\;/;\; m\in\mathbb{N}^+$$

01.07.21.0662.01

$$\int \sin^2(z)\cos(z)\,dz = \frac{\sin^3(z)}{3}$$

01.07.21.0663.01

$$\int \sin^3(z)\cos(z)\,dz = \frac{1}{32}\left(\cos(4\,z) - 4\cos(2\,z)\right)$$

Involving $\sin^\mu(c\,z+d)\cos(a\,z)$

01.07.21.0664.01

$$\int \sin^\mu(d+c\,z)\cos(a\,z)\,dz = -\frac{1}{2\left(a^2-c^2\,\mu^2\right)}\left(i\,e^{-i\,a\,z}\left(1-e^{2\,i\,(d+c\,z)}\right)^{-\mu}\left(e^{2\,i\,a\,z}\,(a+c\,\mu)\,{}_2F_1\!\left(\frac{a-c\,\mu}{2\,c}, -\mu; \frac{1}{2}\left(\frac{a}{c}-\mu+2\right); e^{2\,i\,(d+c\,z)}\right) + (c\,\mu-a)\,{}_2F_1\!\left(-\frac{a+c\,\mu}{2\,c}, -\mu; -\frac{a+c\,(\mu-2)}{2\,c}; e^{2\,i\,(d+c\,z)}\right)\right)\sin^\mu(d+c\,z)\right)$$

01.07.21.0665.01

$$\int \sin^m(d+c\,z)\cos(a\,z)\,dz = \frac{1}{a}\,i^{-m}\,2^{-m-1}\,e^{-i\,a\,z}\left(-i\,i^m\left(-1+e^{2\,i\,a\,z}\right)\binom{m}{\frac{m}{2}} + i\,i^m\left(-1+e^{2\,i\,a\,z}\right)\binom{m}{\frac{m}{2}}(m \bmod 2) + a\,e^{i\,a\,z}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} -\left(i\,(-1)^k\left(e^{i\,(d\,(m-2\,k)+(a-2\,c\,k+c\,m)\,z)}\,(a+2\,c\,k-c\,m)\,(a-2\,c\,k+c\,m) - i\,(a-2\,c\,k+c\,m)\left(-i\,e^{-i\,(2\,d\,k+2\,c\,z\,k-d\,m+a\,z-c\,m\,z)}\,(a-2\,c\,k+c\,m) + e^{i\,(2\,d\,k+2\,c\,z\,k-d\,m+a\,z-c\,m\,z+m\,\pi)}\,i\,(a-2\,c\,k+c\,m) - i\,e^{-i\,(-2\,d\,k-2\,c\,z\,k+d\,m+a\,z+c\,m\,z-m\,\pi)}\,(a+2\,c\,k-c\,m)\right)\right)\binom{m}{k}\right)\Big/\left((a+2\,c\,k-c\,m)\,(a-2\,c\,k+c\,m)^2\right)\right)\;/;\; m\in\mathbb{N}^+$$

Involving $\sin^\mu(c\,z)\cos(a\,z+b)$

01.07.21.0666.01

$$\int \sin^{\mu}(c\,z)\cos(b+a\,z)\,dz = -\frac{1}{2\left(a^2-c^2\mu^2\right)}\left(i\,e^{-i(b+a\,z)}\left(1-e^{2\,i\,c\,z}\right)^{-\mu}\left(e^{2\,i(b+a\,z)}(a+c\,\mu)\,{}_2F_1\!\left(\frac{a-c\,\mu}{2\,c},-\mu;\frac{1}{2}\left(\frac{a}{c}-\mu+2\right);e^{2\,i\,c\,z}\right)+(c\,\mu-a)\,{}_2F_1\!\left(-\frac{a+c\,\mu}{2\,c},-\mu;-\frac{a+c(\mu-2)}{2\,c};e^{2\,i\,c\,z}\right)\right)\sin^{\mu}(c\,z)\right)$$

01.07.21.2773.01

$$\int \sin^{m}(d+c\,z)\cos(b+a\,z)\,dz = \frac{1}{a}\,i^{-m}\,2^{-m-1}\,e^{-i(b+a\,z)}\left(-i\,i^m\left(-1+e^{2\,i(b+a\,z)}\right)\binom{m}{\frac{m}{2}}+i\,i^m\left(-1+e^{2\,i(b+a\,z)}\right)\binom{m}{\frac{m}{2}}(m \bmod 2)+a\,e^{i\,a\,z}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}-\left(i\,(-1)^k\left(e^{i(2\,b+(a-2\,c\,k+c\,m)\,z)}(a+2\,c\,k-c\,m)(a-2\,c\,k+c\,m)-i\,(a-2\,c\,k+c\,m)\left(-i\,e^{-i(a\,z+2\,c\,k\,z-c\,m\,z)}(a-2\,c\,k+c\,m)+e^{i(2\,b+a\,z+2\,c\,k\,z-c\,m\,z+m\,\pi)}\,i\,(a-2\,c\,k+c\,m)-i\,e^{-i(c\,z\,m+a\,z-2\,c\,k\,z-m\,\pi)}(a+2\,c\,k-c\,m)\right)\right)\binom{m}{k}\right)\Big/\left((a+2\,c\,k-c\,m)(a-2\,c\,k+c\,m)^2\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^{\mu}(c\,z+d)\cos(a\,z+b)$

01.07.21.0667.01

$$\int \sin^{\mu}(d+c\,z)\cos(b+a\,z)\,dz = -\frac{1}{2\left(a^2-c^2\mu^2\right)}\left(i\,e^{-i(b+a\,z)}\left(1-e^{2\,i(d+c\,z)}\right)^{-\mu}\left(e^{2\,i(b+a\,z)}(a+c\,\mu)\,{}_2F_1\!\left(\frac{a-c\,\mu}{2\,c},-\mu;\frac{1}{2}\left(\frac{a}{c}-\mu+2\right);e^{2\,i(d+c\,z)}\right)+(c\,\mu-a)\,{}_2F_1\!\left(-\frac{a+c\,\mu}{2\,c},-\mu;-\frac{a+c(\mu-2)}{2\,c};e^{2\,i(d+c\,z)}\right)\right)\sin^{\mu}(d+c\,z)\right)$$

01.07.21.0668.01

$$\int \sin^{m}(d+c\,z)\cos(b+a\,z)\,dz = \frac{1}{a}\,i^{-m}\,2^{-m-1}\,e^{-i(b+a\,z)}\left(-i\,i^m\left(-1+e^{2\,i(b+a\,z)}\right)\binom{m}{\frac{m}{2}}+i\,i^m\left(-1+e^{2\,i(b+a\,z)}\right)\binom{m}{\frac{m}{2}}(m \bmod 2)+a\,e^{i\,a\,z}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}-\left(i\,(-1)^k\left(e^{i(2\,b+d(m-2\,k)+(a-2\,c\,k+c\,m)\,z)}(a+2\,c\,k-c\,m)(a-2\,c\,k+c\,m)-i\,(a-2\,c\,k+c\,m)\left(-i\,e^{-i(2\,d\,k+2\,c\,z\,k-d\,m+a\,z-c\,m\,z)}(a-2\,c\,k+c\,m)+e^{i(2\,b+2\,d\,k-d\,m+a\,z+2\,c\,k\,z-c\,m\,z+m\,\pi)}\,i\,(a-2\,c\,k+c\,m)-i\,e^{-i(-2\,d\,k-2\,c\,z\,k+d\,m+a\,z+c\,m\,z-m\,\pi)}(a+2\,c\,k-c\,m)\right)\right)\binom{m}{k}\right)\Big/\left((a+2\,c\,k-c\,m)(a-2\,c\,k+c\,m)^2\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^{m}\left(b\,z^r\right)\cos(c\,z)$

01.07.21.0669.01

$$\int \sin^m(b z^2)\cos(c z)\,dz = \frac{2^{-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sin(c z)}{c} + 2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{2bk-bm}}\left(\cos\left(\frac{m\pi}{2}-\frac{c^2}{4(2bk-bm)}\right)C\left(\frac{2(2bk-bm)z-c}{\sqrt{2bk-bm}\sqrt{2\pi}}\right)-S\left(\frac{2(2bk-bm)z-c}{\sqrt{2bk-bm}\sqrt{2\pi}}\right)\sin\left(\frac{m\pi}{2}-\frac{c^2}{4(2bk-bm)}\right)\right)+\frac{1}{\sqrt{2bk-bm}}\left(\cos\left(\frac{m\pi}{2}-\frac{c^2}{4(2bk-bm)}\right)C\left(\frac{c+2(2bk-bm)z}{\sqrt{2bk-bm}\sqrt{2\pi}}\right)-S\left(\frac{c+2(2bk-bm)z}{\sqrt{2bk-bm}\sqrt{2\pi}}\right)\sin\left(\frac{m\pi}{2}-\frac{c^2}{4(2bk-bm)}\right)\right)\right) /;\ m\in\mathbb{N}^+$$

01.07.21.0670.01

$$\int \sin^m(\sqrt{z}\,b)\cos(c z)\,dz = \frac{2^{-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sin(c z)}{c} + 2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{c^{3/2}}\left((bm-2bk)\sqrt{2\pi}\cos\left(-\frac{(2bk-bm)^2}{4c}+\frac{m\pi}{2}\right)C\left(\frac{2\sqrt{z}\,c+2bk-bm}{\sqrt{c}\sqrt{2\pi}}\right)+(2bk-bm)\sqrt{2\pi}\,S\left(\frac{2\sqrt{z}\,c+2bk-bm}{\sqrt{c}\sqrt{2\pi}}\right)\sin\left(-\frac{(2bk-bm)^2}{4c}+\frac{m\pi}{2}\right)+2\sqrt{c}\sin\left(cz+(2bk-bm)\sqrt{z}+\frac{m\pi}{2}\right)\right)+\frac{1}{(-c)^{3/2}}\left((bm-2bk)\sqrt{2\pi}\cos\left(\frac{(2bk-bm)^2}{4c}+\frac{m\pi}{2}\right)C\left(\frac{-2\sqrt{z}\,c+2bk-bm}{\sqrt{-c}\sqrt{2\pi}}\right)+(2bk-bm)\sqrt{2\pi}\,S\left(\frac{-2\sqrt{z}\,c+2bk-bm}{\sqrt{-c}\sqrt{2\pi}}\right)\sin\left(\frac{(2bk-bm)^2}{4c}+\frac{m\pi}{2}\right)+2\sqrt{-c}\sin\left(-cz+(2bk-bm)\sqrt{z}+\frac{m\pi}{2}\right)\right)\right) /;\ m\in\mathbb{N}^+$$

Involving $\sin^m(b z^r + e)\cos(c z)$

01.07.21.0671.01

$$\int \sin^m\left(b z^2 + e\right)\cos(c z)\,dz = \frac{2^{-m}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sin(c z)}{c} + 2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{2 b k - b m}}\left(\cos\left(-\frac{c^2}{4(2 b k - b m)} + 2 e k - e m + \frac{m\pi}{2}\right)C\left(\frac{2(2 b k - b m) z - c}{\sqrt{2 b k - b m}\,\sqrt{2\pi}}\right) - S\left(\frac{2(2 b k - b m) z - c}{\sqrt{2 b k - b m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4(2 b k - b m)} + 2 e k - e m + \frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{2 b k - b m}}\left(\cos\left(-\frac{c^2}{4(2 b k - b m)} + 2 e k - e m + \frac{m\pi}{2}\right)C\left(\frac{c + 2(2 b k - b m) z}{\sqrt{2 b k - b m}\,\sqrt{2\pi}}\right) - S\left(\frac{c + 2(2 b k - b m) z}{\sqrt{2 b k - b m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4(2 b k - b m)} + 2 e k - e m + \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0672.01

$$\int \sin^m\left(\sqrt{z}\, b + e\right)\cos(c z)\,dz = \frac{2^{-m}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sin(c z)}{c} + 2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{c^{3/2}}\left((b m - 2 b k)\sqrt{2\pi}\cos\left(-\frac{(2 b k - b m)^2}{4 c} + 2 e k - e m + \frac{m\pi}{2}\right)C\left(\frac{2\sqrt{z}\, c + 2 b k - b m}{\sqrt{c}\,\sqrt{2\pi}}\right) + (2 b k - b m)\sqrt{2\pi}\, S\left(\frac{2\sqrt{z}\, c + 2 b k - b m}{\sqrt{c}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2 b k - b m)^2}{4 c} + 2 e k - e m + \frac{m\pi}{2}\right) + 2\sqrt{c}\,\sin\left(2 e k - e m + c z + (2 b k - b m)\sqrt{z} + \frac{m\pi}{2}\right)\right) + \frac{1}{(-c)^{3/2}}\left((b m - 2 b k)\sqrt{2\pi}\cos\left(\frac{(2 b k - b m)^2}{4 c} + 2 e k - e m + \frac{m\pi}{2}\right)C\left(\frac{-2\sqrt{z}\, c + 2 b k - b m}{\sqrt{-c}\,\sqrt{2\pi}}\right) + (2 b k - b m)\sqrt{2\pi}\, S\left(\frac{-2\sqrt{z}\, c + 2 b k - b m}{\sqrt{-c}\,\sqrt{2\pi}}\right)\sin\left(\frac{(2 b k - b m)^2}{4 c} + 2 e k - e m + \frac{m\pi}{2}\right) + 2\sqrt{-c}\,\sin\left(2 e k - e m - c z + (2 b k - b m)\sqrt{z} + \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z\right)\cos(c z)$

01.07.21.0673.01

$$\int \sin^m(b z^2 + d z) \cos(c z)\, dz = \frac{2^{-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sin(c z)}{c} + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{2 b k - b m}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{m \pi}{2} - \frac{(-c + 2 d k - d m)^2}{4 (2 b k - b m)}\right) C\left(\frac{-c + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}}\right) + \cos\left(\frac{m \pi}{2} - \frac{(c + 2 d k - d m)^2}{4 (2 b k - b m)}\right) C\left(\frac{c + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}}\right) - S\left(\frac{-c + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(\frac{m \pi}{2} - \frac{(-c + 2 d k - d m)^2}{4 (2 b k - b m)}\right) - S\left(\frac{c + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(\frac{m \pi}{2} - \frac{(c + 2 d k - d m)^2}{4 (2 b k - b m)}\right)\right)\right) /;\, m \in \mathbb{N}^+$$

01.07.21.0674.01

$$\int \sin^m\left(\sqrt{z}\, b + d z\right) \cos(c z)\, dz = \frac{2^{-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sin(c z)}{c} + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\left((b m - 2 b k) \sqrt{2 \pi} \cos\left(\frac{m \pi}{2} - \frac{(2 b k - b m)^2}{4 (-c + 2 d k - d m)}\right) C\left(\frac{2 b k - b m + 2 (-c + 2 d k - d m) \sqrt{z}}{\sqrt{-c + 2 d k - d m} \sqrt{2 \pi}}\right) + (2 b k - b m) \sqrt{2 \pi}\, S\left(\frac{2 b k - b m + 2 (-c + 2 d k - d m) \sqrt{z}}{\sqrt{-c + 2 d k - d m} \sqrt{2 \pi}}\right) \sin\left(\frac{m \pi}{2} - \frac{(2 b k - b m)^2}{4 (-c + 2 d k - d m)}\right) + 2 \sqrt{-c + 2 d k - d m} \sin\left(\frac{\pi m}{2} + (-c + 2 d k - d m) z + (2 b k - b m) \sqrt{z}\right)\right) \Big/ (-c + 2 d k - d m)^{3/2} + \frac{1}{(c + 2 d k - d m)^{3/2}} \left((b m - 2 b k) \sqrt{2 \pi} \cos\left(\frac{m \pi}{2} - \frac{(2 b k - b m)^2}{4 (c + 2 d k - d m)}\right) C\left(\frac{2 b k - b m + 2 (c + 2 d k - d m) \sqrt{z}}{\sqrt{c + 2 d k - d m} \sqrt{2 \pi}}\right) + (2 b k - b m) \sqrt{2 \pi}\, S\left(\frac{2 b k - b m + 2 (c + 2 d k - d m) \sqrt{z}}{\sqrt{c + 2 d k - d m} \sqrt{2 \pi}}\right) \sin\left(\frac{m \pi}{2} - \frac{(2 b k - b m)^2}{4 (c + 2 d k - d m)}\right) + 2 \sqrt{c + 2 d k - d m} \sin\left(\frac{\pi m}{2} + (c + 2 d k - d m) z + (2 b k - b m) \sqrt{z}\right)\right)\right) /;\, m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + d z + e) \cos(c z)$

01.07.21.0675.01

$$\int \sin^m\left(b z^2 + d z + e\right) \cos(c z) \, dz = \frac{2^{-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sin(c z)}{c} + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{2 b k - b m}} \left(\cos\left(-\frac{(-c + 2 d k - d m)^2}{4 (2 b k - b m)} + 2 e k - e m + \frac{m \pi}{2} \right) C\left(\frac{-c + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) - S\left(\frac{-c + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) \sin\left(-\frac{(-c + 2 d k - d m)^2}{4 (2 b k - b m)} + 2 e k - e m + \frac{m \pi}{2} \right) \right) + \frac{1}{\sqrt{2 b k - b m}} \left(\cos\left(-\frac{(c + 2 d k - d m)^2}{4 (2 b k - b m)} + 2 e k - e m + \frac{m \pi}{2} \right) C\left(\frac{c + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) - S\left(\frac{c + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) \sin\left(-\frac{(c + 2 d k - d m)^2}{4 (2 b k - b m)} + 2 e k - e m + \frac{m \pi}{2} \right) \right) \right) /; m \in \mathbb{N}^+$$

01.07.21.0676.01

$$\int \sin^m\left(\sqrt{z}\, b + d z + e\right) \cos(c z) \, dz = \frac{2^{-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sin(c z)}{c} + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\left((b m - 2 b k) \sqrt{2 \pi} \cos\left(-\frac{(2 b k - b m)^2}{4 (-c + 2 d k - d m)} + 2 e k - e m + \frac{m \pi}{2} \right) C\left(\frac{2 b k - b m + 2 (-c + 2 d k - d m) \sqrt{z}}{\sqrt{-c + 2 d k - d m} \sqrt{2 \pi}} \right) + (2 b k - b m) \sqrt{2 \pi}\, S\left(\frac{2 b k - b m + 2 (-c + 2 d k - d m) \sqrt{z}}{\sqrt{-c + 2 d k - d m} \sqrt{2 \pi}} \right) \sin\left(-\frac{(2 b k - b m)^2}{4 (-c + 2 d k - d m)} + 2 e k - e m + \frac{m \pi}{2} \right) + 2 \sqrt{-c + 2 d k - d m} \sin\left(2 e k - e m + (-c + 2 d k - d m) z + (2 b k - b m) \sqrt{z} + \frac{m \pi}{2} \right) \right) \Big/ (-c + 2 d k - d m)^{3/2} + \frac{1}{(c + 2 d k - d m)^{3/2}} \left((b m - 2 b k) \sqrt{2 \pi} \cos\left(-\frac{(2 b k - b m)^2}{4 (c + 2 d k - d m)} + 2 e k - e m + \frac{m \pi}{2} \right) C\left(\frac{2 b k - b m + 2 (c + 2 d k - d m) \sqrt{z}}{\sqrt{c + 2 d k - d m} \sqrt{2 \pi}} \right) + (2 b k - b m) \sqrt{2 \pi}\, S\left(\frac{2 b k - b m + 2 (c + 2 d k - d m) \sqrt{z}}{\sqrt{c + 2 d k - d m} \sqrt{2 \pi}} \right) \sin\left(-\frac{(2 b k - b m)^2}{4 (c + 2 d k - d m)} + 2 e k - e m + \frac{m \pi}{2} \right) + 2 \sqrt{c + 2 d k - d m} \sin\left(2 e k - e m + (c + 2 d k - d m) z + (2 b k - b m) \sqrt{z} + \frac{m \pi}{2} \right) \right) \right) /; m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r\right) \cos(f z + g)$

01.07.21.0677.01

$$\int \sin^m(b z^2) \cos(f z + g) \, dz = \frac{2^{-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sin(g + f z)}{f} + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{2 b k - b m}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{f^2}{4 (2 b k - b m)} + g - \frac{m \pi}{2} \right) C\left(\frac{2 (2 b k - b m) z - f}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) + \cos\left(-\frac{f^2}{4 (2 b k - b m)} + g + \frac{m \pi}{2} \right) C\left(\frac{f + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) - S\left(\frac{f + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) \sin\left(-\frac{f^2}{4 (2 b k - b m)} + g + \frac{m \pi}{2} \right) + S\left(\frac{2 (2 b k - b m) z - f}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) \sin\left(\frac{f^2}{4 (2 b k - b m)} + g - \frac{m \pi}{2} \right) \right) \right) /; m \in \mathbb{N}^+$$

01.07.21.0678.01

$$\int \sin^m(\sqrt{z} \, b) \cos(f z + g) \, dz = \frac{2^{-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sin(g + f z)}{f} + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{f^{3/2}} \left((b m - 2 b k) \sqrt{2 \pi} \left(\cos\left(-\frac{(2 b k - b m)^2}{4 f} + g + \frac{m \pi}{2} \right) C\left(\frac{2 \sqrt{z} \, f + 2 b k - b m}{\sqrt{f} \sqrt{2 \pi}} \right) - S\left(\frac{2 \sqrt{z} \, f + 2 b k - b m}{\sqrt{f} \sqrt{2 \pi}} \right) \sin\left(-\frac{(2 b k - b m)^2}{4 f} + g + \frac{m \pi}{2} \right) \right) + 2 \sqrt{f} \sin\left(g + f z + (2 b k - b m) \sqrt{z} + \frac{m \pi}{2} \right) \right) + \frac{1}{(-f)^{3/2}} \left((b m - 2 b k) \sqrt{2 \pi} \left(\cos\left(-\frac{(2 b k - b m)^2}{4 f} + g - \frac{m \pi}{2} \right) C\left(\frac{-2 \sqrt{z} \, f + 2 b k - b m}{\sqrt{-f} \sqrt{2 \pi}} \right) + S\left(\frac{-2 \sqrt{z} \, f + 2 b k - b m}{\sqrt{-f} \sqrt{2 \pi}} \right) \sin\left(-\frac{(2 b k - b m)^2}{4 f} + g - \frac{m \pi}{2} \right) \right) - 2 \sqrt{-f} \sin\left(g + f z - (2 b k - b m) \sqrt{z} - \frac{m \pi}{2} \right) \right) \right) /; m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + e) \cos(f z + g)$

01.07.21.0679.01

$$\int \sin^m\left(b z^2+e\right)\cos(f z+g)\,dz = \frac{2^{-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sin(g+f z)}{f} + 2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{2 b k-b m}}\left((-1)^k\binom{m}{k}\left(\cos\left(\frac{f^2}{4(2 b k-b m)}+g-2 e k+e m-\frac{m\pi}{2}\right)C\left(\frac{2(2 b k-b m)z-f}{\sqrt{2 b k-b m}\sqrt{2\pi}}\right)+\cos\left(-\frac{f^2}{4(2 b k-b m)}+g+2 e k-e m+\frac{m\pi}{2}\right)C\left(\frac{f+2(2 b k-b m)z}{\sqrt{2 b k-b m}\sqrt{2\pi}}\right)-S\left(\frac{f+2(2 b k-b m)z}{\sqrt{2 b k-b m}\sqrt{2\pi}}\right)\sin\left(-\frac{f^2}{4(2 b k-b m)}+g+2 e k-e m+\frac{m\pi}{2}\right)+S\left(\frac{2(2 b k-b m)z-f}{\sqrt{2 b k-b m}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4(2 b k-b m)}+g-2 e k+e m-\frac{m\pi}{2}\right)\right)\right)\;/;\; m\in\mathbb{N}^+$$

01.07.21.0680.01

$$\int \sin^m\left(\sqrt{z}\,b+e\right)\cos(f z+g)\,dz = \frac{2^{-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sin(g+f z)}{f} + 2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{f^{3/2}}\left((b m-2 b k)\sqrt{2\pi}\left(\cos\left(-\frac{(2 b k-b m)^2}{4 f}+g+2 e k-e m+\frac{m\pi}{2}\right)C\left(\frac{2\sqrt{z}\,f+2 b k-b m}{\sqrt{f}\sqrt{2\pi}}\right)-S\left(\frac{2\sqrt{z}\,f+2 b k-b m}{\sqrt{f}\sqrt{2\pi}}\right)\sin\left(-\frac{(2 b k-b m)^2}{4 f}+g+2 e k-e m+\frac{m\pi}{2}\right)\right)+2\sqrt{f}\sin\left(g+2 e k-e m+f z+(2 b k-b m)\sqrt{z}+\frac{m\pi}{2}\right)\right)+\frac{1}{(-f)^{3/2}}\left((b m-2 b k)\sqrt{2\pi}\left(\cos\left(-\frac{(2 b k-b m)^2}{4 f}+g-2 e k+e m-\frac{m\pi}{2}\right)C\left(\frac{-2\sqrt{z}\,f+2 b k-b m}{\sqrt{-f}\sqrt{2\pi}}\right)+S\left(\frac{-2\sqrt{z}\,f+2 b k-b m}{\sqrt{-f}\sqrt{2\pi}}\right)\sin\left(-\frac{(2 b k-b m)^2}{4 f}+g-2 e k+e m-\frac{m\pi}{2}\right)\right)-2\sqrt{-f}\sin\left(g-2 e k+e m+f z-(2 b k-b m)\sqrt{z}-\frac{m\pi}{2}\right)\right)\right)\;/;\; m\in\mathbb{N}^+$$

Involving $\sin^m\left(b z^r+d z\right)\cos(f z+g)$

01.07.21.0681.01

$$\int \sin^m\left(b z^2 + d z\right) \cos(f z + g)\, dz = \frac{2^{-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sin(g + f z)}{f} + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{2 b k - b m}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{(-f + 2 d k - d m)^2}{4 (2 b k - b m)} + g - \frac{m \pi}{2} \right) C\left(\frac{-f + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) + \cos\left(-\frac{(f + 2 d k - d m)^2}{4 (2 b k - b m)} + g + \frac{m \pi}{2} \right) C\left(\frac{f + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) - S\left(\frac{f + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) \sin\left(-\frac{(f + 2 d k - d m)^2}{4 (2 b k - b m)} + g + \frac{m \pi}{2} \right) + S\left(\frac{-f + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) \sin\left(\frac{(-f + 2 d k - d m)^2}{4 (2 b k - b m)} + g - \frac{m \pi}{2} \right) \right) \right) /;\ m \in \mathbb{N}^+$$

01.07.21.0682.01

$$\int \sin^m\left(\sqrt{z}\, b + d z\right) \cos(f z + g)\, dz = \frac{2^{-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sin(g + f z)}{f} + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(f + 2 d k - d m)^{3/2}} \left((b m - 2 b k) \sqrt{2 \pi} \left(\cos\left(-\frac{(2 b k - b m)^2}{4 (f + 2 d k - d m)} + g + \frac{m \pi}{2} \right) C\left(\frac{2 b k - b m + 2 (f + 2 d k - d m) \sqrt{z}}{\sqrt{f + 2 d k - d m} \sqrt{2 \pi}} \right) - S\left(\frac{2 b k - b m + 2 (f + 2 d k - d m) \sqrt{z}}{\sqrt{f + 2 d k - d m} \sqrt{2 \pi}} \right) \sin\left(-\frac{(2 b k - b m)^2}{4 (f + 2 d k - d m)} + g + \frac{m \pi}{2} \right) \right) + 2 \sqrt{f + 2 d k - d m} \sin\left(g + (f + 2 d k - d m) z + (2 b k - b m) \sqrt{z} + \frac{m \pi}{2} \right) \right) + \left((b m - 2 b k) \sqrt{2 \pi} \left(\cos\left(\frac{(2 b k - b m)^2}{4 (-f + 2 d k - d m)} + g - \frac{m \pi}{2} \right) C\left(\frac{2 b k - b m + 2 (-f + 2 d k - d m) \sqrt{z}}{\sqrt{-f + 2 d k - d m} \sqrt{2 \pi}} \right) + S\left(\frac{2 b k - b m + 2 (-f + 2 d k - d m) \sqrt{z}}{\sqrt{-f + 2 d k - d m} \sqrt{2 \pi}} \right) \sin\left(\frac{(2 b k - b m)^2}{4 (-f + 2 d k - d m)} + g - \frac{m \pi}{2} \right) \right) - 2 \sqrt{-f + 2 d k - d m} \sin\left(g - (-f + 2 d k - d m) z - (2 b k - b m) \sqrt{z} - \frac{m \pi}{2} \right) \right) \Big/ (-f + 2 d k - d m)^{3/2} \right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z + e\right) \cos(f z + g)$

01.07.21.0683.01

$$\int \sin^m\left(b z^2 + d z + e\right) \cos(f z + g)\, dz = \frac{2^{-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sin(g + f z)}{f} + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{2 b k - b m}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{(-f + 2 d k - d m)^2}{4 (2 b k - b m)} + g - 2 e k + e m - \frac{m \pi}{2}\right) C\left(\frac{-f + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}}\right) + \cos\left(-\frac{(f + 2 d k - d m)^2}{4 (2 b k - b m)} + g + 2 e k - e m + \frac{m \pi}{2}\right) C\left(\frac{f + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}}\right) - S\left(\frac{f + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(-\frac{(f + 2 d k - d m)^2}{4 (2 b k - b m)} + g + 2 e k - e m + \frac{m \pi}{2}\right) + S\left(\frac{-f + 2 d k - d m + 2 (2 b k - b m) z}{\sqrt{2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(\frac{(-f + 2 d k - d m)^2}{4 (2 b k - b m)} + g - 2 e k + e m - \frac{m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

01.07.21.0684.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \cos(f\, z + g)\, dz = \frac{2^{-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sin(g + f\, z)}{f} + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(f + 2\, d\, k - d\, m)^{3/2}} \left((b\, m - 2\, b\, k) \sqrt{2\pi} \left(\cos\left(-\frac{(2\, b\, k - b\, m)^2}{4\, (f + 2\, d\, k - d\, m)} + g + 2\, e\, k - e\, m + \frac{m\, \pi}{2} \right) C\left(\frac{2\, b\, k - b\, m + 2\, (f + 2\, d\, k - d\, m) \sqrt{z}}{\sqrt{f + 2\, d\, k - d\, m}\, \sqrt{2\pi}} \right) - S\left(\frac{2\, b\, k - b\, m + 2\, (f + 2\, d\, k - d\, m) \sqrt{z}}{\sqrt{f + 2\, d\, k - d\, m}\, \sqrt{2\pi}} \right) \sin\left(-\frac{(2\, b\, k - b\, m)^2}{4\, (f + 2\, d\, k - d\, m)} + g + 2\, e\, k - e\, m + \frac{m\, \pi}{2} \right) \right) + 2 \sqrt{f + 2\, d\, k - d\, m}\, \sin\left(g + 2\, e\, k - e\, m + (f + 2\, d\, k - d\, m)\, z + (2\, b\, k - b\, m) \sqrt{z} + \frac{m\, \pi}{2} \right) \right) + \left((b\, m - 2\, b\, k) \sqrt{2\pi} \left(\cos\left(\frac{(2\, b\, k - b\, m)^2}{4\, (-f + 2\, d\, k - d\, m)} + g - 2\, e\, k + e\, m - \frac{m\, \pi}{2} \right) C\left(\frac{2\, b\, k - b\, m + 2\, (-f + 2\, d\, k - d\, m) \sqrt{z}}{\sqrt{-f + 2\, d\, k - d\, m}\, \sqrt{2\pi}} \right) + S\left(\frac{2\, b\, k - b\, m + 2\, (-f + 2\, d\, k - d\, m) \sqrt{z}}{\sqrt{-f + 2\, d\, k - d\, m}\, \sqrt{2\pi}} \right) \sin\left(\frac{(2\, b\, k - b\, m)^2}{4\, (-f + 2\, d\, k - d\, m)} + g - 2\, e\, k + e\, m - \frac{m\, \pi}{2} \right) \right) - 2 \sqrt{-f + 2\, d\, k - d\, m}\, \sin\left(g - 2\, e\, k + e\, m - (-f + 2\, d\, k - d\, m)\, z - (2\, b\, k - b\, m) \sqrt{z} - \frac{m\, \pi}{2} \right) \right) \Big/ (-f + 2\, d\, k - d\, m)^{3/2} \right) /;\; m \in \mathbb{N}^+$$

Involving $\sin(b\, z)^m \cos(c\, z^r)$

01.07.21.0685.01

$$\int \sin^m(b\, z) \cos\left(c\, z^2\right) dz = \frac{2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} C\left(\sqrt{c} \sqrt{\frac{2}{\pi}}\, z \right) (1 - m \bmod 2)}{\sqrt{c}} + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{-c}} \left(\cos\left(\frac{(2\, b\, k - b\, m)^2}{4\, c} + \frac{m\, \pi}{2} \right) C\left(\frac{2\, b\, k - b\, m - 2\, c\, z}{\sqrt{-c}\, \sqrt{2\pi}} \right) - S\left(\frac{2\, b\, k - b\, m - 2\, c\, z}{\sqrt{-c}\, \sqrt{2\pi}} \right) \sin\left(\frac{(2\, b\, k - b\, m)^2}{4\, c} + \frac{m\, \pi}{2} \right) \right) + \frac{1}{\sqrt{c}} \left(\cos\left(\frac{(2\, b\, k - b\, m)^2}{4\, c} - \frac{m\, \pi}{2} \right) C\left(\frac{2\, b\, k - b\, m + 2\, c\, z}{\sqrt{c}\, \sqrt{2\pi}} \right) + S\left(\frac{2\, b\, k - b\, m + 2\, c\, z}{\sqrt{c}\, \sqrt{2\pi}} \right) \sin\left(\frac{(2\, b\, k - b\, m)^2}{4\, c} - \frac{m\, \pi}{2} \right) \right) \right) /;\; m \in \mathbb{N}^+$$

01.07.21.0686.01

$$\int \sin^m(b\,z)\cos\left(c\sqrt{z}\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cos\left(c\sqrt{z}\right)+c\sqrt{z}\,\sin\left(c\sqrt{z}\right)\right)}{c^2} + 2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(2\,b\,k-b\,m)^{3/2}}\left((-1)^k\binom{m}{k}\left(c\sqrt{2\pi}\,\cos\left(\frac{c^2}{4(2\,b\,k-b\,m)}-\frac{m\,\pi}{2}\right)C\left(\frac{2(2\,b\,k-b\,m)\sqrt{z}-c}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)-\right.\right.$$
$$c\sqrt{2\pi}\,\cos\left(\frac{c^2}{4(2\,b\,k-b\,m)}-\frac{m\,\pi}{2}\right)C\left(\frac{c+2(2\,b\,k-b\,m)\sqrt{z}}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)+$$
$$c\sqrt{2\pi}\,S\left(\frac{2(2\,b\,k-b\,m)\sqrt{z}-c}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4(2\,b\,k-b\,m)}-\frac{m\,\pi}{2}\right)-c\sqrt{2\pi}\,S\left(\frac{c+2(2\,b\,k-b\,m)\sqrt{z}}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)$$
$$\left.\left.\sin\left(\frac{c^2}{4(2\,b\,k-b\,m)}-\frac{m\,\pi}{2}\right)+4\sqrt{b(2\,k-m)}\,\cos\left(c\sqrt{z}\right)\sin\left(2\,b\,k\,z+\frac{1}{2}\,m(\pi-2\,b\,z)\right)\right)\right)\text{/; } m\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\cos\left(c\,z^r\right)$

01.07.21.0687.01

$$\int \sin^m(d\,z+e)\cos\left(c\,z^2\right)dz = \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)}{\sqrt{c}}\,C\left(\sqrt{c}\,\sqrt{\frac{2}{\pi}}\,z\right)+$$
$$2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)C\left(\frac{2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\pi}}\right)-\right.\right.$$
$$\left.S\left(\frac{2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)\right)+$$
$$\frac{1}{\sqrt{-c}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)C\left(\frac{2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\pi}}\right)+\right.$$
$$\left.\left.\left.S\left(\frac{2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)\right)\right)\right)\text{/; } m\in\mathbb{N}^+$$

01.07.21.0688.01

$$\int \sin^m(d\,z+e)\cos\left(\sqrt{z}\;c\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cos\left(\sqrt{z}\;c\right)+c\sqrt{z}\;\sin\left(\sqrt{z}\;c\right)\right)}{c^2} + 2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{2\,d\,k-d\,m}\;\sin\left(\sqrt{z}\;c+2\,e\,k-e\,m+(2\,d\,k-d\,m)\,z+\frac{m\,\pi}{2}\right)-c\sqrt{2\,\pi}\left(\cos\left(-\frac{c^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)C\left(\frac{c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\;\sqrt{2\,\pi}}\right)-S\left(\frac{c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\;\sqrt{2\,\pi}}\right)\sin\left(-\frac{c^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(c\sqrt{2\,\pi}\left(\cos\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)C\left(\frac{2\,(2\,d\,k-d\,m)\sqrt{z}-c}{\sqrt{2\,d\,k-d\,m}\;\sqrt{2\,\pi}}\right)+S\left(\frac{2\,(2\,d\,k-d\,m)\sqrt{z}-c}{\sqrt{2\,d\,k-d\,m}\;\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)\right)-2\sqrt{2\,d\,k-d\,m}\;\sin\left(\sqrt{z}\;c-2\,e\,k+e\,m-(2\,d\,k-d\,m)\,z-\frac{m\,\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m(b\,z^r)\cos(c\,z^r)$

01.07.21.0689.01

$$\int \sin^m(b\,z^r)\cos(c\,z^r)\,dz = -\frac{1}{r}\left(2^{-m-1}\,z\binom{m}{\frac{m}{2}}\left(\Gamma\left(\frac{1}{r},-i\,c\,z^r\right)(-i\,c\,z^r)^{-1/r}+(i\,c\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},i\,c\,z^r\right)\right)(1-m \bmod 2)\right)-\frac{1}{r}\left(2^{-m-1}\,z\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{i\frac{m\pi}{2}}\,\Gamma\left(\frac{1}{r},-i\,(-c+2\,b\,k-b\,m)\,z^r\right)(-i\,(-c+2\,b\,k-b\,m)\,z^r)^{-1/r}+e^{-i\frac{m\pi}{2}}\,(i\,(-c+2\,b\,k-b\,m)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},i\,(-c+2\,b\,k-b\,m)\,z^r\right)+e^{i\frac{m\pi}{2}}\,(-i\,(c+2\,b\,k-b\,m)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},-i\,(c+2\,b\,k-b\,m)\,z^r\right)+e^{-i\frac{m\pi}{2}}\,(i\,(c+2\,b\,k-b\,m)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},i\,(c+2\,b\,k-b\,m)\,z^r\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.07.21.0690.01

$$\int \sin^m(b z^2)\cos(c z^2)\,dz = \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)}{\sqrt{c}}\, C\left(\sqrt{c}\sqrt{\frac{2}{\pi}}\, z\right) + 2^{-m-\frac{1}{2}}\sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{c+2bk-bm}}\left(\cos\left(\frac{m\pi}{2}\right) C\left(\sqrt{c+2bk-bm}\sqrt{\frac{2}{\pi}}\, z\right) - S\left(\sqrt{c+2bk-bm}\sqrt{\frac{2}{\pi}}\, z\right)\sin\left(\frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{-c+2bk-bm}}\left(\cos\left(\frac{m\pi}{2}\right) C\left(\sqrt{-c+2bk-bm}\sqrt{\frac{2}{\pi}}\, z\right) - S\left(\sqrt{-c+2bk-bm}\sqrt{\frac{2}{\pi}}\, z\right)\sin\left(\frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0691.01

$$\int \sin^m\left(\sqrt{z}\, b\right)\cos\left(\sqrt{z}\, c\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cos\left(\sqrt{z}\, c\right) + c\sqrt{z}\sin\left(\sqrt{z}\, c\right)\right)}{c^2} + 2^{1-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(c+2bk-bm)^2}\left(\cos\left((c+2bk-bm)\sqrt{z} + \frac{m\pi}{2}\right) + (c+2bk-bm)\sqrt{z}\sin\left((c+2bk-bm)\sqrt{z} + \frac{m\pi}{2}\right)\right) + \frac{1}{(-c+2bk-bm)^2}\left(\cos\left((-c+2bk-bm)\sqrt{z} + \frac{m\pi}{2}\right) + (-c+2bk-bm)\sqrt{z}\sin\left((-c+2bk-bm)\sqrt{z} + \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + e)\cos(c z^r)$

01.07.21.0692.01

$$\int \sin^m(b z^r + e)\cos(c z^r)\,dz = -\frac{1}{r}\left(2^{-m-1} z \binom{m}{\frac{m}{2}}\left(\Gamma\left(\frac{1}{r}, -i c z^r\right)(-i c z^r)^{-1/r} + (i c z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i c z^r\right)\right)(1-m \bmod 2)\right) - \frac{1}{r}\left(2^{-m-1} z \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{i\left(2ek-em+\frac{m\pi}{2}\right)}\,\Gamma\left(\frac{1}{r}, -i(-c+2bk-bm) z^r\right)(-i(-c+2bk-bm) z^r)^{-1/r} + e^{-i\left(2ek-em+\frac{m\pi}{2}\right)}(i(-c+2bk-bm) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i(-c+2bk-bm) z^r\right) + e^{i\left(2ek-em+\frac{m\pi}{2}\right)}(-i(c+2bk-bm) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, -i(c+2bk-bm) z^r\right) + e^{-i\left(2ek-em+\frac{m\pi}{2}\right)}(i(c+2bk-bm) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i(c+2bk-bm) z^r\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0693.01

$$\int \sin^m(b z^2 + e) \cos(c z^2)\, dz = \frac{2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)}{\sqrt{c}} C\left(\sqrt{c} \sqrt{\frac{2}{\pi}}\, z\right) + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{c + 2 b k - b m}} \left(\cos\left(2 e k - e m + \frac{m \pi}{2}\right) C\left(\sqrt{c + 2 b k - b m} \sqrt{\frac{2}{\pi}}\, z\right) - S\left(\sqrt{c + 2 b k - b m} \sqrt{\frac{2}{\pi}}\, z\right) \sin\left(2 e k - e m + \frac{m \pi}{2}\right)\right) + \frac{1}{\sqrt{-c + 2 b k - b m}} \left(\cos\left(-2 e k + e m - \frac{m \pi}{2}\right) C\left(\sqrt{-c + 2 b k - b m} \sqrt{\frac{2}{\pi}}\, z\right) + S\left(\sqrt{-c + 2 b k - b m} \sqrt{\frac{2}{\pi}}\, z\right) \sin\left(-2 e k + e m - \frac{m \pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0694.01

$$\int \sin^m\left(\sqrt{z}\, b + e\right) \cos\left(\sqrt{z}\, c\right) dz = \frac{2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cos\left(\sqrt{z}\, c\right) + c \sqrt{z} \sin\left(\sqrt{z}\, c\right)\right)}{c^2} + 2^{1-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(c + 2 b k - b m)^2} \left(\cos\left(2 e k - e m + (c + 2 b k - b m) \sqrt{z} + \frac{m \pi}{2}\right) + (c + 2 b k - b m) \sqrt{z} \sin\left(2 e k - e m + (c + 2 b k - b m) \sqrt{z} + \frac{m \pi}{2}\right)\right) + \frac{1}{(-c + 2 b k - b m)^2} \left(\cos\left(-2 e k + e m - (-c + 2 b k - b m) \sqrt{z} - \frac{m \pi}{2}\right) - (-c + 2 b k - b m) \sqrt{z} \sin\left(-2 e k + e m - (-c + 2 b k - b m) \sqrt{z} - \frac{m \pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + d z) \cos(c z^r)$

01.07.21.0695.01

$$\int \sin^m(b z^2 + d z)\cos(c z^2)\, dz = \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)}{\sqrt{c}} C\left(\sqrt{c}\sqrt{\frac{2}{\pi}}\, z\right) + 2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c+2bk-bm}}\left(\cos\left(-\frac{(2dk-dm)^2}{4(c+2bk-bm)} + \frac{m\pi}{2}\right)C\left(\frac{2dk-dm+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right) - S\left(\frac{2dk-dm+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(-\frac{(2dk-dm)^2}{4(c+2bk-bm)} + \frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{-c+2bk-bm}}\left(\cos\left(\frac{(2dk-dm)^2}{4(-c+2bk-bm)} - \frac{m\pi}{2}\right)C\left(\frac{2dk-dm+2(-c+2bk-bm)z}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right) + S\left(\frac{2dk-dm+2(-c+2bk-bm)z}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(\frac{(2dk-dm)^2}{4(-c+2bk-bm)} - \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0696.01

$$\int \sin^m\left(\sqrt{z}\, b + d z\right)\cos\left(\sqrt{z}\, c\right) dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left(\cos\left(\sqrt{z}\, c\right) + c\sqrt{z}\sin\left(\sqrt{z}\, c\right)\right)}{c^2} + 2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(2dk-dm)^{3/2}}\left((-c-2bk+bm)\sqrt{2\pi}\left(\cos\left(-\frac{(c+2bk-bm)^2}{4(2dk-dm)} + \frac{m\pi}{2}\right)C\left(\frac{c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right) - S\left(\frac{c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)\sin\left(-\frac{(c+2bk-bm)^2}{4(2dk-dm)} + \frac{m\pi}{2}\right)\right) + 2\sqrt{2dk-dm}\sin\left((2dk-dm)z + (c+2bk-bm)\sqrt{z} + \frac{m\pi}{2}\right)\right) + \frac{1}{(2dk-dm)^{3/2}}\left((c-2bk+bm)\sqrt{2\pi}\left(\cos\left(\frac{(-c+2bk-bm)^2}{4(2dk-dm)} - \frac{m\pi}{2}\right)C\left(\frac{-c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right) + S\left(\frac{-c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)\sin\left(\frac{(-c+2bk-bm)^2}{4(2dk-dm)} - \frac{m\pi}{2}\right)\right) + 2\sqrt{2dk-dm}\sin\left((2dk-dm)z + (-c+2bk-bm)\sqrt{z} + \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + d z + e)\cos(c z^r)$

01.07.21.0697.01

$$\int \sin^m(b z^2+d z+e)\cos(c z^2)\,dz = \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)}{\sqrt{c}} C\left(\sqrt{c}\sqrt{\frac{2}{\pi}}\,z\right)+2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$
$$\left(\frac{1}{\sqrt{c+2bk-bm}}\left(\cos\left(-\frac{(2dk-dm)^2}{4(c+2bk-bm)}+2ek-em+\frac{m\pi}{2}\right)C\left(\frac{2dk-dm+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right)-\right.\right.$$
$$\left.S\left(\frac{2dk-dm+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(-\frac{(2dk-dm)^2}{4(c+2bk-bm)}+2ek-em+\frac{m\pi}{2}\right)\right)+\frac{1}{\sqrt{-c+2bk-bm}}$$
$$\left(\cos\left(\frac{(2dk-dm)^2}{4(-c+2bk-bm)}-2ek+em-\frac{m\pi}{2}\right)C\left(\frac{2dk-dm+2(-c+2bk-bm)z}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right)+\right.$$
$$\left.\left.\left.S\left(\frac{2dk-dm+2(-c+2bk-bm)z}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(\frac{(2dk-dm)^2}{4(-c+2bk-bm)}-2ek+em-\frac{m\pi}{2}\right)\right)\right)\right) /;\ m\in\mathbb{N}^+$$

01.07.21.0698.01

$$\int \sin^m\left(\sqrt{z}\,b+d z+e\right)\cos\left(\sqrt{z}\,c\right)dz =$$
$$\frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cos\left(\sqrt{z}\,c\right)+c\sqrt{z}\sin\left(\sqrt{z}\,c\right)\right)}{c^2}+2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(2dk-dm)^{3/2}}\left((-c-2bk+bm)\right.\right.$$
$$\sqrt{2\pi}\left(\cos\left(-\frac{(c+2bk-bm)^2}{4(2dk-dm)}+2ek-em+\frac{m\pi}{2}\right)C\left(\frac{c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)-\right.$$
$$\left.S\left(\frac{c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)\sin\left(-\frac{(c+2bk-bm)^2}{4(2dk-dm)}+2ek-em+\frac{m\pi}{2}\right)\right)+$$
$$\left.2\sqrt{2dk-dm}\sin\left(2ek-em+(2dk-dm)z+(c+2bk-bm)\sqrt{z}+\frac{m\pi}{2}\right)\right)+$$
$$\frac{1}{(2dk-dm)^{3/2}}\left((c-2bk+bm)\sqrt{2\pi}\left(\cos\left(\frac{(-c+2bk-bm)^2}{4(2dk-dm)}-2ek+em-\frac{m\pi}{2}\right)\right.\right.$$
$$C\left(\frac{-c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)+$$
$$\left.S\left(\frac{-c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)\sin\left(\frac{(-c+2bk-bm)^2}{4(2dk-dm)}-2ek+em-\frac{m\pi}{2}\right)\right)-$$
$$\left.\left.2\sqrt{2dk-dm}\sin\left(-2ek+em-(2dk-dm)z-(-c+2bk-bm)\sqrt{z}-\frac{m\pi}{2}\right)\right)\right) /;\ m\in\mathbb{N}^+$$

Involving $\sin^m(d\,z)\cos(c\,z^r+g)$

01.07.21.0699.01

$$\int \sin^m(d\,z)\cos\left(c\,z^2+g\right)dz = \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)}{\sqrt{c}}\left(\cos(g)\,C\left(\sqrt{c}\,\sqrt{\frac{2}{\pi}}\,z\right)-S\left(\sqrt{c}\,\sqrt{\frac{2}{\pi}}\,z\right)\sin(g)\right)+$$
$$2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}+g+\frac{m\,\pi}{2}\right)C\left(\frac{2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)-\right.\right.$$
$$\left.S\left(\frac{2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}+g+\frac{m\,\pi}{2}\right)\right)+\frac{1}{\sqrt{-c}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}+g-\frac{m\,\pi}{2}\right)\right.$$
$$\left.\left.C\left(\frac{2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)+S\left(\frac{2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}+g-\frac{m\,\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.07.21.0700.01

$$\int \sin^m(d\,z)\cos\left(\sqrt{z}\,c+g\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cos\left(\sqrt{z}\,c+g\right)+c\,\sqrt{z}\,\sin\left(\sqrt{z}\,c+g\right)\right)}{c^2}+$$
$$2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(2\,\sqrt{2\,d\,k-d\,m}\,\sin\left(\sqrt{z}\,c+g+(2\,d\,k-d\,m)\,z+\frac{m\,\pi}{2}\right)-\right.\right.$$
$$c\,\sqrt{2\,\pi}\left(\cos\left(-\frac{c^2}{4\,(2\,d\,k-d\,m)}+g+\frac{m\,\pi}{2}\right)C\left(\frac{c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)-\right.$$
$$\left.\left.S\left(\frac{c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{c^2}{4\,(2\,d\,k-d\,m)}+g+\frac{m\,\pi}{2}\right)\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}$$
$$\left(c\,\sqrt{2\,\pi}\left(\cos\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}+g-\frac{m\,\pi}{2}\right)C\left(\frac{2\,(2\,d\,k-d\,m)\sqrt{z}-c}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+S\left(\frac{2\,(2\,d\,k-d\,m)\sqrt{z}-c}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\right.\right.$$
$$\left.\left.\left.\sin\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}+g-\frac{m\,\pi}{2}\right)\right)-2\,\sqrt{2\,d\,k-d\,m}\,\sin\left(\sqrt{z}\,c+g-(2\,d\,k-d\,m)\,z-\frac{m\,\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\cos\left(c\,z^r+g\right)$

01.07.21.0701.01

$$\int \sin^m(d\,z+e)\cos\left(c\,z^2+g\right)dz = \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)}{\sqrt{c}}\left(\cos(g)\,C\left(\sqrt{c}\,\sqrt{\frac{2}{\pi}}\,z\right)-S\left(\sqrt{c}\,\sqrt{\frac{2}{\pi}}\,z\right)\sin(g)\right)+2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}+g+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)C\left(\frac{2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}+g+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)\right)+\frac{1}{\sqrt{-c}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}+g-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)C\left(\frac{2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)+S\left(\frac{2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}+g-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.07.21.0702.01

$$\int \sin^m(d\,z+e)\cos\left(\sqrt{z}\,c+g\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cos\left(\sqrt{z}\,c+g\right)+c\,\sqrt{z}\,\sin\left(\sqrt{z}\,c+g\right)\right)}{c^2}+2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{2\,d\,k-d\,m}\,\sin\left(\sqrt{z}\,c+g+2\,e\,k-e\,m+(2\,d\,k-d\,m)\,z+\frac{m\,\pi}{2}\right)-c\,\sqrt{2\,\pi}\left(\cos\left(-\frac{c^2}{4\,(2\,d\,k-d\,m)}+g+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)C\left(\frac{c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)-S\left(\frac{c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{c^2}{4\,(2\,d\,k-d\,m)}+g+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(c\,\sqrt{2\,\pi}\left(\cos\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}+g-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)C\left(\frac{2\,(2\,d\,k-d\,m)\sqrt{z}-c}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+S\left(\frac{2\,(2\,d\,k-d\,m)\sqrt{z}-c}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}+g-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)\right)-2\sqrt{2\,d\,k-d\,m}\,\sin\left(\sqrt{z}\,c+g-2\,e\,k+e\,m-(2\,d\,k-d\,m)\,z-\frac{m\,\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m(b\,z^r)\cos(c\,z^r+g)$

01.07.21.0703.01

$$\int \sin^m(b z^r)\cos(c z^r+g)\,dz = -\frac{1}{r}\left(2^{-m-1} z \binom{m}{\frac{m}{2}} \left(e^{i g}\,\Gamma\!\left(\frac{1}{r}, -i c z^r\right)(-i c z^r)^{-1/r} + e^{-i g}\,(i c z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, i c z^r\right)\right)(1 - m \bmod 2)\right) - \frac{1}{r}\left(2^{-m-1} z \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(e^{i\left(-g+\frac{m\pi}{2}\right)}\,\Gamma\!\left(\frac{1}{r}, -i(-c+2bk-bm) z^r\right)(-i(-c+2bk-bm) z^r)^{-1/r} + e^{-i\left(-g+\frac{m\pi}{2}\right)}\,(i(-c+2bk-bm) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, i(-c+2bk-bm) z^r\right) + e^{i\left(g+\frac{m\pi}{2}\right)}\,(-i(c+2bk-bm) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, -i(c+2bk-bm) z^r\right) + e^{-i\left(g+\frac{m\pi}{2}\right)}\,(i(c+2bk-bm) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, i(c+2bk-bm) z^r\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0704.01

$$\int \sin^m(b z^2)\cos(c z^2+g)\,dz = \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)}{\sqrt{c}}\left(\cos(g)\, C\!\left(\sqrt{c}\sqrt{\frac{2}{\pi}}\, z\right) - S\!\left(\sqrt{c}\sqrt{\frac{2}{\pi}}\, z\right)\sin(g)\right) + 2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c+2bk-bm}}\left(\cos\!\left(g+\frac{m\pi}{2}\right) C\!\left(\sqrt{c+2bk-bm}\sqrt{\frac{2}{\pi}}\, z\right) - S\!\left(\sqrt{c+2bk-bm}\sqrt{\frac{2}{\pi}}\, z\right)\sin\!\left(g+\frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{-c+2bk-bm}}\left(\cos\!\left(g-\frac{m\pi}{2}\right) C\!\left(\sqrt{-c+2bk-bm}\sqrt{\frac{2}{\pi}}\, z\right) + S\!\left(\sqrt{-c+2bk-bm}\sqrt{\frac{2}{\pi}}\, z\right)\sin\!\left(g-\frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0705.01

$$\int \sin^m\!\left(\sqrt{z}\, b\right)\cos\!\left(\sqrt{z}\, c+g\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left(\cos\!\left(\sqrt{z}\, c+g\right) + c\sqrt{z}\,\sin\!\left(\sqrt{z}\, c+g\right)\right)}{c^2} + 2^{1-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(c+2bk-bm)^2}\left(\cos\!\left(g+(c+2bk-bm)\sqrt{z}+\frac{m\pi}{2}\right) + (c+2bk-bm)\sqrt{z}\,\sin\!\left(g+(c+2bk-bm)\sqrt{z}+\frac{m\pi}{2}\right)\right) + \frac{1}{(-c+2bk-bm)^2}\left(\cos\!\left(g-(-c+2bk-bm)\sqrt{z}-\frac{m\pi}{2}\right) - (-c+2bk-bm)\sqrt{z}\,\sin\!\left(g-(-c+2bk-bm)\sqrt{z}-\frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r+e)\cos(c z^r+g)$

01.07.21.0706.01

$$\int \sin^m(b z^r + e) \cos(c z^r + g)\, dz = -\frac{1}{r}\left(2^{-m-1} z \binom{m}{\frac{m}{2}} \left(e^{i g}\, \Gamma\!\left(\frac{1}{r}, -i c z^r\right) (-i c z^r)^{-1/r} + e^{-i g} (i c z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, i c z^r\right)\right) (1 - m \bmod 2)\right) - \frac{1}{r}\left(2^{-m-1} z \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{i\left(-g+2 e k-e m+\frac{m\pi}{2}\right)}\, \Gamma\!\left(\frac{1}{r}, -i(-c+2 b k-b m) z^r\right) (-i(-c+2 b k-b m) z^r)^{-1/r} + e^{-i\left(-g+2 e k-e m+\frac{m\pi}{2}\right)} (i(-c+2 b k-b m) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, i(-c+2 b k-b m) z^r\right) + e^{i\left(g+2 e k-e m+\frac{m\pi}{2}\right)} (-i(c+2 b k-b m) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, -i(c+2 b k-b m) z^r\right) + e^{-i\left(g+2 e k-e m+\frac{m\pi}{2}\right)} (i(c+2 b k-b m) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, i(c+2 b k-b m) z^r\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0707.01

$$\int \sin^m\left(b z^2 + e\right) \cos\left(c z^2 + g\right) dz = \frac{2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)}{\sqrt{c}} \left(\cos(g)\, C\!\left(\sqrt{c} \sqrt{\frac{2}{\pi}}\, z\right) - S\!\left(\sqrt{c} \sqrt{\frac{2}{\pi}}\, z\right) \sin(g)\right) + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{c+2 b k-b m}} \left(\cos\!\left(g+2 e k-e m+\frac{m\pi}{2}\right) C\!\left(\sqrt{c+2 b k-b m} \sqrt{\frac{2}{\pi}}\, z\right) - S\!\left(\sqrt{c+2 b k-b m} \sqrt{\frac{2}{\pi}}\, z\right) \sin\!\left(g+2 e k-e m+\frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{-c+2 b k-b m}} \left(\cos\!\left(g-2 e k+e m-\frac{m\pi}{2}\right) C\!\left(\sqrt{-c+2 b k-b m} \sqrt{\frac{2}{\pi}}\, z\right) + S\!\left(\sqrt{-c+2 b k-b m} \sqrt{\frac{2}{\pi}}\, z\right) \sin\!\left(g-2 e k+e m-\frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0708.01

$$\int \sin^m\left(\sqrt{z}\, b + e\right) \cos\left(\sqrt{z}\, c + g\right) dz = \frac{2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cos\left(\sqrt{z}\, c + g\right) + c \sqrt{z}\, \sin\left(\sqrt{z}\, c + g\right)\right)}{c^2} + 2^{1-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(c+2 b k-b m)^2} \left(\cos\!\left(g+2 e k-e m+(c+2 b k-b m)\sqrt{z}+\frac{m\pi}{2}\right) + (c+2 b k-b m)\sqrt{z}\, \sin\!\left(g+2 e k-e m+(c+2 b k-b m)\sqrt{z}+\frac{m\pi}{2}\right)\right) + \frac{1}{(-c+2 b k-b m)^2} \left(\cos\!\left(g-2 e k+e m-(-c+2 b k-b m)\sqrt{z}-\frac{m\pi}{2}\right) - (-c+2 b k-b m)\sqrt{z}\, \sin\!\left(g-2 e k+e m-(-c+2 b k-b m)\sqrt{z}-\frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + d z)\cos(c z^r + g)$

01.07.21.0709.01

$$\int \sin^m(b z^2 + d z)\cos(c z^2 + g)\,dz = \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)}{\sqrt{c}}\left(\cos(g)\,C\left(\sqrt{c}\sqrt{\frac{2}{\pi}}\,z\right) - S\left(\sqrt{c}\sqrt{\frac{2}{\pi}}\,z\right)\sin(g)\right) + 2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c+2bk-bm}}\left(\cos\left(-\frac{(2dk-dm)^2}{4(c+2bk-bm)} + g + \frac{m\pi}{2}\right)C\left(\frac{2dk-dm+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right) - S\left(\frac{2dk-dm+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(-\frac{(2dk-dm)^2}{4(c+2bk-bm)} + g + \frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{-c+2bk-bm}}\left(\cos\left(\frac{(2dk-dm)^2}{4(-c+2bk-bm)} + g - \frac{m\pi}{2}\right)C\left(\frac{2dk-dm+2(-c+2bk-bm)z}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right) + S\left(\frac{2dk-dm+2(-c+2bk-bm)z}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(\frac{(2dk-dm)^2}{4(-c+2bk-bm)} + g - \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0710.01

$$\int \sin^m(\sqrt{z}\,b + d z)\cos(\sqrt{z}\,c + g)\,dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left(\cos(\sqrt{z}\,c + g) + c\sqrt{z}\sin(\sqrt{z}\,c + g)\right)}{c^2} + 2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(2dk-dm)^{3/2}}\left((-c-2bk+bm)\sqrt{2\pi}\left(\cos\left(-\frac{(c+2bk-bm)^2}{4(2dk-dm)} + g + \frac{m\pi}{2}\right)C\left(\frac{c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right) - S\left(\frac{c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)\sin\left(-\frac{(c+2bk-bm)^2}{4(2dk-dm)} + g + \frac{m\pi}{2}\right)\right) + 2\sqrt{2dk-dm}\sin\left(g + (2dk-dm)z + (c+2bk-bm)\sqrt{z} + \frac{m\pi}{2}\right)\right) + \frac{1}{(2dk-dm)^{3/2}}\left((c-2bk+bm)\sqrt{2\pi}\left(\cos\left(\frac{(-c+2bk-bm)^2}{4(2dk-dm)} + g - \frac{m\pi}{2}\right)C\left(\frac{-c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right) + S\left(\frac{-c+2bk-bm+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)\sin\left(\frac{(-c+2bk-bm)^2}{4(2dk-dm)} + g - \frac{m\pi}{2}\right)\right) - 2\sqrt{2dk-dm}\sin\left(g - (2dk-dm)z - (-c+2bk-bm)\sqrt{z} - \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + d z + e)\cos(c z^r + g)$

01.07.21.0711.01

$$\int \sin^m(b z^2 + d z + e) \cos(c z^2 + g) \, dz = \frac{2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)}{\sqrt{c}} \left(\cos(g) C\left(\sqrt{c} \sqrt{\frac{2}{\pi}} z\right) - S\left(\sqrt{c} \sqrt{\frac{2}{\pi}} z\right) \sin(g) \right) + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{c + 2 b k - b m}} \left(\cos\left(-\frac{(2 d k - d m)^2}{4 (c + 2 b k - b m)} + g + 2 e k - e m + \frac{m \pi}{2} \right) C\left(\frac{2 d k - d m + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m} \sqrt{2 \pi}} \right) - S\left(\frac{2 d k - d m + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m} \sqrt{2 \pi}} \right) \sin\left(-\frac{(2 d k - d m)^2}{4 (c + 2 b k - b m)} + g + 2 e k - e m + \frac{m \pi}{2} \right) \right) + \frac{1}{\sqrt{-c + 2 b k - b m}} \left(\cos\left(\frac{(2 d k - d m)^2}{4 (-c + 2 b k - b m)} + g - 2 e k + e m - \frac{m \pi}{2} \right) C\left(\frac{2 d k - d m + 2 (-c + 2 b k - b m) z}{\sqrt{-c + 2 b k - b m} \sqrt{2 \pi}} \right) + S\left(\frac{2 d k - d m + 2 (-c + 2 b k - b m) z}{\sqrt{-c + 2 b k - b m} \sqrt{2 \pi}} \right) \sin\left(\frac{(2 d k - d m)^2}{4 (-c + 2 b k - b m)} + g - 2 e k + e m - \frac{m \pi}{2} \right) \right) \right) /; m \in \mathbb{N}^+$$

01.07.21.0712.01

$$\int \sin^m(\sqrt{z}\, b + d z + e) \cos(\sqrt{z}\, c + g) \, dz = \frac{2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cos(\sqrt{z}\, c + g) + c \sqrt{z} \sin(\sqrt{z}\, c + g) \right)}{c^2} + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(2 d k - d m)^{3/2}} \left((-c - 2 b k + b m) \sqrt{2 \pi} \left(\cos\left(-\frac{(c + 2 b k - b m)^2}{4 (2 d k - d m)} + g + 2 e k - e m + \frac{m \pi}{2} \right) C\left(\frac{c + 2 b k - b m + 2 (2 d k - d m) \sqrt{z}}{\sqrt{2 d k - d m} \sqrt{2 \pi}} \right) - S\left(\frac{c + 2 b k - b m + 2 (2 d k - d m) \sqrt{z}}{\sqrt{2 d k - d m} \sqrt{2 \pi}} \right) \sin\left(-\frac{(c + 2 b k - b m)^2}{4 (2 d k - d m)} + g + 2 e k - e m + \frac{m \pi}{2} \right) \right) + 2 \sqrt{2 d k - d m} \sin\left(g + 2 e k - e m + (2 d k - d m) z + (c + 2 b k - b m) \sqrt{z} + \frac{m \pi}{2} \right) \right) + \frac{1}{(2 d k - d m)^{3/2}} \left((c - 2 b k + b m) \sqrt{2 \pi} \left(\cos\left(\frac{(-c + 2 b k - b m)^2}{4 (2 d k - d m)} + g - 2 e k + e m - \frac{m \pi}{2} \right) C\left(\frac{-c + 2 b k - b m + 2 (2 d k - d m) \sqrt{z}}{\sqrt{2 d k - d m} \sqrt{2 \pi}} \right) + S\left(\frac{-c + 2 b k - b m + 2 (2 d k - d m) \sqrt{z}}{\sqrt{2 d k - d m} \sqrt{2 \pi}} \right) \sin\left(\frac{(-c + 2 b k - b m)^2}{4 (2 d k - d m)} + g - 2 e k + e m - \frac{m \pi}{2} \right) \right) - 2 \sqrt{2 d k - d m} \sin\left(g - 2 e k + e m - (2 d k - d m) z - (-c + 2 b k - b m) \sqrt{z} - \frac{m \pi}{2} \right) \right) \right) /; m \in \mathbb{N}^+$$

Involving $\sin^m(d\,z)\cos(c\,z^r+f\,z)$

01.07.21.0713.01

$$\int \sin^m(d\,z)\cos(c\,z^2+f\,z)\,dz = \frac{1}{\sqrt{c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cos\left(\frac{f^2}{4\,c}\right)C\left(\frac{f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)+S\left(\frac{f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{f^2}{4\,c}\right)\right)\right)+2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c}}\left(\cos\left(-\frac{(f+2\,d\,k-d\,m)^2}{4\,c}+\frac{m\,\pi}{2}\right)C\left(\frac{f+2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)-S\left(\frac{f+2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(f+2\,d\,k-d\,m)^2}{4\,c}+\frac{m\,\pi}{2}\right)\right)+\frac{1}{\sqrt{-c}}\left(\cos\left(\frac{(-f+2\,d\,k-d\,m)^2}{4\,c}+\frac{m\,\pi}{2}\right)C\left(\frac{-f+2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)-S\left(\frac{-f+2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(-f+2\,d\,k-d\,m)^2}{4\,c}+\frac{m\,\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.07.21.0714.01

$$\int \sin^m(d\,z)\cos\left(\sqrt{z}\;c+f\,z\right)dz = \frac{1}{f^{3/2}}\left(2^{-m-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(2\sqrt{f}\,\sin\left(\sqrt{z}\;c+f\,z\right)-c\sqrt{2\,\pi}\left(\cos\left(\frac{c^2}{4\,f}\right)C\left(\frac{c+2\,f\sqrt{z}}{\sqrt{f}\,\sqrt{2\,\pi}}\right)+S\left(\frac{c+2\,f\sqrt{z}}{\sqrt{f}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,f}\right)\right)\right)\right)+2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(f+2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{f+2\,d\,k-d\,m}\,\sin\left(\sqrt{z}\;c+(f+2\,d\,k-d\,m)\,z+\frac{m\,\pi}{2}\right)-c\sqrt{2\,\pi}\left(\cos\left(-\frac{c^2}{4\,(f+2\,d\,k-d\,m)}+\frac{m\,\pi}{2}\right)C\left(\frac{c+2\,(f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)-S\left(\frac{c+2\,(f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{c^2}{4\,(f+2\,d\,k-d\,m)}+\frac{m\,\pi}{2}\right)\right)\right)+\left(c\sqrt{2\,\pi}\left(\cos\left(\frac{c^2}{4\,(-f+2\,d\,k-d\,m)}-\frac{m\,\pi}{2}\right)C\left(\frac{2\,(-f+2\,d\,k-d\,m)\sqrt{z}-c}{\sqrt{-f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+S\left(\frac{2\,(-f+2\,d\,k-d\,m)\sqrt{z}-c}{\sqrt{-f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(-f+2\,d\,k-d\,m)}-\frac{m\,\pi}{2}\right)\right)-2\sqrt{-f+2\,d\,k-d\,m}\,\sin\left(\sqrt{z}\;c-(-f+2\,d\,k-d\,m)\,z-\frac{m\,\pi}{2}\right)\right)\Big/(-f+2\,d\,k-d\,m)^{3/2}\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\cos(c\,z^r+f\,z)$

01.07.21.0715.01

$$\int \sin^m(d z + e) \cos\left(c z^2 + f z\right) dz = \frac{1}{\sqrt{c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cos\left(\frac{f^2}{4 c}\right) C\left(\frac{f + 2 c z}{\sqrt{c} \sqrt{2 \pi}}\right) + S\left(\frac{f + 2 c z}{\sqrt{c} \sqrt{2 \pi}}\right) \sin\left(\frac{f^2}{4 c}\right)\right)\right) +$$

$$2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{c}} \left(\cos\left(-\frac{(f + 2 d k - d m)^2}{4 c} + 2 e k - e m + \frac{m \pi}{2}\right) C\left(\frac{f + 2 d k - d m + 2 c z}{\sqrt{c} \sqrt{2 \pi}}\right) -\right.\right.$$

$$\left. S\left(\frac{f + 2 d k - d m + 2 c z}{\sqrt{c} \sqrt{2 \pi}}\right) \sin\left(-\frac{(f + 2 d k - d m)^2}{4 c} + 2 e k - e m + \frac{m \pi}{2}\right)\right) +$$

$$\frac{1}{\sqrt{-c}} \left(\cos\left(-\frac{(-f + 2 d k - d m)^2}{4 c} - 2 e k + e m - \frac{m \pi}{2}\right) C\left(\frac{-f + 2 d k - d m - 2 c z}{\sqrt{-c} \sqrt{2 \pi}}\right) +\right.$$

$$\left.\left. S\left(\frac{-f + 2 d k - d m - 2 c z}{\sqrt{-c} \sqrt{2 \pi}}\right) \sin\left(-\frac{(-f + 2 d k - d m)^2}{4 c} - 2 e k + e m - \frac{m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

01.07.21.0716.01

$$\int \sin^m(d\,z+e)\cos\left(\sqrt{z}\;c+f\,z\right)dz = \frac{1}{f^{3/2}} \left(2^{-m-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(2\sqrt{f}\;\sin\left(\sqrt{z}\;c+f\,z\right)-c\sqrt{2\pi}\left(\cos\left(\frac{c^2}{4f}\right)C\left(\frac{c+2f\sqrt{z}}{\sqrt{f}\;\sqrt{2\pi}}\right)+S\left(\frac{c+2f\sqrt{z}}{\sqrt{f}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4f}\right)\right)\right)\right)+$$

$$2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(f+2dk-dm)^{3/2}}\left(2\sqrt{f+2dk-dm}\;\sin\left(\sqrt{z}\;c+2ek-em+(f+2dk-dm)z+\frac{m\pi}{2}\right)-\right.\right.$$

$$c\sqrt{2\pi}\left(\cos\left(-\frac{c^2}{4(f+2dk-dm)}+2ek-em+\frac{m\pi}{2}\right)C\left(\frac{c+2(f+2dk-dm)\sqrt{z}}{\sqrt{f+2dk-dm}\;\sqrt{2\pi}}\right)-\right.$$

$$\left.\left.S\left(\frac{c+2(f+2dk-dm)\sqrt{z}}{\sqrt{f+2dk-dm}\;\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4(f+2dk-dm)}+2ek-em+\frac{m\pi}{2}\right)\right)\right)+$$

$$\left(c\sqrt{2\pi}\left(\cos\left(\frac{c^2}{4(-f+2dk-dm)}-2ek+em-\frac{m\pi}{2}\right)C\left(\frac{2(-f+2dk-dm)\sqrt{z}-c}{\sqrt{-f+2dk-dm}\;\sqrt{2\pi}}\right)+\right.\right.$$

$$\left.S\left(\frac{2(-f+2dk-dm)\sqrt{z}-c}{\sqrt{-f+2dk-dm}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4(-f+2dk-dm)}-2ek+em-\frac{m\pi}{2}\right)\right)-$$

$$\left.2\sqrt{-f+2dk-dm}\;\sin\left(\sqrt{z}\;c-2ek+em-(-f+2dk-dm)z-\frac{m\pi}{2}\right)\right)\Big/$$

$$\left.(-f+2dk-dm)^{3/2}\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r\right)\cos\left(c\,z^r+f\,z\right)$

01.07.21.0717.01

$$\int \sin^m(b z^2)\cos(c z^2+f z)\,dz = \frac{1}{\sqrt{c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cos\left(\frac{f^2}{4c}\right)C\left(\frac{f+2cz}{\sqrt{c}\sqrt{2\pi}}\right)+S\left(\frac{f+2cz}{\sqrt{c}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4c}\right)\right)\right)+$$
$$2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c+2bk-bm}}\left(\cos\left(-\frac{f^2}{4(c+2bk-bm)}+\frac{m\pi}{2}\right)C\left(\frac{f+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right)-\right.\right.$$
$$S\left(\frac{f+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(-\frac{f^2}{4(c+2bk-bm)}+\frac{m\pi}{2}\right)\right)+$$
$$\frac{1}{\sqrt{-c+2bk-bm}}\left(\cos\left(\frac{f^2}{4(-c+2bk-bm)}-\frac{m\pi}{2}\right)C\left(\frac{2(-c+2bk-bm)z-f}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right)+\right.$$
$$\left.\left.S\left(\frac{2(-c+2bk-bm)z-f}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4(-c+2bk-bm)}-\frac{m\pi}{2}\right)\right)\right)\;/;\; m\in\mathbb{N}^+$$

01.07.21.0718.01

$$\int \sin^m(\sqrt{z}\,b)\cos(\sqrt{z}\,c+f z)\,dz = \frac{1}{f^{3/2}}$$
$$\left(2^{-m-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(2\sqrt{f}\sin(\sqrt{z}\,c+f z)-c\sqrt{2\pi}\left(\cos\left(\frac{c^2}{4f}\right)C\left(\frac{c+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)+S\left(\frac{c+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4f}\right)\right)\right)\right)+$$
$$2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{f^{3/2}}\left((-c-2bk+bm)\sqrt{2\pi}\left(\cos\left(-\frac{(c+2bk-bm)^2}{4f}+\frac{m\pi}{2}\right)C\left(\frac{c+2bk-bm+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)-\right.\right.\right.$$
$$\left.S\left(\frac{c+2bk-bm+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)\sin\left(-\frac{(c+2bk-bm)^2}{4f}+\frac{m\pi}{2}\right)\right)+$$
$$\left.2\sqrt{f}\sin\left(f z+(c+2bk-bm)\sqrt{z}+\frac{m\pi}{2}\right)\right)+\frac{1}{(-f)^{3/2}}\left((c-2bk+bm)\sqrt{2\pi}\right.$$
$$\left(\cos\left(\frac{(-c+2bk-bm)^2}{4f}+\frac{m\pi}{2}\right)C\left(\frac{-c+2bk-bm-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right)-S\left(\frac{-c+2bk-bm-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right)\sin\left(\right.\right.$$
$$\left.\left.\left.\left.\frac{(-c+2bk-bm)^2}{4f}+\frac{m\pi}{2}\right)\right)-2\sqrt{-f}\sin\left(f z-(-c+2bk-bm)\sqrt{z}-\frac{m\pi}{2}\right)\right)\right)\;/;\; m\in\mathbb{N}^+$$

Involving $\sin^m(b z^r+e)\cos(c z^r+f z)$

01.07.21.0719.01

$$\int \sin^m\left(b z^2+e\right)\cos\left(c z^2+f z\right) dz = \frac{1}{\sqrt{c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cos\left(\frac{f^2}{4c}\right)C\left(\frac{f+2cz}{\sqrt{c}\sqrt{2\pi}}\right)+S\left(\frac{f+2cz}{\sqrt{c}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4c}\right)\right)\right)+2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c+2bk-bm}}\left(\cos\left(-\frac{f^2}{4(c+2bk-bm)}+2ek-em+\frac{m\pi}{2}\right)C\left(\frac{f+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right)-S\left(\frac{f+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(-\frac{f^2}{4(c+2bk-bm)}+2ek-em+\frac{m\pi}{2}\right)\right)+\frac{1}{\sqrt{-c+2bk-bm}}\left(\cos\left(\frac{f^2}{4(-c+2bk-bm)}-2ek+em-\frac{m\pi}{2}\right)C\left(\frac{2(-c+2bk-bm)z-f}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right)+S\left(\frac{2(-c+2bk-bm)z-f}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4(-c+2bk-bm)}-2ek+em-\frac{m\pi}{2}\right)\right)\right) /; m\in\mathbb{N}^+$$

01.07.21.0720.01

$$\int \sin^m\left(\sqrt{z}\, b+e\right)\cos\left(\sqrt{z}\, c+f z\right) dz = \frac{1}{f^{3/2}}\left(2^{-m-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(2\sqrt{f}\sin\left(\sqrt{z}\, c+f z\right)-c\sqrt{2\pi}\left(\cos\left(\frac{c^2}{4f}\right)C\left(\frac{c+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)+S\left(\frac{c+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4f}\right)\right)\right)\right)+2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{f^{3/2}}\left((-c-2bk+bm)\sqrt{2\pi}\left(\cos\left(-\frac{(c+2bk-bm)^2}{4f}+2ek-em+\frac{m\pi}{2}\right)C\left(\frac{c+2bk-bm+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)-S\left(\frac{c+2bk-bm+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)\sin\left(-\frac{(c+2bk-bm)^2}{4f}+2ek-em+\frac{m\pi}{2}\right)\right)+2\sqrt{f}\sin\left(2ek-em+fz+(c+2bk-bm)\sqrt{z}+\frac{m\pi}{2}\right)\right)+\frac{1}{(-f)^{3/2}}\left((c-2bk+bm)\sqrt{2\pi}\left(\cos\left(-\frac{(-c+2bk-bm)^2}{4f}-2ek+em-\frac{m\pi}{2}\right)C\left(\frac{-c+2bk-bm-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right)+S\left(\frac{-c+2bk-bm-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right)\sin\left(-\frac{(-c+2bk-bm)^2}{4f}-2ek+em-\frac{m\pi}{2}\right)\right)-2\sqrt{-f}\sin\left(-2ek+em+fz-(-c+2bk-bm)\sqrt{z}-\frac{m\pi}{2}\right)\right)\right) /; m\in\mathbb{N}^+$$

Involving $\sin^m\left(b z^r+d z\right)\cos\left(c z^r+f z\right)$

01.07.21.0721.01

$$\int \sin^m(b z^2 + d z) \cos(c z^2 + f z) \, dz = \frac{1}{\sqrt{c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cos\left(\frac{f^2}{4 c}\right) C\left(\frac{f + 2 c z}{\sqrt{c} \sqrt{2 \pi}}\right) + S\left(\frac{f + 2 c z}{\sqrt{c} \sqrt{2 \pi}}\right) \sin\left(\frac{f^2}{4 c}\right)\right)\right) + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{c + 2 b k - b m}} \left(\cos\left(-\frac{(f + 2 d k - d m)^2}{4 (c + 2 b k - b m)} + \frac{m \pi}{2}\right) C\left(\frac{f + 2 d k - d m + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m} \sqrt{2 \pi}}\right) - S\left(\frac{f + 2 d k - d m + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(-\frac{(f + 2 d k - d m)^2}{4 (c + 2 b k - b m)} + \frac{m \pi}{2}\right)\right) + \frac{1}{\sqrt{-c + 2 b k - b m}} \left(\cos\left(\frac{(-f + 2 d k - d m)^2}{4 (-c + 2 b k - b m)} - \frac{m \pi}{2}\right) C\left(\frac{-f + 2 d k - d m + 2 (-c + 2 b k - b m) z}{\sqrt{-c + 2 b k - b m} \sqrt{2 \pi}}\right) + S\left(\frac{-f + 2 d k - d m + 2 (-c + 2 b k - b m) z}{\sqrt{-c + 2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(\frac{(-f + 2 d k - d m)^2}{4 (-c + 2 b k - b m)} - \frac{m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

01.07.21.0722.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z\right) \cos\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{f^{3/2}}$$
$$\left(2^{-m-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2\sqrt{f}\, \sin\left(\sqrt{z}\, c + f\, z\right) - c\sqrt{2\pi} \left(\cos\left(\frac{c^2}{4 f}\right) C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{f}\, \sqrt{2\pi}}\right) + S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{f}\, \sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4 f}\right)\right)\right)\right) +$$
$$2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(f + 2 d k - d m)^{3/2}}\right.$$
$$\left((-c - 2 b k + b m)\sqrt{2\pi} \left(\cos\left(-\frac{(c + 2 b k - b m)^2}{4 (f + 2 d k - d m)} + \frac{m\pi}{2}\right) C\left(\frac{c + 2 b k - b m + 2 (f + 2 d k - d m)\sqrt{z}}{\sqrt{f + 2 d k - d m}\, \sqrt{2\pi}}\right) - \right.\right.$$
$$\left. S\left(\frac{c + 2 b k - b m + 2 (f + 2 d k - d m)\sqrt{z}}{\sqrt{f + 2 d k - d m}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(c + 2 b k - b m)^2}{4 (f + 2 d k - d m)} + \frac{m\pi}{2}\right)\right) +$$
$$\left. 2\sqrt{f + 2 d k - d m}\, \sin\left((f + 2 d k - d m) z + (c + 2 b k - b m)\sqrt{z} + \frac{m\pi}{2}\right)\right) +$$
$$\left((c - 2 b k + b m)\sqrt{2\pi} \left(\cos\left(\frac{(-c + 2 b k - b m)^2}{4 (-f + 2 d k - d m)} - \frac{m\pi}{2}\right) C\left(\frac{-c + 2 b k - b m + 2 (-f + 2 d k - d m)\sqrt{z}}{\sqrt{-f + 2 d k - d m}\, \sqrt{2\pi}}\right) + \right.\right.$$
$$\left. S\left(\frac{-c + 2 b k - b m + 2 (-f + 2 d k - d m)\sqrt{z}}{\sqrt{-f + 2 d k - d m}\, \sqrt{2\pi}}\right) \sin\left(\frac{(-c + 2 b k - b m)^2}{4 (-f + 2 d k - d m)} - \frac{m\pi}{2}\right)\right) +$$
$$\left. 2\sqrt{-f + 2 d k - d m}\, \sin\left((-f + 2 d k - d m) z + (-c + 2 b k - b m)\sqrt{z} + \frac{m\pi}{2}\right)\right) \Big/$$
$$\left.(-f + 2 d k - d m)^{3/2}\right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m\left(b\, z^r + d\, z + e\right) \cos\left(c\, z^r + f\, z\right)$

01.07.21.0723.01

$$\int \sin^m\left(b z^2 + d z + e\right) \cos\left(c z^2 + f z\right) dz = \frac{1}{\sqrt{c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cos\left(\frac{f^2}{4c}\right) C\left(\frac{f + 2 c z}{\sqrt{c} \sqrt{2\pi}}\right) + S\left(\frac{f + 2 c z}{\sqrt{c} \sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4c}\right)\right)\right) + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{c + 2 b k - b m}} \left(\cos\left(-\frac{(f + 2 d k - d m)^2}{4 (c + 2 b k - b m)} + 2 e k - e m + \frac{m \pi}{2}\right) C\left(\frac{f + 2 d k - d m + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m} \sqrt{2\pi}}\right) - S\left(\frac{f + 2 d k - d m + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m} \sqrt{2\pi}}\right) \sin\left(-\frac{(f + 2 d k - d m)^2}{4 (c + 2 b k - b m)} + 2 e k - e m + \frac{m \pi}{2}\right)\right) + \frac{1}{\sqrt{-c + 2 b k - b m}} \left(\cos\left(\frac{(-f + 2 d k - d m)^2}{4 (-c + 2 b k - b m)} - 2 e k + e m - \frac{m \pi}{2}\right) C\left(\frac{-f + 2 d k - d m + 2 (-c + 2 b k - b m) z}{\sqrt{-c + 2 b k - b m} \sqrt{2\pi}}\right) + S\left(\frac{-f + 2 d k - d m + 2 (-c + 2 b k - b m) z}{\sqrt{-c + 2 b k - b m} \sqrt{2\pi}}\right) \sin\left(\frac{(-f + 2 d k - d m)^2}{4 (-c + 2 b k - b m)} - 2 e k + e m - \frac{m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

01.07.21.0724.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \cos\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{f^{3/2}}$$

$$\left(2^{-m-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2 \sqrt{f} \sin\left(\sqrt{z}\, c + f\, z\right) - c \sqrt{2\pi} \left(\cos\left(\frac{c^2}{4 f}\right) C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{f} \sqrt{2\pi}}\right) + S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{f} \sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4 f}\right)\right)\right)\right) +$$

$$2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(f + 2 d k - d m)^{3/2}} \left((-c - 2 b k + b m) \sqrt{2\pi}\right.\right.$$

$$\left(\cos\left(-\frac{(c + 2 b k - b m)^2}{4 (f + 2 d k - d m)} + 2 e k - e m + \frac{m \pi}{2}\right) C\left(\frac{c + 2 b k - b m + 2 (f + 2 d k - d m) \sqrt{z}}{\sqrt{f + 2 d k - d m} \sqrt{2\pi}}\right) -\right.$$

$$\left. S\left(\frac{c + 2 b k - b m + 2 (f + 2 d k - d m) \sqrt{z}}{\sqrt{f + 2 d k - d m} \sqrt{2\pi}}\right) \sin\left(-\frac{(c + 2 b k - b m)^2}{4 (f + 2 d k - d m)} + 2 e k - e m + \frac{m \pi}{2}\right)\right) +$$

$$\left. 2 \sqrt{f + 2 d k - d m} \sin\left(2 e k - e m + (f + 2 d k - d m) z + (c + 2 b k - b m) \sqrt{z} + \frac{m \pi}{2}\right)\right) +$$

$$\left((c - 2 b k + b m) \sqrt{2\pi} \left(\cos\left(\frac{(-c + 2 b k - b m)^2}{4 (-f + 2 d k - d m)} - 2 e k + e m - \frac{m \pi}{2}\right) C\left(\right.\right.\right.$$

$$\left.\frac{-c + 2 b k - b m + 2 (-f + 2 d k - d m) \sqrt{z}}{\sqrt{-f + 2 d k - d m} \sqrt{2\pi}}\right) + S\left(\frac{-c + 2 b k - b m + 2 (-f + 2 d k - d m) \sqrt{z}}{\sqrt{-f + 2 d k - d m} \sqrt{2\pi}}\right)$$

$$\left.\sin\left(\frac{(-c + 2 b k - b m)^2}{4 (-f + 2 d k - d m)} - 2 e k + e m - \frac{m \pi}{2}\right)\right) - 2 \sqrt{-f + 2 d k - d m} \sin\left(\right.$$

$$\left.\left.\left. -2 e k + e m - (-f + 2 d k - d m) z - (-c + 2 b k - b m) \sqrt{z} - \frac{m \pi}{2}\right)\right) \middle/ (-f + 2 d k - d m)^{3/2}\right) /; m \in \mathbb{N}^+$$

Involving $\sin^m(d\, z) \cos\left(c\, z^r + f\, z + g\right)$

01.07.21.0725.01

$$\int \sin^m(d\,z)\cos\left(c\,z^2+f\,z+g\right)dz = \frac{1}{\sqrt{c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cos\left(\frac{f^2}{4\,c}-g\right)C\left(\frac{f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)+S\left(\frac{f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{f^2}{4\,c}-g\right)\right)\right)+ 2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c}}\left(\cos\left(-\frac{(f+2\,d\,k-d\,m)^2}{4\,c}+g+\frac{m\,\pi}{2}\right)C\left(\frac{f+2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)- S\left(\frac{f+2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(f+2\,d\,k-d\,m)^2}{4\,c}+g+\frac{m\,\pi}{2}\right)\right)+ \frac{1}{\sqrt{-c}}\left(\cos\left(-\frac{(-f+2\,d\,k-d\,m)^2}{4\,c}+g-\frac{m\,\pi}{2}\right)C\left(\frac{-f+2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)+ S\left(\frac{-f+2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(-f+2\,d\,k-d\,m)^2}{4\,c}+g-\frac{m\,\pi}{2}\right)\right)\right)\;/;\; m\in\mathbb{N}^+$$

01.07.21.0726.01

$$\int \sin^m(d\,z)\cos\left(\sqrt{z}\;c+f\,z+g\right)dz = \frac{1}{f^{3/2}}\left(2^{-m-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\right. \left(2\sqrt{f}\,\sin\left(\sqrt{z}\;c+g+f\,z\right)-c\sqrt{2\,\pi}\left(\cos\left(\frac{c^2}{4\,f}-g\right)C\left(\frac{c+2\,f\sqrt{z}}{\sqrt{f}\,\sqrt{2\,\pi}}\right)+S\left(\frac{c+2\,f\sqrt{z}}{\sqrt{f}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,f}-g\right)\right)\right)+ 2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(f+2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{f+2\,d\,k-d\,m}\,\sin\left(\sqrt{z}\;c+g+(f+2\,d\,k-d\,m)\,z+\frac{m\,\pi}{2}\right)-\right.\right. c\sqrt{2\,\pi}\left(\cos\left(-\frac{c^2}{4\,(f+2\,d\,k-d\,m)}+g+\frac{m\,\pi}{2}\right)C\left(\frac{c+2\,(f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)- S\left(\frac{c+2\,(f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{c^2}{4\,(f+2\,d\,k-d\,m)}+g+\frac{m\,\pi}{2}\right)\right)\Bigg)+ \left(c\sqrt{2\,\pi}\left(\cos\left(\frac{c^2}{4\,(-f+2\,d\,k-d\,m)}+g-\frac{m\,\pi}{2}\right)C\left(\frac{2\,(-f+2\,d\,k-d\,m)\sqrt{z}\,-c}{\sqrt{-f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+ S\left(\frac{2\,(-f+2\,d\,k-d\,m)\sqrt{z}\,-c}{\sqrt{-f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(-f+2\,d\,k-d\,m)}+g-\frac{m\,\pi}{2}\right)\right)- 2\sqrt{-f+2\,d\,k-d\,m}\,\sin\left(\sqrt{z}\;c+g-(-f+2\,d\,k-d\,m)\,z-\frac{m\,\pi}{2}\right)\right)\Big/(-f+2\,d\,k-d\,m)^{3/2}\Bigg)\;/;\; m\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\cos\left(c\,z^r+f\,z+g\right)$

01.07.21.0727.01

$$\int \sin^m(d\,z+e)\cos\left(c\,z^2+f\,z+g\right)dz = \frac{1}{\sqrt{c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cos\left(\frac{f^2}{4\,c}-g\right)C\left(\frac{f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)+S\left(\frac{f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{f^2}{4\,c}-g\right)\right)\right)+ 2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c}}\left(\cos\left(-\frac{(f+2\,d\,k-d\,m)^2}{4\,c}+g+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)C\left(\frac{f+2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)- S\left(\frac{f+2\,d\,k-d\,m+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(f+2\,d\,k-d\,m)^2}{4\,c}+g+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)\right)+ \frac{1}{\sqrt{-c}}\left(\cos\left(-\frac{(-f+2\,d\,k-d\,m)^2}{4\,c}+g-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)C\left(\frac{-f+2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)+ S\left(\frac{-f+2\,d\,k-d\,m-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(-f+2\,d\,k-d\,m)^2}{4\,c}+g-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)\right)\right)\;/;\; m\in\mathbb{N}^+$$

01.07.21.0728.01

$$\int \sin^m(d\,z+e)\cos\left(\sqrt{z}\;c+f\,z+g\right)dz = \frac{1}{f^{3/2}}\left(2^{-m-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\right.$$
$$\left(2\sqrt{f}\,\sin\left(\sqrt{z}\;c+g+f\,z\right)-c\sqrt{2\pi}\left(\cos\left(\frac{c^2}{4f}-g\right)C\left(\frac{c+2f\sqrt{z}}{\sqrt{f}\,\sqrt{2\pi}}\right)+S\left(\frac{c+2f\sqrt{z}}{\sqrt{f}\,\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4f}-g\right)\right)\right)\right)+$$
$$2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(f+2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{f+2\,d\,k-d\,m}\,\sin\left(\sqrt{z}\;c+g+2\,e\,k-e\,m+(f+2\,d\,k-d\,m)\,z+\frac{m\,\pi}{2}\right)-\right.\right.$$
$$c\sqrt{2\pi}\left(\cos\left(-\frac{c^2}{4\,(f+2\,d\,k-d\,m)}+g+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)C\left(\frac{c+2\,(f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{f+2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)-\right.$$
$$\left.\left.S\left(\frac{c+2\,(f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{f+2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4\,(f+2\,d\,k-d\,m)}+g+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)\right)\right)+$$
$$\left(c\sqrt{2\pi}\left(\cos\left(\frac{c^2}{4\,(-f+2\,d\,k-d\,m)}+g-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)C\left(\frac{2\,(-f+2\,d\,k-d\,m)\sqrt{z}-c}{\sqrt{-f+2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+\right.\right.$$
$$\left.S\left(\frac{2\,(-f+2\,d\,k-d\,m)\sqrt{z}-c}{\sqrt{-f+2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,(-f+2\,d\,k-d\,m)}+g-2\,e\,k+e\,m-\frac{m\,\pi}{2}\right)\right)-$$
$$\left.2\sqrt{-f+2\,d\,k-d\,m}\,\sin\left(\sqrt{z}\;c+g-2\,e\,k+e\,m-(-f+2\,d\,k-d\,m)\,z-\frac{m\,\pi}{2}\right)\right)\Big/$$
$$\left.\left.(-f+2\,d\,k-d\,m)^{3/2}\right)\right)/;\; m\in\mathbb{N}^+$$

Involving $\sin^m(b\,z^r)\cos(c\,z^r+f\,z+g)$

01.07.21.0729.01

$$\int \sin^m(b z^2)\cos(c z^2 + f z + g)\, dz = \frac{1}{\sqrt{c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left(\cos\left(\frac{f^2}{4c} - g\right) C\left(\frac{f + 2cz}{\sqrt{c}\sqrt{2\pi}}\right) + S\left(\frac{f + 2cz}{\sqrt{c}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4c} - g\right)\right)\right) + 2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{c+2bk-bm}}\left(\cos\left(-\frac{f^2}{4(c+2bk-bm)} + g + \frac{m\pi}{2}\right) C\left(\frac{f+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right) - S\left(\frac{f+2(c+2bk-bm)z}{\sqrt{c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(-\frac{f^2}{4(c+2bk-bm)} + g + \frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{-c+2bk-bm}}\left(\cos\left(\frac{f^2}{4(-c+2bk-bm)} + g - \frac{m\pi}{2}\right) C\left(\frac{2(-c+2bk-bm)z - f}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right) + S\left(\frac{2(-c+2bk-bm)z - f}{\sqrt{-c+2bk-bm}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4(-c+2bk-bm)} + g - \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0730.01

$$\int \sin^m\left(\sqrt{z}\, b\right)\cos\left(\sqrt{z}\, c + f z + g\right) dz = \frac{1}{f^{3/2}}\left(2^{-m-1}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left(2\sqrt{f}\sin\left(\sqrt{z}\, c + g + f z\right) - c\sqrt{2\pi}\left(\cos\left(\frac{c^2}{4f} - g\right) C\left(\frac{c + 2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right) + S\left(\frac{c + 2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4f} - g\right)\right)\right)\right) + 2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{f^{3/2}}\left((-c-2bk+bm)\sqrt{2\pi}\left(\cos\left(-\frac{(c+2bk-bm)^2}{4f} + g + \frac{m\pi}{2}\right) C\left(\frac{c+2bk-bm+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right) - S\left(\frac{c+2bk-bm+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)\sin\left(-\frac{(c+2bk-bm)^2}{4f} + g + \frac{m\pi}{2}\right)\right) + 2\sqrt{f}\sin\left(g + f z + (c+2bk-bm)\sqrt{z} + \frac{m\pi}{2}\right)\right) + \frac{1}{(-f)^{3/2}}\left((c-2bk+bm)\sqrt{2\pi}\left(\cos\left(-\frac{(-c+2bk-bm)^2}{4f} + g - \frac{m\pi}{2}\right) C\left(\frac{-c+2bk-bm-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right) + S\left(\frac{-c+2bk-bm-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right)\sin\left(-\frac{(-c+2bk-bm)^2}{4f} + g - \frac{m\pi}{2}\right)\right) - 2\sqrt{-f}\sin\left(g + f z - (-c+2bk-bm)\sqrt{z} - \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + e) \cos(c z^r + f z + g)$

01.07.21.0731.01

$$\int \sin^m(b z^2 + e) \cos(c z^2 + f z + g) \, dz = \frac{1}{\sqrt{c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cos\left(\frac{f^2}{4 c} - g\right) C\left(\frac{f + 2 c z}{\sqrt{c} \sqrt{2 \pi}}\right) + S\left(\frac{f + 2 c z}{\sqrt{c} \sqrt{2 \pi}}\right) \sin\left(\frac{f^2}{4 c} - g\right)\right)\right) + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{c + 2 b k - b m}} \left(\cos\left(-\frac{f^2}{4 (c + 2 b k - b m)} + g + 2 e k - e m + \frac{m \pi}{2}\right) C\left(\frac{f + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m} \sqrt{2 \pi}}\right) - S\left(\frac{f + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(-\frac{f^2}{4 (c + 2 b k - b m)} + g + 2 e k - e m + \frac{m \pi}{2}\right)\right) + \frac{1}{\sqrt{-c + 2 b k - b m}} \left(\cos\left(\frac{f^2}{4 (-c + 2 b k - b m)} + g - 2 e k + e m - \frac{m \pi}{2}\right) C\left(\frac{2 (-c + 2 b k - b m) z - f}{\sqrt{-c + 2 b k - b m} \sqrt{2 \pi}}\right) + S\left(\frac{2 (-c + 2 b k - b m) z - f}{\sqrt{-c + 2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(\frac{f^2}{4 (-c + 2 b k - b m)} + g - 2 e k + e m - \frac{m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

01.07.21.0732.01

$$\int \sin^m\left(\sqrt{z}\, b+e\right) \cos\left(\sqrt{z}\, c+f z+g\right) dz = \frac{1}{f^{3/2}} \left(2^{-m-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(2\sqrt{f} \sin\left(\sqrt{z}\, c+g+f z\right)-c\sqrt{2\pi} \left(\cos\left(\frac{c^2}{4 f}-g\right) C\left(\frac{c+2 f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)+S\left(\frac{c+2 f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4 f}-g\right)\right)\right)\right)+$$
$$2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{f^{3/2}} \left((-c-2 b k+b m)\sqrt{2\pi} \left(\cos\left(-\frac{(c+2 b k-b m)^2}{4 f}+g+2 e k-e m+\frac{m\pi}{2}\right) C\left(\frac{c+2 b k-b m+2 f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)-S\left(\frac{c+2 b k-b m+2 f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right) \sin\left(-\frac{(c+2 b k-b m)^2}{4 f}+g+2 e k-e m+\frac{m\pi}{2}\right)\right)+2\sqrt{f} \sin\left(g+2 e k-e m+f z+(c+2 b k-b m)\sqrt{z}+\frac{m\pi}{2}\right)\right)+\frac{1}{(-f)^{3/2}} \left((c-2 b k+b m)\sqrt{2\pi} \left(\cos\left(-\frac{(-c+2 b k-b m)^2}{4 f}+g-2 e k+e m-\frac{m\pi}{2}\right) C\left(\frac{-c+2 b k-b m-2 f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right)+S\left(\frac{-c+2 b k-b m-2 f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right) \sin\left(-\frac{(-c+2 b k-b m)^2}{4 f}+g-2 e k+e m-\frac{m\pi}{2}\right)\right)-2\sqrt{-f} \sin\left(g-2 e k+e m+f z-(-c+2 b k-b m)\sqrt{z}-\frac{m\pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r+d z\right) \cos\left(c z^r+f z+g\right)$

01.07.21.0733.01

$$\int \sin^m(b z^2 + d z) \cos(c z^2 + f z + g) \, dz = \frac{2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)}{\sqrt{c}} \left(\cos\left(\frac{f^2}{4c} - g\right) C\left(\frac{f + 2 c z}{\sqrt{c} \sqrt{2\pi}}\right) + S\left(\frac{f + 2 c z}{\sqrt{c} \sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4c} - g\right) \right) + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{c + 2 b k - b m}} \left(\cos\left(-\frac{(f + 2 d k - d m)^2}{4 (c + 2 b k - b m)} + g + \frac{m \pi}{2}\right) C\left(\frac{f + 2 d k - d m + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m} \sqrt{2\pi}}\right) - S\left(\frac{f + 2 d k - d m + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m} \sqrt{2\pi}}\right) \sin\left(-\frac{(f + 2 d k - d m)^2}{4 (c + 2 b k - b m)} + g + \frac{m \pi}{2}\right) \right) + \frac{1}{\sqrt{-c + 2 b k - b m}} \left(\cos\left(\frac{(-f + 2 d k - d m)^2}{4 (-c + 2 b k - b m)} + g - \frac{m \pi}{2}\right) C\left(\frac{-f + 2 d k - d m + 2 (-c + 2 b k - b m) z}{\sqrt{-c + 2 b k - b m} \sqrt{2\pi}}\right) + S\left(\frac{-f + 2 d k - d m + 2 (-c + 2 b k - b m) z}{\sqrt{-c + 2 b k - b m} \sqrt{2\pi}}\right) \sin\left(\frac{(-f + 2 d k - d m)^2}{4 (-c + 2 b k - b m)} + g - \frac{m \pi}{2}\right) \right) \right) /; m \in \mathbb{N}^+$$

01.07.21.0734.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z\right) \cos\left(\sqrt{z}\, c + f\, z + g\right) dz = \frac{1}{f^{3/2}} \left(2^{-m-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2 \sqrt{f} \sin\left(\sqrt{z}\, c + g + f\, z\right) - c \sqrt{2\pi} \left(\cos\left(\frac{c^2}{4 f} - g\right) C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{f} \sqrt{2\pi}}\right) + S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{f} \sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4 f} - g\right)\right)\right)\right) +$$

$$2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(f + 2 d k - d m)^{3/2}} \left((-c - 2 b k + b m) \sqrt{2\pi} \left(\cos\left(-\frac{(c + 2 b k - b m)^2}{4 (f + 2 d k - d m)} + g + \frac{m \pi}{2}\right) C\left(\frac{c + 2 b k - b m + 2 (f + 2 d k - d m) \sqrt{z}}{\sqrt{f + 2 d k - d m} \sqrt{2\pi}}\right) - S\left(\frac{c + 2 b k - b m + 2 (f + 2 d k - d m) \sqrt{z}}{\sqrt{f + 2 d k - d m} \sqrt{2\pi}}\right) \sin\left(-\frac{(c + 2 b k - b m)^2}{4 (f + 2 d k - d m)} + g + \frac{m \pi}{2}\right)\right) + 2 \sqrt{f + 2 d k - d m} \sin\left(g + (f + 2 d k - d m) z + (c + 2 b k - b m) \sqrt{z} + \frac{m \pi}{2}\right)\right) + \left((c - 2 b k + b m) \sqrt{2\pi} \left(\cos\left(\frac{(-c + 2 b k - b m)^2}{4 (-f + 2 d k - d m)} + g - \frac{m \pi}{2}\right) C\left(\frac{-c + 2 b k - b m + 2 (-f + 2 d k - d m) \sqrt{z}}{\sqrt{-f + 2 d k - d m} \sqrt{2\pi}}\right) + S\left(\frac{-c + 2 b k - b m + 2 (-f + 2 d k - d m) \sqrt{z}}{\sqrt{-f + 2 d k - d m} \sqrt{2\pi}}\right) \sin\left(\frac{(-c + 2 b k - b m)^2}{4 (-f + 2 d k - d m)} + g - \frac{m \pi}{2}\right)\right) - 2 \sqrt{-f + 2 d k - d m} \sin\left(g - (-f + 2 d k - d m) z - (-c + 2 b k - b m) \sqrt{z} - \frac{m \pi}{2}\right)\right) \Big/ (-f + 2 d k - d m)^{3/2} \right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m\left(b\, z^r + d\, z + e\right) \cos\left(c\, z^r + f\, z + g\right)$

01.07.21.0735.01

$$\int \sin^m(b z^2 + d z + e) \cos(c z^2 + f z + g)\, dz = \frac{1}{\sqrt{c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cos\left(\frac{f^2}{4c} - g\right) C\left(\frac{f + 2 c z}{\sqrt{c}\, \sqrt{2\pi}}\right) + S\left(\frac{f + 2 c z}{\sqrt{c}\, \sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4c} - g\right)\right)\right) + 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{c + 2 b k - b m}} \left(\cos\left(-\frac{(f + 2 d k - d m)^2}{4 (c + 2 b k - b m)} + g + 2 e k - e m + \frac{m\pi}{2}\right) C\left(\frac{f + 2 d k - d m + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m}\, \sqrt{2\pi}}\right) - S\left(\frac{f + 2 d k - d m + 2 (c + 2 b k - b m) z}{\sqrt{c + 2 b k - b m}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(f + 2 d k - d m)^2}{4 (c + 2 b k - b m)} + g + 2 e k - e m + \frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{-c + 2 b k - b m}} \left(\cos\left(\frac{(-f + 2 d k - d m)^2}{4 (-c + 2 b k - b m)} + g - 2 e k + e m - \frac{m\pi}{2}\right) C\left(\frac{-f + 2 d k - d m + 2 (-c + 2 b k - b m) z}{\sqrt{-c + 2 b k - b m}\, \sqrt{2\pi}}\right) + S\left(\frac{-f + 2 d k - d m + 2 (-c + 2 b k - b m) z}{\sqrt{-c + 2 b k - b m}\, \sqrt{2\pi}}\right) \sin\left(\frac{(-f + 2 d k - d m)^2}{4 (-c + 2 b k - b m)} + g - 2 e k + e m - \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0736.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \cos\left(\sqrt{z}\, c + f\, z + g\right) dz = \frac{1}{f^{3/2}} \left(2^{-m-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2\sqrt{f}\, \sin\left(\sqrt{z}\, c + g + f\, z\right) - c\sqrt{2\pi} \left(\cos\left(\frac{c^2}{4 f} - g\right) C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{f}\, \sqrt{2\pi}}\right) + S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{f}\, \sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4 f} - g\right)\right)\right)\right) +$$

$$2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(f + 2 d k - d m)^{3/2}} \left((-c - 2 b k + b m) \sqrt{2\pi} \left(\cos\left(-\frac{(c + 2 b k - b m)^2}{4 (f + 2 d k - d m)} + g + 2 e k - e m + \frac{m \pi}{2}\right) C\left(\frac{c + 2 b k - b m + 2 (f + 2 d k - d m) \sqrt{z}}{\sqrt{f + 2 d k - d m}\, \sqrt{2\pi}}\right) - S\left(\frac{c + 2 b k - b m + 2 (f + 2 d k - d m) \sqrt{z}}{\sqrt{f + 2 d k - d m}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(c + 2 b k - b m)^2}{4 (f + 2 d k - d m)} + g + 2 e k - e m + \frac{m \pi}{2}\right)\right) + 2\sqrt{f + 2 d k - d m}\, \sin\left(g + 2 e k - e m + (f + 2 d k - d m) z + (c + 2 b k - b m) \sqrt{z} + \frac{m \pi}{2}\right)\right) + \left((c - 2 b k + b m) \sqrt{2\pi} \left(\cos\left(\frac{(-c + 2 b k - b m)^2}{4 (-f + 2 d k - d m)} + g - 2 e k + e m - \frac{m \pi}{2}\right) C\left(\frac{-c + 2 b k - b m + 2 (-f + 2 d k - d m) \sqrt{z}}{\sqrt{-f + 2 d k - d m}\, \sqrt{2\pi}}\right) + S\left(\frac{-c + 2 b k - b m + 2 (-f + 2 d k - d m) \sqrt{z}}{\sqrt{-f + 2 d k - d m}\, \sqrt{2\pi}}\right) \sin\left(\frac{(-c + 2 b k - b m)^2}{4 (-f + 2 d k - d m)} + g - 2 e k + e m - \frac{m \pi}{2}\right)\right) - 2\sqrt{-f + 2 d k - d m}\, \sin\left(g - 2 e k + e m - (-f + 2 d k - d m) z - (-c + 2 b k - b m) \sqrt{z} - \frac{m \pi}{2}\right)\right) \Big/ (-f + 2 d k - d m)^{3/2}\right) /;\, m \in \mathbb{N}^+$$

Involving products of sin

01.07.21.0737.01

$$\int \sin(a\, z) \sin(b\, z) \cos(c\, z)\, dz = \frac{1}{4} \left(\frac{\sin((a - b - c) z)}{a - b - c} + \frac{\sin((a - b + c) z)}{a - b + c} - \frac{\sin((a + b - c) z)}{a + b - c} - \frac{\sin((a + b + c) z)}{a + b + c}\right)$$

Involving rational functions of sin

Involving $\frac{\cos(c\, z)}{a + b \sin(d\, z)}$

01.07.21.0738.01

$$\int \frac{\cos(c z)}{a + b \sin(d z)} \, dz = \frac{1}{2 b \sqrt{a^2 - b^2}} \left(i e^{-i (c-d) z} \left(\frac{1}{c+d} \left(i e^{2 i c z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c+d}{d}, 1; \frac{c}{d} + 2; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c+d}{d}, 1; \frac{c}{d} + 2; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) - \frac{1}{c-d} \left(i \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(1 - \frac{c}{d}, 1; 2 - \frac{c}{d}; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(1 - \frac{c}{d}, 1; 2 - \frac{c}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \right) \right)$$

Involving $(a + b \sin(d z))^{-n} \cos(c z)$

01.07.21.0739.01

$$\int \frac{\cos(c z)}{a + b \sin^2(d z)} \, dz = \frac{1}{2 \sqrt{a} \, b \sqrt{a+b}} \left(\frac{1}{c + 2 d} \left(i e^{i (c+2 d) z} \left(\left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b \right) {}_2F_1\left(\frac{c}{2 d} + 1, 1; \frac{c}{2 d} + 2; \frac{b e^{2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b \right) {}_2F_1\left(\frac{c}{2 d} + 1, 1; \frac{c}{2 d} + 2; \frac{b e^{2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) - \frac{1}{c - 2 d} \left(i e^{-i (c-2 d) z} \left(\left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b \right) {}_2F_1\left(1 - \frac{c}{2 d}, 1; 2 - \frac{c}{2 d}; \frac{b e^{2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b \right) {}_2F_1\left(1 - \frac{c}{2 d}, 1; 2 - \frac{c}{2 d}; \frac{b e^{2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) \right)$$

Involving $\frac{\cos(c z)}{a + b \sin^2(d z)}$

01.07.21.0740.01

$$\int \frac{\cos(c z)}{a + b \sin^2(d z)} \, dz = \frac{1}{2 \sqrt{a} \, b \sqrt{a+b}} \left(\frac{1}{i c + 2 i d} \left(e^{(-i c - 2 i d) z} \left(\left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b \right) {}_2F_1\left(\frac{c}{2 d} + 1, 1; \frac{c}{2 d} + 2; \frac{b e^{-2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b \right) {}_2F_1\left(\frac{c}{2 d} + 1, 1; \frac{c}{2 d} + 2; \frac{b e^{-2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) - \frac{1}{i c - 2 i d} \left(e^{(i c - 2 i d) z} \left(\left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b \right) {}_2F_1\left(1 - \frac{c}{2 d}, 1; 2 - \frac{c}{2 d}; \frac{b e^{-2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b \right) {}_2F_1\left(1 - \frac{c}{2 d}, 1; 2 - \frac{c}{2 d}; \frac{b e^{-2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) \right)$$

Involving $\left(a+b\sin^2(d\,z)\right)^{-n}\cos(c\,z)$

01.07.21.0741.01

$$\int \frac{\cos(c\,z)}{\left(a+b\sin^2(d\,z)\right)^2}\,dz = \frac{1}{4\,a^{3/2}\,b\,(a+b)^{3/2}}$$
$$\Bigg(-\frac{1}{i\,c+2\,i\,d}\Bigg(e^{(i\,c+2\,i\,d)\,z}\Bigg((2\,a+b)\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(\frac{c}{2\,d}+1,1;\frac{c}{2\,d}+2;\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$(2\,a+b)\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(\frac{c}{2\,d}+1,1;\frac{c}{2\,d}+2;\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\Bigg(\left(2\,a^{3/2}-2\sqrt{a+b}\,a+2\,b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\!\left(\frac{c}{2\,d}+1,2;\frac{c}{2\,d}+2;\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$\left(-2\,a^{3/2}-2\sqrt{a+b}\,a-2\,b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\!\left(\frac{c}{2\,d}+1,2;\frac{c}{2\,d}+2;\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg)-$$
$$\frac{1}{-i\,c+2\,i\,d}\Bigg(e^{2\,i\,d\,z-i\,c\,z}\Bigg((2\,a+b)\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1-\frac{c}{2\,d},1;2-\frac{c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$(2\,a+b)\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{c}{2\,d},1;2-\frac{c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\Bigg(\left(2\,a^{3/2}-2\sqrt{a+b}\,a+2\,b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\!\left(1-\frac{c}{2\,d},2;2-\frac{c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$\left(-2\,a^{3/2}-2\sqrt{a+b}\,a-2\,b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\!\left(1-\frac{c}{2\,d},2;2-\frac{c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

Involving $\frac{\sin(e\,z)\cos(c\,z)}{a+b\sin(d\,z)}$

01.07.21.0742.01

$$\int \frac{\sin(e\,z)\cos(c\,z)}{a+b\sin(d\,z)}\,dz = -\frac{1}{4}\,i\Bigg(\frac{1}{b\sqrt{a^2-b^2}\,(-i\,c+i\,d-i\,e)}\Bigg(i\,e^{(-i\,c+i\,d-i\,e)\,z}\Bigg(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(-\frac{i\,(-i\,c+i\,d-i\,e)}{d},1;2-\frac{i\,(-i\,c-i\,e)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right)$$

$$ {}_2F_1\!\left(-\frac{i\,(-i\,c+i\,d-i\,e)}{d},1;2-\frac{i\,(-i\,c-i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)+\frac{1}{b\sqrt{a^2-b^2}\,(i\,c+i\,d-i\,e)}$$

$$\Bigg(i\,e^{(i\,c+i\,d-i\,e)\,z}\Bigg(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(-\frac{i\,(i\,c+i\,d-i\,e)}{d},1;2-\frac{i\,(i\,c-i\,e)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+$$

$$\left(\sqrt{a^2-b^2}-a\right){}_2F_1\!\left(-\frac{i\,(i\,c+i\,d-i\,e)}{d},1;2-\frac{i\,(i\,c-i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)-\frac{1}{b\sqrt{a^2-b^2}\,(-i\,c+i\,d+i\,e)}$$

$$\Bigg(i\,e^{(-i\,c+i\,d+i\,e)\,z}\Bigg(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(-\frac{i\,(-i\,c+i\,d+i\,e)}{d},1;2-\frac{i\,(-i\,c+i\,e)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right)$$

$$ {}_2F_1\!\left(-\frac{i\,(-i\,c+i\,d+i\,e)}{d},1;2-\frac{i\,(-i\,c+i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)-\frac{1}{b\sqrt{a^2-b^2}\,(i\,c+i\,d+i\,e)}$$

$$\Bigg(i\,e^{(i\,c+i\,d+i\,e)\,z}\Bigg(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(-\frac{i\,(i\,c+i\,d+i\,e)}{d},1;2-\frac{i\,(i\,c+i\,e)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+$$

$$\left(\sqrt{a^2-b^2}-a\right){}_2F_1\!\left(-\frac{i\,(i\,c+i\,d+i\,e)}{d},1;2-\frac{i\,(i\,c+i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)$$

Involving $\sin(e\,z)\cos(c\,z)\,(a+b\sin(d\,z))^{-n}$

01.07.21.0743.01

$$\int \frac{\sin(e\,z)\cos(c\,z)}{(a+b\sin(d\,z))^2}\,dz =$$

$$-\frac{1}{4}\,i\Bigg(\frac{1}{b\left(a^2-b^2\right)^{3/2}(-i\,c+i\,d+i\,e)}\Bigg(i\,e^{(-i\,c+i\,d+i\,e)\,z}\Bigg(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(-\frac{i\,(-i\,c+i\,d+i\,e)}{d},1;2-\frac{i\,(-i\,c+i\,e)}{d};\right.$$

$$\left.-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\!\left(-\frac{i\,(-i\,c+i\,d+i\,e)}{d},1;2-\frac{i\,(-i\,c+i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\;a-b^2\right){}_2F_1\left(-\frac{i\,(-i\,c+i\,d+i\,e)}{d},2;2-\frac{i\,(-i\,c+i\,e)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+$$

$$\left.\left.\left.\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\left(-\frac{i\,(-i\,c+i\,d+i\,e)}{d},2;2-\frac{i\,(-i\,c+i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)+$$

$$\frac{1}{b\left(a^2-b^2\right)^{3/2}(i\,c+i\,d+i\,e)}\left(i\,e^{(i\,c+i\,d+i\,e)\,z}\left(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e)}{d},1;2-\frac{i\,(i\,c+i\,e)}{d};\right.\right.\right.$$

$$\left.-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e)}{d},1;2-\frac{i\,(i\,c+i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\;a-b^2\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e)}{d},2;2-\frac{i\,(i\,c+i\,e)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+$$

$$\left.\left.\left.\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e)}{d},2;2-\frac{i\,(i\,c+i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)-$$

$$\frac{1}{b\left(a^2-b^2\right)^{3/2}(-i\,c+i\,d-i\,e)}\left(i\,e^{(-i\,c+i\,d-i\,e)\,z}\left(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(-i\,c+i\,d-i\,e)}{d},1;2-\frac{i\,(-i\,c-i\,e)}{d};\right.\right.\right.$$

$$\left.-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(-i\,c+i\,d-i\,e)}{d},1;2-\frac{i\,(-i\,c-i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\;a-b^2\right){}_2F_1\left(-\frac{i\,(-i\,c+i\,d-i\,e)}{d},2;2-\frac{i\,(-i\,c-i\,e)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+$$

$$\left.\left.\left.\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\left(-\frac{i\,(-i\,c+i\,d-i\,e)}{d},2;2-\frac{i\,(-i\,c-i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)-$$

$$\frac{1}{b\left(a^2-b^2\right)^{3/2}(i\,c+i\,d-i\,e)}\left(i\,e^{(i\,c+i\,d-i\,e)\,z}\left(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e)}{d},1;2-\frac{i\,(i\,c-i\,e)}{d};\right.\right.\right.$$

$$\left.-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e)}{d},1;2-\frac{i\,(i\,c-i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\;a-b^2\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e)}{d},2;2-\frac{i\,(i\,c-i\,e)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+$$

$$\left.\left.\left.\left.\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e)}{d},2;2-\frac{i\,(i\,c-i\,e)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)$$

Involving $\frac{\sin(e z)\cos(c z)}{a+b\sin^2(d z)}$

01.07.21.0744.01

$$\int \frac{\sin(e z)\cos(c z)}{a+b\sin^2(d z)}\,dz = -\frac{1}{4}i\Bigg(\Bigg(e^{(-i c-2 i d-i e)z}\Bigg(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(1+\frac{i(-i c-i e)}{2d},1;2+\frac{i(-i c-i e)}{2d};-\frac{b e^{-2 i d z}}{-2a+2\sqrt{a+b}\sqrt{a}-b}\right)+\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(1+\frac{i(-i c-i e)}{2d},1;2+\frac{i(-i c-i e)}{2d};-\frac{b e^{-2 i d z}}{-2a-2\sqrt{a+b}\sqrt{a}-b}\right)\Bigg)\Bigg)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(-i c-2 i d-i e)\right)+\Bigg(e^{(i c-2 i d-i e)z}\Bigg(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(1+\frac{i(i c-i e)}{2d},1;2+\frac{i(i c-i e)}{2d};-\frac{b e^{-2 i d z}}{-2a+2\sqrt{a+b}\sqrt{a}-b}\right)+\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(1+\frac{i(i c-i e)}{2d},1;2+\frac{i(i c-i e)}{2d};-\frac{b e^{-2 i d z}}{-2a-2\sqrt{a+b}\sqrt{a}-b}\right)\Bigg)\Bigg)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(i c-2 i d-i e)\right)-\Bigg(e^{(-i c-2 i d+i e)z}\Bigg(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(1+\frac{i(-i c+i e)}{2d},1;2+\frac{i(-i c+i e)}{2d};-\frac{b e^{-2 i d z}}{-2a+2\sqrt{a+b}\sqrt{a}-b}\right)+\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(1+\frac{i(-i c+i e)}{2d},1;2+\frac{i(-i c+i e)}{2d};-\frac{b e^{-2 i d z}}{-2a-2\sqrt{a+b}\sqrt{a}-b}\right)\Bigg)\Bigg)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(-i c-2 i d+i e)\right)-\Bigg(e^{(i c-2 i d+i e)z}\Bigg(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(1+\frac{i(i c+i e)}{2d},1;2+\frac{i(i c+i e)}{2d};-\frac{b e^{-2 i d z}}{-2a+2\sqrt{a+b}\sqrt{a}-b}\right)+\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(1+\frac{i(i c+i e)}{2d},1;2+\frac{i(i c+i e)}{2d};-\frac{b e^{-2 i d z}}{-2a-2\sqrt{a+b}\sqrt{a}-b}\right)\Bigg)\Bigg)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(i c-2 i d+i e)\right)\Bigg)$$

Involving $\sin(e z)\cos(c z)\left(a+b\sin^2(d z)\right)^{-n}$

01.07.21.0745.01

$$\int \frac{\sin(e z)\cos(c z)}{\left(a+b\sin^2(d z)\right)^2}\,dz = -\frac{1}{4}i\Bigg(\Bigg(e^{(-i c+2 i d-i e)z}\Bigg((2a+b)\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(1-\frac{i(-i c-i e)}{2d},1;2-\frac{i(-i c-i e)}{2d};-\frac{b e^{2 i d z}}{-2a+2\sqrt{a+b}\sqrt{a}-b}\right)+(2a+b)\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{i(-i c-i e)}{2d},1;2-\frac{i(-i c-i e)}{2d};-\frac{b e^{2 i d z}}{-2a-2\sqrt{a+b}\sqrt{a}-b}\right)+2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a+b}\,a-2b\sqrt{a}-b\sqrt{a+b}\right)\right.$$

$$ {}_2F_1\left(1-\frac{i(-i c-i e)}{2 d}, 2; 2-\frac{i(-i c-i e)}{2 d}; -\frac{b e^{2 i d z}}{-2 a+2 \sqrt{a+b} \sqrt{a}-b}\right)+\left(2 a^{3/2}-2 \sqrt{a+b}\, a+2 b\right. $$

$$ \left.\sqrt{a}-b \sqrt{a+b}\right) {}_2F_1\left(1-\frac{i(-i c-i e)}{2 d}, 2; 2-\frac{i(-i c-i e)}{2 d}; -\frac{b e^{2 i d z}}{-2 a-2 \sqrt{a+b} \sqrt{a}-b}\right)\Bigg)\Bigg)\Bigg)\Bigg) \Big/ $$

$$ \left(2 a^{3/2} b (a+b)^{3/2} (-i c+2 i d-i e)\right)+\Bigg(e^{(i c+2 i d-i e) z}\Bigg((2 a+b)\left(2 a+2 \sqrt{a+b} \sqrt{a}+b\right) $$

$$ {}_2F_1\left(1-\frac{i(i c-i e)}{2 d}, 1; 2-\frac{i(i c-i e)}{2 d}; -\frac{b e^{2 i d z}}{-2 a+2 \sqrt{a+b} \sqrt{a}-b}\right)+ $$

$$ (2 a+b)\left(-2 a+2 \sqrt{a+b} \sqrt{a}-b\right) {}_2F_1\left(1-\frac{i(i c-i e)}{2 d}, 1; 2-\frac{i(i c-i e)}{2 d}; -\frac{b e^{2 i d z}}{-2 a-2 \sqrt{a+b} \sqrt{a}-b}\right)+ $$

$$ 2 \sqrt{a}\Bigg(\left(-2 a^{3/2}-2 \sqrt{a+b}\, a-2 b \sqrt{a}-b \sqrt{a+b}\right) {}_2F_1\Bigg(1-\frac{i(i c-i e)}{2 d}, 2; 2-\frac{i(i c-i e)}{2 d}; $$

$$ \left.-\frac{b e^{2 i d z}}{-2 a+2 \sqrt{a+b} \sqrt{a}-b}\right)+\left(2 a^{3/2}-2 \sqrt{a+b}\, a+2 b \sqrt{a}-b \sqrt{a+b}\right) $$

$$ {}_2F_1\left(1-\frac{i(i c-i e)}{2 d}, 2; 2-\frac{i(i c-i e)}{2 d}; -\frac{b e^{2 i d z}}{-2 a-2 \sqrt{a+b} \sqrt{a}-b}\right)\Bigg)\Bigg)\Bigg)\Bigg) \Big/ $$

$$ \left(2 a^{3/2} b (a+b)^{3/2} (i c+2 i d-i e)\right)-\Bigg(e^{(-i c+2 i d+i e) z}\Bigg((2 a+b)\left(2 a+2 \sqrt{a+b} \sqrt{a}+b\right) $$

$$ {}_2F_1\left(1-\frac{i(-i c+i e)}{2 d}, 1; 2-\frac{i(-i c+i e)}{2 d}; -\frac{b e^{2 i d z}}{-2 a+2 \sqrt{a+b} \sqrt{a}-b}\right)+(2 a+b) $$

$$ \left(-2 a+2 \sqrt{a+b} \sqrt{a}-b\right) {}_2F_1\left(1-\frac{i(-i c+i e)}{2 d}, 1; 2-\frac{i(-i c+i e)}{2 d}; -\frac{b e^{2 i d z}}{-2 a-2 \sqrt{a+b} \sqrt{a}-b}\right)+ $$

$$ 2 \sqrt{a}\Bigg(\left(-2 a^{3/2}-2 \sqrt{a+b}\, a-2 b \sqrt{a}-b \sqrt{a+b}\right) {}_2F_1\Bigg(1-\frac{i(-i c+i e)}{2 d}, 2; 2-\frac{i(-i c+i e)}{2 d}; $$

$$ \left.-\frac{b e^{2 i d z}}{-2 a+2 \sqrt{a+b} \sqrt{a}-b}\right)+\left(2 a^{3/2}-2 \sqrt{a+b}\, a+2 b \sqrt{a}-b \sqrt{a+b}\right) $$

$$ {}_2F_1\left(1-\frac{i(-i c+i e)}{2 d}, 2; 2-\frac{i(-i c+i e)}{2 d}; -\frac{b e^{2 i d z}}{-2 a-2 \sqrt{a+b} \sqrt{a}-b}\right)\Bigg)\Bigg)\Bigg)\Bigg) \Big/ $$

$$ \left(2 a^{3/2} b (a+b)^{3/2} (-i c+2 i d+i e)\right)-\Bigg(e^{(i c+2 i d+i e) z}\Bigg((2 a+b)\left(2 a+2 \sqrt{a+b} \sqrt{a}+b\right) $$

$$ {}_2F_1\left(1-\frac{i(i c+i e)}{2 d}, 1; 2-\frac{i(i c+i e)}{2 d}; -\frac{b e^{2 i d z}}{-2 a+2 \sqrt{a+b} \sqrt{a}-b}\right)+ $$

$$ (2 a+b)\left(-2 a+2 \sqrt{a+b} \sqrt{a}-b\right) {}_2F_1\left(1-\frac{i(i c+i e)}{2 d}, 1; 2-\frac{i(i c+i e)}{2 d}; -\frac{b e^{2 i d z}}{-2 a-2 \sqrt{a+b} \sqrt{a}-b}\right)+ $$

$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a+b}\,a-2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(1-\frac{i(i c+i e)}{2d},2;2-\frac{i(i c+i e)}{2d};-\frac{b e^{2idz}}{-2a+2\sqrt{a+b}\sqrt{a}-b}\right)+\left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(1-\frac{i(i c+i e)}{2d},2;2-\frac{i(i c+i e)}{2d};-\frac{b e^{2idz}}{-2a-2\sqrt{a+b}\sqrt{a}-b}\right)\right)\right)\right)\Big/\left(2a^{3/2}b(a+b)^{3/2}(i c+2 i d+i e)\right)$$

Involving algebraic functions of sin

Involving $(a+b\sin(dz))^{\beta}\cos(cz)$

01.07.21.0746.01

$$\int(a+b\sin(dz))^{\beta}\cos(cz)\,dz = -\frac{1}{2(c^2-d^2\beta^2)}\left(i e^{-icz}\left(1+\frac{i b e^{idz}}{\sqrt{a^2-b^2}-a}\right)^{-\beta}\left(1-\frac{i b e^{idz}}{a+\sqrt{a^2-b^2}}\right)^{-\beta}\left(a-\frac{1}{2} i b e^{-idz}\left(-1+e^{2idz}\right)\right)^{\beta}\left((d\beta-c)F_1\left(-\frac{c+d\beta}{d};-\beta,-\beta;-\frac{c}{d}-\beta+1;\frac{i b e^{idz}}{a+\sqrt{a^2-b^2}},\frac{i b e^{idz}}{a-\sqrt{a^2-b^2}}\right)+e^{2icz}(c+d\beta)F_1\left(\frac{c}{d}-\beta;-\beta,-\beta;\frac{c}{d}-\beta+1;\frac{i b e^{idz}}{a+\sqrt{a^2-b^2}},\frac{i b e^{idz}}{a-\sqrt{a^2-b^2}}\right)\right)\right)$$

Involving $\left(a+b\sin^2(dz)\right)^{\beta}\cos(cz)$

01.07.21.0747.01

$$\int\left(a+b\sin^2(dz)\right)^{\beta}\cos(cz)\,dz = -\frac{1}{2(c^2-4d^2\beta^2)}\left(i e^{-icz}\left(1-\frac{b e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)^{-\beta}\left(1-\frac{b e^{2idz}}{2a+b+2\sqrt{a(a+b)}}\right)^{-\beta}\left(a-\frac{1}{4} b e^{-2idz}\left(-1+e^{2idz}\right)^2\right)^{\beta}\left(e^{2icz}(c+2d\beta)F_1\left(\frac{c}{2d}-\beta;-\beta,-\beta;\frac{c}{2d}-\beta+1;\frac{b e^{2idz}}{2a+b+2\sqrt{a(a+b)}},\frac{b e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)-(c-2d\beta)F_1\left(-\frac{c+2d\beta}{2d};-\beta,-\beta;-\frac{c}{2d}-\beta+1;\frac{b e^{2idz}}{2a+b+2\sqrt{a(a+b)}},\frac{b e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)\right)\right)$$

Involving $\sin(ez)\cos(cz)(a+b\sin(dz))^{\beta}$

01.07.21.0748.01

$$\int \sin(e\,z)\cos(c\,z)\,(a+b\sin(d\,z))^\beta\,dz = \frac{1}{4}\left(1+\frac{i\,b\,e^{-i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)^{-\beta}\left(1+\frac{i\,b\,e^{-i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)^{-\beta} (a+b\sin(d\,z))^\beta\left(\frac{e^{-i(c-e)z}}{c-e-d\,\beta}F_1\left(\frac{c-e-d\,\beta}{d};-\beta,-\beta;\frac{c+d-e-d\,\beta}{d};-\frac{i\,b\,e^{-i\,d\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{-i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)-\frac{e^{-i(c+e)z}}{c+e-d\,\beta}F_1\left(\frac{c+e-d\,\beta}{d};-\beta,-\beta;\frac{c+d+e-d\,\beta}{d};-\frac{i\,b\,e^{-i\,d\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{-i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\frac{e^{i(c-e)z}}{c-e+d\,\beta}F_1\left(-\frac{c-e+d\,\beta}{d};-\beta,-\beta;\frac{-c+d+e-d\,\beta}{d};-\frac{i\,b\,e^{-i\,d\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{-i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)-\frac{e^{i(c+e)z}}{c+e+d\,\beta}F_1\left(-\frac{c+e+d\,\beta}{d};-\beta,-\beta;-\frac{c+e+d(\beta-1)}{d};-\frac{i\,b\,e^{-i\,d\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{-i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)\right)$$

Involving $\sin(e\,z)\cos(c\,z)\left(a+b\sin^2(d\,z)\right)^\beta$

01.07.21.0749.01

$$\int \sin(e\,z)\cos(c\,z)\left(a+b\sin^2(d\,z)\right)^\beta dz = \frac{1}{4}\left(1-\frac{b\,e^{-2\,i\,d\,z}}{2\,a+b-2\sqrt{a(a+b)}}\right)^{-\beta}\left(1-\frac{b\,e^{-2\,i\,d\,z}}{2\,a+b+2\sqrt{a(a+b)}}\right)^{-\beta}\left(a-\frac{1}{4}b\,e^{-2\,i\,d\,z}\left(-1+e^{2\,i\,d\,z}\right)^2\right)^\beta \left(\frac{e^{-i(c-e)z}}{c-e-2\,d\,\beta}F_1\left(\frac{c-e-2\,d\,\beta}{2\,d};-\beta,-\beta;\frac{c+2\,d-e-2\,d\,\beta}{2\,d};\frac{b\,e^{-2\,i\,d\,z}}{2\,a+b+2\sqrt{a(a+b)}},\frac{b\,e^{-2\,i\,d\,z}}{2\,a+b-2\sqrt{a(a+b)}}\right)-\frac{e^{-i(c+e)z}}{c+e-2\,d\,\beta}F_1\left(\frac{c+e-2\,d\,\beta}{2\,d};-\beta,-\beta;\frac{c+2\,d+e-2\,d\,\beta}{2\,d};\frac{b\,e^{-2\,i\,d\,z}}{2\,a+b+2\sqrt{a(a+b)}},\frac{b\,e^{-2\,i\,d\,z}}{2\,a+b-2\sqrt{a(a+b)}}\right)+\frac{e^{i(c-e)z}}{c-e+2\,d\,\beta}F_1\left(-\frac{c-e+2\,d\,\beta}{2\,d};-\beta,-\beta;\frac{-c+2\,d+e-2\,d\,\beta}{2\,d};\frac{b\,e^{-2\,i\,d\,z}}{2\,a+b+2\sqrt{a(a+b)}},\frac{b\,e^{-2\,i\,d\,z}}{2\,a+b-2\sqrt{a(a+b)}}\right)-\frac{e^{i(c+e)z}}{c+e+2\,d\,\beta}F_1\left(-\frac{c+e+2\,d\,\beta}{2\,d};-\beta,-\beta;-\frac{c+e+2\,d(\beta-1)}{2\,d};\frac{b\,e^{-2\,i\,d\,z}}{2\,a+b+2\sqrt{a(a+b)}},\frac{b\,e^{-2\,i\,d\,z}}{2\,a+b-2\sqrt{a(a+b)}}\right)\right)$$

Involving trigonometric and a power functions

Involving sin and power

Involving $z^{\alpha-1}\sin(c\,z)\sin(a\,z)$

01.07.21.0750.01

$$\int z^{\alpha-1}\sin(c\,z)\cos(a\,z)\,dz = \frac{1}{4}\,i\,z^{\alpha}\,(-(-i\,(a-c)\,z)^{-\alpha}\,\Gamma(\alpha,-i\,(a-c)\,z)+(i\,(a-c)\,z)^{-\alpha}\,\Gamma(\alpha,i\,(a-c)\,z)+(-i\,(a+c)\,z)^{-\alpha}\,\Gamma(\alpha,-i\,(a+c)\,z)-(i\,(a+c)\,z)^{-\alpha}\,\Gamma(\alpha,i\,(a+c)\,z))$$

01.07.21.0751.01

$$\int z^{n}\sin(c\,z)\cos(a\,z)\,dz = \frac{1}{4}\,i\,n!\left(-(-i\,(a-c))^{-n-1}\,e^{i\,(a-c)\,z}\sum_{k=0}^{n}\frac{(-i\,(a-c)\,z)^{k}}{k!}+(i\,(a-c))^{-n-1}\,e^{-i\,(a-c)\,z}\sum_{k=0}^{n}\frac{(i\,(a-c)\,z)^{k}}{k!}+(-i\,(a+c))^{-n-1}\,e^{i\,(a+c)\,z}\sum_{k=0}^{n}\frac{(-i\,(a+c)\,z)^{k}}{k!}-(i\,(a+c))^{-n-1}\,e^{-i\,(a+c)\,z}\sum_{k=0}^{n}\frac{(i\,(a+c)\,z)^{k}}{k!}\right)/;\,n\in\mathbb{N}$$

01.07.21.0752.01

$$\int z^{-n}\sin(c\,z)\cos(a\,z)\,dz = -\frac{1}{4\left(c^{2}-a^{2}\right)(n-1)!}\left(e^{-2\,i\,a\,z}\left(-(a+c)\,e^{i\,(a+c)\,z}\,(n-1)!\left(\sum_{k=1}^{n-1}\frac{(i\,(a-c))^{k-n}\,z^{k-n}}{(1-n)_{k}}\right)(i\,(a-c))^{n}+(-1)^{n}\,e^{2\,i\,a\,z}\,((i\,(a-c))^{n}\,(a+c)\,\mathrm{Ei}(-i\,(a-c)\,z)-(a-c)\,(-i\,(a+c))^{n}\,\mathrm{Ei}(i\,(a+c)\,z))+(a-c)\,(-i\,(a+c))^{n}\,e^{i\,(3\,a+c)\,z}\,(n-1)!\sum_{k=1}^{n-1}\frac{(-i\,(a+c))^{k-n}\,z^{k-n}}{(1-n)_{k}}\right)+e^{-i\,(a+c)\,z}\left(-(a+c)\,e^{2\,i\,a\,z}\,(n-1)!\left(\sum_{k=1}^{n-1}\frac{(-i\,(a-c))^{k-n}\,z^{k-n}}{(1-n)_{k}}\right)(-i\,(a-c))^{n}+(-1)^{n}\,e^{i\,(a+c)\,z}\,((-i\,(a-c))^{n}\,(a+c)\,\mathrm{Ei}(i\,(a-c)\,z)-(a-c)\,(i\,(a+c))^{n}\,\mathrm{Ei}(-i\,(a+c)\,z))+(a-c)\,(i\,(a+c))^{n}\,(n-1)!\sum_{k=1}^{n-1}\frac{(i\,(a+c))^{k-n}\,z^{k-n}}{(1-n)_{k}}\right)\right)/;\,n\in\mathbb{N}^{+}$$

Involving $z^{\alpha-1}\sin(c\,z+d)\cos(a\,z)$

01.07.21.0753.01

$$\int z^{\alpha-1}\sin(d+c\,z)\cos(a\,z)\,dz = \frac{1}{4}\,i\,z^{\alpha}\left((a-c)^{2}\,z^{2}\right)^{-\alpha}\left((a+c)^{2}\,z^{2}\right)^{-\alpha}\left(((i\,(a+c)\,z)^{\alpha}\,\Gamma(\alpha,-i\,(a+c)\,z)\,(\cos(d)+i\sin(d))-(-i\,(a+c)\,z)^{\alpha}\,\Gamma(\alpha,i\,(a+c)\,z)\,(\cos(d)-i\sin(d)))\left((a-c)^{2}\,z^{2}\right)^{\alpha}+(-i\,(a-c)\,z)^{\alpha}\left((a+c)^{2}\,z^{2}\right)^{\alpha}\Gamma(\alpha,i\,(a-c)\,z)\,(\cos(d)+i\sin(d))-(i\,(a-c)\,z)^{\alpha}\left((a+c)^{2}\,z^{2}\right)^{\alpha}\Gamma(\alpha,-i\,(a-c)\,z)\,(\cos(d)-i\sin(d))\right)$$

Involving $z^{\alpha-1}\sin(c\,z)\cos(a\,z+b)$

01.07.21.0754.01

$$\int z^{\alpha-1}\sin(c\,z)\cos(b+a\,z)\,dz = \frac{1}{4}\,i\,z^{\alpha}\left((a-c)^{2}\,z^{2}\right)^{-\alpha}\left((a+c)^{2}\,z^{2}\right)^{-\alpha}\left(((i\,(a+c)\,z)^{\alpha}\,\Gamma(\alpha,-i\,(a+c)\,z)\,(\cos(b)+i\sin(b))-(-i\,(a+c)\,z)^{\alpha}\,\Gamma(\alpha,i\,(a+c)\,z)\,(\cos(b)-i\sin(b)))\left((a-c)^{2}\,z^{2}\right)^{\alpha}-(i\,(a-c)\,z)^{\alpha}\left((a+c)^{2}\,z^{2}\right)^{\alpha}\Gamma(\alpha,-i\,(a-c)\,z)\,(\cos(b)+i\sin(b))+(-i\,(a-c)\,z)^{\alpha}\left((a+c)^{2}\,z^{2}\right)^{\alpha}\Gamma(\alpha,i\,(a-c)\,z)\,(\cos(b)-i\sin(b))\right)$$

Involving $z^{\alpha-1}\sin(c\,z+d)\cos(a\,z+b)$

01.07.21.0755.01

$$\int z^{\alpha-1}\sin(d+c\,z)\cos(b+a\,z)\,dz = \frac{1}{4}\,i\,z^{\alpha}\left((a-c)^2 z^2\right)^{-\alpha}\left((a+c)^2 z^2\right)^{-\alpha}\Big(\big((i\,(a+c)\,z)^{\alpha}\,\Gamma(\alpha,\,-i\,(a+c)\,z)\,(\cos(b)+i\sin(b))\,(\cos(d)+i\sin(d)) - (-i\,(a+c)\,z)^{\alpha}\,\Gamma(\alpha,\,i\,(a+c)\,z)\,(\cos(b)-i\sin(b))\,(\cos(d)-i\sin(d))\big)\left((a-c)^2 z^2\right)^{\alpha} + (-i\,(a-c)\,z)^{\alpha}\left((a+c)^2 z^2\right)^{\alpha}\Gamma(\alpha,\,i\,(a-c)\,z)\,(\cos(b)-i\sin(b))\,(\cos(d)+i\sin(d)) - (i\,(a-c)\,z)^{\alpha}\left((a+c)^2 z^2\right)^{\alpha}\Gamma(\alpha,\,-i\,(a-c)\,z)\,(\cos(b)+i\sin(b))\,(\cos(d)-i\sin(d))\Big)$$

Involving $z^n \sin(b\,z^r)\cos(c\,z)$

01.07.21.0756.01

$$\int z^n \sin(b\,z^2)\cos(c\,z)\,dz = \frac{1}{8}\,i\left(-e^{\frac{i c^2}{4b}}\left(\sum_{q=0}^{n} 2^{q-n}\,(i\,c)^{n-q}\,(i\,(-c-2\,b\,z))^{q+1}\left(\frac{i\,(c+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(c+2\,b\,z)^2}{4\,b}\right)\right)(-i\,b)^{-n-1} - e^{\frac{i c^2}{4b}}\left(\sum_{q=0}^{n} 2^{q-n}\,(-i\,c)^{n-q}\,(i\,(c-2\,b\,z))^{q+1}\left(\frac{i\,(c-2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(c-2\,b\,z)^2}{4\,b}\right)\right)(-i\,b)^{-n-1} + (i\,b)^{-n-1}\,e^{-\frac{i c^2}{4b}}\sum_{q=0}^{n} 2^{q-n}\,(-i\,c)^{n-q}\,(-i\,(-c-2\,b\,z))^{q+1}\left(-\frac{i\,(c+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(c+2\,b\,z)^2}{4\,b}\right) + (i\,b)^{-n-1}\,e^{-\frac{i c^2}{4b}}\sum_{q=0}^{n} 2^{q-n}\,(i\,c)^{n-q}\,(-i\,(c-2\,b\,z))^{q+1}\left(-\frac{i\,(c-2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(c-2\,b\,z)^2}{4\,b}\right)\right) /;\; n \in \mathbb{N}$$

01.07.21.0757.01

$$\int z^n \sin\left(b\sqrt{z}\right)\cos(c\,z)\,dz = i\,(-1)^n\,2^{-2n-3}\,c^{-2n-2}$$

$$\Bigg(e^{-\frac{i b^2}{4c}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2n}\left(i\left(b+2c\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,c\sqrt{-\frac{i\left(b+2c\sqrt{z}\right)^2}{c}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+2c\sqrt{z}\right)^2}{4c}\right)-b\left(b+2c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+2c\sqrt{z}\right)^2}{4c}\right)\Bigg)\Bigg)-$$

$$e^{\frac{i b^2}{2c}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2n}\left(-i\left(b+2c\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(-b\left(b+2c\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+2c\sqrt{z}\right)^2}{4c}\right)-2\,i\,c\sqrt{\frac{i\left(b+2c\sqrt{z}\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(b+2c\sqrt{z}\right)^2}{4c}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i b^2}{4c}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2n}\left(i\left(b-2c\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(-b\left(b-2c\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b-2c\sqrt{z}\right)^2}{4c}\right)-2\,i\,c\sqrt{\frac{i\left(b-2c\sqrt{z}\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(b-2c\sqrt{z}\right)^2}{4c}\right)\Bigg)-$$

$$e^{-\frac{i b^2}{4c}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2n}\left(-i\left(b-2c\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(2\,i\,c\sqrt{-\frac{i\left(b-2c\sqrt{z}\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(b-2c\sqrt{z}\right)^2}{4c}\right)-$$

$$b\left(b-2c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b-2c\sqrt{z}\right)^2}{4c}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin\left(b\,z^r+e\right)\cos(c\,z)$

01.07.21.0758.01

$$\int z^n \sin\left(b z^2 + e\right) \cos(c z)\, dz = \frac{1}{8} i e^{i e} \left(-e^{i\left(\frac{c^2}{4b} - 2e\right)} \left(\sum_{q=0}^{n} 2^{q-n} (i c)^{n-q} (i(-c - 2bz))^{q+1} \left(\frac{i (c + 2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c+2bz)^2}{4b} \right) \right) (-i b)^{-n-1} - e^{i\left(\frac{c^2}{4b} - 2e\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i c)^{n-q} (i(c - 2bz))^{q+1} \left(\frac{i (c - 2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c-2bz)^2}{4b} \right) \right) (-i b)^{-n-1} + (i b)^{-n-1} e^{-\frac{i c^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (-i c)^{n-q} (-i(-c - 2bz))^{q+1} \left(-\frac{i (c + 2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c+2bz)^2}{4b} \right) + (i b)^{-n-1} e^{-\frac{i c^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (i c)^{n-q} (-i(c - 2bz))^{q+1} \left(-\frac{i (c - 2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c-2bz)^2}{4b} \right) \right) /;\ n \in \mathbb{N}$$

01.07.21.0759.01

$$\int z^n \sin\left(\sqrt{z}\, b + e\right) \cos(c z)\, dz = i (-1)^n 2^{-2n-3} e^{-i e} c^{-2n-2} \left(e^{-\frac{i b^2}{4c}} \left(e^{2 i e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2n} \left(i \left(b + 2c\sqrt{z} \right) \right)^{h+k} \left(-\frac{i \left(b + 2c\sqrt{z} \right)^2}{c} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2 i c \sqrt{-\frac{i \left(b + 2c\sqrt{z} \right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b + 2c\sqrt{z} \right)^2}{4c} \right) - b \left(b + 2c\sqrt{z} \right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b + 2c\sqrt{z} \right)^2}{4c} \right) \right) \right) - e^{\frac{i b^2}{2c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2n} \left(-i \left(b + 2c\sqrt{z} \right) \right)^{h+k} \left(\frac{i \left(b + 2c\sqrt{z} \right)^2}{c} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-b \left(b + 2c\sqrt{z} \right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b + 2c\sqrt{z} \right)^2}{4c} \right) - 2 i c \sqrt{\frac{i \left(b + 2c\sqrt{z} \right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b + 2c\sqrt{z} \right)^2}{4c} \right) \right) \right) + $$

$$e^{i\left(\frac{b^2}{4c}+2e\right)} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2n}\left(i\left(b-2c\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-b\left(b-2c\sqrt{z}\right)\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b-2c\sqrt{z}\right)^2}{4c}\right)-2\,i\,c\sqrt{\frac{i\left(b-2c\sqrt{z}\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b-2c\sqrt{z}\right)^2}{4c}\right)\right)-$$

$$e^{-\frac{i\,b^2}{4c}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2n}\left(-i\left(b-2c\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,c\sqrt{-\frac{i\left(b-2c\sqrt{z}\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b-2c\sqrt{z}\right)^2}{4c}\right)-\right.$$

$$\left.\left.b\left(b-2c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b-2c\sqrt{z}\right)^2}{4c}\right)\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n \sin\left(b\,z^r + d\,z\right)\cos(c\,z)$

01.07.21.0760.01

$$\int z^n \sin\left(b\,z^2+d\,z\right)\cos(c\,z)\,dz =$$

$$\frac{1}{8b}\left((i\,b)^{-n}\,e^{-\frac{i(c+d)^2}{4b}}\left((-1)^n\,e^{\frac{i\left(c^2+d^2\right)}{2b}}\sum_{q=0}^{n}2^{q-n}\,(i\,(d-c))^{n-q}\,(-i\,(-c+d+2\,b\,z))^{q+1}\left(\frac{i\,(-c+d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\right.\right.$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(-c+d+2\,b\,z)^2}{4b}\right)+(-1)^n\,e^{\frac{i(c+d)^2}{2b}}$$

$$\sum_{q=0}^{n}2^{q-n}\,(i\,(c+d))^{n-q}\,(-i\,(c+d+2\,b\,z))^{q+1}\left(\frac{i\,(c+d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(c+d+2\,b\,z)^2}{4b}\right)+e^{\frac{i\,c\,d}{b}}$$

$$\sum_{q=0}^{n}2^{q-n}\,(-i\,(d-c))^{n-q}\,(i\,(-c+d+2\,b\,z))^{q+1}\left(-\frac{i\,(-c+d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(-c+d+2\,b\,z)^2}{4b}\right)+$$

$$\left.\left.\sum_{q=0}^{n}2^{q-n}\,(-i\,(c+d))^{n-q}\,(i\,(c+d+2\,b\,z))^{q+1}\left(-\frac{i\,(c+d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(c+d+2\,b\,z)^2}{4b}\right)\right)\right)\,/;\,n\in\mathbb{N}$$

01.07.21.0761.01

$$\int z^n \sin\left(\sqrt{z}\, b + d\, z\right) \cos(c\, z)\, dz =$$

$$i\,(-1)^n\, 2^{-2n-3} \left(\left(e^{\frac{i b^2}{4d-4c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, b)^{-h-k+2n} \left(-i\left(b + 2\,(d-c)\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b + 2\,(d-c)\sqrt{z}\right)^2}{d-c}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k} \left(b\left(b + 2\,(d-c)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),\, \frac{i\left(b + 2\,(d-c)\sqrt{z}\right)^2}{4\,(d-c)}\right) +\right.$$

$$\left.\left. 2\sqrt{\frac{i\left(b + 2\,(d-c)\sqrt{z}\right)^2}{d-c}}\;(d-c)\, i\, \Gamma\left(\frac{1}{2}(h+k+2),\, \frac{i\left(b + 2\,(d-c)\sqrt{z}\right)^2}{4\,(d-c)}\right)\right)\right) +$$

$$e^{\frac{i b^2}{4c-4d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i\left(b + 2\,(d-c)\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b + 2\,(d-c)\sqrt{z}\right)^2}{d-c}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k} \left(2\, i\,(d-c)\sqrt{-\frac{i\left(b + 2\,(d-c)\sqrt{z}\right)^2}{d-c}}\;\Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{i\left(b + 2\,(d-c)\sqrt{z}\right)^2}{4\,(d-c)}\right) -\right.$$

$$\left.\left.\left. b\left(b + 2\,(d-c)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{i\left(b + 2\,(d-c)\sqrt{z}\right)^2}{4\,(d-c)}\right)\right)\right)(d-c)^{-2n-2} +$$

$$(c+d)^{-2n-2}\, e^{-\frac{i b^2}{4(c+d)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i\left(b + 2\,(c+d)\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b + 2\,(c+d)\sqrt{z}\right)^2}{c+d}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k} \left(2\, i\,(c+d)\sqrt{-\frac{i\left(b + 2\,(c+d)\sqrt{z}\right)^2}{c+d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{i\left(b + 2\,(c+d)\sqrt{z}\right)^2}{4\,(c+d)}\right) -\right.$$

$$\left. b\left(b + 2\,(c+d)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{i\left(b + 2\,(c+d)\sqrt{z}\right)^2}{4\,(c+d)}\right)\right) -$$

$$e^{\frac{i b^2}{2(c+d)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2n} \left(-i \left(b + 2(c+d)\sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b + 2(c+d)\sqrt{z}\right)^2}{c+d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(-b \left(b + 2(c+d)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b + 2(c+d)\sqrt{z}\right)^2}{4(c+d)}\right) - \right.$$

$$\left.\left.\left. 2 i (c+d) \sqrt{\frac{i \left(b + 2(c+d)\sqrt{z}\right)^2}{c+d}}\ \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b + 2(c+d)\sqrt{z}\right)^2}{4(c+d)}\right)\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \sin\left(b z^r + d z + e\right) \cos(c z)$

01.07.21.0762.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \cos(c z)\, dz =$$

$$\frac{1}{8 b} \left((i b)^{-n} e^{-\frac{i \left(c^2 + 2 d c + d^2 + 4 b e\right)}{4 b}} \left((-1)^n e^{\frac{i \left(c^2 + d^2\right)}{2 b}} \sum_{q=0}^{n} 2^{q-n} (i (d-c))^{n-q} (-i (-c + d + 2 b z))^{q+1} \left(\frac{i (-c + d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\right.\right.$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (-c + d + 2 b z)^2}{4 b}\right) + (-1)^n e^{\frac{i (c+d)^2}{2 b}}$$

$$\sum_{q=0}^{n} 2^{q-n} (i (c+d))^{n-q} (-i (c + d + 2 b z))^{q+1} \left(\frac{i (c + d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c + d + 2 b z)^2}{4 b}\right) + e^{i \left(\frac{c d}{b} + 2 e\right)}$$

$$\sum_{q=0}^{n} 2^{q-n} (-i (d-c))^{n-q} (i (-c + d + 2 b z))^{q+1} \left(-\frac{i (-c + d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-c + d + 2 b z)^2}{4 b}\right) +$$

$$e^{2 i e} \sum_{q=0}^{n} 2^{q-n} (-i (c+d))^{n-q} (i (c + d + 2 b z))^{q+1} \left(-\frac{i (c + d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c + d + 2 b z)^2}{4 b}\right)\right)\right) /; n \in \mathbb{N}$$

01.07.21.0763.01

$$\int z^n \sin\left(\sqrt{z}\ b + d z + e\right) \cos(c z)\, dz =$$

$$i (-1)^n 2^{-2n-3} e^{-i e} \left(\left(e^{\frac{i b^2}{4 d - 4 c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2n} \left(-i \left(b + 2(d-c)\sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b + 2(d-c)\sqrt{z}\right)^2}{d-c}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(b\left(b+2(d-c)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+2(d-c)\sqrt{z}\right)^2}{4(d-c)}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(b+2(d-c)\sqrt{z}\right)^2}{d-c}}\,(d-c)\,i\,\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+2(d-c)\sqrt{z}\right)^2}{4(d-c)}\right)\right)\right)+$$

$$e^{i\left(\frac{b^2}{4c-4d}+2e\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2n}\left(i\left(b+2(d-c)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2(d-c)\sqrt{z}\right)^2}{d-c}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d-c)\sqrt{-\frac{i\left(b+2(d-c)\sqrt{z}\right)^2}{d-c}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+2(d-c)\sqrt{z}\right)^2}{4(d-c)}\right)-\right.$$

$$\left.\left.b\left(b+2(d-c)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+2(d-c)\sqrt{z}\right)^2}{4(d-c)}\right)\right)\right)(d-c)^{-2n-2}+$$

$$(c+d)^{-2n-2}\,e^{-\frac{i\,b^2}{4(c+d)}}\left(e^{2\,i\,e}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2n}\left(i\left(b+2(c+d)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2(c+d)\sqrt{z}\right)^2}{c+d}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(c+d)\sqrt{-\frac{i\left(b+2(c+d)\sqrt{z}\right)^2}{c+d}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+2(c+d)\sqrt{z}\right)^2}{4(c+d)}\right)-\right.$$

$$\left.\left.b\left(b+2(c+d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+2(c+d)\sqrt{z}\right)^2}{4(c+d)}\right)\right)\right)-$$

$$e^{\frac{i\,b^2}{2(c+d)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2n}\left(-i\left(b+2(c+d)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2(c+d)\sqrt{z}\right)^2}{c+d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-b\left(b+2(c+d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+2(c+d)\sqrt{z}\right)^2}{4(c+d)}\right)-\right.$$

Involving $z^n \sin\left(b z^r\right) \cos(f z + g)$

01.07.21.0764.01

$$\int z^n \sin\left(b z^2\right) \cos(f z + g)\, dz = \frac{1}{8} i\, e^{i g} \left(-e^{i\left(\frac{f^2}{4b} - 2g\right)} \left(\sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (i(-f - 2 b z))^{q+1} \left(\frac{i (f + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f + 2 b z)^2}{4 b}\right)\right) (-i b)^{-n-1} - e^{\frac{i f^2}{4b}} \left(\sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i(f - 2 b z))^{q+1} \left(\frac{i (f - 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f - 2 b z)^2}{4 b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{-\frac{i f^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (-i(-f - 2 b z))^{q+1} \left(-\frac{i (f + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f + 2 b z)^2}{4 b}\right) + (i b)^{-n-1} e^{-\frac{i f^2}{4b} - 2 i g} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i(f - 2 b z))^{q+1} \left(-\frac{i (f - 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f - 2 b z)^2}{4 b}\right)\right) /;\, n \in \mathbb{N}$$

01.07.21.0765.01

$$\int z^n \sin\left(\sqrt{z}\; b\right) \cos(f z + g)\, dz = i (-1)^n 2^{-2n-3} e^{i g} f^{-2n-2} \left(e^{-\frac{i b^2}{4 f}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2n} \left(i\left(b + 2 f \sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2 i f \sqrt{-\frac{i\left(b + 2 f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b + 2 f \sqrt{z}\right)^2}{4 f}\right) - b\left(b + 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b + 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) - e^{\frac{1}{2} i \left(\frac{b^2}{f} - 4 g\right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2n} \left(-i\left(b + 2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-b\left(b + 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b + 2 f \sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{\frac{i\left(b + 2 f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b + 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) +$$

$$e^{i\left(\frac{b^2}{4f}-2g\right)} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i\left(b-2f\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg(-b\left(b-2f\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+k+1),\, \frac{i\left(b-2f\sqrt{z}\right)^2}{4f}\right) - 2\, i\, f\sqrt{\frac{i\left(b-2f\sqrt{z}\right)^2}{f}}\; \Gamma\!\left(\frac{1}{2}(h+k+2),\, \frac{i\left(b-2f\sqrt{z}\right)^2}{4f}\right)\Bigg) -$$

$$e^{-\frac{i b^2}{4f}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (-i\, b)^{-h-k+2n} \left(-i\left(b-2f\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\Bigg(2\, i\, f\sqrt{-\frac{i\left(b-2f\sqrt{z}\right)^2}{f}}\; \Gamma\!\left(\frac{1}{2}(h+k+2),\, -\frac{i\left(b-2f\sqrt{z}\right)^2}{4f}\right) -$$

$$b\left(b-2f\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\, -\frac{i\left(b-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg) \;/;\; n\in\mathbb{N}$$

Involving $z^n \sin\left(b\, z^r + e\right) \cos(f\, z + g)$

01.07.21.0766.01

$$\int z^n \sin\left(b\, z^2 + e\right)\cos(f\, z + g)\, dz = \frac{1}{8}\, i\, e^{i(e+g)}$$

$$\Bigg(-e^{i\left(\frac{f^2}{4b}-2e-2g\right)}\left(\sum_{q=0}^{n} 2^{q-n}\, (i\, f)^{n-q}\, (i\,(-f-2\, b\, z))^{q+1} \left(\frac{i\,(f+2\, b\, z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\, \frac{i\,(f+2\, b\, z)^2}{4b}\right)\right)(-i\, b)^{-n-1} -$$

$$e^{i\left(\frac{f^2}{4b}-2e\right)}\left(\sum_{q=0}^{n} 2^{q-n}\, (-i\, f)^{n-q}\, (i\,(f-2\, b\, z))^{q+1} \left(\frac{i\,(f-2\, b\, z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\, \frac{i\,(f-2\, b\, z)^2}{4b}\right)\right)(-i\, b)^{-n-1} +$$

$$(i\, b)^{-n-1}\, e^{-\frac{i f^2}{4b}} \sum_{q=0}^{n} 2^{q-n}\, (-i\, f)^{n-q}\, (-i\,(-f-2\, b\, z))^{q+1} \left(-\frac{i\,(f+2\, b\, z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\, -\frac{i\,(f+2\, b\, z)^2}{4b}\right) +$$

$$(i\, b)^{-n-1}\, e^{-\frac{i f^2}{4b}-2\, i\, g} \sum_{q=0}^{n} 2^{q-n}\, (i\, f)^{n-q}\, (-i\,(f-2\, b\, z))^{q+1} \left(-\frac{i\,(f-2\, b\, z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\, -\frac{i\,(f-2\, b\, z)^2}{4b}\right)\Bigg) \;/;\; n\in\mathbb{N}$$

01.07.21.0767.01

$$\int z^n \sin\left(\sqrt{z}\, b+e\right)\cos(f\, z+g)\, dz = i\,(-1)^n\, 2^{-2n-3}\, e^{-i(e-g)}\, f^{-2n-2} \left(e^{-\frac{i b^2}{4f}} \left(e^{2 i e} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i\left(b+2 f\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b+2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(2 i f \sqrt{-\frac{i\left(b+2 f\sqrt{z}\right)^2}{f}}\; \Gamma\!\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+2 f\sqrt{z}\right)^2}{4f}\right) - b\left(b+2 f\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+2 f\sqrt{z}\right)^2}{4f}\right)\right) - e^{\frac{1}{2} i\left(\frac{b^2}{f}-4g\right)} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, b)^{-h-k+2n} \left(-i\left(b+2 f\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b+2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(-b\left(b+2 f\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1), \frac{i\left(b+2 f\sqrt{z}\right)^2}{4f}\right) - 2 i f \sqrt{\frac{i\left(b+2 f\sqrt{z}\right)^2}{f}}\; \Gamma\!\left(\frac{1}{2}(h+k+2), \frac{i\left(b+2 f\sqrt{z}\right)^2}{4f}\right)\right)\right) + e^{i\left(\frac{b^2}{4f}+2e-2g\right)} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i\left(b-2 f\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b-2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-b\left(b-2 f\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1), \frac{i\left(b-2 f\sqrt{z}\right)^2}{4f}\right) - 2 i f \sqrt{\frac{i\left(b-2 f\sqrt{z}\right)^2}{f}}\; \Gamma\!\left(\frac{1}{2}(h+k+2), \frac{i\left(b-2 f\sqrt{z}\right)^2}{4f}\right)\right) -$$

$$e^{-\frac{i b^2}{4 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2n} \left(-i \left(b - 2 f \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left(2 i f \sqrt{-\frac{i \left(b - 2 f \sqrt{z}\right)^2}{f}} \, \Gamma\!\left(\frac{1}{2}(h+k+2), -\frac{i \left(b - 2 f \sqrt{z}\right)^2}{4 f}\right) - \right.$$

$$\left.\left.b \left(b - 2 f \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1), -\frac{i \left(b - 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \sin(b z^r + d z) \cos(f z + g)$

01.07.21.0768.01

$$\int z^n \sin(b z^2 + d z) \cos(f z + g) \, dz = \frac{1}{8} i e^{i g}$$

$$\left(-e^{i \left(\frac{(d+f)^2}{4 b} - 2 g\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i(-d-f))^{n-q} (i(-d-f-2 b z))^{q+1} \left(\frac{i (d+f+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i (d+f+2 b z)^2}{4 b}\right)\right)\right.$$

$$(-i b)^{-n-1} -$$

$$e^{\frac{i (f-d)^2}{4 b}} \left(\sum_{q=0}^{n} 2^{q-n} (-i(f-d))^{n-q} (i(-d+f-2 b z))^{q+1} \left(\frac{i (-d+f-2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i (-d+f-2 b z)^2}{4 b}\right)\right)$$

$$(-i b)^{-n-1} + (i b)^{-n-1} e^{-\frac{i (d+f)^2}{4 b}}$$

$$\sum_{q=0}^{n} 2^{q-n} (i(-d-f))^{n-q} (-i(-d-f-2 b z))^{q+1} \left(-\frac{i (d+f+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{i (d+f+2 b z)^2}{4 b}\right) +$$

$$(i b)^{-n-1} e^{-\frac{i (f-d)^2}{4 b} - 2 i g} \sum_{q=0}^{n} 2^{q-n} (i(f-d))^{n-q} (-i(-d+f-2 b z))^{q+1}$$

$$\left.\left(-\frac{i (-d+f-2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{i (-d+f-2 b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0769.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \cos(f z + g) \, dz =$$

$$i (-1)^n 2^{-2n-3} e^{i g} \left(\left(e^{-i \left(\frac{b^2}{4 d - 4 f} + 2 g\right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2n} \left(i \left(b + 2 (d-f) \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b + 2 (d-f) \sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d-f)\sqrt{-\frac{i\left(b+2\,(d-f)\sqrt{z}\right)^2}{d-f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,(d-f)\sqrt{z}\right)^2}{4\,d-4\,f}\right)-\right.$$

$$\left.\left.b\left(b+2\,(d-f)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,(d-f)\sqrt{z}\right)^2}{4\,d-4\,f}\right)\right)\right)-$$

$$e^{\frac{i\,b^2}{4\,d-4\,f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,(d-f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2\,(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-b\left(b+2\,(d-f)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,(d-f)\sqrt{z}\right)^2}{4\,d-4\,f}\right)-\right.$$

$$\left.\left.2\,i\,(d-f)\sqrt{\frac{i\left(b+2\,(d-f)\sqrt{z}\right)^2}{d-f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+2\,(d-f)\sqrt{z}\right)^2}{4\,d-4\,f}\right)\right)\right)(d-f)^{-2\,n-2}+$$

$$e^{-\frac{i\,b^2}{4\,(d+f)}}\,(d+f)^{-2\,n-2}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\left(i\left(b+2\,(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2\,(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}\,(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+f)\sqrt{-\frac{i\left(b+2\,(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)-\right.$$

$$\left.\left.b\left(b+2\,(d+f)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)\right)\right)-$$

$$e^{\frac{1}{2}\,i\left(\frac{b^2}{d+f}-4\,g\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,(d+f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2\,(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-b\left(b+2\,(d+f)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)-\right.$$

Involving $z^n \sin\left(b z^r + d z + e\right) \cos(f z + g)$

01.07.21.0770.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \cos(f z + g)\, dz = \frac{1}{8} i\, e^{i(e+g)} \left(-e^{i\left(\frac{(d+f)^2}{4b} - 2e - 2g\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i(-d-f))^{n-q} (i(-d-f-2bz))^{q+1} \left(\frac{i(d+f+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+f+2bz)^2}{4b}\right)\right) (-i b)^{-n-1} - e^{i\left(\frac{(f-d)^2}{4b} - 2e\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i(f-d))^{n-q} (i(-d+f-2bz))^{q+1} \left(\frac{i(-d+f-2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-d+f-2bz)^2}{4b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{-\frac{i(d+f)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (i(-d-f))^{n-q} (-i(-d-f-2bz))^{q+1} \left(-\frac{i(d+f+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+f+2bz)^2}{4b}\right) + (i b)^{-n-1} e^{-\frac{i(f-d)^2}{4b} - 2ig} \sum_{q=0}^{n} 2^{q-n} (i(f-d))^{n-q} (-i(-d+f-2bz))^{q+1} \left(-\frac{i(-d+f-2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-d+f-2bz)^2}{4b}\right)\right) /;\, n \in \mathbb{N}$$

01.07.21.0771.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z + e\right) \cos(f z + g)\, dz = i (-1)^n 2^{-2n-3} e^{-i(e-g)} \left(\left(e^{i\left(-\frac{b^2}{4d-4f} + 2e - 2g\right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2n} \left(i\left(b + 2(d-f)\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2 i (d-f) \sqrt{-\frac{i\left(b+2(d-f)\sqrt{z}\right)^2}{d-f}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+2(d-f)\sqrt{z}\right)^2}{4d-4f}\right) - b\left(b + 2(d-f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+2(d-f)\sqrt{z}\right)^2}{4d-4f}\right)\right) - \right.\right.$$

$$e^{\frac{i b^2}{4d-4f}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-i b)^{-h-k+2n} \left(-i\left(b+2(d-f)\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-b\left(b+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+2(d-f)\sqrt{z}\right)^2}{4d-4f}\right)-\right.$$

$$\left.\left.2 i (d-f)\sqrt{\frac{i\left(b+2(d-f)\sqrt{z}\right)^2}{d-f}}\;\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+2(d-f)\sqrt{z}\right)^2}{4d-4f}\right)\right)\right)(d-f)^{-2n-2}+$$

$$e^{-\frac{i b^2}{4(d+f)}}(d+f)^{-2n-2}\left(e^{2 i e}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (i b)^{-h-k+2n}\left(i\left(b+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(2 i (d+f)\sqrt{-\frac{i\left(b+2(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.b\left(b+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)-$$

$$e^{\frac{1}{2} i\left(\frac{b^2}{d+f}-4g\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-i b)^{-h-k+2n}\left(-i\left(b+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-b\left(b+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left.2 i (d+f)\sqrt{\frac{i\left(b+2(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \sin(b z) \cos(c z^r)$

01.07.21.0772.01

$$\int z^n \sin(b\,z)\cos\left(c\,z^2\right)dz = -\frac{1}{8}\,c^{-2\,n-1}\,e^{\frac{i\,b^2}{4\,c}}\left(-e^{-\frac{i\,b^2}{2\,c}}\left(\sum_{q=0}^{n} 2^{q-n}\,(-i\,b)^{n-q}\,(i\,(b+2\,c\,z))^{q+1}\left(-\frac{i\,(b+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(b+2\,c\,z)^2}{4\,c}\right)\right)(-i\,c)^n + e^{-\frac{i\,b^2}{2\,c}}\left(\sum_{q=0}^{n} 2^{q-n}\,(i\,b)^{n-q}\,(-i\,(b-2\,c\,z))^{q+1}\left(-\frac{i\,(b-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(b-2\,c\,z)^2}{4\,c}\right)\right)(-i\,c)^n - (i\,c)^n\sum_{q=0}^{n} 2^{q-n}\,(i\,b)^{n-q}\,(-i\,(b+2\,c\,z))^{q+1}\left(\frac{i\,(b+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(b+2\,c\,z)^2}{4\,c}\right) + (i\,c)^n\sum_{q=0}^{n} 2^{q-n}\,(-i\,b)^{n-q}\,(i\,(b-2\,c\,z))^{q+1}\left(\frac{i\,(b-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(b-2\,c\,z)^2}{4\,c}\right)\right) /;\ n \in \mathbb{N}$$

01.07.21.0773.01

$$\int z^n \sin(b\,z)\cos\left(c\sqrt{z}\right)dz = i\,(-1)^n\,2^{-2n-3}\,b^{-2n-2}\,e^{-\frac{i c^2}{4b}}$$

$$\left(e^{\frac{i c^2}{2b}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(i\left(c-2b\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(2b\sqrt{z}-c\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2\,i\,b\sqrt{\frac{i\left(2b\sqrt{z}-c\right)^2}{b}}\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(2b\sqrt{z}-c\right)^2}{4b}\right)-c\left(2b\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(2b\sqrt{z}-c\right)^2}{4b}\right)\right)+$$

$$e^{\frac{i c^2}{2b}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(i\left(-2\sqrt{z}\,b-c\right)\right)^{h+k}\left(\frac{i\left(2\sqrt{z}\,b+c\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2\,i\,b\sqrt{\frac{i\left(2\sqrt{z}\,b+c\right)^2}{b}}\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(2\sqrt{z}\,b+c\right)^2}{4b}\right)-c\left(-2\sqrt{z}\,b-c\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(2\sqrt{z}\,b+c\right)^2}{4b}\right)\right)-$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(i\left(2b\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2b\sqrt{z}-c\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-c\left(2b\sqrt{z}-c\right)\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(2b\sqrt{z}-c\right)^2}{4b}\right)-2\,i\,b\sqrt{-\frac{i\left(2b\sqrt{z}-c\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(2b\sqrt{z}-c\right)^2}{4b}\right)\right)-$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(-i\left(-2\sqrt{z}\,b-c\right)\right)^{h+k}\left(-\frac{i\left(2\sqrt{z}\,b+c\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-c\left(-2\sqrt{z}\,b-c\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(2\sqrt{z}\,b+c\right)^2}{4b}\right)-\right.$$

$$\left.\left.2\,i\,b\sqrt{-\frac{i\left(2\sqrt{z}\,b+c\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(2\sqrt{z}\,b+c\right)^2}{4b}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin(d z + e) \cos(c z^r)$

01.07.21.0774.01

$$\int z^n \sin(d z + e) \cos(c z^2)\, dz = \frac{1}{8} i e^{i e} \left(e^{\frac{i d^2}{4 c}} \left(\sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i (2 c z - d))^{q+1} \left(\frac{i (2 c z - d)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2 c z - d)^2}{4 c} \right) \right) (-i c)^{-n-1} - e^{-i\left(-\frac{d^2}{4 c} + 2 e\right)} \left(\sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i (-d - 2 c z))^{q+1} \left(\frac{i (d + 2 c z)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 c z)^2}{4 c} \right) \right) (-i c)^{-n-1} - (i c)^{-n-1} e^{-i\left(\frac{d^2}{4 c} + 2 e\right)} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i (2 c z - d))^{q+1} \left(-\frac{i (2 c z - d)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2 c z - d)^2}{4 c} \right) + (i c)^{-n-1} e^{-\frac{i d^2}{4 c}} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i (-d - 2 c z))^{q+1} \left(-\frac{i (d + 2 c z)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 c z)^2}{4 c} \right) \right) /;\ n \in \mathbb{N}$$

01.07.21.0775.01

$$\int z^n \sin(d z + e) \cos\left(\sqrt{z}\, c\right) dz = i (-1)^n 2^{-2 n-3} d^{-2 n-2} e^{-i e} \left(-e^{\frac{i c^2}{4 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2 n} \left(-i \left(2 d \sqrt{z} - c \right) \right)^{h+k} \left(\frac{i \left(2 d \sqrt{z} - c \right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c \left(2 d \sqrt{z} - c \right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(2 d \sqrt{z} - c \right)^2}{4 d} \right) - 2 i d \sqrt{\frac{i \left(2 d \sqrt{z} - c \right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(2 d \sqrt{z} - c \right)^2}{4 d} \right) \right) + e^{-\frac{i c^2}{4 d}} \left(e^{2 i e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2 n} \left(i \left(c + 2 d \sqrt{z} \right) \right)^{h+k} \left(-\frac{i \left(c + 2 d \sqrt{z} \right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2 i d \sqrt{-\frac{i \left(c + 2 d \sqrt{z} \right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(c + 2 d \sqrt{z} \right)^2}{4 d} \right) - c \left(c + 2 d \sqrt{z} \right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(c + 2 d \sqrt{z} \right)^2}{4 d} \right) \right) - \right.$$

$$e^{\frac{i c^2}{2d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c)^{-h-k+2n} \left(-i \left(c + 2 d \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(c + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-c \left(c + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(c + 2 d \sqrt{z}\right)^2}{4 d}\right) - 2 i d \sqrt{\frac{i \left(c + 2 d \sqrt{z}\right)^2}{d}} \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(c + 2 d \sqrt{z}\right)^2}{4 d}\right)\right)\Bigg) +$$

$$e^{i\left(2e - \frac{c^2}{4d}\right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c)^{-h-k+2n} \left(i \left(2 d \sqrt{z} - c\right)\right)^{h+k} \left(-\frac{i \left(2 d \sqrt{z} - c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c \left(2 d \sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(2 d \sqrt{z} - c\right)^2}{4 d}\right) + 2 \sqrt{-\frac{i \left(2 d \sqrt{z} - c\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(2 d \sqrt{z} - c\right)^2}{4 d}\right)\right)\Bigg)\Bigg) /;\, n \in \mathbb{N}$$

Involving $z^{\alpha-1} \sin(b z^r) \cos(c z^r)$

01.07.21.0776.01

$$\int z^{\alpha-1} \sin(b z^r) \cos(c z^r)\, dz = -\frac{1}{4r} \left(i z^{\alpha} \left(-\Gamma\left(\frac{\alpha}{r}, (-i b + i c) z^r\right) ((-i b + i c) z^r)^{-\frac{\alpha}{r}} + ((i b + i c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b + i c) z^r\right) - ((-i b - i c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-i b - i c) z^r\right) + ((i b - i c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b - i c) z^r\right)\right)\right)$$

01.07.21.0777.01

$$\int z^n \sin(b z^2) \cos(c z^2)\, dz = -\frac{1}{8} i z^{n+1} \left(-\Gamma\left(\frac{n+1}{2}, (-i b + i c) z^2\right) \left((-i b + i c) z^2\right)^{\frac{1}{2}(-n-1)} + \left((i b + i c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b + i c) z^2\right) - \left((-i b - i c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i b - i c) z^2\right) + \left((i b - i c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - i c) z^2\right)\right) /;\, n \in \mathbb{N}$$

01.07.21.0778.01

$$\int z^n \sin\left(\sqrt{z}\, b\right) \cos\left(\sqrt{z}\, c\right) dz = -\frac{1}{2} i z^{n+1} \left(-\Gamma\left(2(n+1), (-i b + i c) \sqrt{z}\right) \left((-i b + i c) \sqrt{z}\right)^{-2(n+1)} + \left((i b + i c) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i b + i c) \sqrt{z}\right) - \left((-i b - i c) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-i b - i c) \sqrt{z}\right) + \left((i b - i c) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i b - i c) \sqrt{z}\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^{\alpha-1}\sin(b\,z^r+e)\cos(c\,z^r)$

01.07.21.0779.01

$$\int z^{\alpha-1}\sin(b\,z^r+e)\cos(c\,z^r)\,dz = -\frac{1}{4r}\left(i\,z^\alpha\left(-e^{i\,e}\,\Gamma\left(\frac{\alpha}{r},(-i\,b+i\,c)\,z^r\right)((-i\,b+i\,c)\,z^r)^{-\frac{\alpha}{r}}+e^{-i\,e}\,((i\,b+i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i\,b+i\,c)\,z^r\right)-e^{i\,e}\,((-i\,b-i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(-i\,b-i\,c)\,z^r\right)+e^{-i\,e}\,((i\,b-i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i\,b-i\,c)\,z^r\right)\right)\right)$$

01.07.21.0780.01

$$\int z^n\sin(b\,z^2+e)\cos(c\,z^2)\,dz = -\frac{1}{8}\,i\,z^{n+1}\left(-e^{i\,e}\,\Gamma\left(\frac{n+1}{2},(-i\,b+i\,c)\,z^2\right)\left((-i\,b+i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}+e^{-i\,e}\left((i\,b+i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i\,b+i\,c)\,z^2\right)-e^{i\,e}\left((-i\,b-i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(-i\,b-i\,c)\,z^2\right)+e^{-i\,e}\left((i\,b-i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i\,b-i\,c)\,z^2\right)\right)\,/;\,n\in\mathbb{N}$$

01.07.21.0781.01

$$\int z^n\sin\left(\sqrt{z}\,b+e\right)\cos\left(\sqrt{z}\,c\right)dz = -\frac{1}{2}\,i\,z^{n+1}\left(-e^{i\,e}\,\Gamma\left(2\,(n+1),(-i\,b+i\,c)\sqrt{z}\right)\left((-i\,b+i\,c)\sqrt{z}\right)^{-2(n+1)}+e^{-i\,e}\left((i\,b+i\,c)\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2\,(n+1),(i\,b+i\,c)\sqrt{z}\right)-e^{i\,e}\left((-i\,b-i\,c)\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2\,(n+1),(-i\,b-i\,c)\sqrt{z}\right)+e^{-i\,e}\left((i\,b-i\,c)\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2\,(n+1),(i\,b-i\,c)\sqrt{z}\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n\sin(b\,z^r+d\,z)\cos(c\,z^r)$

01.07.21.0782.01

$$\int z^n \sin(b z^2 + d z)\cos(c z^2)\,dz = \frac{1}{8} i \left(e^{\frac{i d^2}{-4b-4c}} \left(\sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i(-d-2bz-2cz))^{q+1} \left(\frac{i (d+2(b+c)z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d+2(b+c)z)^2}{-4b-4c} \right) \right) (-i(-b-c))^{-n-1} + (-i(c-b))^{-n-1} e^{\frac{i d^2}{4c-4b}} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i(2(c-b)z-d))^{q+1} \left(\frac{i(2(c-b)z-d)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(2(c-b)z-d)^2}{4c-4b} \right) - (i(c-b))^{-n-1} e^{-\frac{i d^2}{4c-4b}} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i(2(c-b)z-d))^{q+1} \left(-\frac{i(2(c-b)z-d)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(2(c-b)z-d)^2}{4c-4b} \right) - (i(-b-c))^{-n-1} e^{\frac{i d^2}{4b+4c}} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i(-d-2bz-2cz))^{q+1} \left(-\frac{i(d+2(b+c)z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+2(b+c)z)^2}{-4b-4c} \right) \right) /;\ n \in \mathbb{N}$$

01.07.21.0783.01

$$\int z^n \sin(\sqrt{z}\, b + d z)\cos(c\sqrt{z})\,dz = i(-1)^n 2^{-2n-3} d^{-2n-2} \left(-e^{\frac{i(b-c)^2}{4d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i(b-c))^{-h-k+2n} \left(-i\left(b-c+2d\sqrt{z}\right) \right)^{h+k} \left(\frac{i\left(b-c+2d\sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((c-b)\left(b-c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b-c+2d\sqrt{z}\right)^2}{4d} \right) - 2 i d \sqrt{\frac{i\left(b-c+2d\sqrt{z}\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b-c+2d\sqrt{z}\right)^2}{4d} \right) \right) + e^{-\frac{i(b+c)^2}{4d}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i(b+c))^{-h-k+2n} \left(i\left(b+c+2d\sqrt{z}\right) \right)^{h+k} \left(-\frac{i\left(b+c+2d\sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \right.$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.2\sqrt{-\frac{i\left(b+c+2d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)\right)-$$

$$e^{\frac{i(b+c)^2}{2d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+c))^{-h-k+2n}\left(-i\left(b+c+2d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{\frac{i\left(b+c+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)+$$

$$e^{-\frac{i(b-c)^2}{4d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-c))^{-h-k+2n}\left(i\left(b-c+2d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b-c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c-b)\left(b-c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b-c+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(b-c+2d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b-c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin\left(b\,z^r + d\,z + e\right)\cos\left(c\,z^r\right)$

01.07.21.0784.01

$$\int z^n \sin\left(b\,z^2 + d\,z + e\right) \cos\left(c\,z^2\right) dz = \frac{1}{8}\, i\, e^{i\,e} \left(e^{\frac{i\,d^2}{-4\,b-4\,c}} \left(\sum_{q=0}^{n} 2^{q-n} (-i\,d)^{n-q} (-i\,(-d-2\,b\,z-2\,c\,z))^{q+1} \left(\frac{i\,(d+2\,(b+c)\,z)^2}{-b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\,(d+2\,(b+c)\,z)^2}{-4\,b-4\,c}\right) \right) (-i\,(-b-c))^{-n-1} + (-i\,(c-b))^{-n-1} e^{\frac{i\,d^2}{4\,c-4\,b}} \sum_{q=0}^{n} 2^{q-n} (-i\,d)^{n-q} (-i\,(2\,(c-b)\,z-d))^{q+1} \left(\frac{i\,(2\,(c-b)\,z-d)^2}{c-b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\,(2\,(c-b)\,z-d)^2}{4\,c-4\,b}\right) - (i\,(c-b))^{-n-1} e^{-i\left(\frac{d^2}{4\,c-4\,b}+2\,e\right)} \sum_{q=0}^{n} 2^{q-n} (i\,d)^{n-q} (i\,(2\,(c-b)\,z-d))^{q+1} \left(-\frac{i\,(2\,(c-b)\,z-d)^2}{c-b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\,(2\,(c-b)\,z-d)^2}{4\,c-4\,b}\right) - (i\,(-b-c))^{-n-1} e^{-i\left(\frac{d^2}{-4\,b-4\,c}+2\,e\right)} \sum_{q=0}^{n} 2^{q-n} (i\,d)^{n-q} (i\,(-d-2\,b\,z-2\,c\,z))^{q+1} \left(-\frac{i\,(d+2\,(b+c)\,z)^2}{-b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\,(d+2\,(b+c)\,z)^2}{-4\,b-4\,c}\right) \right) /;\, n \in \mathbb{N}$$

01.07.21.0785.01

$$\int z^n \sin\left(\sqrt{z}\; b + d\,z + e\right) \cos\left(c\,\sqrt{z}\right) dz = i\,(-1)^n\, 2^{-2\,n-3}\, d^{-2\,n-2}\, e^{-i\,e} \left(-e^{\frac{i\,(b-c)^2}{4\,d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,(b-c))^{-h-k+2\,n} \left(-i\left(b-c+2\,d\,\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b-c+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((c-b)\left(b-c+2\,d\,\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b-c+2\,d\,\sqrt{z}\right)^2}{4\,d}\right) - 2\,i\,d\,\sqrt{\frac{i\left(b-c+2\,d\,\sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b-c+2\,d\,\sqrt{z}\right)^2}{4\,d}\right) \right) + e^{-\frac{i\,(b+c)^2}{4\,d}} \left(e^{2\,i\,e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,(b+c))^{-h-k+2\,n} \left(i\left(b+c+2\,d\,\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b+c+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.2\sqrt{-\frac{i\left(b+c+2d\sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)\right)-$$

$$e^{\frac{i(b+c)^2}{2d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+c))^{-h-k+2n}\left(-i\left(b+c+2d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{\frac{i\left(b+c+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)+$$

$$e^{i\left(2e-\frac{(b-c)^2}{4d}\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-c))^{-h-k+2n}\left(i\left(b-c+2d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b-c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c-b)\left(b-c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b-c+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(b-c+2d\sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b-c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)\; /;\; n\in\mathbb{N}$$

Involving $z^n \sin(d\, z) \cos\left(c\, z^r + g\right)$

01.07.21.0786.01

$$\int z^n \sin(d\,z)\cos\left(c\,z^2+g\right) dz = \frac{1}{8}\,i\,e^{i\,g}\left(e^{\frac{i\,d^2}{4c}-2\,i\,g}\left(\sum_{q=0}^{n} 2^{q-n}\,(-i\,d)^{n-q}\,(-i\,(2\,c\,z-d))^{q+1}\left(\frac{i\,(2\,c\,z-d)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(2\,c\,z-d)^2}{4\,c}\right)\right)(-i\,c)^{-n-1} - e^{-i\left(-\frac{d^2}{4c}+2\,g\right)}\left(\sum_{q=0}^{n} 2^{q-n}\,(i\,d)^{n-q}\,(i\,(-d-2\,c\,z))^{q+1}\left(\frac{i\,(d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(d+2\,c\,z)^2}{4\,c}\right)\right)(-i\,c)^{-n-1} - (i\,c)^{-n-1}\,e^{-i\frac{d^2}{4c}}\sum_{q=0}^{n} 2^{q-n}\,(i\,d)^{n-q}\,(i\,(2\,c\,z-d))^{q+1}\left(-\frac{i\,(2\,c\,z-d)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(2\,c\,z-d)^2}{4\,c}\right) + (i\,c)^{-n-1}\,e^{-\frac{i\,d^2}{4c}}\sum_{q=0}^{n} 2^{q-n}\,(-i\,d)^{n-q}\,(-i\,(-d-2\,c\,z))^{q+1}\left(-\frac{i\,(d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(d+2\,c\,z)^2}{4\,c}\right)\right) /;\; n\in\mathbb{N}$$

01.07.21.0787.01

$$\int z^n \sin(d\,z)\cos\left(\sqrt{z}\;c+g\right) dz = i\,(-1)^n\,2^{-2n-3}\,d^{-2n-2}\,e^{i\,g}\left(-e^{\frac{i\,c^2}{4d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(-i\left(2\,d\sqrt{z}-c\right)\right)^{h+k}\left(\frac{i\left(2\,d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\left(2\,d\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right) - 2\,i\,d\sqrt{\frac{i\left(2\,d\sqrt{z}-c\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right)\right) + e^{-\frac{i\,c^2}{4d}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(i\left(c+2\,d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2\,i\,d\sqrt{-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right) - c\left(c+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right) - e^{\frac{1}{2}i\left(\frac{c^2}{d}-4\,g\right)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(-i\left(c+2\,d\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-c\left(c+2\,d\,\sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(c+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{\frac{i\left(c+2\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(c+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$e^{-i\left(\frac{c^2}{4d}+2g\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(i\left(2\,d\,\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2\,d\,\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(c\left(2\,d\,\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(2\,d\,\sqrt{z}-c\right)^2}{4\,d}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(2\,d\,\sqrt{z}-c\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(2\,d\,\sqrt{z}-c\right)^2}{4\,d}\right)\right)\right)\ /;\ n\in\mathbb{N}$$

Involving $z^n \sin(d\,z+e)\cos\left(c\,z^r+g\right)$

01.07.21.0788.01

$$\int z^n \sin(d\,z+e)\cos\left(c\,z^2+g\right)dz=$$

$$\frac{1}{8}\,i\,e^{i(e+g)}\left(e^{\frac{i\,d^2}{4c}-2\,i\,g}\left(\sum_{q=0}^{n}2^{q-n}\,(-i\,d)^{n-q}\,(-i\,(2\,c\,z-d))^{q+1}\left(\frac{i\,(2\,c\,z-d)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(2\,c\,z-d)^2}{4\,c}\right)\right)(-i\,c)^{-n-1}-\right.$$

$$e^{-i\left(-\frac{d^2}{4c}+2\,e+2\,g\right)}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,d)^{n-q}\,(i\,(-d-2\,c\,z))^{q+1}\left(\frac{i\,(d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(d+2\,c\,z)^2}{4\,c}\right)\right)(-i\,c)^{-n-1}-$$

$$(i\,c)^{-n-1}\,e^{-i\left(\frac{d^2}{4c}+2\,e\right)}\sum_{q=0}^{n}2^{q-n}\,(i\,d)^{n-q}\,(i\,(2\,c\,z-d))^{q+1}\left(-\frac{i\,(2\,c\,z-d)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(2\,c\,z-d)^2}{4\,c}\right)+$$

$$\left.(i\,c)^{-n-1}\,e^{-\frac{i\,d^2}{4c}}\sum_{q=0}^{n}2^{q-n}\,(-i\,d)^{n-q}\,(-i\,(-d-2\,c\,z))^{q+1}\left(-\frac{i\,(d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(d+2\,c\,z)^2}{4\,c}\right)\right)\ /;\ n\in\mathbb{N}$$

01.07.21.0789.01

$$\int z^n \sin(d\,z+e)\cos\left(\sqrt{z}\;c+g\right)dz = i\,(-1)^n\,2^{-2n-3}\,d^{-2n-2}\,e^{-i(e-g)}$$

$$\left(-e^{\frac{i c^2}{4 d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(-i\left(2\,d\sqrt{z}-c\right)\right)^{h+k}\left(\frac{i\left(2\,d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\left(2\,d\sqrt{z}-c\right)\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right)-2\,i\,d\sqrt{\frac{i\left(2\,d\sqrt{z}-c\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i c^2}{4 d}}\left(e^{2 i e}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(i\left(c+2\,d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\right.$$

$$\binom{n}{k}\left(2\,i\,d\sqrt{-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.c\left(c+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)-e^{\frac{1}{2}i\left(\frac{c^2}{d}-4g\right)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(-i\left(c+2\,d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-c\left(c+2\,d\sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\sqrt{\frac{i\left(c+2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$e^{i\left(-\frac{c^2}{4d}+2e-2g\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(i\left(2\,d\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2\,d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(c\left(2\,d\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(2\,d\sqrt{z}-c\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sin(b\,z^r)\cos(c\,z^r+g)$

01.07.21.0790.01

$$\int z^{\alpha-1}\sin(b\,z^r)\cos(c\,z^r+g)\,dz = -\frac{1}{4r}\left(i\,z^\alpha\left(-e^{-i g}\,\Gamma\left(\frac{\alpha}{r},(-i\,b+i\,c)\,z^r\right)((-i\,b+i\,c)\,z^r)^{-\frac{\alpha}{r}}+e^{-i g}\,((i\,b+i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i\,b+i\,c)\,z^r\right)-e^{i g}\,((-i\,b-i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(-i\,b-i\,c)\,z^r\right)+e^{i g}\,((i\,b-i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i\,b-i\,c)\,z^r\right)\right)\right)$$

01.07.21.0791.01

$$\int z^n\sin(b\,z^2)\cos(c\,z^2+g)\,dz = -\frac{1}{8}\,i\,z^{n+1}\left(-e^{-i g}\,\Gamma\left(\frac{n+1}{2},(-i\,b+i\,c)\,z^2\right)\left((-i\,b+i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}+e^{-i g}\left((i\,b+i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i\,b+i\,c)\,z^2\right)-e^{i g}\left((-i\,b-i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(-i\,b-i\,c)\,z^2\right)+e^{i g}\left((i\,b-i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i\,b-i\,c)\,z^2\right)\right)\;/;\;n\in\mathbb{N}$$

01.07.21.0792.01

$$\int z^n\sin\left(\sqrt{z}\,b\right)\cos\left(\sqrt{z}\,c+g\right)dz = -\frac{1}{2}\,i\,z^{n+1}\left(-e^{-i g}\,\Gamma\left(2(n+1),(-i\,b+i\,c)\sqrt{z}\right)\left((-i\,b+i\,c)\sqrt{z}\right)^{-2(n+1)}+e^{-i g}\left((i\,b+i\,c)\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1),(i\,b+i\,c)\sqrt{z}\right)-e^{i g}\left((-i\,b-i\,c)\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1),(-i\,b-i\,c)\sqrt{z}\right)+e^{i g}\left((i\,b-i\,c)\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1),(i\,b-i\,c)\sqrt{z}\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sin(b\,z^r+e)\cos(c\,z^r+g)$

01.07.21.0793.01

$$\int z^{\alpha-1}\sin(b\,z^r+e)\cos(c\,z^r+g)\,dz = -\frac{1}{4r}\left(i\,z^\alpha\left(-e^{i e-i g}\,\Gamma\left(\frac{\alpha}{r},(-i\,b+i\,c)\,z^r\right)((-i\,b+i\,c)\,z^r)^{-\frac{\alpha}{r}}+e^{-i e-i g}\,((i\,b+i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i\,b+i\,c)\,z^r\right)-e^{i e+i g}\,((-i\,b-i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(-i\,b-i\,c)\,z^r\right)+e^{-i e+i g}\,((i\,b-i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i\,b-i\,c)\,z^r\right)\right)\right)$$

01.07.21.0794.01

$$\int z^n\sin(b\,z^2+e)\cos(c\,z^2+g)\,dz = -\frac{1}{8}\,i\,z^{n+1}\left(-e^{i e-i g}\,\Gamma\left(\frac{n+1}{2},(-i\,b+i\,c)\,z^2\right)\left((-i\,b+i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}+e^{-i e-i g}\left((i\,b+i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i\,b+i\,c)\,z^2\right)-e^{i e+i g}\left((-i\,b-i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(-i\,b-i\,c)\,z^2\right)+e^{-i e+i g}\left((i\,b-i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i\,b-i\,c)\,z^2\right)\right)\;/;\;n\in\mathbb{N}$$

01.07.21.0795.01

$$\int z^n \sin\left(\sqrt{z}\, b+e\right)\cos\left(\sqrt{z}\, c+g\right)dz = -\frac{1}{2}\, i\, z^{n+1}\left(-e^{i e - i g}\, \Gamma\left(2(n+1), (-i b+i c)\sqrt{z}\right)\left((-i b+i c)\sqrt{z}\right)^{-2(n+1)} + e^{-i e - i g}\left((i b+i c)\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i b+i c)\sqrt{z}\right) - e^{i e+i g}\left((-i b - i c)\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-i b-i c)\sqrt{z}\right) + e^{-i e+i g}\left((i b-i c)\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1), (i b - i c)\sqrt{z}\right)\right) /; n\in\mathbb{N}$$

Involving $z^n \sin\left(b z^r + d z\right)\cos\left(c z^r + g\right)$

01.07.21.0796.01

$$\int z^n \sin\left(b z^2 + d z\right)\cos\left(c z^2+g\right)dz = \frac{1}{8}\, i\, e^{i g}\left(e^{\frac{i d^2}{-4b-4c}}\left(\sum_{q=0}^{n} 2^{q-n}(-i d)^{n-q}(-i(-d-2 b z-2 c z))^{q+1}\left(\frac{i(d+2(b+c)z)^2}{-b-c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(d+2(b+c)z)^2}{-4b-4c}\right)\right)\right.$$
$$(-i(-b-c))^{-n-1} + (-i(c-b))^{-n-1} e^{\frac{i d^2}{4c-4b}-2 i g} \sum_{q=0}^{n} 2^{q-n}(-i d)^{n-q}(-i(2(c-b)z-d))^{q+1}\left(\frac{i(2(c-b)z-d)^2}{c-b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(2(c-b)z-d)^2}{4c-4b}\right) -$$
$$(i(c-b))^{-n-1} e^{-i\frac{d^2}{4c-4b}} \sum_{q=0}^{n} 2^{q-n}(i d)^{n-q}(i(2(c-b)z-d))^{q+1}\left(-\frac{i(2(c-b)z-d)^2}{c-b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(2(c-b)z-d)^2}{4c-4b}\right) - (i(-b-c))^{-n-1} e^{-i\left(\frac{d^2}{-4b-4c}+2g\right)}$$
$$\left.\sum_{q=0}^{n} 2^{q-n}(i d)^{n-q}(i(-d-2 b z-2 c z))^{q+1}\left(-\frac{i(d+2(b+c)z)^2}{-b-c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(d+2(b+c)z)^2}{-4b-4c}\right)\right) /; n\in\mathbb{N}$$

01.07.21.0797.01

$$\int z^n \sin\left(\sqrt{z}\, b+d z\right)\cos\left(\sqrt{z}\, c+g\right)dz = i(-1)^n\, 2^{-2n-3}\, d^{-2n-2}\, e^{i g}\left(-e^{-\frac{i(b-c)^2}{4d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (-i(b-c))^{-h-k+2n}\left(-i\left(b-c+2 d\sqrt{z}\right)\right)^{h+k}\right.$$
$$\left(\frac{i\left(b-c+2 d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((c-b)\left(b-c+2 d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b-c+2 d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$2\,i\,d\sqrt{\frac{i\left(b-c+2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b-c+2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{i(b+c)^2}{4d}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+c))^{-h-k+2n}\left(i\left(b+c+2\,d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+c+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2\,d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+c+2\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$2\sqrt{-\frac{i\left(b+c+2\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+c+2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)-$$

$$e^{\frac{1}{2}i\left(\frac{(b+c)^2}{d}-4g\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+c))^{-h-k+2n}\left(-i\left(b+c+2\,d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+c+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2\,d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+c+2\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$2\,i\,d\sqrt{\frac{i\left(b+c+2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+c+2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{-i\left(\frac{(b-c)^2}{4d}+2g\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-c))^{-h-k+2n}\left(i\left(b-c+2\,d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b-c+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c-b)\left(b-c+2\,d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b-c+2\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$2\sqrt{-\frac{i\left(b-c+2\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b-c+2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin(b z^r + d z + e) \cos(c z^r + g)$

01.07.21.0798.01

$$\int z^n \sin(b z^2 + d z + e) \cos(c z^2 + g)\, dz = \frac{1}{8} i\, e^{i(e+g)} \left(e^{\frac{i d^2}{-4b-4c}} \left(\sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i(-d - 2 b z - 2 c z))^{q+1} \left(\frac{i(d + 2(b+c) z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+2(b+c)z)^2}{-4b-4c} \right) \right) (-i(-b-c))^{-n-1} + (-i(c-b))^{-n-1} e^{\frac{i d^2}{4c-4b} - 2 i g} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i(2(c-b) z - d))^{q+1} \left(\frac{i(2(c-b)z - d)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(2(c-b)z-d)^2}{4c-4b} \right) - (i(c-b))^{-n-1} e^{-i\left(\frac{d^2}{4c-4b} + 2e\right)} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i(2(c-b)z - d))^{q+1} \left(-\frac{i(2(c-b)z-d)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(2(c-b)z-d)^2}{4c-4b} \right) - (i(-b-c))^{-n-1} e^{-i\left(\frac{d^2}{-4b-4c} + 2e + 2g\right)} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i(-d - 2 b z - 2 c z))^{q+1} \left(-\frac{i(d+2(b+c)z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+2(b+c)z)^2}{-4b-4c} \right) \right) /;\ n \in \mathbb{N}$$

01.07.21.0799.01

$$\int z^n \sin(\sqrt{z}\, b + d z + e) \cos(\sqrt{z}\, c + g)\, dz = i(-1)^n 2^{-2n-3} d^{-2n-2} e^{-i(e-g)} \left(-e^{\frac{i(b-c)^2}{4d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i(b-c))^{-h-k+2n} \left(-i\left(b - c + 2 d \sqrt{z}\right) \right)^{h+k} \left(\frac{i\left(b - c + 2d\sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((c-b)\left(b - c + 2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b-c+2d\sqrt{z}\right)^2}{4d} \right) - 2 i d \sqrt{\frac{i\left(b-c+2d\sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b-c+2d\sqrt{z}\right)^2}{4d} \right) \right) + e^{-\frac{i(b+c)^2}{4d}} \left(e^{2ie} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i(b+c))^{-h-k+2n} \left(i\left(b + c + 2d\sqrt{z}\right) \right)^{h+k} \left(-\frac{i\left(b+c+2d\sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.\left. 2\sqrt{-\frac{i\left(b+c+2d\sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) -$$

$$e^{\frac{1}{2} i \left(\frac{(b+c)^2}{d}-4g\right)} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,(b+c))^{-h-k+2n} \left(-i\left(b+c+2d\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b+c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.\left. 2\, i\, d\sqrt{\frac{i\left(b+c+2d\sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) +$$

$$e^{i\left(-\frac{(b-c)^2}{4d}+2e-2g\right)} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,(b-c))^{-h-k+2n} \left(i\left(b-c+2d\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b-c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c-b)\left(b-c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b-c+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.\left. 2\sqrt{-\frac{i\left(b-c+2d\sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b-c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^n \sin(d\, z) \cos\left(c\, z^r + f\, z\right)$

01.07.21.0800.01

$$\int z^n \sin(d\,z)\cos\left(c\,z^2+f\,z\right)dz = \frac{1}{8}\,i\left(e^{\frac{i(f-d)^2}{4c}}\left(\sum_{q=0}^{n} 2^{q-n}\,(i\,(f-d))^{n-q}\,(-i\,(-d+f+2\,c\,z))^{q+1}\left(\frac{i\,(-d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(-d+f+2\,c\,z)^2}{4\,c}\right)\right)\right.$$

$$(-i\,c)^{-n-1}-e^{i\frac{(d+f)^2}{4c}}\left(\sum_{q=0}^{n} 2^{q-n}\,(-i\,(-d-f))^{n-q}\,(i\,(-d-f-2\,c\,z))^{q+1}\right.$$

$$\left.\left(\frac{i\,(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(d+f+2\,c\,z)^2}{4\,c}\right)\right)(-i\,c)^{-n-1}-(i\,c)^{-n-1}\,e^{-i\frac{(f-d)^2}{4c}}$$

$$\sum_{q=0}^{n} 2^{q-n}\,(-i\,(f-d))^{n-q}\,(i\,(-d+f+2\,c\,z))^{q+1}\left(-\frac{i\,(-d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(-d+f+2\,c\,z)^2}{4\,c}\right)+$$

$$(i\,c)^{-n-1}\,e^{-\frac{i(d+f)^2}{4c}}\sum_{q=0}^{n} 2^{q-n}\,(i\,(-d-f))^{n-q}\,(-i\,(-d-f-2\,c\,z))^{q+1}$$

$$\left.\left(-\frac{i\,(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(d+f+2\,c\,z)^2}{4\,c}\right)\right)/;\,n\in\mathbb{N}$$

01.07.21.0801.01

$$\int z^n \sin(d\,z)\cos\left(\sqrt{z}\;c+f\,z\right)dz = i\,(-1)^n\,2^{-2n-3}\left(-e^{\frac{i c^2}{4d-4f}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(-i\left(2\,(d-f)\sqrt{z}-c\right)\right)^{h+k}\left(\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c\left(2\,(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{4\,d-4\,f}\right)-\right.$$

$$\left.\left.\left.2\,i\,(d-f)\sqrt{\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{4\,d-4\,f}\right)\right)\right)(d-f)^{-2n-2}+$$

$$e^{-i\frac{c^2}{4d-4f}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(i\left(2\,(d-f)\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4d-4f}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\,(d-f)\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4d-4f}\right)\right)\right)(d-f)^{-2n-2}+$$

$$e^{-\frac{i c^2}{4(d+f)}}(d+f)^{-2n-2}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i c)^{-h-k+2n}\left(i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+f)\sqrt{-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)-$$

$$e^{\frac{i c^2}{2(d+f)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i c)^{-h-k+2n}\left(-i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\, \frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left.2\,i\,(d+f)\sqrt{\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\, \frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)\;/;\; n\in\mathbb{N}$$

Involving $z^n \sin(d\,z+e)\cos\left(c\,z^r+f\,z\right)$

01.07.21.0802.01

$$\int z^n \sin(d z+e) \cos\left(c z^2+f z\right) dz = \frac{1}{8} i e^{i e} \left(e^{\frac{i (f-d)^2}{4 c}} \left(\sum_{q=0}^n 2^{q-n} (i (f-d))^{n-q} (-i (-d+f+2 c z))^{q+1} \left(\frac{i (-d+f+2 c z)^2}{c}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (-d+f+2 c z)^2}{4 c}\right)\right) (-i c)^{-n-1} - e^{i\left(\frac{(d+f)^2}{4 c}-2 e\right)} \left(\sum_{q=0}^n 2^{q-n} (-i (-d-f))^{n-q} (i (-d-f-2 c z))^{q+1} \left(\frac{i (d+f+2 c z)^2}{c}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d+f+2 c z)^2}{4 c}\right)\right) (-i c)^{-n-1} - (i c)^{-n-1} e^{-i\left(\frac{(f-d)^2}{4 c}+2 e\right)} \sum_{q=0}^n 2^{q-n} (-i (f-d))^{n-q} (i (-d+f+2 c z))^{q+1} \left(-\frac{i (-d+f+2 c z)^2}{c}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-d+f+2 c z)^2}{4 c}\right) + (i c)^{-n-1} e^{-\frac{i (d+f)^2}{4 c}} \sum_{q=0}^n 2^{q-n} (i (-d-f))^{n-q} (-i (-d-f-2 c z))^{q+1} \left(-\frac{i (d+f+2 c z)^2}{c}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d+f+2 c z)^2}{4 c}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0803.01

$$\int z^n \sin(d z+e) \cos\left(\sqrt{z}\, c+f z\right) dz = i (-1)^n 2^{-2 n-3} e^{-i e} \left(-e^{\frac{i c^2}{4 d-4 f}} \left(\sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (i c)^{-h-k+2 n} \left(-i \left(2 (d-f) \sqrt{z}-c\right)\right)^{h+k} \left(\frac{i \left(2 (d-f) \sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c \left(2 (d-f) \sqrt{z}-c\right) \Gamma\left(\frac{1}{2} (h+k+1), \frac{i \left(2 (d-f) \sqrt{z}-c\right)^2}{4 d-4 f}\right) - 2 i (d-f) \sqrt{\frac{i \left(2 (d-f) \sqrt{z}-c\right)^2}{d-f}}\, \Gamma\left(\frac{1}{2} (h+k+2), \frac{i \left(2 (d-f) \sqrt{z}-c\right)^2}{4 d-4 f}\right)\right)\right) (d-f)^{-2 n-2} + e^{i\left(2 e-\frac{c^2}{4 d-4 f}\right)} \left(\sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (-i c)^{-h-k+2 n} \left(i \left(2 (d-f) \sqrt{z}-c\right)\right)^{h+k} \left(-\frac{i \left(2 (d-f) \sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2} (-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4d-4f}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\,(d-f)\,i\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4d-4f}\right)\right)\right)(d-f)^{-2n-2}+$$

$$e^{-\frac{ic^2}{4(d+f)}}(d+f)^{-2n-2}\left(e^{2ie}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(ic)^{-h-k+2n}\left(i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(2i(d+f)\sqrt{-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)-$$

$$e^{\frac{ic^2}{2(d+f)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-ic)^{-h-k+2n}\left(-i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left.2i(d+f)\sqrt{\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin(b\,z^r)\cos(c\,z^r+f\,z)$

01.07.21.0804.01

$$\int z^n \sin\left(b\, z^2\right) \cos\left(c\, z^2 + f\, z\right) dz = \frac{1}{8}\, i \left(e^{\frac{i f^2}{-4b-4c}} \left(\sum_{q=0}^{n} 2^{q-n} \left(-i\, f\right)^{n-q} \left(-i\left(-f-2\,b\,z-2\,c\,z\right)\right)^{q+1} \left(\frac{i\left(f+2\,(b+c)\,z\right)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\left(f+2\,(b+c)\,z\right)^2}{-4\,b-4\,c} \right) \right) \right.$$

$$(-i\,(-b-c))^{-n-1} + (-i\,(c-b))^{-n-1}\, e^{\frac{i f^2}{4c-4b}}$$

$$\sum_{q=0}^{n} 2^{q-n} \left(i\, f\right)^{n-q} \left(-i\left(f+2\,(c-b)\,z\right)\right)^{q+1} \left(\frac{i\left(f+2\,(c-b)\,z\right)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\left(f+2\,(c-b)\,z\right)^2}{4\,c-4\,b} \right) -$$

$$(i\,(c-b))^{-n-1}\, e^{-\frac{i f^2}{4c-4b}} \sum_{q=0}^{n} 2^{q-n} \left(-i\, f\right)^{n-q} \left(i\left(f+2\,(c-b)\,z\right)\right)^{q+1} \left(-\frac{i\left(f+2\,(c-b)\,z\right)^2}{c-b} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\left(f+2\,(c-b)\,z\right)^2}{4\,c-4\,b} \right) - (i\,(-b-c))^{-n-1}\, e^{-\frac{i f^2}{-4b-4c}}$$

$$\left. \sum_{q=0}^{n} 2^{q-n} \left(i\, f\right)^{n-q} \left(i\left(-f-2\,b\,z-2\,c\,z\right)\right)^{q+1} \left(-\frac{i\left(f+2\,(b+c)\,z\right)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\left(f+2\,(b+c)\,z\right)^2}{-4\,b-4\,c} \right) \right) /;\, n \in \mathbb{N}$$

01.07.21.0805.01

$$\int z^n \sin\left(b \sqrt{z}\right) \cos\left(\sqrt{z}\; c + f\, z\right) dz = -i\,(-1)^n\, 2^{-2n-3}\, f^{-2(n+1)}$$

$$\left(e^{-\frac{i (b+c)^2}{4f}} \left(e^{\frac{i (b+c)^2}{2f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,(b+c))^{-h-k+2n} \left(-i\left(b+c+2\,f\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b+c+2\,f\sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-k-1)} \right. \right.$$

$$\binom{k}{h}\binom{n}{k} \left((-b-c)\left(b+c+2\,f\sqrt{z}\right) \Gamma\left(\frac{1}{2}\,(h+k+1), \frac{i\left(b+c+2\,f\sqrt{z}\right)^2}{4\,f} \right) - \right.$$

$$\left. 2\, i\, f \sqrt{\frac{i\left(b+c+2\,f\sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}\,(h+k+2), \frac{i\left(b+c+2\,f\sqrt{z}\right)^2}{4\,f} \right) \right) -$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,(b+c))^{-h-k+2n} \left(i\left(b+c+2\,f\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b+c+2\,f\sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k} \left((-b-c)\left(b+c+2\,f\sqrt{z}\right) \Gamma\left(\frac{1}{2}\,(h+k+1), -\frac{i\left(b+c+2\,f\sqrt{z}\right)^2}{4\,f} \right) + \right.$$

$$2\sqrt{-\frac{i\left(b+c+2f\sqrt{z}\right)^2}{f}}\; f\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\, -\frac{i\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg) -$$

$$e^{\frac{i(b-c)^2}{4f}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-c))^{-h-k+2n}\left(i\left(b-c-2f\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c-b)\left(b-c-2f\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\, \frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right) -$$

$$2\,i\,f\sqrt{\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),\, \frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg) +$$

$$e^{-\frac{i(b-c)^2}{4f}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b-c))^{-h-k+2n}\left(-i\left(b-c-2f\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c-b)\left(b-c-2f\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\, -\frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right) +$$

$$2\sqrt{-\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}}\; f\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\, -\frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg) /;\; n\in\mathbb{N}$$

Involving $z^n \sin\left(b z^r + e\right) \cos\left(c z^r + f z\right)$

01.07.21.0806.01

$$\int z^n \sin(b z^2 + e) \cos(c z^2 + f z) \, dz = \frac{1}{8} i e^{i e} \left(e^{\frac{i f^2}{-4b-4c}} \left(\sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (-i(-f - 2bz - 2cz))^{q+1} \left(\frac{i(f + 2(b+c)z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(f+2(b+c)z)^2}{-4b-4c} \right) \right) (-i(-b-c))^{-n-1} + (-i(c-b))^{-n-1} e^{\frac{i f^2}{4c-4b}} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i(f + 2(c-b)z))^{q+1} \left(\frac{i(f+2(c-b)z)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(f+2(c-b)z)^2}{4c-4b} \right) - (i(c-b))^{-n-1} e^{-i\left(\frac{f^2}{4c-4b} + 2e\right)} \sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i(f + 2(c-b)z))^{q+1} \left(-\frac{i(f+2(c-b)z)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(f+2(c-b)z)^2}{4c-4b} \right) - (i(-b-c))^{-n-1} e^{-i\left(\frac{f^2}{-4b-4c} + 2e\right)} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (i(-f - 2bz - 2cz))^{q+1} \left(-\frac{i(f+2(b+c)z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(f+2(b+c)z)^2}{-4b-4c} \right) \right) /; n \in \mathbb{N}$$

01.07.21.0807.01

$$\int z^n \sin(\sqrt{z}\, b + e) \cos(\sqrt{z}\, c + f z) \, dz = -i (-1)^n 2^{-2n-3} e^{-i e} f^{-2(n+1)} \left(e^{-\frac{i(b+c)^2}{4f}} \left(e^{\frac{i(b+c)^2}{2f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i(b+c))^{-h-k+2n} \left(-i\left(b + c + 2f\sqrt{z}\right) \right)^{h+k} \left(\frac{i\left(b+c+2f\sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((-b-c)\left(b + c + 2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+c+2f\sqrt{z}\right)^2}{4f} \right) - 2 i f \sqrt{\frac{i\left(b+c+2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+c+2f\sqrt{z}\right)^2}{4f} \right) \right) - e^{2ie} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i(b+c))^{-h-k+2n} \left(i\left(b + c + 2f\sqrt{z}\right) \right)^{h+k} \left(-\frac{i\left(b+c+2f\sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((-b-c)\left(b + c + 2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+c+2f\sqrt{z}\right)^2}{4f} \right) + \right.\right.\right.$$

$$2\sqrt{-\frac{i\left(b+c+2f\sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg) -$$

$$e^{i\left(\frac{(b-c)^2}{4f}+2e\right)} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (i(b-c))^{-h-k+2n} \left(i\left(b-c-2f\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c-b)\left(b-c-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right) -$$

$$2\, i\, f\sqrt{\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg) +$$

$$e^{-\frac{i(b-c)^2}{4f}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (-i(b-c))^{-h-k+2n} \left(-i\left(b-c-2f\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c-b)\left(b-c-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right) +$$

$$2\sqrt{-\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg) \;/;\; n \in \mathbb{N}$$

Involving $z^n \sin(b z^r + d z) \cos(c z^r + f z)$

01.07.21.0808.01

$$\int z^n \sin\left(b z^2 + d z\right) \cos\left(c z^2 + f z\right) dz = \frac{1}{8} i \left(e^{-\frac{i (d+f)^2}{4 b+4 c}} \left(\sum_{q=0}^{n} 2^{q-n} (i (-d-f))^{n-q} (-i (-d-f-2 b z-2 c z))^{q+1} \left(\frac{i (d+f+2 (b+c) z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d+f+2 (b+c) z)^2}{-4 b-4 c} \right) \right) (-i (-b-c))^{-n-1} + (-i (c-b))^{-n-1} e^{\frac{i (f-d)^2}{4 c-4 b}} \sum_{q=0}^{n} 2^{q-n} (i (f-d))^{n-q} (-i (-d+f+2 (c-b) z))^{q+1} \left(\frac{i (-d+f+2 (c-b) z)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (-d+f+2 (c-b) z)^2}{4 c-4 b} \right) - (i (c-b))^{-n-1} e^{-\frac{i (f-d)^2}{4 c-4 b}} \sum_{q=0}^{n} 2^{q-n} (-i (f-d))^{n-q} (i (-d+f+2 (c-b) z))^{q+1} \left(-\frac{i (-d+f+2 (c-b) z)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-d+f+2 (c-b) z)^2}{4 c-4 b} \right) - (i (-b-c))^{-n-1} e^{\frac{i (d+f)^2}{4 b+4 c}} \sum_{q=0}^{n} 2^{q-n} (-i (-d-f))^{n-q} (i (-d-f-2 b z-2 c z))^{q+1} \left(-\frac{i (d+f+2 (b+c) z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d+f+2 (b+c) z)^2}{-4 b-4 c} \right) \right) /; n \in \mathbb{N}$$

01.07.21.0809.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \cos\left(\sqrt{z}\, c + f z\right) dz = i (-1)^n 2^{-2 n-3} \left(\left(e^{-\frac{i (b-c)^2}{4 (d-f)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b-c))^{-h-k+2 n} \left(i \left(b-c+2 (d-f) \sqrt{z} \right) \right)^{h+k} \left(-\frac{i \left(b-c+2 (d-f) \sqrt{z} \right)^2}{d-f} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((c-b) \left(b-c+2 (d-f) \sqrt{z} \right) \Gamma\left(\frac{1}{2} (h+k+1), -\frac{i \left(b-c+2 (d-f) \sqrt{z} \right)^2}{4 (d-f)} \right) + 2 \sqrt{-\frac{i \left(b-c+2 (d-f) \sqrt{z} \right)^2}{d-f}} (d-f)\, i\, \Gamma\left(\frac{1}{2} (h+k+2), -\frac{i \left(b-c+2 (d-f) \sqrt{z} \right)^2}{4 (d-f)} \right) \right) - e^{\frac{i (b-c)^2}{4 (d-f)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b-c))^{-h-k+2 n} \left(-i \left(b-c+2 (d-f) \sqrt{z} \right) \right)^{h+k} \left(\frac{i \left(b-c+2 (d-f) \sqrt{z} \right)^2}{d-f} \right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c-b)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)-2\,i\,(d-f)\right.$$

$$\left.\left.\sqrt{\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right)(d-f)^{-2n-2}+e^{-\frac{i(b+c)^2}{4(d+f)}}$$

$$(d+f)^{-2n-2}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+c))^{-h-k+2n}\left(i\left(b+c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\;(d+f)\,i\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)-$$

$$e^{\frac{i(b+c)^2}{2(d+f)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+c))^{-h-k+2n}\left(-i\left(b+c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left.2\,i\,(d+f)\sqrt{\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin\left(b\,z^r+d\,z+e\right)\cos\left(c\,z^r+f\,z\right)$

01.07.21.0810.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \cos\left(c z^2 + f z\right) dz =$$

$$\frac{1}{8} i e^{i e} \left(e^{\frac{i (d+f)^2}{-4b-4c}} \left(\sum_{q=0}^{n} 2^{q-n} \left(i (-d-f)\right)^{n-q} \left(-i (-d-f-2 b z-2 c z)\right)^{q+1} \left(\frac{i \left(d+f+2 (b+c) z\right)^2}{-b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i \left(d+f+2 (b+c) z\right)^2}{-4b-4c}\right) \right) \left(-i (-b-c)\right)^{-n-1} + \right.$$

$$\left(-i (c-b)\right)^{-n-1} e^{\frac{i (f-d)^2}{4c-4b}} \sum_{q=0}^{n} 2^{q-n} \left(i (f-d)\right)^{n-q} \left(-i (-d+f+2 (c-b) z)\right)^{q+1} \left(\frac{i \left(-d+f+2 (c-b) z\right)^2}{c-b}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i \left(-d+f+2 (c-b) z\right)^2}{4c-4b}\right) - \left(i (c-b)\right)^{-n-1} e^{-i \left(\frac{(f-d)^2}{4c-4b}+2 e\right)} \sum_{q=0}^{n} 2^{q-n} \left(-i (f-d)\right)^{n-q}$$

$$\left(i (-d+f+2 (c-b) z)\right)^{q+1} \left(-\frac{i \left(-d+f+2 (c-b) z\right)^2}{c-b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i \left(-d+f+2 (c-b) z\right)^2}{4c-4b}\right) -$$

$$\left(i (-b-c)\right)^{-n-1} e^{-i \left(\frac{(d+f)^2}{-4b-4c}+2 e\right)} \sum_{q=0}^{n} 2^{q-n} \left(-i (-d-f)\right)^{n-q} \left(i (-d-f-2 b z-2 c z)\right)^{q+1}$$

$$\left.\left(-\frac{i \left(d+f+2 (b+c) z\right)^2}{-b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i \left(d+f+2 (b+c) z\right)^2}{-4b-4c}\right) \right) /; n \in \mathbb{N}$$

01.07.21.0811.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z + e\right) \cos\left(\sqrt{z}\, c + f z\right) dz = i\, 2^{-2n-3} e^{-i e}$$

$$\left((-1)^n \left(e^{\frac{1}{4} i \left(8 e - \frac{(b-c)^2}{d-f}\right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k \left(i (b-c)\right)^{-h-k+2n} \left(i \left(b-c+2 (d-f) \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b-c+2 (d-f) \sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \right.\right.$$

$$\binom{k}{h} \binom{n}{k} \left((c-b) \left(b-c+2 (d-f) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b-c+2 (d-f) \sqrt{z}\right)^2}{4 (d-f)}\right) + \right.$$

$$\left. 2 \sqrt{-\frac{i \left(b-c+2 (d-f) \sqrt{z}\right)^2}{d-f}}\, (d-f)\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b-c+2 (d-f) \sqrt{z}\right)^2}{4 (d-f)}\right) \right) -$$

$$e^{\frac{i (b-c)^2}{4 (d-f)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, (b-c))^{-h-k+2n} \left(-i \left(b-c+2\,(d-f)\,\sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b-c+2\,(d-f)\,\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c-b)\left(b-c+2\,(d-f)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\, \frac{i\left(b-c+2\,(d-f)\,\sqrt{z}\right)^2}{4\,(d-f)}\right)-\right.$$

$$\left.\left.2\,i\,(d-f)\sqrt{\frac{i\left(b-c+2\,(d-f)\,\sqrt{z}\right)^2}{d-f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\, \frac{i\left(b-c+2\,(d-f)\,\sqrt{z}\right)^2}{4\,(d-f)}\right)\right)\right)(d-f)^{-2n-2}+$$

$$(-1)^n\, e^{-\frac{i (b+c)^2}{4 (d+f)}}\, (d+f)^{-2n-2} \left(e^{2\,i\,e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,(b+c))^{-h-k+2n} \left(i\left(b+c+2\,(d+f)\,\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((-b-c)\left(b+c+2\,(d+f)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\, -\frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^2}{4\,(d+f)}\right)+\right.$$

$$\left.2\sqrt{-\frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^2}{d+f}}\;(d+f)\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\, -\frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^2}{4\,(d+f)}\right)\right)-$$

$$e^{\frac{i (b+c)^2}{2 (d+f)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,(b+c))^{-h-k+2n} \left(-i\left(b+c+2\,(d+f)\,\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2\,(d+f)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\, \frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^2}{4\,(d+f)}\right)-\right.$$

$$\left.\left.\left.2\,i\,(d+f)\sqrt{\frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^2}{d+f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\, \frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^2}{4\,(d+f)}\right)\right)\right)\right) /;\; n\in\mathbb{N}$$

Involving $z^n \sin(d z) \cos(c z^r + f z + g)$

01.07.21.0812.01

$$\int z^n \sin(d z)\cos(c z^2 + f z + g)\,dz = \frac{1}{8} i e^{i g} \left(e^{\frac{i(f-d)^2}{4c} - 2 i g} \left(\sum_{q=0}^{n} 2^{q-n} (i(f-d))^{n-q} (-i(-d+f+2cz))^{q+1} \left(\frac{i(-d+f+2cz)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-d+f+2cz)^2}{4c} \right) \right) (-i c)^{-n-1} - e^{i\left(\frac{(d+f)^2}{4c} - 2g\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i(-d-f))^{n-q} (i(-d-f-2cz))^{q+1} \left(\frac{i(d+f+2cz)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+f+2cz)^2}{4c} \right) \right) (-i c)^{-n-1} - (i c)^{-n-1} e^{-\frac{i(f-d)^2}{4c}} \sum_{q=0}^{n} 2^{q-n} (-i(f-d))^{n-q} (i(-d+f+2cz))^{q+1} \left(-\frac{i(-d+f+2cz)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-d+f+2cz)^2}{4c} \right) + (i c)^{-n-1} e^{-\frac{i(d+f)^2}{4c}} \sum_{q=0}^{n} 2^{q-n} (i(-d-f))^{n-q} (-i(-d-f-2cz))^{q+1} \left(-\frac{i(d+f+2cz)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+f+2cz)^2}{4c} \right) \right) /; n \in \mathbb{N}$$

01.07.21.0813.01

$$\int z^n \sin(d z)\cos(\sqrt{z}\, c + f z + g)\,dz = i(-1)^n 2^{-2n-3} e^{i g} \left(-e^{\frac{i c^2}{4d-4f}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2n} \left(-i\left(2(d-f)\sqrt{z} - c\right) \right)^{h+k} \left(\frac{i\left(2(d-f)\sqrt{z} - c\right)^2}{d-f} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\left(2(d-f)\sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(2(d-f)\sqrt{z} - c\right)^2}{4d-4f} \right) - 2 i (d-f) \sqrt{\frac{i\left(2(d-f)\sqrt{z} - c\right)^2}{d-f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(2(d-f)\sqrt{z} - c\right)^2}{4d-4f} \right) \right) \right) (d-f)^{-2n-2} + \right.$$

$$e^{-i\left(\frac{c^2}{4d-4f}+2g\right)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(i\left(2(d-f)\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4d-4f}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\,(d-f)\,i\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4d-4f}\right)\right)\right)(d-f)^{-2n-2}+$$

$$e^{-\frac{i c^2}{4(d+f)}}\,(d+f)^{-2n-2}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+f)\sqrt{-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)-$$

$$e^{\frac{1}{2}i\left(\frac{c^2}{d+f}-4g\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(-i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left.2\,i\,(d+f)\sqrt{\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin(d\,z+e)\cos\left(c\,z^r+f\,z+g\right)$

01.07.21.0814.01

$$\int z^n \sin(d z + e) \cos\left(c z^2 + f z + g\right) dz = \frac{1}{8} i e^{i(e+g)} \left(e^{\frac{i(f-d)^2}{4c} - 2 i g} \left(\sum_{q=0}^{n} 2^{q-n} (i (f-d))^{n-q} (-i(-d+f+2cz))^{q+1} \left(\frac{i(-d+f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-d+f+2cz)^2}{4c}\right)\right) (-i c)^{-n-1} - e^{i\left(\frac{(d+f)^2}{4c} - 2e - 2g\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i(-d-f))^{n-q} (i(-d-f-2cz))^{q+1} \left(\frac{i(d+f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+f+2cz)^2}{4c}\right)\right) (-i c)^{-n-1} - (i c)^{-n-1} e^{-i\left(\frac{(f-d)^2}{4c} + 2e\right)} \sum_{q=0}^{n} 2^{q-n} (-i(f-d))^{n-q} (i(-d+f+2cz))^{q+1} \left(-\frac{i(-d+f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-d+f+2cz)^2}{4c}\right) + (i c)^{-n-1} e^{-\frac{i(d+f)^2}{4c}} \sum_{q=0}^{n} 2^{q-n} (i(-d-f))^{n-q} (-i(-d-f-2cz))^{q+1} \left(-\frac{i(d+f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+f+2cz)^2}{4c}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0815.01

$$\int z^n \sin(d z + e) \cos\left(\sqrt{z}\, c + f z + g\right) dz = i (-1)^n 2^{-2n-3} e^{-i(e-g)} \left(-e^{\frac{i c^2}{4d-4f}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2n} \left(-i\left(2(d-f)\sqrt{z} - c\right)\right)^{h+k} \left(\frac{i\left(2(d-f)\sqrt{z} - c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\left(2(d-f)\sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(2(d-f)\sqrt{z} - c\right)^2}{4d-4f}\right) - 2 i (d-f) \sqrt{\frac{i\left(2(d-f)\sqrt{z} - c\right)^2}{d-f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(2(d-f)\sqrt{z} - c\right)^2}{4d-4f}\right)\right)\right) (d-f)^{-2n-2} + e^{i\left(-\frac{c^2}{4d-4f} + 2e - 2g\right)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c)^{-h-k+2n} \left(i\left(2(d-f)\sqrt{z} - c\right)\right)^{h+k} \left(-\frac{i\left(2(d-f)\sqrt{z} - c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4d-4f}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\,(d-f)\,i\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4d-4f}\right)\right)\right)(d-f)^{-2n-2}+$$

$$e^{-\frac{i c^2}{4(d+f)}}(d+f)^{-2n-2}\left(e^{2ie}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i c)^{-h-k+2n}\left(i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(2i(d+f)\sqrt{-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)-$$

$$e^{\frac{1}{2}i\left(\frac{c^2}{d+f}-4g\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i c)^{-h-k+2n}\left(-i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left.2i(d+f)\sqrt{\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)\;/;\; n\in\mathbb{N}$$

Involving $z^n \sin\left(b z^r\right) \cos\left(c z^r + f z + g\right)$

01.07.21.0816.01

$$\int z^n \sin(b z^2) \cos(c z^2 + f z + g)\, dz = \frac{1}{8} i e^{i g} \left(e^{\frac{i f^2}{-4b-4c}} \left(\sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (-i(-f-2bz-2cz))^{q+1} \left(\frac{i(f+2(b+c)z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(f+2(b+c)z)^2}{-4b-4c} \right) \right) (-i(-b-c))^{-n-1} + (-i(c-b))^{-n-1} e^{\frac{i f^2}{4c-4b} - 2 i g} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i(f+2(c-b)z))^{q+1} \left(\frac{i(f+2(c-b)z)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(f+2(c-b)z)^2}{4c-4b} \right) - (i(c-b))^{-n-1} e^{-\frac{i f^2}{4c-4b}} \sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i(f+2(c-b)z))^{q+1} \left(-\frac{i(f+2(c-b)z)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(f+2(c-b)z)^2}{4c-4b} \right) - (i(-b-c))^{-n-1} e^{-i\left(\frac{f^2}{-4b-4c} + 2g \right)} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (i(-f-2bz-2cz))^{q+1} \left(-\frac{i(f+2(b+c)z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(f+2(b+c)z)^2}{-4b-4c} \right) \right) /; n \in \mathbb{N}$$

01.07.21.0817.01

$$\int z^n \sin(\sqrt{z}\, b) \cos(\sqrt{z}\, c + f z + g)\, dz = -i (-1)^n 2^{-2n-3} e^{i g} f^{-2(n+1)} \left(e^{-\frac{i(b+c)^2}{4f}} \left(e^{\frac{1}{2} i \left(\frac{(b+c)^2}{f} - 4g \right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i(b+c))^{-h-k+2n} \left(-i\left(b+c+2f\sqrt{z} \right) \right)^{h+k} \left(\frac{i\left(b+c+2f\sqrt{z} \right)^2}{f} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((-b-c)\left(b+c+2f\sqrt{z} \right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+c+2f\sqrt{z} \right)^2}{4f} \right) - 2 i f \sqrt{\frac{i\left(b+c+2f\sqrt{z} \right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+c+2f\sqrt{z} \right)^2}{4f} \right) \right) - \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i(b+c))^{-h-k+2n} \left(i\left(b+c+2f\sqrt{z} \right) \right)^{h+k} \left(-\frac{i\left(b+c+2f\sqrt{z} \right)^2}{f} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((-b-c)\left(b+c+2f\sqrt{z} \right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+c+2f\sqrt{z} \right)^2}{4f} \right) + \right.\right.\right.$$

$$2\sqrt{-\frac{i\left(b+c+2f\sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)-$$

$$e^{i\left(\frac{(b-c)^2}{4f}-2g\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-c))^{-h-k+2n}\left(i\left(b-c-2f\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c-b)\left(b-c-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)-$$

$$2\,i\,f\sqrt{\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)+$$

$$e^{-\frac{i(b-c)^2}{4f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b-c))^{-h-k+2n}\left(-i\left(b-c-2f\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c-b)\left(b-c-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)+$$

$$2\sqrt{-\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)\Bigg)\;/;\; n\in\mathbb{N}$$

Involving $z^n \sin\left(b\, z^r + e\right) \cos\left(c\, z^r + f\, z + g\right)$

01.07.21.0818.01

$$\int z^n \sin\left(b z^2 + e\right) \cos\left(c z^2 + f z + g\right) dz = \frac{1}{8} i e^{i(e+g)} \left(e^{\frac{i f^2}{-4b-4c}} \left(\sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (-i(-f - 2bz - 2cz))^{q+1} \left(\frac{i(f + 2(b+c)z)^2}{-b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(f+2(b+c)z)^2}{-4b-4c}\right)\right)\right.$$

$$(-i(-b-c))^{-n-1} + (-i(c-b))^{-n-1} e^{\frac{i f^2}{4c-4b} - 2 i g}$$

$$\sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i(f + 2(c-b)z))^{q+1} \left(\frac{i(f+2(c-b)z)^2}{c-b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(f+2(c-b)z)^2}{4c-4b}\right) -$$

$$(i(c-b))^{-n-1} e^{-i\left(\frac{f^2}{4c-4b}+2e\right)} \sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i(f+2(c-b)z))^{q+1} \left(-\frac{i(f+2(c-b)z)^2}{c-b}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(f+2(c-b)z)^2}{4c-4b}\right) - (i(-b-c))^{-n-1} e^{-i\left(\frac{f^2}{-4b-4c}+2e+2g\right)}$$

$$\left.\sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (i(-f-2bz-2cz))^{q+1} \left(-\frac{i(f+2(b+c)z)^2}{-b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(f+2(b+c)z)^2}{-4b-4c}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0819.01

$$\int z^n \sin\left(\sqrt{z}\, b + e\right) \cos\left(\sqrt{z}\, c + f z + g\right) dz = -i (-1)^n 2^{-2n-3} e^{-i(e-g)} f^{-2(n+1)}$$

$$\left(e^{-\frac{i(b+c)^2}{4f}} \left(e^{\frac{1}{2} i \left(\frac{(b+c)^2}{f} - 4g\right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i(b+c))^{-h-k+2n} \left(-i\left(b+c+2f\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b+c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+c+2f\sqrt{z}\right)^2}{4f}\right) -\right.$$

$$\left.2 i f \sqrt{\frac{i\left(b+c+2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)\right) -$$

$$e^{2ie} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i(b+c))^{-h-k+2n} \left(i\left(b+c+2f\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b+c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2 f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right)+\right.$$

$$\left.\left. 2\sqrt{-\frac{i\left(b+c+2 f \sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right)-$$

$$e^{i\left(\frac{(b-c)^2}{4 f}+2 e-2 g\right)} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (i\,(b-c))^{-h-k+2 n} \left(i\left(b-c-2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c-b)\left(b-c-2 f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)-\right.$$

$$\left. 2\, i\, f \sqrt{\frac{i\left(b-c-2 f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\right)+$$

$$e^{-\frac{i (b-c)^2}{4 f}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (-i\,(b-c))^{-h-k+2 n} \left(-i\left(b-c-2 f \sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c-b)\left(b-c-2 f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)+\right.$$

$$\left.\left. 2\sqrt{-\frac{i\left(b-c-2 f \sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n \sin\left(b z^r + d z\right) \cos\left(c z^r + f z + g\right)$

01.07.21.0820.01

$$\int z^n \sin\left(b z^2 + d z\right) \cos\left(c z^2 + f z + g\right) dz = \frac{1}{8} i e^{i g} \left(e^{\frac{i (d+f)^2}{-4 b - 4 c}} \left(\sum_{q=0}^{n} 2^{q-n} (i(-d-f))^{n-q} (-i(-d-f-2bz-2cz))^{q+1} \left(\frac{i(d+f+2(b+c)z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+f+2(b+c)z)^2}{-4b-4c} \right) \right) (-i(-b-c))^{-n-1} + (-i(c-b))^{-n-1} e^{\frac{i(f-d)^2}{4c-4b} - 2 i g} \sum_{q=0}^{n} 2^{q-n} (i(f-d))^{n-q} (-i(-d+f+2(c-b)z))^{q+1} \left(\frac{i(-d+f+2(c-b)z)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-d+f+2(c-b)z)^2}{4c-4b} \right) - (i(c-b))^{-n-1} e^{-\frac{i(f-d)^2}{4c-4b}} \sum_{q=0}^{n} 2^{q-n} (-i(f-d))^{n-q} (i(-d+f+2(c-b)z))^{q+1} \left(-\frac{i(-d+f+2(c-b)z)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-d+f+2(c-b)z)^2}{4c-4b} \right) - (i(-b-c))^{-n-1} e^{-i\left(\frac{(d+f)^2}{-4b-4c} + 2g \right)} \sum_{q=0}^{n} 2^{q-n} (-i(-d-f))^{n-q} (i(-d-f-2bz-2cz))^{q+1} \left(-\frac{i(d+f+2(b+c)z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+f+2(b+c)z)^2}{-4b-4c} \right) \right) /; n \in \mathbb{N}$$

01.07.21.0821.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \cos\left(\sqrt{z}\, c + f z + g\right) dz = i\, 2^{-2n-3} e^{i g} \left((-1)^n \left(e^{-\frac{1}{4} i \left(\frac{(b-c)^2}{d-f} + 8 g \right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i(b-c))^{-h-k+2n} \left(i\left(b-c+2(d-f)\sqrt{z}\right) \right)^{h+k} \left(-\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((c-b)\left(b-c+2(d-f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)} \right) + 2 \sqrt{-\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\, (d-f)\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)} \right) \right) - \right.\right.$$

$$e^{\frac{i(b-c)^2}{4(d-f)}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b-c))^{-h-k+2n}\left(-i\left(b-c+2\,(d-f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c-b)\left(b-c+2\,(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{4\,(d-f)}\right)-\right.$$

$$\left.\left.2\,i\,(d-f)\sqrt{\frac{i\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{d-f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{4\,(d-f)}\right)\right)\right)(d-f)^{-2n-2}+$$

$$(-1)^n\,e^{-\frac{i(b+c)^2}{4(d+f)}}\,(d+f)^{-2n-2}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+c))^{-h-k+2n}\left(i\left(b+c+2\,(d+f)\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b-c)\left(b+c+2\,(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{d+f}}\;(d+f)\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)\right)\right)-e^{\frac{1}{2}i\left(\frac{(b+c)^2}{d+f}-4g\right)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+c))^{-h-k+2n}\left(-i\left(b+c+2\,(d+f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2\,(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)-\right.$$

$$\left.\left.\left.2\,i\,(d+f)\sqrt{\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)\right)\right)\right)\right)\,/;\;n\in\mathbb{N}$$

Involving $z^n \sin(b z^r + d z + e) \cos(c z^r + f z + g)$

01.07.21.0822.01

$$\int z^n \sin(b z^2 + d z + e) \cos(c z^2 + f z + g)\, dz = \frac{1}{8} i e^{i(e+g)} \left(e^{\frac{i(d+f)^2}{-4b-4c}} \left(\sum_{q=0}^{n} 2^{q-n} (i(-d-f))^{n-q} (-i(-d-f-2bz-2cz))^{q+1} \left(\frac{i(d+f+2(b+c)z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+f+2(b+c)z)^2}{-4b-4c} \right) \right) (-i(-b-c))^{-n-1} + (-i(c-b))^{-n-1} e^{\frac{i(f-d)^2}{4c-4b} - 2ig} \sum_{q=0}^{n} 2^{q-n} (i(f-d))^{n-q} (-i(-d+f+2(c-b)z))^{q+1} \left(\frac{i(-d+f+2(c-b)z)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-d+f+2(c-b)z)^2}{4c-4b} \right) - (i(c-b))^{-n-1} e^{-i\left(\frac{(f-d)^2}{4c-4b} + 2e\right)} \sum_{q=0}^{n} 2^{q-n} (-i(f-d))^{n-q} (i(-d+f+2(c-b)z))^{q+1} \left(-\frac{i(-d+f+2(c-b)z)^2}{c-b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-d+f+2(c-b)z)^2}{4c-4b} \right) - (i(-b-c))^{-n-1} e^{-i\left(\frac{(d+f)^2}{-4b-4c} + 2e + 2g\right)} \sum_{q=0}^{n} 2^{q-n} (-i(-d-f))^{n-q} (i(-d-f-2bz-2cz))^{q+1} \left(-\frac{i(d+f+2(b+c)z)^2}{-b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+f+2(b+c)z)^2}{-4b-4c} \right) \right) /; n \in \mathbb{N}$$

01.07.21.0823.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z + e\right) \cos\left(\sqrt{z}\, c + f z + g\right) dz = i\, 2^{-2n-3} e^{-i(e-g)} \left((-1)^n \left(e^{\frac{1}{4} i \left(-\frac{(b-c)^2}{d-f} + 8e - 8g \right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i(b-c))^{-h-k+2n} \left(i\left(b-c+2(d-f)\sqrt{z} \right) \right)^{h+k} \left(-\frac{i\left(b-c+2(d-f)\sqrt{z} \right)^2}{d-f} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((c-b)\left(b-c+2(d-f)\sqrt{z} \right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b-c+2(d-f)\sqrt{z} \right)^2}{4(d-f)} \right) + 2\sqrt{-\frac{i\left(b-c+2(d-f)\sqrt{z} \right)^2}{d-f}}\, (d-f)\, i\, \Gamma\left(\right. \right. \right. \right.$$

$$\left.\left.\frac{1}{2}(h+k+2),\ -\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)-$$

$$e^{\frac{i(b-c)^2}{4(d-f)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i(b-c))^{-h-k+2n}\left(-i\left(b-c+2(d-f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(\left(c-b\right)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)-\right.$$

$$\left.\left.2\,i\,(d-f)\sqrt{\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right)(d-f)^{-2n-2}+$$

$$(-1)^n\,e^{-\frac{i(b+c)^2}{4(d+f)}}\,(d+f)^{-2n-2}\left(e^{2ie}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i(b+c))^{-h-k+2n}\left(i\left(b+c+2(d+f)\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(\left(-b-c\right)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\ (d+f)\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)-$$

$$e^{\frac{1}{2}i\left(\frac{(b+c)^2}{d+f}-4g\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i(b+c))^{-h-k+2n}\left(-i\left(b+c+2(d+f)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b-c)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left.2\,i\,(d+f)\sqrt{\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)\right)\ /;\ n\in\mathbb{N}$$

Involving powers of sin and power

Involving $z^{\alpha-1}\sin^{\mu}(c\,z)\cos(a\,z)$

01.07.21.0824.01

$$\int z^{\alpha-1}\sin^m(c\,z)\cos(a\,z)\,dz = 2^{-m-1}z^{\alpha}\left(a^2z^2\right)^{-\alpha}\left(\binom{m}{\frac{m}{2}}\left(\Gamma(\alpha,\ i\,a\,z)\,(-i\,a\,z)^{\alpha}+(i\,a\,z)^{\alpha}\,\Gamma(\alpha,\ -i\,a\,z)\right)(m \bmod 2-1)-\right.$$

$$\left(a^2z^2\right)^{\alpha}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\left((a+2\,c\,k-c\,m)^2z^2\right)^{-\alpha}\left((a-2\,c\,k+c\,m)^2z^2\right)^{-\alpha}\binom{m}{k}$$

$$\left((i\,(a+2\,c\,k-c\,m)\,z)^{\alpha}\,\Gamma(\alpha,\ -i\,(a+2\,c\,k-c\,m)\,z)\left(\cos\left(\frac{m\,\pi}{2}\right)+i\sin\left(\frac{m\,\pi}{2}\right)\right)\left((a-2\,c\,k+c\,m)^2z^2\right)^{\alpha}+\right.$$

$$(-i\,(a+2\,c\,k-c\,m)\,z)^{\alpha}\,\Gamma(\alpha,\ i\,(a+2\,c\,k-c\,m)\,z)\left(\cos\left(\frac{m\,\pi}{2}\right)-i\sin\left(\frac{m\,\pi}{2}\right)\right)\left((a-2\,c\,k+c\,m)^2z^2\right)^{\alpha}+$$

$$\left((a+2\,c\,k-c\,m)^2z^2\right)^{\alpha}\left(\Gamma(\alpha,\ i\,(a-2\,c\,k+c\,m)\,z)\left(\cos\left(\frac{m\,\pi}{2}\right)+i\sin\left(\frac{m\,\pi}{2}\right)\right)(-i\,(a-2\,c\,k+c\,m)\,z)^{\alpha}+\right.$$

$$\left.\left.\left.\left.(i\,(a-2\,c\,k+c\,m)\,z)^{\alpha}\,\Gamma(\alpha,\ -i\,(a-2\,c\,k+c\,m)\,z)\left(\cos\left(\frac{m\,\pi}{2}\right)-i\sin\left(\frac{m\,\pi}{2}\right)\right)\right)\right)\right)\right)\ /;\ m\in\mathbb{N}^+$$

01.07.21.0825.01

$$\int z^n\sin^{\mu}(c\,z)\cos(a\,z)\,dz = \frac{1}{2}\left(1-e^{2\,i\,c\,z}\right)^{-\mu}n!\,\sin^{\mu}(c\,z)$$

$$\left(e^{i\,a\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}\,(i\,a-i\,c\,\mu)^{-p-1}}{(n-p)!}\;{}_{p+2}F_{p+1}\left(-\frac{c\,\mu-a}{2\,c},\ \ldots,\ -\frac{c\,\mu-a}{2\,c},\ -\mu;\ 1-\frac{c\,\mu-a}{2\,c},\ \ldots,\ 1-\frac{c\,\mu-a}{2\,c};\ e^{2\,i\,c\,z}\right)+e^{-i\,a\,z}\right.$$

$$\left.\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}\,(-i\,a-i\,c\,\mu)^{-p-1}}{(n-p)!}\;{}_{p+2}F_{p+1}\left(-\frac{a+c\,\mu}{2\,c},\ \ldots,\ -\frac{a+c\,\mu}{2\,c},\ -\mu;\ 1-\frac{a+c\,\mu}{2\,c},\ \ldots,\ 1-\frac{a+c\,\mu}{2\,c};\ e^{2\,i\,c\,z}\right)\right)\ /;\ n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sin^{\mu}(c\,z+d)\cos(a\,z)$

01.07.21.0826.01

$$\int z^{\alpha-1}\sin^m(d+cz)\cos(az)\,dz = 2^{-m-1} z^\alpha \left(a^2 z^2\right)^{-\alpha} \left(\binom{m}{\frac{m}{2}} (\Gamma(\alpha, i a z)(-i a z)^\alpha + (i a z)^\alpha \Gamma(\alpha, -i a z))(m \bmod 2 - 1) - \left(a^2 z^2\right)^\alpha \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{1}{2} i (4dk+2dm+m\pi)} \left((a+2ck-cm)^2 z^2\right)^{-\alpha} \left((a-2ck+cm)^2 z^2\right)^{-\alpha} \binom{m}{k} \left(e^{i(4dk+m\pi)} (i(a+2ck-cm)z)^\alpha \Gamma(\alpha, -i(a+2ck-cm)z) \left((a-2ck+cm)^2 z^2\right)^\alpha + e^{2idm} (-i(a+2ck-cm)z)^\alpha \Gamma(\alpha, i(a+2ck-cm)z) \left((a-2ck+cm)^2 z^2\right)^\alpha + \left((a+2ck-cm)^2 z^2\right)^\alpha \left(e^{i(4dk+m\pi)} \Gamma(\alpha, i(a-2ck+cm)z)(-i(a-2ck+cm)z)^\alpha + e^{2idm} (i(a-2ck+cm)z)^\alpha \Gamma(\alpha, -i(a-2ck+cm)z) \right) \right) \right) /; m \in \mathbb{N}^+$$

01.07.21.0827.01

$$\int z^n \sin^\mu(d+cz)\cos(az)\,dz = \frac{1}{2}\left(1-e^{2i(d+cz)}\right)^{-\mu} n!\,\sin^\mu(d+cz) \left(e^{iaz} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (ia - ic\mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{c\mu-a}{2c}, \ldots, -\frac{c\mu-a}{2c}, -\mu; 1-\frac{c\mu-a}{2c}, \ldots, 1-\frac{c\mu-a}{2c}; e^{2i(d+cz)}\right) + e^{-iaz} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-ia - ic\mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{a+c\mu}{2c}, \ldots, -\frac{a+c\mu}{2c}, -\mu; 1-\frac{a+c\mu}{2c}, \ldots, 1-\frac{a+c\mu}{2c}; e^{2i(d+cz)}\right) \right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1}\sin^\mu(cz)\cos(az+b)$

01.07.21.0828.01

$$\int z^{\alpha-1}\sin^m(cz)\cos(b+az)\,dz = 2^{-m-1} e^{-ib} z^\alpha \left(a^2 z^2\right)^{-\alpha} \left(\binom{m}{\frac{m}{2}} \left(\Gamma(\alpha, i a z)(-i a z)^\alpha + e^{2ib} (i a z)^\alpha \Gamma(\alpha, -i a z)\right)(m \bmod 2 - 1) - e^{ib} \left(a^2 z^2\right)^\alpha \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{1}{2} i (2b+m\pi)} \left((a+2ck-cm)^2 z^2\right)^{-\alpha} \left((a-2ck+cm)^2 z^2\right)^{-\alpha} \binom{m}{k} \left(e^{i(2b+m\pi)} (i(a+2ck-cm)z)^\alpha \Gamma(\alpha, -i(a+2ck-cm)z) \left((a-2ck+cm)^2 z^2\right)^\alpha + (-i(a+2ck-cm)z)^\alpha \Gamma(\alpha, i(a+2ck-cm)z) \left((a-2ck+cm)^2 z^2\right)^\alpha + \left((a+2ck-cm)^2 z^2\right)^\alpha \left(e^{im\pi} \Gamma(\alpha, i(a-2ck+cm)z)(-i(a-2ck+cm)z)^\alpha + e^{2ib} (i(a-2ck+cm)z)^\alpha \Gamma(\alpha, -i(a-2ck+cm)z) \right) \right) \right) /; m \in \mathbb{N}^+$$

01.07.21.0829.01

$$\int z^n \sin^\mu(c z) \cos(b + a z)\, dz = \frac{1}{2} \left(1 - e^{2 i c z}\right)^{-\mu} n! \sin^\mu(c z) \Bigg(e^{i(b+a z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i a - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{c\mu - a}{2c}, \ldots, -\frac{c\mu - a}{2c}, -\mu; 1 - \frac{c\mu - a}{2c}, \ldots, 1 - \frac{c\mu - a}{2c}; e^{2 i c z}\right) + e^{-i(b+a z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i a - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{a + c\mu}{2c}, \ldots, -\frac{a + c\mu}{2c}, -\mu; 1 - \frac{a + c\mu}{2c}, \ldots, 1 - \frac{a + c\mu}{2c}; e^{2 i c z}\right)\Bigg) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \sin^\mu(c z + d) \cos(a z + b)$

01.07.21.0830.01

$$\int z^{\alpha-1} \sin^m(d + c z) \cos(b + a z)\, dz = 2^{-m-1} e^{-i b} z^\alpha \left(a^2 z^2\right)^{-\alpha} \Bigg(\binom{m}{\frac{m}{2}} \left(\Gamma(\alpha, i a z) (-i a z)^\alpha + e^{2 i b} (i a z)^\alpha \Gamma(\alpha, -i a z)\right) (m \bmod 2 - 1) - e^{i b} \left(a^2 z^2\right)^\alpha \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{1}{2} i (2 b + 4 d k + 2 d m + m\pi)} \left((a + 2 c k - c m)^2 z^2\right)^{-\alpha} \left((a - 2 c k + c m)^2 z^2\right)^{-\alpha} \binom{m}{k} \Big(e^{i(2 b + 4 d k + m\pi)} (i (a + 2 c k - c m) z)^\alpha \Gamma(\alpha, -i (a + 2 c k - c m) z) \left((a - 2 c k + c m)^2 z^2\right)^\alpha + e^{2 i d m} (-i (a + 2 c k - c m) z)^\alpha \Gamma(\alpha, i (a + 2 c k - c m) z) \left((a - 2 c k + c m)^2 z^2\right)^\alpha + \left((a + 2 c k - c m)^2 z^2\right)^\alpha \left(e^{i(4 d k + m\pi)} \Gamma(\alpha, i (a - 2 c k + c m) z) (-i (a - 2 c k + c m) z)^\alpha + e^{2 i (b + d m)} (i (a - 2 c k + c m) z)^\alpha \Gamma(\alpha, -i (a - 2 c k + c m) z)\right)\Big)\Bigg) /; m \in \mathbb{N}^+$$

01.07.21.0831.01

$$\int z^n \sin^\mu(d + c z) \cos(b + a z)\, dz = \frac{1}{2} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} n! \sin^\mu(d + c z) \Bigg(e^{i(b+a z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i a - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{c\mu - a}{2c}, \ldots, -\frac{c\mu - a}{2c}, -\mu; 1 - \frac{c\mu - a}{2c}, \ldots, 1 - \frac{c\mu - a}{2c}; e^{2 i (d + c z)}\right) + e^{-i(b+a z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i a - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{a + c\mu}{2c}, \ldots, -\frac{a + c\mu}{2c}, -\mu; 1 - \frac{a + c\mu}{2c}, \ldots, 1 - \frac{a + c\mu}{2c}; e^{2 i (d + c z)}\right)\Bigg) /; n \in \mathbb{N}$$

Involving $z^n \sin^m\left(b z^r\right) \cos(c z)$

01.07.21.0832.01

$$\int z^n \sin^m\left(b z^2\right)\cos(c z)\, dz = 2^{-m-2}\left(-2\binom{m}{\frac{m}{2}}\left(\Gamma(n+1,\, -i c z)\,(-i c)^{-n-1} + (i c)^{-n-1}\,\Gamma(n+1,\, i c z)\right)(1 - m \bmod 2) - i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i c^2}{8 b k - 4 b m}}\left(\sum_{q=0}^{n} 2^{q-n}\,(-i c)^{n-q}\,(-i(-c + 4 b k z - 2 b m z))^{q+1}\left(\frac{i(c + 2(b m - 2 b k) z)^2}{2 b k - b m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\, \frac{i(c + 2(b m - 2 b k) z)^2}{8 b k - 4 b m}\right)\right)(-i(2 b k - b m))^{-n-1} + e^{\frac{i c^2}{8 b k - 4 b m}}\left(\sum_{q=0}^{n} 2^{q-n}\,(i c)^{n-q}\,(-i(c + 2(2 b k - b m) z))^{q+1}\left(\frac{i(c + 2(2 b k - b m) z)^2}{2 b k - b m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\, \frac{i(c + 2(2 b k - b m) z)^2}{8 b k - 4 b m}\right)\right)(-i(2 b k - b m))^{-n-1} + e^{i\left(-\frac{c^2}{8 b k - 4 b m} + m \pi\right)}\,(i(2 b k - b m))^{-n-1}\sum_{q=0}^{n} 2^{q-n}\,(i c)^{n-q}\,(i(-c + 4 b k z - 2 b m z))^{q+1}\left(-\frac{i(c + 2(b m - 2 b k) z)^2}{2 b k - b m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\, -\frac{i(c + 2(b m - 2 b k) z)^2}{8 b k - 4 b m}\right) + e^{i\left(-\frac{c^2}{8 b k - 4 b m} + m \pi\right)}\,(i(2 b k - b m))^{-n-1}\sum_{q=0}^{n} 2^{q-n}\,(-i c)^{n-q}\,(i(c + 2(2 b k - b m) z))^{q+1}\left(-\frac{i(c + 2(2 b k - b m) z)^2}{2 b k - b m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\, -\frac{i(c + 2(2 b k - b m) z)^2}{8 b k - 4 b m}\right)\right)\right) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0833.01

$$\int z^n \sin^m\left(\sqrt{z}\, b\right)\cos(c z)\, dz = 2^{-m-2}\left(-2\binom{m}{\frac{m}{2}}\left(\Gamma(n+1,\, -i c z)\,(-i c)^{-n-1} + (i c)^{-n-1}\,\Gamma(n+1,\, i c z)\right)(1 - m \bmod 2) - (-1)^n\, i^{-m}\, 4^{-n}\, c^{-2n-2}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\left(e^{-\frac{i b^2 (m-2u)^2}{4c}}\left((-1)^m\, e^{\frac{i b^2 (m-2u)^2}{2c}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\,(-i b(m-2u))^{-h-k+2n}\left(-i\left(2\sqrt{z}\, c + b(m-2u)\right)\right)^{h+k}\right.\right.\right.$$

$$\left(\frac{i\left(2\sqrt{z}\ c+b\,(m-2\,u)\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-b\,(m-2\,u)\left(2\sqrt{z}\ c+b\,(m-2\,u)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(2\sqrt{z}\ c+b\,(m-2\,u)\right)^2}{4\,c}\right)-2\,i\,c\sqrt{\frac{i\left(2\sqrt{z}\ c+b\,(m-2\,u)\right)^2}{c}}$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(2\sqrt{z}\ c+b\,(m-2\,u)\right)^2}{4\,c}\right)\right)+\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b\,(m-2\,u))^{-h-k+2\,n}$$

$$\left(i\left(2\sqrt{z}\ c+b\,(m-2\,u)\right)\right)^{h+k}\left(-\frac{i\left(2\sqrt{z}\ c+b\,(m-2\,u)\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,c\sqrt{-\frac{i\left(2\sqrt{z}\ c+b\,(m-2\,u)\right)^2}{c}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(2\sqrt{z}\ c+b\,(m-2\,u)\right)^2}{4\,c}\right)-\right.$$

$$\left.\left.b\,(m-2\,u)\left(2\sqrt{z}\ c+b\,(m-2\,u)\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(2\sqrt{z}\ c+b\,(m-2\,u)\right)^2}{4\,c}\right)\right)\right)+e^{\frac{i\,(b\,m-2\,b\,u)^2}{4\,c}}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,m-2\,b\,u))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((2\,b\,u-b\,m)\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)^2}{4\,c}\right)-\right.$$

$$\left.2\,i\,c\sqrt{\frac{i\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)^2}{c}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)^2}{4\,c}\right)\right)+$$

$$(-1)^m\,e^{-\frac{i\,(b\,m-2\,b\,u)^2}{4\,c}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m-2\,b\,u))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)-2\,c\,\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left((2\,b\,u-b\,m)\left(b\,(m-2\,u)-2\,c\,\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b\,(m-2\,u)-2\,c\,\sqrt{z}\right)^2}{4\,c}\right)+2\,\sqrt{-\frac{i\left(b\,(m-2\,u)-2\,c\,\sqrt{z}\right)^2}{c}}$$

$$\left.\left.\left.\left. c\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b\,(m-2\,u)-2\,c\,\sqrt{z}\right)^2}{4\,c}\right)\right)\right)\right)\right) /;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r+e\right)\cos(c\,z)$

01.07.21.0834.01

$$\int z^n \sin^m\left(b z^2+e\right)\cos(c z)\, dz = 2^{-m-2}\left(-2\binom{m}{\frac{m}{2}}\left(\Gamma(n+1,-i c z)(-i c)^{-n-1}+(i c)^{-n-1}\Gamma(n+1, i c z)\right)(1-m \bmod 2)-i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-i(2 e k-e m)}\right.$$

$$\binom{m}{k}\left(e^{\frac{i c^2}{8 b k-4 b m}}\left(\sum_{q=0}^{n} 2^{q-n}(-i c)^{n-q}(-i(-c+4 b k z-2 b m z))^{q+1}\left(\frac{i(c+2(b m-2 b k) z)^2}{2 b k-b m}\right)^{\frac{1}{2}(-q-1)}\right.\right.$$

$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(c+2(b m-2 b k) z)^2}{8 b k-4 b m}\right)\right)(-i(2 b k-b m))^{-n-1}+$$

$$e^{\frac{i c^2}{8 b k-4 b m}}\left(\sum_{q=0}^{n} 2^{q-n}(i c)^{n-q}(-i(c+2(2 b k-b m) z))^{q+1}\left(\frac{i(c+2(2 b k-b m) z)^2}{2 b k-b m}\right)^{\frac{1}{2}(-q-1)}\right.$$

$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(c+2(2 b k-b m) z)^2}{8 b k-4 b m}\right)\right)(-i(2 b k-b m))^{-n-1}+$$

$$e^{i\left(-\frac{c^2}{8 b k-4 b m}+e(4 k-2 m)+m \pi\right)}(i(2 b k-b m))^{-n-1}\sum_{q=0}^{n} 2^{q-n}(i c)^{n-q}(i(-c+4 b k z-2 b m z))^{q+1}$$

$$\left(-\frac{i(c+2(b m-2 b k) z)^2}{2 b k-b m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(c+2(b m-2 b k) z)^2}{8 b k-4 b m}\right)+$$

$$e^{i\left(-\frac{c^2}{8 b k-4 b m}+e(4 k-2 m)+m \pi\right)}(i(2 b k-b m))^{-n-1}\sum_{q=0}^{n} 2^{q-n}(-i c)^{n-q}(i(c+2(2 b k-b m) z))^{q+1}$$

$$\left.\left.\left(-\frac{i(c+2(2 b k-b m) z)^2}{2 b k-b m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(c+2(2 b k-b m) z)^2}{8 b k-4 b m}\right)\right)\right) /; n \in \mathbb{N} \wedge m \in \mathbb{N}^+$$

01.07.21.0835.01

$$\int z^n \sin^m\left(\sqrt{z}\, b+e\right)\cos(c z)\, dz = 2^{-m-2}\left(-2\binom{m}{\frac{m}{2}}\left(\Gamma(n+1,-i c z)(-i c)^{-n-1}+(i c)^{-n-1}\Gamma(n+1, i c z)\right)(1-m \bmod 2)-(-1)^n i^{-m} 4^{-n} c^{-2 n-2}\right.$$

$$\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u e^{-i(e m-2 e u)}\binom{m}{u}\left(e^{-\frac{i b^2(m-2 u)^2}{4 c}}\left((-1)^m e^{\frac{i b^2(m-2 u)^2}{2 c}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k(-i b(m-2 u))^{-h-k+2 n}\left(-i\right.\right.\right.$$

$$\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)\Big)^{h+k}\left(\frac{i\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\,(m-2\,u)\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)^2}{4\,c}\right)-\right.$$

$$\left.2\,i\,c\sqrt{\frac{i\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)^2}{c}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)^2}{4\,c}\right)\right)\Bigg)+$$

$$e^{2\,i\,e\,(m-2\,u)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b\,(m-2\,u))^{-h-k+2\,n}\left(i\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)\right)^{h+k}$$

$$\left(-\frac{i\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,c\sqrt{-\frac{i\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)^2}{c}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)^2}{4\,c}\right)-\right.$$

$$\left.b\,(m-2\,u)\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\sqrt{z}\,c+b\,(m-2\,u)\right)^2}{4\,c}\right)\right)\Bigg)+$$

$$e^{i\left(\frac{(b\,m-2\,b\,u)^2}{4\,c}+2\,e\,(m-2\,u)\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,m-2\,b\,u))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((2\,b\,u-b\,m)\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)^2}{4\,c}\right)-\right.$$

$$\left.2\,i\,c\sqrt{\frac{i\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)^2}{c}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)-2\,c\sqrt{z}\right)^2}{4\,c}\right)\right)+$$

$$(-1)^m e^{-\frac{i (b m-2 b u)^2}{4 c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b m-2 b u))^{-h-k+2 n} \left(-i \left(b (m-2 u)-2 c \sqrt{z}\right)\right)^{h+k}$$
$$\left(-\frac{i \left(b (m-2 u)-2 c \sqrt{z}\right)^2}{c}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \left((2 b u-b m) \left(b (m-2 u)-2 c \sqrt{z}\right)\right.$$
$$\Gamma\left(\frac{1}{2} (h+k+1), -\frac{i \left(b (m-2 u)-2 c \sqrt{z}\right)^2}{4 c}\right)+2 \sqrt{-\frac{i \left(b (m-2 u)-2 c \sqrt{z}\right)^2}{c}}$$
$$\left.\left.c\, i\, \Gamma\left(\frac{1}{2} (h+k+2), -\frac{i \left(b (m-2 u)-2 c \sqrt{z}\right)^2}{4 c}\right)\right)\right) /; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r + d z\right) \cos(c z)$

01.07.21.0836.01

$$\int z^n \sin^m\left(b z^2 + d z\right) \cos(c z)\, dz = 2^{-m-2} \left(2 \binom{m}{\frac{m}{2}} \left(\Gamma(n+1, -i c z) (-i c)^{-n-1} + (i c)^{-n-1} \Gamma(n+1, i c z)\right) (m \bmod 2 - 1) + \frac{1}{b} \left(i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{2k-m} \left((-1)^k e^{-\frac{i\left(-c^2 - d^2 (m-2k)^2 + b(2k-m) m \pi\right)}{b(4k-2m)}} \left(b^2 (m-2k)^2\right)^{-n} \binom{m}{k} \left(-e^{-\frac{i(c+2dk-dm)^2}{b(8k-4m)}} \left(\sum_{q=0}^{n} 2^{q-n} (i(-c+2dk-dm))^{n-q} (i(c+d(m-2k)+2b(m-2k)z))^{q+1} \left(\frac{i(c+d(m-2k)+2b(m-2k)z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(c+d(m-2k)+2b(m-2k)z)^2}{b(8k-4m)}\right)\right) (i b (2k-m))^n - e^{-\frac{i(c+d(m-2k))^2}{b(8k-4m)}} \left(\sum_{q=0}^{n} 2^{q-n} (i(c+2dk-dm))^{n-q} (-i(c+2dk-dm+4bkz-2bmz))^{q+1} \left(\frac{i(c+2dk-dm+4bkz-2bmz)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(c+2dk-dm+4bkz-2bmz)^2}{b(8k-4m)}\right)\right) (i b (2k-m))^n + e^{\frac{i\left(-3c^2 + 2d(2k-m)c - 3d^2 (m-2k)^2 + 4b(2k-m) m \pi\right)}{b(8k-4m)}} (i b (m-2k))^n \sum_{q=0}^{n} 2^{q-n} (-i(-c+2dk-dm))^{n-q} (i(-c+2dk-dm+4bkz-2bmz))^{q+1} \left(-\frac{i(c+d(m-2k)+2b(m-2k)z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(c+d(m-2k)+2b(m-2k)z)^2}{b(8k-4m)}\right) + e^{\frac{i\left(-3c^2 - 2d(2k-m)c - 3d^2 (m-2k)^2 + 4b(2k-m) m \pi\right)}{b(8k-4m)}} (i b (m-2k))^n \sum_{q=0}^{n} 2^{q-n} (i(-c-2dk+dm))^{n-q} (i(c+2dk-dm+4bkz-2bmz))^{q+1} \left(-\frac{i(c+2dk-dm+4bkz-2bmz)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(c+2dk-dm+4bkz-2bmz)^2}{b(8k-4m)}\right)\right)\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0837.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z\right) \cos(c\, z)\, dz = 2^{-m-2} \left(2 \binom{m}{\frac{m}{2}} \left(\Gamma(n+1, -i\, c\, z)\, (-i\, c)^{-n-1} + (i\, c)^{-n-1}\, \Gamma(n+1, i\, c\, z)\right) (m \bmod 2 - 1) + i^{-m}\, 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \right.$$

$$\left(\left((c + d\, m - 2\, d\, u)^2\right)^{-2\, n-1} \left(-e^{-\frac{i\, b^2 (m-2\, u)^2}{4\, (c+d\, m-2\, d\, u)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b\, (m - 2\, u))^{-h-k+2\, n} \left(i \left(b\, (m - 2\, u) + 2\, (c + d\, m - \right.\right.\right.\right.\right.$$

$$\left. 2\, d\, u)\, \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b\, (m - 2\, u) + 2\, (c + d\, m - 2\, d\, u)\, \sqrt{z}\right)^2}{c + d\, m - 2\, d\, u} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k} \left(2\, i\, (c + d\, m - 2\, d\, u) \sqrt{-\frac{i \left(b\, (m - 2\, u) + 2\, (c + d\, m - 2\, d\, u)\, \sqrt{z}\right)^2}{c + d\, m - 2\, d\, u}}\; \Gamma\left(\frac{1}{2}\, (h + k + 2), \right.\right.$$

$$\left. -\frac{i \left(b\, (m - 2\, u) + 2\, (c + d\, m - 2\, d\, u)\, \sqrt{z}\right)^2}{4\, (c + d\, m - 2\, d\, u)} \right) - b\, (m - 2\, u) \left(b\, (m - 2\, u) + 2\, (c + d\, m - \right.$$

$$\left.\left.\left.\left. 2\, d\, u)\, \sqrt{z}\right)\, \Gamma\left(\frac{1}{2}\, (h + k + 1), -\frac{i \left(b\, (m - 2\, u) + 2\, (c + d\, m - 2\, d\, u)\, \sqrt{z}\right)^2}{4\, (c + d\, m - 2\, d\, u)} \right)\right)\right)\right)$$

$$(-i\, (c + d\, m - 2\, d\, u))^{2\, n} - (-1)^m\, e^{\frac{i\, b^2 (m-2\, u)^2}{4\, (c+d\, m-2\, d\, u)}}\, (i\, (c + d\, m - 2\, d\, u))^{2\, n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k$$

$$(-i\, b\, (m - 2\, u))^{-h-k+2\, n} \left(-i \left(b\, (m - 2\, u) + 2\, (c + d\, m - 2\, d\, u)\, \sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i \left(b\, (m - 2\, u) + 2\, (c + d\, m - 2\, d\, u)\, \sqrt{z}\right)^2}{c + d\, m - 2\, d\, u} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-b\, (m - 2\, u) \left(b\, (m - 2\, u) + \right.\right.$$

$$\left. 2\, (c + d\, m - 2\, d\, u)\, \sqrt{z}\right)\, \Gamma\left(\frac{1}{2}\, (h + k + 1), \frac{i \left(b\, (m - 2\, u) + 2\, (c + d\, m - 2\, d\, u)\, \sqrt{z}\right)^2}{4\, (c + d\, m - 2\, d\, u)} \right) -$$

$$2\, i\, (c + d\, m - 2\, d\, u) \sqrt{\frac{i \left(b\, (m - 2\, u) + 2\, (c + d\, m - 2\, d\, u)\, \sqrt{z}\right)^2}{c + d\, m - 2\, d\, u}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b(m-2u)+2(c+dm-2du)\sqrt{z}\right)^2}{4(c+dm-2du)}\right)\Bigg)\Bigg)-$$

$$\left(e^{-\frac{i b^2 (m-2u)^2}{4(-c+dm-2du)}} (i(-c+dm-2du))^{-2n} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (i\, b(m-2u))^{-h-k+2n}\right.$$

$$\left(i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)^2}{-c+dm-2du}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(2\, i(-c+dm-2du)\sqrt{-\frac{i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)^2}{-c+dm-2du}}\ \Gamma\left(\frac{1}{2}(h+k+2),\right.\right.$$

$$\left.-\frac{i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)^2}{4d(m-2u)-4c}\right)-b(m-2u)\left(b(m-2u)+2(-c+dm-\right.$$

$$\left.\left.\left.2du)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)^2}{4d(m-2u)-4c}\right)\right)\right)\Bigg/$$

$$(-c+dm-2du)^2 - \frac{1}{(-c+dm-2du)^2}\left((-1)^m e^{\frac{i b^2 (m-2u)^2}{-4c+4dm-8du}} (-i(-c+dm-2du))^{-2n}\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-i\, b(m-2u))^{-h-k+2n}\left(-i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)^2}{-c+dm-2du}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(-b(m-2u)\left(b(m-2u)+\right.\right.$$

$$2\,(-c+d\,m-2\,d\,u)\,\sqrt{z}\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+k+1),\;\frac{i\,\big(b\,(m-2\,u)+2\,(-c+d\,m-2\,d\,u)\,\sqrt{z}\big)^2}{-4\,c+4\,d\,m-8\,d\,u}\right)-$$

$$2\,i\,(-c+d\,m-2\,d\,u)\,\sqrt{\frac{i\,\big(b\,(m-2\,u)+2\,(-c+d\,m-2\,d\,u)\,\sqrt{z}\big)^2}{-c+d\,m-2\,d\,u}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\;\frac{i\,\big(b\,(m-2\,u)+2\,(-c+d\,m-2\,d\,u)\,\sqrt{z}\big)^2}{-4\,c+4\,d\,m-8\,d\,u}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m\!\left(b\,z^r+d\,z+e\right)\cos(c\,z)$

01.07.21.0838.01

$$\int z^n \sin^m\left(b z^2 + d z + e\right) \cos(c z)\, dz = 2^{-m-2}\left(2\binom{m}{\frac{m}{2}}\left(\Gamma(n+1, -i c z)(-i c)^{-n-1} + (i c)^{-n-1}\Gamma(n+1, i c z)\right)(m \bmod 2 - 1) + \frac{1}{b}\left(i \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{2k-m}\left((-1)^k e^{-\frac{i\left(-c^2-d^2(m-2k)^2+b(2k-m)(4ek-2em+m\pi)\right)}{b(4k-2m)}}\left(b^2(m-2k)^2\right)^{-n}\binom{m}{k}\left(-e^{-\frac{i(c+2dk-dm)^2}{b(8k-4m)}}\left(\sum_{q=0}^{n} 2^{q-n}(i(-c+2dk-dm))^{n-q} (i(c+d(m-2k)+2b(m-2k)z))^{q+1}\left(\frac{i(c+d(m-2k)+2b(m-2k)z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(c+d(m-2k)+2b(m-2k)z)^2}{b(8k-4m)}\right)\right)(i b(2k-m))^n - e^{-\frac{i(c+d(m-2k))^2}{b(8k-4m)}}\left(\sum_{q=0}^{n} 2^{q-n}(i(c+2dk-dm))^{n-q}(-i(c+2dk-dm+4bkz-2bmz))^{q+1}\left(\frac{i(c+2dk-dm+4bkz-2bmz)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(c+2dk-dm+4bkz-2bmz)^2}{b(8k-4m)}\right)\right)(i b(2k-m))^n + e^{\frac{i\left(-3c^2+2d(2k-m)c-3d^2(m-2k)^2+4b(2k-m)(4ek-2em+m\pi)\right)}{b(8k-4m)}}(i b(m-2k))^n \sum_{q=0}^{n} 2^{q-n}(-i(-c+2dk-dm))^{n-q}(i(-c+2dk-dm+4bkz-2bmz))^{q+1}\left(-\frac{i(c+d(m-2k)+2b(m-2k)z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(c+d(m-2k)+2b(m-2k)z)^2}{b(8k-4m)}\right) + e^{\frac{i\left(-3c^2-2d(2k-m)c-3d^2(m-2k)^2+4b(2k-m)(4ek-2em+m\pi)\right)}{b(8k-4m)}}(i b(m-2k))^n \sum_{q=0}^{n} 2^{q-n}(i(-c-2dk+dm))^{n-q}(i(c+2dk-dm+4bkz-2bmz))^{q+1}\left(-\frac{i(c+2dk-dm+4bkz-2bmz)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(c+2dk-dm+4bkz-2bmz)^2}{b(8k-4m)}\right)\right)\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0839.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \cos(c\, z)\, dz = 2^{-m-2} \left(2 \binom{m}{\frac{m}{2}} \left(\Gamma(n+1, -i\, c\, z)\, (-i\, c)^{-n-1} + (i\, c)^{-n-1}\, \Gamma(n+1, i\, c\, z)\right) (m \bmod 2 - 1) + i^{-m}\, 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u\, e^{-i\, e\, (m-2\, u)} \binom{m}{u} \right.$$

$$\left(\left((c + d\, m - 2\, d\, u)^2\right)^{-2\, n-1} \left(-e^{\frac{1}{4}\, i\, (m-2\, u) \left(8\, e - \frac{b^2\, (m-2\, u)}{c+d\, m-2\, d\, u}\right)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b\, (m-2\, u))^{-h-k+2\, n} \left(i \left(b\, (m-2\, u) + \right.\right.\right.\right.\right.$$

$$\left.\left. 2\, (c + d\, m - 2\, d\, u) \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b\, (m-2\, u) + 2\, (c + d\, m - 2\, d\, u) \sqrt{z}\right)^2}{c + d\, m - 2\, d\, u}\right)^{\frac{1}{2}\, (-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(2\, i\, (c + d\, m - 2\, d\, u) \sqrt{-\frac{i \left(b\, (m-2\, u) + 2\, (c + d\, m - 2\, d\, u) \sqrt{z}\right)^2}{c + d\, m - 2\, d\, u}}\; \Gamma\left(\frac{1}{2}\, (h + k + 2), \right.\right.$$

$$\left. -\frac{i \left(b\, (m-2\, u) + 2\, (c + d\, m - 2\, d\, u) \sqrt{z}\right)^2}{4\, (c + d\, m - 2\, d\, u)}\right) - b\, (m-2\, u) \left(b\, (m-2\, u) + 2\, (c + d\, m - \right.$$

$$\left.\left.\left.\left. 2\, d\, u) \sqrt{z}\right) \Gamma\left(\frac{1}{2}\, (h + k + 1), -\frac{i \left(b\, (m-2\, u) + 2\, (c + d\, m - 2\, d\, u) \sqrt{z}\right)^2}{4\, (c + d\, m - 2\, d\, u)}\right)\right)\right)\right)$$

$$(-i\, (c + d\, m - 2\, d\, u))^{2\, n} - (-1)^m\, e^{\frac{i\, b^2\, (m-2\, u)^2}{4\, (c+d\, m-2\, d\, u)}}\, (i\, (c + d\, m - 2\, d\, u))^{2\, n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k$$

$$(-i\, b\, (m-2\, u))^{-h-k+2\, n} \left(-i \left(b\, (m-2\, u) + 2\, (c + d\, m - 2\, d\, u) \sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i \left(b\, (m-2\, u) + 2\, (c + d\, m - 2\, d\, u) \sqrt{z}\right)^2}{c + d\, m - 2\, d\, u}\right)^{\frac{1}{2}\, (-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-b\, (m-2\, u) \left(b\, (m-2\, u) + \right.\right.$$

$$\left. 2\, (c + d\, m - 2\, d\, u) \sqrt{z}\right) \Gamma\left(\frac{1}{2}\, (h + k + 1), \frac{i \left(b\, (m-2\, u) + 2\, (c + d\, m - 2\, d\, u) \sqrt{z}\right)^2}{4\, (c + d\, m - 2\, d\, u)}\right) -$$

$$2\, i\, (c + d\, m - 2\, d\, u) \sqrt{\frac{i \left(b\, (m-2\, u) + 2\, (c + d\, m - 2\, d\, u) \sqrt{z}\right)^2}{c + d\, m - 2\, d\, u}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b(m-2u)+2(c+dm-2du)\sqrt{z}\right)^2}{4(c+dm-2du)}\right)\Bigg)\Bigg)-$$

$$\Bigg(e^{\frac{1}{4}(m-2u)\left(8ie-\frac{ib^2(m-2u)}{-c+dm-2du}\right)}(i(-c+dm-2du))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(ib(m-2u))^{-h-k+2n}$$

$$\left(i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)^2}{-c+dm-2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(2i(-c+dm-2du)\sqrt{-\frac{i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)^2}{-c+dm-2du}}\ \Gamma\Bigg(\frac{1}{2}(h+k+2),$$

$$-\frac{i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)^2}{4d(m-2u)-4c}\Bigg)-b(m-2u)\Big(b(m-2u)+2(-c+dm-$$

$$2du)\sqrt{z}\Big)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)^2}{4d(m-2u)-4c}\right)\Bigg)\Bigg)\Bigg/$$

$$(-c+dm-2du)^2-\frac{1}{(-c+dm-2du)^2}\Bigg((-1)^m e^{\frac{ib^2(m-2u)^2}{-4c+4dm-8du}}(-i(-c+dm-2du))^{-2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-ib(m-2u))^{-h-k+2n}\left(-i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b(m-2u)+2(-c+dm-2du)\sqrt{z}\right)^2}{-c+dm-2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(-b(m-2u)\Big(b(m-2u)+$$

$$2\,(-c+d\,m-2\,d\,u)\,\sqrt{z}\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(b\,(m-2\,u)+2\,(-c+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{-4\,c+4\,d\,m-8\,d\,u}\right)-$$

$$2\,i\,(-c+d\,m-2\,d\,u)\,\sqrt{\frac{i\left(b\,(m-2\,u)+2\,(-c+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{-c+d\,m-2\,d\,u}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(b\,(m-2\,u)+2\,(-c+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{-4\,c+4\,d\,m-8\,d\,u}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\, z^r\right) \cos(f\, z+g)$

01.07.21.0840.01

$$\int z^n \sin^m(b z^2) \cos(f z+g)\, dz = 2^{-m-2}\left(-2\binom{m}{\frac{m}{2}}\left(e^{i g}\,\Gamma(n+1,-i f z)\,(-i f)^{-n-1}+e^{-i g}\,(i f)^{-n-1}\,\Gamma(n+1,i f z)\right)(1-m \bmod 2)-i^{-m} e^{i g} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i f^2}{8bk-4bm}}\left(\sum_{q=0}^{n} 2^{q-n}\,(-i f)^{n-q}\,(-i(-f+4bkz-2bmz))^{q+1}\left(\frac{i(f+2(bm-2bk)z)^2}{2bk-bm}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\frac{i(f+2(bm-2bk)z)^2}{8bk-4bm}\right)\right)(-i(2bk-bm))^{-n-1}+e^{\frac{i f^2}{8bk-4bm}-2 i g}\left(\sum_{q=0}^{n} 2^{q-n}\,(i f)^{n-q}\,(-i(f+2(2bk-bm)z))^{q+1}\left(\frac{i(f+2(2bk-bm)z)^2}{2bk-bm}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\frac{i(f+2(2bk-bm)z)^2}{8bk-4bm}\right)\right)(-i(2bk-bm))^{-n-1}+e^{i\left(-\frac{f^2}{8bk-4bm}-2g+m\pi\right)}(i(2bk-bm))^{-n-1}\sum_{q=0}^{n} 2^{q-n}\,(i f)^{n-q}\,(i(-f+4bkz-2bmz))^{q+1}\left(-\frac{i(f+2(bm-2bk)z)^2}{2bk-bm}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},-\frac{i(f+2(bm-2bk)z)^2}{8bk-4bm}\right)+e^{i\left(-\frac{f^2}{8bk-4bm}+m\pi\right)}(i(2bk-bm))^{-n-1}\sum_{q=0}^{n} 2^{q-n}\,(-i f)^{n-q}\,(i(f+2(2bk-bm)z))^{q+1}\left(-\frac{i(f+2(2bk-bm)z)^2}{2bk-bm}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},-\frac{i(f+2(2bk-bm)z)^2}{8bk-4bm}\right)\right)\right) /;\, n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.07.21.0841.01

$$\int z^n \sin^m\left(\sqrt{z}\, b\right) \cos(f z+g)\, dz = 2^{-m-2}\left(-2\binom{m}{\frac{m}{2}}\left(e^{i g}\,\Gamma(n+1,-i f z)\,(-i f)^{-n-1}+e^{-i g}\,(i f)^{-n-1}\,\Gamma(n+1,i f z)\right)(1-m \bmod 2)-\right.$$

$$(-1)^n\, i^{-m}\, 4^{-n}\, f^{-2n-2}\, e^{i g} \sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}$$

$$\left(e^{-\frac{i b^2 (m-2u)^2}{4f}} \left((-1)^m e^{\frac{1}{2} i \left(\frac{b^2 (m-2u)^2}{f} - 4g\right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b (m-2u))^{-h-k+2n} \left(-i \left(2\sqrt{z}\, f + b (m-2u)\right)\right)^{h+k} \right.\right.$$

$$\left(\frac{i \left(2\sqrt{z}\, f + b (m-2u)\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-b (m-2u) \left(2\sqrt{z}\, f + b (m-2u)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(2\sqrt{z}\, f + b (m-2u)\right)^2}{4f}\right) - 2 i f \sqrt{\frac{i \left(2\sqrt{z}\, f + b (m-2u)\right)^2}{f}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(2\sqrt{z}\, f + b (m-2u)\right)^2}{4f}\right)\right)\right) + \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b (m-2u))^{-h-k+2n}$$

$$\left(i \left(2\sqrt{z}\, f + b (m-2u)\right)\right)^{h+k} \left(-\frac{i \left(2\sqrt{z}\, f + b (m-2u)\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left(2 i f \sqrt{-\frac{i \left(2\sqrt{z}\, f + b (m-2u)\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(2\sqrt{z}\, f + b (m-2u)\right)^2}{4f}\right) - b (m-2u)\right.$$

$$\left.\left.\left(2\sqrt{z}\, f + b (m-2u)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(2\sqrt{z}\, f + b (m-2u)\right)^2}{4f}\right)\right)\right) + e^{i \left(\frac{(b m - 2 b u)^2}{4f} - 2g\right)}$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b m - 2 b u))^{-h-k+2n} \left(i \left(b (m-2u) - 2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b (m-2u) - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((2 b u - b m) \left(b (m-2u) - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b (m-2u) - 2 f \sqrt{z}\right)^2}{4f}\right) - \right.$$

$$\left. 2 i f \sqrt{\frac{i \left(b (m-2u) - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b (m-2u) - 2 f \sqrt{z}\right)^2}{4f}\right)\right) +$$

$$(-1)^m e^{-\frac{i (b m-2 b u)^2}{4 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b m - 2 b u))^{-h-k+2n} \left(-i \left(b (m - 2 u) - 2 f \sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i \left(b (m - 2 u) - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((2 b u - b m) \left(b (m - 2 u) - 2 f \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h + k + 1), -\frac{i \left(b (m - 2 u) - 2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{i \left(b (m - 2 u) - 2 f \sqrt{z}\right)^2}{f}}$$

$$\left.\left.\left.f\, i\, \Gamma\left(\frac{1}{2}(h + k + 2), -\frac{i \left(b (m - 2 u) - 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right)\right) /;\ n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r + e\right) \cos(f z + g)$

01.07.21.0842.01

$$\int z^n \sin^m\left(b z^2+e\right)\cos(f z+g)\,dz = 2^{-m-2}\left(-2\binom{m}{\frac{m}{2}}\left(e^{i g}\,\Gamma(n+1,-i f z)\,(-i f)^{-n-1}+e^{-i g}\,(i f)^{-n-1}\,\Gamma(n+1,i f z)\right)(1-m \bmod 2)-\right.$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-i(-g+2 e k-e m)}\binom{m}{k}\left(e^{\frac{i f^2}{8 b k-4 b m}}\left(\sum_{q=0}^{n}2^{q-n}\,(-i f)^{n-q}\,(-i(-f+4 b k z-2 b m z))^{q+1}\right.\right.$$

$$\left.\left(\frac{i(f+2(b m-2 b k) z)^2}{2 b k-b m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\left(\frac{q+1}{2},\frac{i(f+2(b m-2 b k) z)^2}{8 b k-4 b m}\right)\right)(-i(2 b k-b m))^{-n-1}+$$

$$e^{\frac{i f^2}{8 b k-4 b m}-2 i g}\left(\sum_{q=0}^{n}2^{q-n}\,(i f)^{n-q}\,(-i(f+2(2 b k-b m) z))^{q+1}\left(\frac{i(f+2(2 b k-b m) z)^2}{2 b k-b m}\right)^{\frac{1}{2}(-q-1)}\right.$$

$$\left.\binom{n}{q}\,\Gamma\left(\frac{q+1}{2},\frac{i(f+2(2 b k-b m) z)^2}{8 b k-4 b m}\right)\right)(-i(2 b k-b m))^{-n-1}+$$

$$e^{i\left(-\frac{f^2}{8 b k-4 b m}-2 g+e(4 k-2 m)+m\pi\right)}\,(i(2 b k-b m))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i f)^{n-q}\,(i(-f+4 b k z-2 b m z))^{q+1}$$

$$\left(-\frac{i(f+2(b m-2 b k) z)^2}{2 b k-b m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\left(\frac{q+1}{2},-\frac{i(f+2(b m-2 b k) z)^2}{8 b k-4 b m}\right)+$$

$$e^{i\left(-\frac{f^2}{8 b k-4 b m}+e(4 k-2 m)+m\pi\right)}\,(i(2 b k-b m))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i f)^{n-q}\,(i(f+2(2 b k-b m) z))^{q+1}$$

$$\left.\left.\left(-\frac{i(f+2(2 b k-b m) z)^2}{2 b k-b m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\left(\frac{q+1}{2},-\frac{i(f+2(2 b k-b m) z)^2}{8 b k-4 b m}\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.07.21.0843.01

$$\int z^n \sin^m\left(\sqrt{z}\,b+e\right)\cos(f z+g)\,dz = 2^{-m-2}\left(-2\binom{m}{\frac{m}{2}}\left(e^{i g}\,\Gamma(n+1,-i f z)\,(-i f)^{-n-1}+e^{-i g}\,(i f)^{-n-1}\,\Gamma(n+1,i f z)\right)(1-m \bmod 2)-\right.$$

$$(-1)^n\,i^{-m}\,4^{-n}\,f^{-2n-2}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\,e^{-i(-g+e m-2 e u)}\binom{m}{u}$$

$$\left(e^{-\frac{i b^2 (m-2u)^2}{4f}} \left((-1)^m e^{\frac{1}{2} i \left(\frac{b^2 (m-2u)^2}{f} - 4g\right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b (m-2u))^{-h-k+2n} \left(-i \left(2\sqrt{z}\, f + b(m-2u)\right)\right)^{h+k}\right.\right.$$

$$\left(\frac{i \left(2\sqrt{z}\, f + b(m-2u)\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-b(m-2u)\left(2\sqrt{z}\, f + b(m-2u)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(2\sqrt{z}\, f + b(m-2u)\right)^2}{4f}\right) - 2 i f \sqrt{\frac{i \left(2\sqrt{z}\, f + b(m-2u)\right)^2}{f}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(2\sqrt{z}\, f + b(m-2u)\right)^2}{4f}\right)\right)\right) + e^{2 i e (m-2u)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k$$

$$(i b (m-2u))^{-h-k+2n} \left(i \left(2\sqrt{z}\, f + b(m-2u)\right)\right)^{h+k} \left(-\frac{i \left(2\sqrt{z}\, f + b(m-2u)\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(2 i f \sqrt{-\frac{i \left(2\sqrt{z}\, f + b(m-2u)\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(2\sqrt{z}\, f + b(m-2u)\right)^2}{4f}\right) - \right.$$

$$\left.\left.b(m-2u)\left(2\sqrt{z}\, f + b(m-2u)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(2\sqrt{z}\, f + b(m-2u)\right)^2}{4f}\right)\right)\right) +$$

$$e^{i\left(\frac{(b m - 2 b u)^2}{4f} - 2g + 2e(m-2u)\right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b m - 2 b u))^{-h-k+2n} \left(i \left(b(m-2u) - 2 f \sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i \left(b(m-2u) - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((2 b u - b m)\left(b(m-2u) - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b(m-2u) - 2 f \sqrt{z}\right)^2}{4f}\right) - \right.$$

$$2\,i\,f\sqrt{\frac{i\left(b\,(m-2\,u)-2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)+$$

$$(-1)^m\,e^{-\frac{i\,(b\,m-2\,b\,u)^2}{4\,f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m-2\,b\,u))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)-2\,f\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)-2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((2\,b\,u-b\,m)\left(b\,(m-2\,u)-2\,f\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b\,(m-2\,u)-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+2\sqrt{-\frac{i\left(b\,(m-2\,u)-2\,f\,\sqrt{z}\right)^2}{f}}$$

$$f\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b\,(m-2\,u)-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\,\sin^m\!\left(b\,z^r+d\,z\right)\cos(f\,z+g)$

01.07.21.0844.01

$$\int z^n \sin^m\left(b z^2 + d z\right) \cos(g + f z)\, dz =$$

$$2^{-m-2} \left(-2 \binom{m}{\frac{m}{2}} \left(e^{i g}\, \Gamma(n+1, -i f z)\, (-i f)^{-n-1} + e^{-i g}\, (i f)^{-n-1}\, \Gamma(n+1, i f z)\right) (1 - m \bmod 2) - \right.$$

$$i^{-m} e^{i g} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i (f + d (m-2k))^2}{8 b k - 4 b m}} \left(\sum_{q=0}^{n} 2^{q-n} (i(-f + 2 d k - d m))^{n-q} \right.\right.$$

$$(-i(-f + 2 d k - d m + 4 b k z - 2 b m z))^{q+1} \left(\frac{i (f + d (m - 2k) + 2 (b m - 2 b k) z)^2}{2 b k - b m} \right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f + d (m - 2k) + 2 (b m - 2 b k) z)^2}{8 b k - 4 b m} \right) \right) (-i (2 b k - b m))^{-n-1} + \right.$$

$$e^{\frac{i (f + 2 d k - d m)^2}{8 b k - 4 b m} - 2 i g} \left(\sum_{q=0}^{n} 2^{q-n} (i(f + 2 d k - d m))^{n-q} (-i(f + d(2k - m) + 2 (2 b k - b m) z))^{q+1} \right.$$

$$\left. \left(\frac{i (f + d (2k - m) + 2 (2 b k - b m) z)^2}{2 b k - b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f + d (2k - m) + 2 (2 b k - b m) z)^2}{8 b k - 4 b m} \right) \right)$$

$$(-i (2 b k - b m))^{-n-1} + e^{i\left(-\frac{(f + d (m-2k))^2}{8 b k - 4 b m} - 2 g + m \pi\right)} (i (2 b k - b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i(-f + 2 d k - d m))^{n-q}$$

$$(i(-f + 2 d k - d m + 4 b k z - 2 b m z))^{q+1} \left(-\frac{i (f + d (m - 2k) + 2 (b m - 2 b k) z)^2}{2 b k - b m} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f + d (m - 2k) + 2 (b m - 2 b k) z)^2}{8 b k - 4 b m} \right) +$$

$$e^{i\left(m \pi - \frac{(f + 2 d k - d m)^2}{8 b k - 4 b m}\right)} (i (2 b k - b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i(f + 2 d k - d m))^{n-q}$$

$$(i(f + d(2k - m) + 2 (2 b k - b m) z))^{q+1} \left(-\frac{i (f + d (2k - m) + 2 (2 b k - b m) z)^2}{2 b k - b m} \right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f + d (2k - m) + 2 (2 b k - b m) z)^2}{8 b k - 4 b m} \right) \right)\right) \right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0845.01

$$\int z^n \sin^m\left(\sqrt{z}\ b + d\,z\right)\cos(f\,z+g)\,dz = 2^{-m-2}\left(-2\binom{m}{\frac{m}{2}}\left(e^{i g}\,\Gamma(n+1,\,-i\,f\,z)\,(-i\,f)^{-n-1} + e^{-i g}\,(i\,f)^{-n-1}\,\Gamma(n+1,\,i\,f\,z)\right)(1-m \bmod 2) - \right.$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\,e^{i g}\binom{m}{u}\left(\left((-1)^m\,e^{\frac{i\,(b\,m-2\,b\,u)^2}{-4\,f+4\,d\,m-8\,d\,u}}\,(-i\,(-f+d\,m-2\,d\,u))^{-2\,n}\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m-2\,b\,u))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{-f+d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((2\,b\,u-b\,m)\left(b\,(m-2\,u)+\right.\right.$$

$$\left.2\,(-f+d\,m-2\,d\,u)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{-4\,f+4\,d\,m-8\,d\,u}\right)-$$

$$2\,i\,(-f+d\,m-2\,d\,u)\sqrt{\frac{i\left(b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{-f+d\,m-2\,d\,u}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{-4\,f+4\,d\,m-8\,d\,u}\right)\right)\right)\Big/(-f+d\,m-2\,d\,u)^2+$$

$$\left(e^{i\left(-\frac{(b\,m-2\,b\,u)^2}{-4\,f+4\,d\,m-8\,d\,u}-2\,g\right)}\,(i\,(-f+d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,m-2\,b\,u))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+\right.\right.\right.$$

$$\left.\left.2\,(-f+d\,m-2\,d\,u)\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{-f+d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((2\,b\,u-b\,m)\left(b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$-\frac{i\left(b(m-2u)+2(-f+dm-2du)\sqrt{z}\right)^2}{-4f+4dm-8du}\Bigg)+$$

$$2\,i\sqrt{-\frac{i\left(b(m-2u)+2(-f+dm-2du)\sqrt{z}\right)^2}{-f+dm-2du}}\;(-f+dm-2du)$$

$$\Gamma\!\left(\frac{1}{2}(h+k+2),-\frac{i\left(b(m-2u)+2(-f+dm-2du)\sqrt{z}\right)^2}{-4f+4dm-8du}\right)\Bigg)\Bigg)\Bigg/(-f+dm-2du)^2+$$

$$e^{-\frac{i b^2(m-2u)^2}{4(f+d(m-2u))}}\left((f+d(m-2u))^2\right)^{-2n-1}\left(\left(\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b(m-2u))^{-h-k+2n}\left(i\left(b(m-2u)+\right.\right.\right.\right.\right.$$

$$\left.\left.2(f+d(m-2u))\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)^2}{f+d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,(f+d(m-2u))\sqrt{-\frac{i\left(b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)^2}{f+d(m-2u)}}$$

$$\Gamma\!\left(\frac{1}{2}(h+k+2),-\frac{i\left(b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)^2}{4(f+d(m-2u))}\right)-$$

$$b(m-2u)\left(b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+k+1),-\frac{i\left(b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)^2}{4(f+d(m-2u))}\right)\Bigg)\Bigg)$$

$$(-i(f+d(m-2u)))^{2n}+(-1)^m\,e^{\frac{1}{2}i\left(\frac{b^2(m-2u)^2}{f+d(m-2u)}-4g\right)}\,(i(f+d(m-2u)))^{2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b(m-2u))^{-h-k+2n}\left(-i\left(b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)^2}{f+d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(-b(m-2u)\left(b(m-2u)+\right.$$

$$2\,(f+d\,(m-2\,u))\,\sqrt{z}\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\right)^2}{4\,(f+d\,(m-2\,u))}\right)-$$

$$2\,i\,(f+d\,(m-2\,u))\,\sqrt{\frac{i\left(b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\right)^2}{f+d\,(m-2\,u)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\right)^2}{4\,(f+d\,(m-2\,u))}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r+d\,z+e\right)\cos(f\,z+g)$

01.07.21.0846.01

$$\int z^n \sin^m\left(b z^2 + d z + e\right) \cos(f z + g)\, dz = 2^{-m-2}\left(-2\binom{m}{\frac{m}{2}}\left(e^{i g}\,\Gamma(n+1, -i f z)\,(-i f)^{-n-1} + e^{-i g}\,(i f)^{-n-1}\,\Gamma(n+1, i f z)\right)(1 - m \bmod 2) - i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-i(-g+2 e k - e m)}\binom{m}{k}\left(e^{\frac{i(f+d(m-2k))^2}{8bk-4bm}}\left(\sum_{q=0}^{n} 2^{q-n}\,(i(-f+2dk-dm))^{n-q}\,(-i(-f+2dk-dm+4bkz-2bmz))^{q+1}\left(\frac{i(f+d(m-2k)+2(bm-2bk)z)^2}{2bk-bm}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(f+d(m-2k)+2(bm-2bk)z)^2}{8bk-4bm}\right)\right)(-i(2bk-bm))^{-n-1} + e^{\frac{i(f+2dk-dm)^2}{8bk-4bm}-2ig}\left(\sum_{q=0}^{n} 2^{q-n}\,(i(f+2dk-dm))^{n-q}\,(-i(f+d(2k-m)+2(2bk-bm)z))^{q+1}\left(\frac{i(f+d(2k-m)+2(2bk-bm)z)^2}{2bk-bm}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(f+d(2k-m)+2(2bk-bm)z)^2}{8bk-4bm}\right)\right)(-i(2bk-bm))^{-n-1} + e^{i\left(-\frac{(f+d(m-2k))^2}{8bk-4bm}-2g+e(4k-2m)+m\pi\right)}\,(i(2bk-bm))^{-n-1}\sum_{q=0}^{n} 2^{q-n}\,(-i(-f+2dk-dm))^{n-q}\,(i(-f+2dk-dm+4bkz-2bmz))^{q+1}\left(-\frac{i(f+d(m-2k)+2(bm-2bk)z)^2}{2bk-bm}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(f+d(m-2k)+2(bm-2bk)z)^2}{8bk-4bm}\right) + e^{i\left(-\frac{(f+2dk-dm)^2}{8bk-4bm}+e(4k-2m)+m\pi\right)}\,(i(2bk-bm))^{-n-1}\sum_{q=0}^{n} 2^{q-n}\,(-i(f+2dk-dm))^{n-q}\,(i(f+d(2k-m)+2(2bk-bm)z))^{q+1}\left(-\frac{i(f+d(2k-m)+2(2bk-bm)z)^2}{2bk-bm}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(f+d(2k-m)+2(2bk-bm)z)^2}{8bk-4bm}\right)\right)\right) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0847.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \cos(f\, z + g)\, dz ==$$

$$2^{-m-2}\left(-2\binom{m}{\frac{m}{2}}\left(e^{i g}\, \Gamma(n+1, -i\, f\, z)\, (-i\, f)^{-n-1} + e^{-i g}\, (i\, f)^{-n-1}\, \Gamma(n+1, i\, f\, z)\right)(1 - m \bmod 2) - \right.$$

$$i^{-m}\, 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u\, e^{-i\,(-g+e\,m-2\,e\,u)} \binom{m}{u} \left(\left((-1)^m\, e^{\frac{i\,(b\,m-2\,b\,u)^2}{-4\,f+4\,d\,m-8\,d\,u}}\, (-i\,(-f + d\,m - 2\,d\,u))^{-2\,n}\right.\right.$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,(b\,m - 2\,b\,u))^{-h-k+2\,n} \left(-i\left(b\,(m-2\,u) + 2\,(-f + d\,m - 2\,d\,u)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u) + 2\,(-f + d\,m - 2\,d\,u)\,\sqrt{z}\right)^2}{-f + d\,m - 2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left((2\,b\,u - b\,m)\left(b\,(m-2\,u) + \right.\right.$$

$$\left.2\,(-f + d\,m - 2\,d\,u)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\, \frac{i\left(b\,(m-2\,u) + 2\,(-f + d\,m - 2\,d\,u)\,\sqrt{z}\right)^2}{-4\,f + 4\,d\,m - 8\,d\,u}\right) -$$

$$2\,i\,(-f + d\,m - 2\,d\,u)\,\sqrt{\frac{i\left(b\,(m-2\,u) + 2\,(-f + d\,m - 2\,d\,u)\,\sqrt{z}\right)^2}{-f + d\,m - 2\,d\,u}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\, \frac{i\left(b\,(m-2\,u) + 2\,(-f + d\,m - 2\,d\,u)\,\sqrt{z}\right)^2}{-4\,f + 4\,d\,m - 8\,d\,u}\right)\right)\right) \Big/$$

$$(-f + d\,m - 2\,d\,u)^2 + \left(e^{i\left(-\frac{(b\,m-2\,b\,u)^2}{-4\,f+4\,d\,m-8\,d\,u} - 2\,g + 2\,e\,(m-2\,u)\right)}\, (i\,(-f + d\,m - 2\,d\,u))^{-2\,n}\right.$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,(b\,m - 2\,b\,u))^{-h-k+2\,n} \left(i\left(b\,(m-2\,u) + 2\,(-f + d\,m - 2\,d\,u)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u) + 2\,(-f + d\,m - 2\,d\,u)\,\sqrt{z}\right)^2}{-f + d\,m - 2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k}\Bigg((2\,b\,u-b\,m)\left(b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{-4\,f+4\,d\,m-8\,d\,u}\right)+$$

$$2\,i\,\sqrt{-\frac{i\left(b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{-f+d\,m-2\,d\,u}}\;(-f+d\,m-2\,d\,u)$$

$$\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{-4\,f+4\,d\,m-8\,d\,u}\right)\Bigg)\Bigg)\Bigg/(-f+d\,m-2\,d\,u)^2+$$

$$e^{-\frac{i\,b^2\,(m-2\,u)^2}{4\,(f+d\,(m-2\,u))}}\left((f+d\,(m-2\,u))^2\right)^{-2\,n-1}\Bigg(e^{2\,i\,e\,(m-2\,u)}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b\,(m-2\,u))^{-h-k+2\,n}\Big(i\Big(b\,(m-2\,u)+$$

$$2\,(f+d\,(m-2\,u))\sqrt{z}\Big)\Big)^{h+k}\left(-\frac{i\left(b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\sqrt{z}\right)^2}{f+d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,(f+d\,(m-2\,u))\sqrt{-\frac{i\left(b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\sqrt{z}\right)^2}{f+d\,(m-2\,u)}}$$

$$\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\sqrt{z}\right)^2}{4\,(f+d\,(m-2\,u))}\right)-$$

$$b\,(m-2\,u)\left(b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\sqrt{z}\right)^2}{4\,(f+d\,(m-2\,u))}\right)\Bigg)\Bigg)\Bigg)$$

$$(-i\,(f+d\,(m-2\,u)))^{2\,n}+(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{b^2\,(m-2\,u)^2}{f+d\,(m-2\,u)}-4\,g\right)}\,(i\,(f+d\,(m-2\,u)))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)^2}{f+d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg(-b(m-2u)\left(b(m-2u)+\right.$$

$$\left.2(f+d(m-2u))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)^2}{4(f+d(m-2u))}\right)-$$

$$2i(f+d(m-2u))\sqrt{\frac{i\left(b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)^2}{f+d(m-2u)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)^2}{4(f+d(m-2u))}\right)\Bigg)\Bigg)\Bigg)\Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \sin^m(d z + e) \cos(c z^r)$

01.07.21.0848.01

$$\int z^n \sin^m(d z) \cos\left(c z^2\right) dz = 2^{-m-2}\left(z^{n+1}\binom{m}{\frac{m}{2}}\left(\Gamma\left(\frac{n+1}{2}, -i c z^2\right)\left(-i c z^2\right)^{\frac{1}{2}(-n-1)} + \left(i c z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, i c z^2\right)\right)(m \bmod 2 - 1) + i^{1-m} c^{-2n-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{\frac{i d^2 (m-2k)^2}{4c}}\binom{m}{k}\left(e^{-\frac{i d^2 (m-2k)^2}{2c}}\left(\sum_{q=0}^{n}\left(i d\left(k-\frac{m}{2}\right)\right)^{n-q}(i(d(m-2k)+2cz))^{q+1}\left(-\frac{i(d(m-2k)+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(-2dk+dm+2cz)^2}{4c}\right)\right)(-i c)^n + (-1)^m e^{-\frac{i d^2 (m-2k)^2}{2c}}\left(\sum_{q=0}^{n}2^{q-n}(i d(m-2k))^{n-q}(-i(-2dk+dm-2cz))^{q+1}\left(-\frac{i(-2dk+dm-2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(-2dk+dm-2cz)^2}{4c}\right)\right)(-i c)^n - (i c)^n (-1)^m\sum_{q=0}^{n}2^{q-n}(i d(m-2k))^{n-q}(i(2dk-dm-2cz))^{q+1}\left(\frac{i(d(m-2k)+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(-2dk+dm+2cz)^2}{4c}\right) - (i c)^n\sum_{q=0}^{n}\left(i d\left(k-\frac{m}{2}\right)\right)^{n-q}(i(-2dk+dm-2cz))^{q+1}\left(\frac{i(-2dk+dm-2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(-2dk+dm-2cz)^2}{4c}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0849.01

$$\int z^n \sin^m(d z) \cos\left(c\sqrt{z}\right) dz = 2^{-m-2}\left(4(i c)^{-2(n+1)}\binom{m}{\frac{m}{2}}\left(\Gamma\left(2(n+1), -i c\sqrt{z}\right) + \Gamma\left(2(n+1), i c\sqrt{z}\right)\right)(m \bmod 2 - 1) - i^{-m} 4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u e^{-\frac{i c^2}{4d(m-2u)}}\left(d^2(m-2u)^2\right)^{-2n-1}(i d(m-2u))^{2n}\binom{m}{u}\left((-1)^m e^{\frac{i c^2}{2d(m-2u)}} i\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k (i c)^{-h-k+2n}\left(i\left(c-2d(m-2u)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(2d(m-2u)\sqrt{z}-c\right)^2}{d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(i\,c\left(c-2\,d\,(m-2\,u)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\,d\,(m-2\,u)\sqrt{z}-c\right)^2}{4\,d\,(m-2\,u)}\right)-2\,d\,(m-2\,u)\right.$$

$$\left.\sqrt{\frac{i\left(2\,d\,(m-2\,u)\sqrt{z}-c\right)^2}{d\,(m-2\,u)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\,d\,(m-2\,u)\sqrt{z}-c\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)+(-1)^m\,e^{\frac{i\,c^2}{2\,d\,(m-2\,u)}}\,i$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\left(i\left(-c-2\,d\,(m-2\,u)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-i\,c\left(-c-2\,d\,(m-2\,u)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)^2}{4\,d\,(m-2\,u)}\right)-\right.$$

$$\left.2\,d\,(m-2\,u)\sqrt{\frac{i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)^2}{d\,(m-2\,u)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)^2}{4\,d\,(m-2\,u)}\right)\right)+$$

$$i\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\left(i\left(2\,d\,(m-2\,u)\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2\,d\,(m-2\,u)\sqrt{z}-c\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,d\,(m-2\,u)\sqrt{-\frac{i\left(2\,d\,(m-2\,u)\sqrt{z}-c\right)^2}{d\,(m-2\,u)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\,d\,(m-2\,u)\sqrt{z}-c\right)^2}{4\,d\,(m-2\,u)}\right)-\right.$$

$$\left.i\,c\left(2\,d\,(m-2\,u)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\,d\,(m-2\,u)\sqrt{z}-c\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)+$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,d\,(m-2\,u)\sqrt{-\frac{i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)^2}{d\,(m-2\,u)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)^2}{4\,d\,(m-2\,u)}\right)-\right.$$

Involving $z^n \sin^m(d\,z+e)\cos(c\,z^r)$

01.07.21.0850.01

$$\int z^n \sin^m(d\,z+e)\cos(c\,z^2)\,dz = 2^{-m-2}\Bigg(z^{n+1}\binom{m}{\frac{m}{2}}\left(\Gamma\left(\frac{n+1}{2},-i\,c\,z^2\right)(-i\,c\,z^2)^{\frac{1}{2}(-n-1)}+(i\,c\,z^2)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},i\,c\,z^2\right)\right)(m \bmod 2-1)+$$

$$i^{1-m}\,c^{-2n-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-i\left(e(3m-2k)-\frac{d^2(m-2k)^2}{4c}\right)}\binom{m}{k}\Bigg(e^{i\left(4e(m-k)-\frac{d^2(m-2k)^2}{2c}\right)}\Bigg(\sum_{q=0}^{n}\left(i\,d\left(k-\frac{m}{2}\right)\right)^{n-q}(i\,(d\,(m-2k)+2\,c\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(m-2k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(-2\,d\,k+d\,m+2\,c\,z)^2}{4\,c}\right)\Bigg)(-i\,c)^n+$$

$$e^{i\left(-\frac{d^2(m-2k)^2}{2c}+2\,e\,m+m\,\pi\right)}\Bigg(\sum_{q=0}^{n}2^{q-n}\,(i\,d\,(m-2k))^{n-q}\,(-i\,(-2\,d\,k+d\,m-2\,c\,z))^{q+1}$$

$$\left(-\frac{i\,(-2\,d\,k+d\,m-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(-2\,d\,k+d\,m-2\,c\,z)^2}{4\,c}\right)\Bigg)(-i\,c)^n-$$

$$(i\,c)^n\,e^{i\,m\,(2e+\pi)}\sum_{q=0}^{n}2^{q-n}\,(i\,d\,(m-2k))^{n-q}\,(i\,(2\,d\,k-d\,m-2\,c\,z))^{q+1}\left(\frac{i\,(d\,(m-2k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2},\frac{i\,(-2\,d\,k+d\,m+2\,c\,z)^2}{4\,c}\right)-(i\,c)^n\,e^{4\,i\,e\,(m-k)}\sum_{q=0}^{n}\left(i\,d\left(k-\frac{m}{2}\right)\right)^{n-q}(i\,(-2\,d\,k+d\,m-2\,c\,z))^{q+1}$$

$$\left(\frac{i\,(-2\,d\,k+d\,m-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(-2\,d\,k+d\,m-2\,c\,z)^2}{4\,c}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.07.21.0851.01

$$\int z^n \sin^m(e+d\,z)\cos\left(c\sqrt{z}\right)dz = 2^{-m-2}$$

$$\Bigg(4\,(i\,c)^{-2(n+1)}\binom{m}{\frac{m}{2}}\left(\Gamma\left(2\,(n+1),-i\,c\sqrt{z}\right)+\Gamma\left(2\,(n+1),i\,c\sqrt{z}\right)\right)(m \bmod 2-1)-i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\,e^{-\frac{i\,c^2}{4\,d\,(m-2u)}-i\,e\,(m-2u)}$$

$$\left(d^2\,(m-2u)^2\right)^{-2n-1}\binom{m}{u}\Bigg(e^{2\,i\,e\,(m-2u)}\,i\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(i\left(2\,d\,(m-2u)\sqrt{z}-c\right)\right)^{h+k}$$

$$\left(-\frac{i\left(2\,d\,(m-2\,u)\,\sqrt{z}\,-c\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2\,d\,(m-2\,u)\,\sqrt{-\frac{i\left(2\,d\,(m-2\,u)\,\sqrt{z}\,-c\right)^2}{d\,(m-2\,u)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(2\,d\,(m-2\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,(m-2\,u)}\right)-i\,c\left(2\,d\,(m-2\,u)\,\sqrt{z}\,-c\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(2\,d\,(m-2\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)(-i\,d\,(m-2\,u))^{2\,n}+e^{2\,i\,e\,(m-2\,u)}$$

$$\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\right.$$

$$\binom{n}{k}\left(2\,i\,d\,(m-2\,u)\,\sqrt{-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\right)^2}{d\,(m-2\,u)}}\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,u)}\right)-\right.$$

$$\left.\left.c\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)(-i\,d\,(m-2\,u))^{2\,n}+$$

$$(-1)^m\,e^{\frac{i\,c^2}{2\,d\,(m-2\,u)}}\,i\,(i\,d\,(m-2\,u))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(i\left(c-2\,d\,(m-2\,u)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(2\,d\,(m-2\,u)\,\sqrt{z}\,-c\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(i\,c\left(c-2\,d\,(m-2\,u)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(2\,d\,(m-2\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,(m-2\,u)}\right)-2\,d\,(m-2\,u)\,\sqrt{\frac{i\left(2\,d\,(m-2\,u)\,\sqrt{z}\,-c\right)^2}{d\,(m-2\,u)}}$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(2\,d\,(m-2\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,(m-2\,u)}\right)\right)+(-1)^m\,e^{\frac{i\,c^2}{2\,d\,(m-2\,u)}}\,i\,(i\,d\,(m-2\,u))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(i\left(-c-2\,d\,(m-2\,u)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}$$
$$\binom{k}{h}\binom{n}{k}\left(-i\,c\left(-c-2\,d\,(m-2\,u)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)^2}{4\,d\,(m-2\,u)}\right)-2\,d\,(m-2\,u)\right.$$
$$\left.\left.\sqrt{\frac{i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)^2}{d\,(m-2\,u)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(c+2\,d\,(m-2\,u)\sqrt{z}\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m(b\,z^r)\cos(c\,z^r)$

01.07.21.0852.01

$$\int z^{\alpha-1}\sin^m(b\,z^r)\cos(c\,z^r)\,dz = -\frac{1}{r}\left(2^{-m-1}\,z^\alpha\binom{m}{\frac{m}{2}}\left(\Gamma\left(\frac{\alpha}{r},\,-i\,c\,z^r\right)(-i\,c\,z^r)^{-\frac{\alpha}{r}}+(i\,c\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,i\,c\,z^r\right)\right)(1-m\bmod 2)\right)-$$
$$\frac{2^{-m-1}\,z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\,m\,\pi}{2}}\,\Gamma\left(\frac{\alpha}{r},\,(-i\,c+i\,b\,(m-2\,k))\,z^r\right)((-i\,c+i\,b\,(m-2\,k))\,z^r)^{-\frac{\alpha}{r}}+\right.$$
$$e^{\frac{i\,m\,\pi}{2}}\,((i\,c+i\,b\,(m-2\,k))\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(i\,c+i\,b\,(m-2\,k))\,z^r\right)+e^{-\frac{i\,m\,\pi}{2}}\,((-i\,c-i\,b\,(m-2\,k))\,z^r)^{-\frac{\alpha}{r}}$$
$$\left.\Gamma\left(\frac{\alpha}{r},\,(-i\,c-i\,b\,(m-2\,k))\,z^r\right)+e^{-\frac{i\,m\,\pi}{2}}\,((i\,c-i\,b\,(m-2\,k))\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(i\,c-i\,b\,(m-2\,k))\,z^r\right)\right)\,/;\,m\in\mathbb{N}^+$$

01.07.21.0853.01

$$\int z^n\sin^m\left(b\,z^2\right)\cos\left(c\,z^2\right)dz =$$
$$-2^{-m-2}\binom{m}{\frac{m}{2}}\left(\Gamma\left(\frac{n+1}{2},\,-i\,c\,z^2\right)\left(-i\,c\,z^2\right)^{\frac{1}{2}(-n-1)}+\left(i\,c\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,i\,c\,z^2\right)\right)(1-m\bmod 2)\,z^{n+1}-$$
$$2^{-m-2}\,z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\,m\,\pi}{2}}\,\Gamma\left(\frac{n+1}{2},\,(-i\,c+i\,b\,(m-2\,k))\,z^2\right)\left((-i\,c+i\,b\,(m-2\,k))\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$
$$e^{\frac{i\,m\,\pi}{2}}\left((i\,c+i\,b\,(m-2\,k))\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(i\,c+i\,b\,(m-2\,k))\,z^2\right)+$$
$$e^{-\frac{i\,m\,\pi}{2}}\left((-i\,c-i\,b\,(m-2\,k))\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(-i\,c-i\,b\,(m-2\,k))\,z^2\right)+$$
$$\left.e^{-\frac{i\,m\,\pi}{2}}\left((i\,c-i\,b\,(m-2\,k))\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(i\,c-i\,b\,(m-2\,k))\,z^2\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

01.07.21.0854.01

$$\int z^n \sin^m\left(\sqrt{z}\, b\right)\cos\left(\sqrt{z}\, c\right) dz = (-1)^n\, 2^{-m}\, c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2(n+1), -i\, c\sqrt{z}\right) + \Gamma\left(2(n+1), i\, c\sqrt{z}\right)\right)(1 - m \bmod 2) - 2^{-m} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i m \pi}{2}}\, \Gamma\left(2(n+1), (-i\, c + i\, b(m-2k))\sqrt{z}\right)\left((-i\, c + i\, b(m-2k))\sqrt{z}\right)^{-2(n+1)} + e^{\frac{i m\pi}{2}}\left((i\, c + i\, b(m-2k))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i\, c + i\, b(m-2k))\sqrt{z}\right) + e^{-\frac{i m\pi}{2}}\left((-i\, c - i\, b(m-2k))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-i\, c - i\, b(m-2k))\sqrt{z}\right) + e^{-\frac{i m\pi}{2}}\left((i\, c - i\, b(m-2k))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i\, c - i\, b(m-2k))\sqrt{z}\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \sin^m(b\, z^r + e) \cos(c\, z^r)$

01.07.21.0855.01

$$\int z^{\alpha-1} \sin^m(b\, z^r + e)\cos(c\, z^r)\, dz = -\frac{1}{r}\left(2^{-m-1} z^\alpha \binom{m}{\frac{m}{2}} \left(\Gamma\left(\frac{\alpha}{r}, -i\, c\, z^r\right)(-i\, c\, z^r)^{-\frac{\alpha}{r}} + (i\, c\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, i\, c\, z^r\right)\right)(1 - m \bmod 2)\right) - \frac{2^{-m-1} z^\alpha}{r} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(e^{-i\, e(m-2k) + \frac{i m\pi}{2}}\, \Gamma\left(\frac{\alpha}{r}, (-i\, c + i\, b(m-2k))\, z^r\right)((-i\, c + i\, b(m-2k))\, z^r)^{-\frac{\alpha}{r}} + e^{-i\, e(m-2k) + \frac{i m\pi}{2}}\, ((i\, c + i\, b(m-2k))\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (i\, c + i\, b(m-2k))\, z^r\right) + e^{i\, e(m-2k) - \frac{i m\pi}{2}}\, ((-i\, c - i\, b(m-2k))\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (-i\, c - i\, b(m-2k))\, z^r\right) + e^{i\, e(m-2k) - \frac{i m\pi}{2}}\, ((i\, c - i\, b(m-2k))\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (i\, c - i\, b(m-2k))\, z^r\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0856.01

$$\int z^n \sin^m\left(b\, z^2 + e\right)\cos\left(c\, z^2\right) dz = -2^{-m-2} \binom{m}{\frac{m}{2}} \left(\Gamma\left(\frac{n+1}{2}, -i\, c\, z^2\right)\left(-i\, c\, z^2\right)^{\frac{1}{2}(-n-1)} + \left(i\, c\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i\, c\, z^2\right)\right)(1 - m \bmod 2)\, z^{n+1} - 2^{-m-2} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(e^{-i\, e(m-2k) + \frac{i m\pi}{2}}\, \Gamma\left(\frac{n+1}{2}, (-i\, c + i\, b(m-2k))\, z^2\right)\left((-i\, c + i\, b(m-2k))\, z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i\, e(m-2k) + \frac{i m\pi}{2}}\left((i\, c + i\, b(m-2k))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i\, c + i\, b(m-2k))\, z^2\right) + e^{i\, e(m-2k) - \frac{i m\pi}{2}}\left((-i\, c - i\, b(m-2k))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i\, c - i\, b(m-2k))\, z^2\right) + e^{i\, e(m-2k) - \frac{i m\pi}{2}}\left((i\, c - i\, b(m-2k))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i\, c - i\, b(m-2k))\, z^2\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0857.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + e\right) \cos\left(\sqrt{z}\, c\right) dz = (-1)^n\, 2^{-m}\, c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2(n+1), -i\, c\sqrt{z}\right) + \Gamma\left(2(n+1), i\, c\sqrt{z}\right)\right)(1 - m \bmod 2) -$$
$$2^{-m} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-i\, e(m-2k) + \frac{i m \pi}{2}}\, \Gamma\left(2(n+1), (-i\, c + i\, b(m-2k))\sqrt{z}\right) \left((-i\, c + i\, b(m-2k))\sqrt{z}\right)^{-2(n+1)} + \right.$$
$$e^{-i\, e(m-2k) + \frac{i m \pi}{2}} \left((i\, c + i\, b(m-2k))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i\, c + i\, b(m-2k))\sqrt{z}\right) +$$
$$e^{i\, e(m-2k) - \frac{i m \pi}{2}} \left((-i\, c - i\, b(m-2k))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-i\, c - i\, b(m-2k))\sqrt{z}\right) +$$
$$\left. e^{i\, e(m-2k) - \frac{i m \pi}{2}} \left((i\, c - i\, b(m-2k))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i\, c - i\, b(m-2k))\sqrt{z}\right)\right) /;\ n \in \mathbb{N} \wedge m \in \mathbb{N}^+$$

Involving $z^n \sin^m\left(b\, z^r + d\, z\right) \cos\left(c\, z^r\right)$

01.07.21.0858.01

$$\int z^n \sin^m\left(b z^2 + d z\right) \cos\left(c z^2\right) dz = -2^{-m-2} \left(z^{n+1} \left(c^2 z^4\right)^{\frac{1}{2}(-n-1)} \binom{m}{\frac{m}{2}} \left(\Gamma\left(\frac{n+1}{2}, i c z^2\right) \left(-i c z^2\right)^{\frac{n+1}{2}} + \left(i c z^2\right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i c z^2\right)\right) (1 - m \bmod 2) + i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i d^2 (m-2k)^2}{-4c+8bk-4bm}} \left(\sum_{q=0}^{n} 2^{q-n} (i (2 d k - d m))^{n-q} (-i (2 d k + 4 b z k - d m - 2 c z - 2 b m z))^{q+1} \left(\frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-c + 2 b k - b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-4c + 8 b k - 4 b m} \right) \right) (-i (-c + 2 b k - b m))^{-n-1} + e^{i \left(m \pi - \frac{d^2 (m-2k)^2}{-4c+8bk-4bm} \right)} (i (-c + 2 b k - b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (2 d k - d m))^{n-q} (i (2 d k + 4 b z k - d m - 2 c z - 2 b m z))^{q+1} \left(-\frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-c + 2 b k - b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-4c + 8 b k - 4 b m} \right) + e^{\frac{i (2 d k - d m)^2}{4c+8bk-4bm}} (-i (c + 2 b k - b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i (2 d k - d m))^{n-q} (-i (d (2k - m) + 2 (c + 2 b k - b m) z))^{q+1} \left(\frac{i (d (2k - m) + 2 (c + 2 b k - b m) z)^2}{c + 2 b k - b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d (2k - m) + 2 (c + 2 b k - b m) z)^2}{4c + 8 b k - 4 b m} \right) + e^{i \left(m \pi - \frac{(2 d k - d m)^2}{4c+8bk-4bm} \right)} (i (c + 2 b k - b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (2 d k - d m))^{n-q} (i (d (2k - m) + 2 (c + 2 b k - b m) z))^{q+1} \left(-\frac{i (d (2k - m) + 2 (c + 2 b k - b m) z)^2}{c + 2 b k - b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d (2k - m) + 2 (c + 2 b k - b m) z)^2}{4c + 8 b k - 4 b m} \right) \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0859.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d z\right) \cos\left(\sqrt{z}\, c\right) dz = 2^{-m-2} \left(4 (-1)^n c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2(n+1), -i c \sqrt{z}\right) + \Gamma\left(2(n+1), i c \sqrt{z}\right) \right) (1 - m \bmod 2) - \right.$$

$$i^{-m} 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \Biggl(e^{-\frac{i (c+b (m-2 u))^2}{4 d (m-2 u)}} \left(d^2 (m-2 u)^2\right)^{-2 n-1} \Biggl(\Biggl(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (c+b (m-2 u)))^{-h-k+2 n}$$

$$\left(i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{d (m-2 u)}\right)^{\frac{1}{2} (-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \Biggl((-c-b (m-2 u)) \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2} (h+k+1), -\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{4 d (m-2 u)}\right)+$$

$$2 d i (m-2 u) \sqrt{-\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{d (m-2 u)}}$$

$$\Gamma\left(\frac{1}{2} (h+k+2), -\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{4 d (m-2 u)}\right) \Biggr) \Biggr) \Biggr) (-i d (m-2 u))^{2 n}+$$

$$(-1)^m e^{\frac{i (c+b (m-2 u))^2}{2 d (m-2 u)}} (i d (m-2 u))^{2 n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (c+b (m-2 u)))^{-h-k+2 n}$$

$$\left(-i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{d (m-2 u)}\right)^{\frac{1}{2} (-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \Biggl((-c-b (m-2 u)) \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2} (h+k+1), \frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{4 d (m-2 u)}\right)-$$

$$2 i d (m-2 u) \sqrt{\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{d (m-2 u)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)^2}{4d(m-2u)}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{(dm-2du)^2}\Bigg((-1)^m e^{\frac{i(-c+bm-2bu)^2}{4dm-8du}}(-i(dm-2du))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(-c+bm-2bu))^{-h-k+2n}$$

$$\left(-i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)^2}{dm-2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(\left(c-bm+2bu\right)\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)^2}{4dm-8du}\right)-$$

$$2i(dm-2du)\sqrt{\frac{i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)^2}{dm-2du}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)^2}{4dm-8du}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(dm-2du)^2}\Bigg(e^{-\frac{i(-c+bm-2bu)^2}{4dm-8du}}(i(dm-2du))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i(-c+bm-2bu))^{-h-k+2n}$$

$$\left(i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)^2}{dm-2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(\left(c-bm+2bu\right)\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)+$$

$$2\,i\sqrt{-\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{d\,m-2\,d\,u}}\,(d\,m-2\,d\,u)$$

$$\left.\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)\right)\right)\right)\right) /;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\, z^r + d\, z + e\right) \cos\left(c\, z^r\right)$

01.07.21.0860.01

$$\int z^n \sin^m(b z^2 + d z + e) \cos(c z^2)\, dz = 2^{-m-2}\left(-z^{n+1} (c^2 z^4)^{\frac{1}{2}(-n-1)} \binom{m}{\frac{m}{2}} \left(\Gamma\left(\frac{n+1}{2}, i c z^2\right) (-i c z^2)^{\frac{n+1}{2}} + (i c z^2)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i c z^2\right)\right) (1 - m \bmod 2) - i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-i(2k-m)e} \binom{m}{k} \left(e^{\frac{i d^2 (m-2k)^2}{-4c+8bk-4bm}} \left(\sum_{q=0}^{n} 2^{q-n} (i(2dk - dm))^{n-q} (-i(2dk + 4bzk - dm - 2cz - 2bmz))^{q+1} \left(\frac{i(d(m-2k) + 2(c - 2bk + bm)z)^2}{-c + 2bk - bm}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d(m-2k) + 2(c - 2bk + bm)z)^2}{-4c + 8bk - 4bm}\right)\right) (-i(-c + 2bk - bm))^{-n-1} + e^{i\left(-\frac{d^2 (m-2k)^2}{-4c+8bk-4bm} + e(4k-2m) + m\pi\right)} (i(-c + 2bk - bm))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i(2dk - dm))^{n-q} (i(2dk + 4bzk - dm - 2cz - 2bmz))^{q+1} \left(-\frac{i(d(m-2k) + 2(c - 2bk + bm)z)^2}{-c + 2bk - bm}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d(m-2k) + 2(c - 2bk + bm)z)^2}{-4c + 8bk - 4bm}\right) + e^{\frac{i(2dk - dm)^2}{4c+8bk-4bm}} (-i(c + 2bk - bm))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i(2dk - dm))^{n-q} (-i(d(2k - m) + 2(c + 2bk - bm)z))^{q+1} \left(\frac{i(d(2k - m) + 2(c + 2bk - bm)z)^2}{c + 2bk - bm}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d(2k - m) + 2(c + 2bk - bm)z)^2}{4c + 8bk - 4bm}\right) + e^{i\left(-\frac{(2dk - dm)^2}{4c+8bk-4bm} + e(4k-2m) + m\pi\right)} (i(c + 2bk - bm))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i(2dk - dm))^{n-q} (i(d(2k - m) + 2(c + 2bk - bm)z))^{q+1} \left(-\frac{i(d(2k - m) + 2(c + 2bk - bm)z)^2}{c + 2bk - bm}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d(2k - m) + 2(c + 2bk - bm)z)^2}{4c + 8bk - 4bm}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0861.01

$$\int z^n \sin^m(\sqrt{z}\, b + d z + e) \cos(\sqrt{z}\, c)\, dz = 2^{-m-2}\left(4 (-1)^n c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2(n+1), -i c \sqrt{z}\right) + \Gamma\left(2(n+1), i c \sqrt{z}\right)\right) (1 - m \bmod 2) - \right.$$

$$i^{-m} 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u e^{-i (m-2u) e} \binom{m}{u} \left(e^{-\frac{i (c+b(m-2u))^2}{4 d (m-2u)}} \left(d^2 (m-2u)^2\right)^{-2n-1} \right.$$

$$\left(e^{2 i e (m-2u)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (c+b(m-2u)))^{-h-k+2n} \left(i \left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)\right)^{h+k} \right. \right.$$

$$\left(-\frac{i \left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)^2}{d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((-c-b(m-2u)) \left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \right. \right.$$

$$\left. -\frac{i \left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)^2}{4d(m-2u)}\right) +$$

$$2 d i (m-2u) \sqrt{-\frac{i \left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)^2}{d(m-2u)}} \; \Gamma\left(\frac{1}{2}(h+k+2), \right.$$

$$\left. \left. \left. \left. -\frac{i \left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)^2}{4d(m-2u)}\right)\right)\right) (-i d (m-2u))^{2n} + \right.$$

$$(-1)^m e^{\frac{i (c+b(m-2u))^2}{2 d (m-2u)}} (i d (m-2u))^{2n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (c+b(m-2u)))^{-h-k+2n}$$

$$\left(-i \left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)^2}{d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((-c-b(m-2u)) \left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)^2}{4d(m-2u)}\right) -$$

$$2\,i\,d\,(m-2\,u)\,\sqrt{\frac{i\left(c+b\,(m-2\,u)+2\,d\,(m-2\,u)\,\sqrt{z}\right)^2}{d\,(m-2\,u)}}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c+b\,(m-2\,u)+2\,d\,(m-2\,u)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\left((-1)^m\,e^{\frac{i\,(-c+b\,m-2\,b\,u)^2}{4\,d\,m-8\,d\,u}}\,(-i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(-c+b\,m-2\,b\,u))^{-h-k+2\,n}\right.$$

$$\left(-i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left((c-b\,m+2\,b\,u)\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)-$$

$$2\,i\,(d\,m-2\,d\,u)\,\sqrt{\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{d\,m-2\,d\,u}}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)\right)\right)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\left(e^{i\left(2\,e\,(m-2\,u)-\frac{(-c+b\,m-2\,b\,u)^2}{4\,d\,m-8\,d\,u}\right)}\,(i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(i\,(-c+b\,m-2\,b\,u))^{-h-k+2\,n}\left(i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((c-b\,m+2\,b\,u)\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)+$$

$$2\,i\sqrt{-\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{d\,m-2\,d\,u}}\;(d\,m-2\,d\,u)$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z)\cos\left(c\,z^r+g\right)$

01.07.21.0862.01

$$\int z^n \sin^m(d z) \cos\left(c z^2 + g\right) dz = 2^{-m-2} \left(-e^{i g} z^{n+1} \left(c^2 z^4\right)^{\frac{1}{2}(-n-1)} \binom{m}{\frac{m}{2}} \left(e^{-2 i g} \Gamma\left(\frac{n+1}{2}, i c z^2\right) \left(-i c z^2\right)^{\frac{n+1}{2}} + \left(i c z^2\right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i c z^2\right)\right) (1 - m \bmod 2) - i^{-m} e^{i g} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i (2 d k - d m)^2}{4 c} - 2 i g} \left(\sum_{q=0}^{n} 2^{q-n} (i (2 d k - d m))^{n-q} (-i (d (2 k - m) + 2 c z))^{q+1} \left(\frac{i (d (2 k - m) + 2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d (2 k - m) + 2 c z)^2}{4 c}\right)\right) (-i c)^{-n-1} + e^{i \left(\frac{d^2 (m-2k)^2}{4 c} - 2 g + m \pi\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i (2 d k - d m))^{n-q} (i (2 d k - d m - 2 c z))^{q+1} \left(\frac{i (d (m - 2 k) + 2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d (m - 2 k) + 2 c z)^2}{4 c}\right)\right) (-i c)^{-n-1} + (i c)^{-n-1} e^{i \left(m \pi - \frac{(2 d k - d m)^2}{4 c}\right)} \sum_{q=0}^{n} 2^{q-n} (-i (2 d k - d m))^{n-q} (i (d (2 k - m) + 2 c z))^{q+1} \left(-\frac{i (d (2 k - m) + 2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d (2 k - m) + 2 c z)^2}{4 c}\right) + (i c)^{-n-1} e^{-\frac{i d^2 (m-2k)^2}{4 c}} \sum_{q=0}^{n} 2^{q-n} (i (2 d k - d m))^{n-q} (-i (2 d k - d m - 2 c z))^{q+1} \left(-\frac{i (d (m - 2 k) + 2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d (m - 2 k) + 2 c z)^2}{4 c}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0863.01

$$\int z^n \sin^m(d z) \cos\left(\sqrt{z}\, c + g\right) dz = 2^{-m-2} \left(4 (-1)^n c^{-2(n+1)} e^{i g} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2 (n+1), -i c \sqrt{z}\right) + e^{-2 i g} \Gamma\left(2 (n+1), i c \sqrt{z}\right)\right) (1 - m \bmod 2) - i^{-m} 4^{-n} e^{i g} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \left(e^{-\frac{i c^2}{4 d (m-2u)}} \left(d^2 (m - 2 u)^2\right)^{-2n-1} \left(\left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2n} \right.\right.\right.\right.$$

$$\left(i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)\right)^{h+k}\left(-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,d\,(m-2\,u)\sqrt{-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{d\,(m-2\,u)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{4\,d\,(m-2\,u)}\right)-\right.$$

$$\left.\left.c\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)$$

$$(-i\,d\,(m-2\,u))^{2\,n}+(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{c^2}{d\,(m-2\,u)}-4\,g\right)}\,(i\,d\,(m-2\,u))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}$$

$$\left(-i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)\right)^{h+k}\left(\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-c\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{4\,d\,(m-2\,u)}\right)-\right.$$

$$\left.\left.2\,i\,d\,(m-2\,u)\sqrt{\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{d\,(m-2\,u)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\left((-1)^m\,e^{\frac{i\,c^2}{4\,d\,m-8\,d\,u}}\,(-i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\right.$$

$$\left(-i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)\right)^{h+k}\left(\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(c\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,m-8\,d\,u}\right)-2\,i\,(d\,m-2\,d\,u)\right.$$

$$\sqrt{\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{d\,m-2\,d\,u}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,m-8\,d\,u}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\Bigg(e^{-i\left(\frac{c^2}{4\,d\,m-8\,d\,u}+2\,g\right)}\,(i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}$$

$$\left(i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)\right)^{h+k}\left(-\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(c\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,m-8\,d\,u}\right)+$$

$$2\,i\,\sqrt{-\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{d\,m-2\,d\,u}}\;(d\,m-2\,d\,u)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,m-8\,d\,u}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\,\sin^m(d\,z+e)\,\cos\!\left(c\,z^r+g\right)$

01.07.21.0864.01

$$\int z^n \sin^m(d\,z+e)\cos\left(c\,z^2+g\right)dz = 2^{-m-2}\left(-e^{i\,g}\,z^{n+1}\left(c^2\,z^4\right)^{\frac{1}{2}(-n-1)}\binom{m}{\frac{m}{2}}\left(e^{-2\,i\,g}\,\Gamma\left(\frac{n+1}{2},\,i\,c\,z^2\right)\left(-i\,c\,z^2\right)^{\frac{n+1}{2}}+\left(i\,c\,z^2\right)^{\frac{n+1}{2}}\Gamma\left(\frac{n+1}{2},\,-i\,c\,z^2\right)\right)(1-m \bmod 2)-\right.$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-i\,(-g+2\,e\,k-e\,m)}\binom{m}{k}\left(e^{\frac{i\,(2\,d\,k-d\,m)^2}{4\,c}-2\,i\,g}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m))^{n-q}\,(-i\,(d\,(2\,k-m)+2\,c\,z))^{q+1}\right.\right.$$

$$\left.\left(\frac{i\,(d\,(2\,k-m)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(d\,(2\,k-m)+2\,c\,z)^2}{4\,c}\right)\right)(-i\,c)^{-n-1}+$$

$$e^{i\left(\frac{d^2\,(m-2\,k)^2}{4\,c}-2\,g+e\,(4\,k-2\,m)+m\,\pi\right)}\left(\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m))^{n-q}\,(i\,(2\,d\,k-d\,m-2\,c\,z))^{q+1}\right.$$

$$\left.\left(\frac{i\,(d\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(d\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\right)(-i\,c)^{-n-1}+$$

$$(i\,c)^{-n-1}\,e^{i\left(-\frac{(2\,d\,k-d\,m)^2}{4\,c}+e\,(4\,k-2\,m)+m\,\pi\right)}\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m))^{n-q}\,(i\,(d\,(2\,k-m)+2\,c\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(2\,k-m)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(d\,(2\,k-m)+2\,c\,z)^2}{4\,c}\right)+$$

$$(i\,c)^{-n-1}\,e^{-\frac{i\,d^2\,(m-2\,k)^2}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m))^{n-q}\,(-i\,(2\,d\,k-d\,m-2\,c\,z))^{q+1}$$

$$\left.\left.\left(-\frac{i\,(d\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(d\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.07.21.0865.01

$$\int z^n \sin^m(d\,z+e)\cos\left(\sqrt{z}\;c+g\right)dz = 2^{-m-2}\left(4\,(-1)^n\,c^{-2\,(n+1)}\,e^{i\,g}\binom{m}{\frac{m}{2}}\left(\Gamma\left(2\,(n+1),\,-i\,c\,\sqrt{z}\right)+e^{-2\,i\,g}\,\Gamma\left(2\,(n+1),\,i\,c\,\sqrt{z}\right)\right)(1-m \bmod 2)-\right.$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\,e^{-i\,(-g+e\,m-2\,e\,u)}\binom{m}{u}\left(e^{-\frac{i\,c^2}{4\,d\,(m-2\,u)}}\left(d^2\,(m-2\,u)^2\right)^{-2\,n-1}\left(e^{2\,i\,e\,(m-2\,u)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\right.\right.\right.$$

$$\left(i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)\right)^{h+k}\left(-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,d\,(m-2\,u)\sqrt{-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{d\,(m-2\,u)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{4\,d\,(m-2\,u)}\right)-\right.$$

$$\left.\left.c\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)$$

$$(-i\,d\,(m-2\,u))^{2\,n}+(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{c^2}{d\,(m-2\,u)}-4\,g\right)}\,(i\,d\,(m-2\,u))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}$$

$$\left(-i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)\right)^{h+k}\left(\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-c\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{4\,d\,(m-2\,u)}\right)-\right.$$

$$\left.\left.2\,i\,d\,(m-2\,u)\sqrt{\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{d\,(m-2\,u)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c+2\,d\,(m-2\,u)\,\sqrt{z}\,\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\left((-1)^m\,e^{\frac{i\,c^2}{4\,d\,m-8\,d\,u}}\,(-i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\right.$$

$$\left(-i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)\right)^{h+k}\left(\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(c\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,m-8\,d\,u}\right)-2\,i\,(d\,m-2\,d\,u)\right.$$

$$\left.\left.\left.\sqrt{\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{d\,m-2\,d\,u}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,m-8\,d\,u}\right)\right)\right)\right)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\left(e^{i\left(-\frac{c^2}{4\,d\,m-8\,d\,u}-2\,g+2\,e\,(m-2\,u)\right)}\,(i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\right.$$

$$\left(i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)\right)^{h+k}\left(-\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(c\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,m-8\,d\,u}\right)+\right.$$

$$2\,i\,\sqrt{-\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{d\,m-2\,d\,u}}\;(d\,m-2\,d\,u)$$

$$\left.\left.\left.\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\,(d\,m-2\,d\,u)\,\sqrt{z}\,-c\right)^2}{4\,d\,m-8\,d\,u}\right)\right)\right)\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m(b\,z^r)\cos(c\,z^r+g)$

01.07.21.0866.01

$$\int z^{\alpha-1}\sin^m(b\,z^r)\cos(c\,z^r+g)\,dz=$$

$$-\frac{1}{r}\left(2^{-m-1}\,z^\alpha\binom{m}{\frac{m}{2}}\left(e^{i\,g}\,\Gamma\!\left(\frac{\alpha}{r},\,-i\,c\,z^r\right)(-i\,c\,z^r)^{-\frac{\alpha}{r}}+e^{-i\,g}\,(i\,c\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,c\,z^r\right)\right)(1-m\bmod 2)\right)-$$

$$\frac{2^{-m-1}\,z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{i\,g+\frac{i\,m\,\pi}{2}}\,\Gamma\!\left(\frac{\alpha}{r},\,(-i\,c+i\,b\,(m-2\,k))\,z^r\right)((-i\,c+i\,b\,(m-2\,k))\,z^r)^{-\frac{\alpha}{r}}+\right.$$

$$e^{-i\,g+\frac{i\,m\,\pi}{2}}\,((i\,c+i\,b\,(m-2\,k))\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,c+i\,b\,(m-2\,k))\,z^r\right)+e^{i\,g-\frac{i\,m\,\pi}{2}}\,((-i\,c-i\,b\,(m-2\,k))\,z^r)^{-\frac{\alpha}{r}}$$

$$\left.\Gamma\!\left(\frac{\alpha}{r},\,(-i\,c-i\,b\,(m-2\,k))\,z^r\right)+e^{-i\,g-\frac{i\,m\,\pi}{2}}\,((i\,c-i\,b\,(m-2\,k))\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,c-i\,b\,(m-2\,k))\,z^r\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.07.21.0867.01

$$\int z^n \sin^m(b z^2)\cos(c z^2+g)\,dz = -2^{-m-2}\binom{m}{\frac{m}{2}}\left(e^{ig}\,\Gamma\left(\frac{n+1}{2}, -i c z^2\right)\left(-i c z^2\right)^{\frac{1}{2}(-n-1)} + e^{-ig}\left(i c z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, i c z^2\right)\right)(1-m \bmod 2)\, z^{n+1} - 2^{-m-2} z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{ig+\frac{i m\pi}{2}}\,\Gamma\left(\frac{n+1}{2}, (-i c+i b(m-2k))z^2\right)\left((-i c+i b(m-2k))z^2\right)^{\frac{1}{2}(-n-1)} + e^{-ig+\frac{i m\pi}{2}}\left((i c+i b(m-2k))z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (i c+i b(m-2k))z^2\right) + e^{ig-\frac{i m\pi}{2}}\left((-i c-i b(m-2k))z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (-i c-i b(m-2k))z^2\right) + e^{-ig-\frac{i m\pi}{2}}\left((i c-i b(m-2k))z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (i c-i b(m-2k))z^2\right)\right) /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.07.21.0868.01

$$\int z^n \sin^m\left(\sqrt{z}\, b\right)\cos\left(\sqrt{z}\, c+g\right)dz = (-1)^n 2^{-m} c^{-2(n+1)}\binom{m}{\frac{m}{2}}\left(e^{ig}\,\Gamma\left(2(n+1), -i c\sqrt{z}\right) + e^{-ig}\,\Gamma\left(2(n+1), i c\sqrt{z}\right)\right)(1-m \bmod 2) - 2^{-m} z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{ig+\frac{i m\pi}{2}}\,\Gamma\left(2(n+1), (-i c+i b(m-2k))\sqrt{z}\right)\left((-i c+i b(m-2k))\sqrt{z}\right)^{-2(n+1)} + e^{-ig+\frac{i m\pi}{2}}\left((i c+i b(m-2k))\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1), (i c+i b(m-2k))\sqrt{z}\right) + e^{ig-\frac{i m\pi}{2}}\left((-i c-i b(m-2k))\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1), (-i c-i b(m-2k))\sqrt{z}\right) + e^{-ig-\frac{i m\pi}{2}}\left((i c-i b(m-2k))\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1), (i c-i b(m-2k))\sqrt{z}\right)\right) /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m(b z^r+e)\cos(c z^r+g)$

01.07.21.0869.01

$$\int z^{\alpha-1}\sin^m(b z^r+e)\cos(c z^r+g)\,dz = -\frac{1}{r}\left(2^{-m-1} z^\alpha\binom{m}{\frac{m}{2}}\left(e^{ig}\,\Gamma\left(\frac{\alpha}{r}, -i c z^r\right)(-i c z^r)^{-\frac{\alpha}{r}} + e^{-ig}(i c z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, i c z^r\right)\right)(1-m \bmod 2)\right) - \frac{2^{-m-1} z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{ig-i e(m-2k)+\frac{i m\pi}{2}}\,\Gamma\left(\frac{\alpha}{r}, (-i c+i b(m-2k))z^r\right)((-i c+i b(m-2k))z^r)^{-\frac{\alpha}{r}} + e^{-ig-i e(m-2k)+\frac{i m\pi}{2}}((i c+i b(m-2k))z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (i c+i b(m-2k))z^r\right) + e^{ig+i e(m-2k)-\frac{i m\pi}{2}}((-i c-i b(m-2k))z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (-i c-i b(m-2k))z^r\right) + e^{-ig+i e(m-2k)-\frac{i m\pi}{2}}((i c-i b(m-2k))z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (i c-i b(m-2k))z^r\right)\right) /;\ m\in\mathbb{N}^+$$

01.07.21.0870.01

$$\int z^n \sin^m\left(b z^2+e\right)\cos\left(c z^2+g\right)dz ==$$
$$-2^{-m-2}\binom{m}{\frac{m}{2}}\left(e^{ig}\,\Gamma\left(\frac{n+1}{2},-i c z^2\right)\left(-i c z^2\right)^{\frac{1}{2}(-n-1)}+e^{-ig}\left(i c z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},i c z^2\right)\right)(1-m \bmod 2)\,z^{n+1}-$$
$$2^{-m-2} z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{i g-i e(m-2k)+\frac{i m\pi}{2}}\,\Gamma\left(\frac{n+1}{2},(-i c+i b(m-2k))z^2\right)\left((-i c+i b(m-2k))z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$
$$e^{-i g-i e(m-2k)+\frac{i m\pi}{2}}\left((i c+i b(m-2k))z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i c+i b(m-2k))z^2\right)+$$
$$e^{i g+i e(m-2k)-\frac{i m\pi}{2}}\left((-i c-i b(m-2k))z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(-i c-i b(m-2k))z^2\right)+$$
$$\left.e^{-i g+i e(m-2k)-\frac{i m\pi}{2}}\left((i c-i b(m-2k))z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i c-i b(m-2k))z^2\right)\right)\;/;\; n\in\mathbb{N}\land m\in\mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\,b+e\right)\cos\left(\sqrt{z}\,c+g\right)dz ==$$
$$(-1)^n\,2^{-m}\,c^{-2(n+1)}\binom{m}{\frac{m}{2}}\left(e^{ig}\,\Gamma\left(2(n+1),-i c\sqrt{z}\right)+e^{-ig}\,\Gamma\left(2(n+1),i c\sqrt{z}\right)\right)(1-m \bmod 2)-$$
$$2^{-m} z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{i g-i e(m-2k)+\frac{i m\pi}{2}}\,\Gamma\left(2(n+1),(-i c+i b(m-2k))\sqrt{z}\right)\left((-i c+i b(m-2k))\sqrt{z}\right)^{-2(n+1)}+\right.$$
$$e^{-i g-i e(m-2k)+\frac{i m\pi}{2}}\left((i c+i b(m-2k))\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1),(i c+i b(m-2k))\sqrt{z}\right)+$$
$$e^{i g+i e(m-2k)-\frac{i m\pi}{2}}\left((-i c-i b(m-2k))\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1),(-i c-i b(m-2k))\sqrt{z}\right)+$$
$$\left.e^{-i g+i e(m-2k)-\frac{i m\pi}{2}}\left((i c-i b(m-2k))\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1),(i c-i b(m-2k))\sqrt{z}\right)\right)\;/;\; n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r+d z\right)\cos\left(c z^r+g\right)$

01.07.21.0872.01

$$\int z^n \sin^m\left(b z^2 + d z\right) \cos\left(c z^2 + g\right) dz = 2^{-m-2} \left(-e^{i g} z^{n+1} \left(c^2 z^4\right)^{\frac{1}{2}(-n-1)} \binom{m}{\frac{m}{2}} \left(e^{-2 i g} \Gamma\left(\frac{n+1}{2}, i c z^2\right) \left(-i c z^2\right)^{\frac{n+1}{2}} + \left(i c z^2\right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i c z^2\right) \right) (1 - m \bmod 2) - i^{-m} e^{i g} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i d^2 (m-2k)^2}{-4c+8bk-4bm}} \left(\sum_{q=0}^{n} 2^{q-n} (i (2 d k - d m))^{n-q} (-i (2 d k + 4 b z k - d m - 2 c z - 2 b m z))^{q+1} \left(\frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-c + 2 b k - b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-4 c + 8 b k - 4 b m}\right) \right) (-i (-c + 2 b k - b m))^{-n-1} + e^{i \left(-\frac{d^2 (m-2k)^2}{-4c+8bk-4bm} - 2 g + m \pi\right)} (i (-c + 2 b k - b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (2 d k - d m))^{n-q} (i (2 d k + 4 b z k - d m - 2 c z - 2 b m z))^{q+1} \left(-\frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-c + 2 b k - b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-4 c + 8 b k - 4 b m}\right) + e^{\frac{i (2 d k - d m)^2}{4c+8bk-4bm} - 2 i g} (-i (c + 2 b k - b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i (2 d k - d m))^{n-q} (-i (d (2k - m) + 2 (c + 2 b k - b m) z))^{q+1} \left(\frac{i (d (2k-m) + 2 (c + 2 b k - b m) z)^2}{c + 2 b k - b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d (2k-m) + 2 (c + 2 b k - b m) z)^2}{4 c + 8 b k - 4 b m}\right) + e^{i \left(m \pi - \frac{(2 d k - d m)^2}{4c+8bk-4bm}\right)} (i (c + 2 b k - b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (2 d k - d m))^{n-q} (i (d (2k - m) + 2 (c + 2 b k - b m) z))^{q+1} \left(-\frac{i (d (2k-m) + 2 (c + 2 b k - b m) z)^2}{c + 2 b k - b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d (2k-m) + 2 (c + 2 b k - b m) z)^2}{4 c + 8 b k - 4 b m}\right) \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d z\right) \cos\left(\sqrt{z}\, c + g\right) dz = 2^{-m-2} \left(4 (-1)^n c^{-2(n+1)} e^{i g} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2 (n+1), -i c \sqrt{z}\right) + e^{-2 i g} \Gamma\left(2 (n+1), i c \sqrt{z}\right) \right) (1 - m \bmod 2) - \right.$$

$$i^{-m} 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u e^{i g} \binom{m}{u} \left(e^{-\frac{i (c+b (m-2 u))^2}{4 d (m-2 u)}} \left(d^2 (m-2 u)^2\right)^{-2 n-1} \left(\left(\left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (c+b (m-2 u)))^{-h-k+2 n} \right.\right.\right.\right.$$

$$\left(i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{d (m-2 u)}\right)^{\frac{1}{2} (-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((-c-b (m-2 u)) \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2} (h+k+1), -\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{4 d (m-2 u)}\right) +$$

$$2 d i (m-2 u) \sqrt{-\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{d (m-2 u)}}$$

$$\left.\left.\left. \Gamma\left(\frac{1}{2} (h+k+2), -\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{4 d (m-2 u)}\right)\right)\right)\right) (-i d (m-2 u))^{2 n} +$$

$$(-1)^m e^{\frac{1}{2} i \left(\frac{(c+b (m-2 u))^2}{d (m-2 u)}-4 g\right)} (i d (m-2 u))^{2 n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (c+b (m-2 u)))^{-h-k+2 n}$$

$$\left(-i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{d (m-2 u)}\right)^{\frac{1}{2} (-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((-c-b (m-2 u)) \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2} (h+k+1), \frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{4 d (m-2 u)}\right) -$$

$$2 i d (m-2 u) \sqrt{\frac{i \left(c+b (m-2 u)+2 d (m-2 u) \sqrt{z}\right)^2}{d (m-2 u)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)^2}{4d(m-2u)}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{(dm-2du)^2}\Bigg((-1)^m e^{\frac{i(-c+bm-2bu)^2}{4dm-8du}}(-i(dm-2du))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(-c+bm-2bu))^{-h-k+2n}$$

$$\left(-i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)^2}{dm-2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((c-bm+2bu)\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)^2}{4dm-8du}\right)-$$

$$2i(dm-2du)\sqrt{\frac{i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)^2}{dm-2du}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)^2}{4dm-8du}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(dm-2du)^2}\Bigg(e^{-i\left(\frac{(-c+bm-2bu)^2}{4dm-8du}+2g\right)}(i(dm-2du))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i(-c+bm-2bu))^{-h-k+2n}$$

$$\left(i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)^2}{dm-2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((c-bm+2bu)\left(-c+b(m-2u)+2(dm-2du)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)+$$

$$2\,i\sqrt{-\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{d\,m-2\,d\,u}}\;(d\,m-2\,d\,u)$$

$$\left.\left.\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)\right)\right)\right)\right)\right) /;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r + d\,z + e)\cos(c\,z^r + g)$

01.07.21.0874.01

$$\int z^n \sin^m\left(b z^2 + d z + e\right) \cos\left(c z^2 + g\right) dz = 2^{-m-2} \left(-e^{i g} z^{n+1} \left(c^2 z^4\right)^{\frac{1}{2}(-n-1)} \binom{m}{\frac{m}{2}} \left(e^{-2 i g}\, \Gamma\left(\frac{n+1}{2}, i c z^2\right) \left(-i c z^2\right)^{\frac{n+1}{2}} + \left(i c z^2\right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i c z^2\right)\right) (1 - m \bmod 2) - \right.$$

$$i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-i(-g+2 e k - e m)} \binom{m}{k} \left(e^{\frac{i d^2 (m-2k)^2}{-4c+8bk-4bm}} \left(\sum_{q=0}^{n} 2^{q-n} \left(i (2 d k - d m)\right)^{n-q} \right.\right.$$

$$\left(-i (2 d k + 4 b z k - d m - 2 c z - 2 b m z)\right)^{q+1} \left(\frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-c + 2 b k - b m} \right)^{\frac{1}{2}(-q-1)}$$

$$\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-4c + 8 b k - 4 b m} \right)\right) \left(-i (-c + 2 b k - b m)\right)^{-n-1} +$$

$$e^{i\left(-\frac{d^2 (m-2k)^2}{-4c+8bk-4bm} - 2 g + e (4k - 2m) + m\pi\right)} \left(i (-c + 2 b k - b m)\right)^{-n-1} \sum_{q=0}^{n} 2^{q-n} \left(-i (2 d k - d m)\right)^{n-q}$$

$$\left(i (2 d k + 4 b z k - d m - 2 c z - 2 b m z)\right)^{q+1} \left(-\frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-c + 2 b k - b m} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d (m-2k) + 2 (c - 2 b k + b m) z)^2}{-4c + 8 b k - 4 b m} \right) +$$

$$e^{\frac{i (2 d k - d m)^2}{4c+8bk-4bm} - 2 i g} \left(-i (c + 2 b k - b m)\right)^{-n-1} \sum_{q=0}^{n} 2^{q-n} \left(i (2 d k - d m)\right)^{n-q} \left(-i (d (2k - m) + 2 (c + 2 b k - b m) z)\right)^{q+1}$$

$$\left(\frac{i (d (2k-m) + 2 (c + 2 b k - b m) z)^2}{c + 2 b k - b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d (2k-m) + 2 (c + 2 b k - b m) z)^2}{4c + 8 b k - 4 b m} \right) +$$

$$e^{i\left(-\frac{(2 d k - d m)^2}{4c+8bk-4bm} + e (4k - 2m) + m\pi\right)} \left(i (c + 2 b k - b m)\right)^{-n-1} \sum_{q=0}^{n} 2^{q-n} \left(-i (2 d k - d m)\right)^{n-q}$$

$$\left(i (d (2k - m) + 2 (c + 2 b k - b m) z)\right)^{q+1} \left(-\frac{i (d (2k-m) + 2 (c + 2 b k - b m) z)^2}{c + 2 b k - b m} \right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d (2k-m) + 2 (c + 2 b k - b m) z)^2}{4c + 8 b k - 4 b m} \right)\right)\right) \right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0875.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \cos\left(\sqrt{z}\, c + g\right) dz = 2^{-m-2} \left(4\, (-1)^n\, c^{-2\,(n+1)}\, e^{i\, g} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2\,(n+1),\, -i\, c\, \sqrt{z}\right) + e^{-2\, i\, g}\, \Gamma\left(2\,(n+1),\, i\, c\, \sqrt{z}\right)\right) (1 - m \bmod 2) - \right.$$

$$i^{-m}\, 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u\, e^{-i\,(-g + e\, m - 2\, e\, u)} \binom{m}{u} \left(e^{-\frac{i\,(c+b\,(m-2\,u))^2}{4\,d\,(m-2\,u)}} \left(d^2\,(m-2\,u)^2\right)^{-2\,n-1} \right.$$

$$\left(e^{2\, i\, e\,(m-2\,u)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,(c + b\,(m-2\,u)))^{-h-k+2\,n} \left(i\left(c + b\,(m-2\,u) + 2\, d\,(m-2\,u)\,\sqrt{z}\right)\right)^{h+k} \right.\right.$$

$$\left(-\frac{i\left(c + b\,(m-2\,u) + 2\, d\,(m-2\,u)\,\sqrt{z}\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}\,(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((-c - b\,(m-2\,u))\left(c + b\,(m-2\,u) + 2\, d\,(m-2\,u)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\, -\frac{i\left(c + b\,(m-2\,u) + 2\, d\,(m-2\,u)\,\sqrt{z}\right)^2}{4\, d\,(m-2\,u)}\right) +$$

$$2\, d\, i\,(m-2\,u) \sqrt{-\frac{i\left(c + b\,(m-2\,u) + 2\, d\,(m-2\,u)\,\sqrt{z}\right)^2}{d\,(m-2\,u)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\, -\frac{i\left(c + b\,(m-2\,u) + 2\, d\,(m-2\,u)\,\sqrt{z}\right)^2}{4\, d\,(m-2\,u)}\right)\right)\right)\right) (-i\, d\,(m-2\,u))^{2\,n} +$$

$$(-1)^m\, e^{\frac{1}{2}\, i \left(\frac{(c+b\,(m-2\,u))^2}{d\,(m-2\,u)} - 4\, g\right)} (i\, d\,(m-2\,u))^{2\,n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,(c + b\,(m-2\,u)))^{-h-k+2\,n}$$

$$\left(-i\left(c + b\,(m-2\,u) + 2\, d\,(m-2\,u)\,\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c + b\,(m-2\,u) + 2\, d\,(m-2\,u)\,\sqrt{z}\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((-c-b(m-2u))\left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)^2}{4d(m-2u)}\right)-$$

$$2\,i\,d(m-2u)\sqrt{\frac{i\left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)^2}{d(m-2u)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c+b(m-2u)+2d(m-2u)\sqrt{z}\right)^2}{4d(m-2u)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\Bigg((-1)^m e^{\frac{i(-c+b\,m-2\,b\,u)^2}{4\,d\,m-8\,d\,u}}(-i(d\,m-2\,d\,u))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(-c+b\,m-2\,b\,u))^{-h-k+2n}$$

$$\left(-i\left(-c+b(m-2u)+2(d\,m-2\,d\,u)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(-c+b(m-2u)+2(d\,m-2\,d\,u)\sqrt{z}\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((c-b\,m+2\,b\,u)\left(-c+b(m-2u)+2(d\,m-2\,d\,u)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(-c+b(m-2u)+2(d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)-$$

$$2\,i(d\,m-2\,d\,u)\sqrt{\frac{i\left(-c+b(m-2u)+2(d\,m-2\,d\,u)\sqrt{z}\right)^2}{d\,m-2\,d\,u}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(-c+b(m-2u)+2(d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\left(e^{i\left(-\frac{(-c+b\,m-2\,b\,u)^2}{4\,d\,m-8\,d\,u}-2\,g+2\,e\,(m-2\,u)\right)}(i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(i\,(-c+b\,m-2\,b\,u))^{-h-k+2\,n}\left(i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left((c-b\,m+2\,b\,u)\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)+$$

$$2\,i\sqrt{-\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{d\,m-2\,d\,u}}\;(d\,m-2\,d\,u)$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(-c+b\,(m-2\,u)+2\,(d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,d\,m-8\,d\,u}\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z)\cos\left(c\,z^r+f\,z\right)$

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$$\int z^n \sin^m(d\,z)\cos\left(c\,z^2+f\,z\right)dz = i^{-m}\,2^{-m-2}\,(i\,c)^{-n-1}\,e^{-\frac{i f^2}{4c}}\left((-1)^n\,i^m\binom{m}{\frac{m}{2}}(m \bmod 2-1)\right.$$

$$\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}\left(-\frac{i\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(f+2\,c\,z)^2}{4\,c}\right)+(-1)^n\,i^m\,e^{\frac{i f^2}{2c}}$$

$$\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}\left(\frac{i\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(f+2\,c\,z)^2}{4\,c}\right)-$$

$$(i\,c)^{n+1}\,e^{\frac{i f^2}{4c}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i(f+2dk-dm)^2}{4c}}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(f+2\,d\,k-d\,m))^{n-q}\,(-i\,(f+2\,d\,k-d\,m+2\,c\,z))^{q+1}\right.\right.$$

$$\left.\left(\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z)^2}{4\,c}\right)\right)(-i\,c)^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{(f-2dk+dm)^2}{c}+4m\pi\right)}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(f-2\,d\,k+d\,m))^{n-q}\,(-i\,(f+d\,(m-2\,k)+2\,c\,z))^{q+1}\right.$$

$$\left.\left(\frac{i\,(f+d\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(f+d\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\right)(-i\,c)^{-n-1}+$$

$$(i\,c)^{-n-1}\,e^{\frac{1}{4}i\left(4m\pi-\frac{(f+2dk-dm)^2}{c}\right)}\sum_{q=0}^{n}2^{q-n}\,(-i\,(f+2\,d\,k-d\,m))^{n-q}\,(i\,(f+2\,d\,k-d\,m+2\,c\,z))^{q+1}$$

$$\left(-\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z)^2}{4\,c}\right)+$$

$$(i\,c)^{-n-1}\,e^{-\frac{i(f-2dk+dm)^2}{4c}}\sum_{q=0}^{n}2^{q-n}\,(-i\,(f-2\,d\,k+d\,m))^{n-q}\,(i\,(f+d\,(m-2\,k)+2\,c\,z))^{q+1}$$

$$\left.\left.\left(-\frac{i\,(f+d\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(f+d\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\right)\right)/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

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$$\int z^n \sin^m(d\,z)\cos\left(\sqrt{z}\;c+f\,z\right)dz =$$

$$(-1)^{n-1}\,i^{-m}\,2^{-m-2\,n-2}\,e^{-\frac{i c^2}{4f}}\,f^{-2\,n-2}\left(i^m\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(i\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(c\left(c+2 f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)-\right.$$

$$\left.\left.2 i f \sqrt{-\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right)+i^m e^{\frac{i c^2}{2 f}}\binom{m}{\frac{m}{2}}(m \bmod 2-1)$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-i c)^{-h-k+2 n}\left(-i\left(c+2 f \sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(c\left(c+2 f \sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)+2\sqrt{\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}}\; f\, i\,\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right)+$$

$$e^{\frac{i c^2}{4 f}}(-1)^n f^{2 n+2}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\left(e^{-\frac{i c^2}{4(f-d m+2 d u)}}\left((f-d m+2 d u)^2\right)^{-2 n-1}\left((-1)^m\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k\right.\right.\right.$$

$$(i c)^{-h-k+2 n}\left(i\left(c+2(f-d m+2 d u)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2(f-d m+2 d u)\sqrt{z}\right)^2}{f-d m+2 d u}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2 i(f-d m+2 d u)\sqrt{-\frac{i\left(c+2(f-d m+2 d u)\sqrt{z}\right)^2}{f-d m+2 d u}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2(f-d m+2 d u)\sqrt{z}\right)^2}{4(f-d m+2 d u)}\right)-c\left(c+2(f-d m+2 d u)\sqrt{z}\right)$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2(f-d m+2 d u)\sqrt{z}\right)^2}{4(f-d m+2 d u)}\right)\right)\right)(-i(f-d m+2 d u))^{2 n}+$$

$$e^{\frac{i c^2}{2(f-d m+2 d u)}}(i(f-d m+2 d u))^{2 n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k(-i c)^{-h-k+2 n}\left(-i\left(c+2(f-d m+2 d u)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{f-dm+2du}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(-c\left(c+2(f-dm+2du)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\right) - 2\,i\,(f-dm+2du)$$

$$\left.\left.\sqrt{\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{f-dm+2du}}\;\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\right)\right)\right) +$$

$$\frac{1}{(f+dm-2du)^2}\left((-1)^m e^{\frac{i c^2}{4(f+dm-2du)}} (-i(f+dm-2du))^{-2n} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,c)^{-h-k+2n}\right.$$

$$\left(-i\left(c+2(f+dm-2du)\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c+2(f+dm-2du)\sqrt{z}\right)^2}{f+dm-2du}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(-c\left(c+2(f+dm-2du)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2(f+dm-2du)\sqrt{z}\right)^2}{4(f+dm-2du)}\right) -\right.$$

$$2\,i\,(f+dm-2du)\sqrt{\frac{i\left(c+2(f+dm-2du)\sqrt{z}\right)^2}{f+dm-2du}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2(f+dm-2du)\sqrt{z}\right)^2}{4(f+dm-2du)}\right)\right)\right) +$$

$$\frac{1}{(f+dm-2du)^2}\left(e^{-\frac{i c^2}{4(f+dm-2du)}} (i(f+dm-2du))^{-2n} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,c)^{-h-k+2n}\right.$$

$$\left(i\left(c+2(f+dm-2du)\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(c+2(f+dm-2du)\sqrt{z}\right)^2}{f+dm-2du}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(f+d\,m-2\,d\,u)\sqrt{-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)-c\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)\right)\Bigg)\Bigg)\Bigg)\Bigg) /;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\cos\left(c\,z^r+f\,z\right)$

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$$\int z^n \sin^m(e+d z)\cos\left(c z^2+f z\right)dz = i^{-m}\, 2^{-m-2}\, (i c)^{-n-1}\, e^{-\frac{i f^2}{4 c}} \left((-1)^n\, i^m \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{q=0}^{n} (-1)^q\, 2^{q-n}\, (i f)^{n-q}\, (i (f+2 c z))^{q+1} \left(-\frac{i (f+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+2 c z)^2}{4 c}\right) + (-1)^n\, i^m\, e^{\frac{i f^2}{2 c}} \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{q=0}^{n} (-1)^q\, 2^{q-n}\, (i f)^{n-q}\, (i (f+2 c z))^{q+1} \left(\frac{i (f+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+2 c z)^2}{4 c}\right) - (i c)^{n+1}\, e^{\frac{i f^2}{4 c}} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k\, e^{i e (m-2 k)} \binom{m}{k} \left(e^{\frac{i (f+2 d k-d m)^2}{4 c}} \left(\sum_{q=0}^{n} 2^{q-n}\, (i (f+2 d k-d m))^{n-q}\, (-i (f+2 d k-d m+2 c z))^{q+1} \left(\frac{i (f+2 d k-d m+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+2 d k-d m+2 c z)^2}{4 c}\right)\right)(-i c)^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{(f-2 d k+d m)^2}{c}+8 e (m-2 k)-4 m \pi\right)} \left(\sum_{q=0}^{n} 2^{q-n}\, (i (f-2 d k+d m))^{n-q}\, (-i (f+d (m-2 k)+2 c z))^{q+1} \left(\frac{i (f+d (m-2 k)+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+d (m-2 k)+2 c z)^2}{4 c}\right)\right)(-i c)^{-n-1} + (i c)^{-n-1}\, e^{\frac{1}{4} i \left(-\frac{(f+2 d k-d m)^2}{c}+8 e (2 k-m)+4 m \pi\right)} \sum_{q=0}^{n} 2^{q-n}\, (-i (f+2 d k-d m))^{n-q}\, (i (f+2 d k-d m+2 c z))^{q+1} \left(-\frac{i (f+2 d k-d m+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+2 d k-d m+2 c z)^2}{4 c}\right) + (i c)^{-n-1}\, e^{-\frac{i (f-2 d k+d m)^2}{4 c}} \sum_{q=0}^{n} 2^{q-n}\, (-i (f-2 d k+d m))^{n-q}\, (i (f+d (m-2 k)+2 c z))^{q+1} \left(-\frac{i (f+d (m-2 k)+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+d (m-2 k)+2 c z)^2}{4 c}\right)\right)\right) /; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+$$

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$$\int z^n \sin^m(d z+e)\cos\left(\sqrt{z}\; c+f z\right)dz = (-1)^{n-1}\, i^{-m}\, 2^{-m-2 n-2}\, e^{-\frac{i c^2}{4 f}}\, f^{-2 n-2} \left(i^m \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i c)^{-h-k+2 n} \left(i \left(c+2 f \sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)-\right.$$

$$\left.\left.2\,i\,f\sqrt{-\frac{i\left(c+2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right)+i^m\,e^{\frac{ic^2}{2f}}\binom{m}{\frac{m}{2}}(m\bmod 2-1)$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(-i\left(c+2f\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\left(c+2f\sqrt{z}\right)\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)+2\sqrt{\frac{i\left(c+2f\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)+$$

$$e^{\frac{ic^2}{4f}}(-1)^n f^{2n+2}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\,e^{-i(m-2u)e}\binom{m}{u}\left(e^{-\frac{ic^2}{4(f-dm+2du)}}\left((f-dm+2du)^2\right)^{-2n-1}\left((-1)^m\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\right.\right.\right.$$

$$4^k\,(i\,c)^{-h-k+2n}\left(i\left(c+2(f-dm+2du)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{f-dm+2du}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(f-dm+2du)\sqrt{-\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{f-dm+2du}}\;\Gamma\left(\frac{1}{2}(h+k+2),\right.\right.$$

$$\left.-\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\right)-c\left(c+2(f-dm+2du)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.$$

$$\left.\left.\left.\left.-\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\right)\right)\right)\right)(-i\,(f-dm+2du))^{2n}+e^{\frac{1}{2}i\left(\frac{c^2}{f-dm+2du}+4e(m-2u)\right)}$$

$$(i\,(f-dm+2du))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(-i\left(c+2(f-dm+2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c+2\,(f-d\,m+2\,d\,u)\,\sqrt{z}\right)^2}{f-d\,m+2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(-c\left(c+2\,(f-d\,m+2\,d\,u)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(c+2\,(f-d\,m+2\,d\,u)\,\sqrt{z}\right)^2}{4\,(f-d\,m+2\,d\,u)}\right)-2\,i\,(f-d\,m+2\,d\,u)$$

$$\left.\left.\sqrt{\frac{i\left(c+2\,(f-d\,m+2\,d\,u)\,\sqrt{z}\right)^2}{f-d\,m+2\,d\,u}}\ \Gamma\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(c+2\,(f-d\,m+2\,d\,u)\,\sqrt{z}\right)^2}{4\,(f-d\,m+2\,d\,u)}\right)\right)\right)+$$

$$\frac{1}{(f+d\,m-2\,d\,u)^2}\left((-1)^m\,e^{\frac{i\,c^2}{4\,(f+d\,m-2\,d\,u)}}\,(-i\,(f+d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\right.$$

$$\left(-i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-c\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)-\right.$$

$$2\,i\,(f+d\,m-2\,d\,u)\sqrt{\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)\right)\right)+$$

$$\frac{1}{(f+d\,m-2\,d\,u)^2}\left(e^{\frac{1}{4}\,i\left(8\,e\,(m-2\,u)-\frac{c^2}{f+d\,m-2\,d\,u}\right)}\,(i\,(f+d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\right.$$

$$\left(i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(f+d\,m-2\,d\,u)\sqrt{-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)-c\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)\right)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\sin^m(b\,z^r)\cos(c\,z^r+f\,z)$

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$$
\begin{aligned}
&\int z^n \sin^m\left(b z^2\right) \cos\left(c z^2 + f z\right) dz = \\
&i^{-m}\, 2^{-m-2}\, (i\, c)^{-n-1}\, e^{-\frac{i f^2}{4 c}} \Bigg((-1)^n\, i^m \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{q=0}^{n} (-1)^q\, 2^{q-n}\, (i\, f)^{n-q}\, (i\, (f + 2\, c\, z))^{q+1} \left(-\frac{i\, (f + 2\, c\, z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \\
&\quad \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\, (f + 2\, c\, z)^2}{4\, c}\right) + (-1)^n\, i^m\, e^{\frac{i f^2}{2 c}} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \\
&\quad \sum_{q=0}^{n} (-1)^q\, 2^{q-n}\, (i\, f)^{n-q}\, (i\, (f + 2\, c\, z))^{q+1} \left(\frac{i\, (f + 2\, c\, z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\, (f + 2\, c\, z)^2}{4\, c}\right) - (i\, c)^{n+1}\, e^{\frac{i f^2}{4 c}} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \\
&\quad \binom{m}{k} \Bigg(e^{-\frac{1}{4} i \left(-\frac{f^2}{c - 2 b k + b m} - 4 m \pi\right)} \Bigg(\sum_{q=0}^{n} 2^{q-n}\, (i\, f)^{n-q}\, (-i\, (f + 2\, (c - 2\, b\, k + b\, m)\, z))^{q+1} \left(\frac{i\, (f + 2\, (c - 2\, b\, k + b\, m)\, z)^2}{c - 2\, b\, k + b\, m}\right)^{\frac{1}{2}(-q-1)} \\
&\quad\quad \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\, (f + 2\, (c - 2\, b\, k + b\, m)\, z)^2}{4\, (c - 2\, b\, k + b\, m)}\right) \Bigg) (-i\, (c - 2\, b\, k + b\, m))^{-n-1} + \\
&\quad e^{-\frac{i f^2}{4 (c - 2 b k + b m)}}\, (i\, (c - 2\, b\, k + b\, m))^{-n-1} \sum_{q=0}^{n} 2^{q-n}\, (-i\, f)^{n-q}\, (i\, (f + 2\, (c - 2\, b\, k + b\, m)\, z))^{q+1} \\
&\quad\quad \left(-\frac{i\, (f + 2\, (c - 2\, b\, k + b\, m)\, z)^2}{c - 2\, b\, k + b\, m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\, (f + 2\, (c - 2\, b\, k + b\, m)\, z)^2}{4\, (c - 2\, b\, k + b\, m)}\right) + \\
&\quad e^{\frac{i f^2}{4 (c + 2 b k - b m)}}\, (-i\, (c + 2\, b\, k - b\, m))^{-n-1} \sum_{q=0}^{n} 2^{q-n}\, (i\, f)^{n-q}\, (-i\, (f + 2\, c\, z + 4\, b\, k\, z - 2\, b\, m\, z))^{q+1} \\
&\quad\quad \left(\frac{i\, (f + 2\, c\, z + 4\, b\, k\, z - 2\, b\, m\, z)^2}{c + 2\, b\, k - b\, m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\, (f + 2\, c\, z + 4\, b\, k\, z - 2\, b\, m\, z)^2}{4\, (c + 2\, b\, k - b\, m)}\right) + \\
&\quad e^{\frac{1}{4} i \left(4 m \pi - \frac{f^2}{c + 2 b k - b m}\right)}\, (i\, (c + 2\, b\, k - b\, m))^{-n-1} \sum_{q=0}^{n} 2^{q-n}\, (-i\, f)^{n-q}\, (i\, (f + 2\, c\, z + 4\, b\, k\, z - 2\, b\, m\, z))^{q+1} \\
&\quad\quad \left(-\frac{i\, (f + 2\, c\, z + 4\, b\, k\, z - 2\, b\, m\, z)^2}{c + 2\, b\, k - b\, m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \\
&\quad\quad \Gamma\left(\frac{q+1}{2}, -\frac{i\, (f + 2\, c\, z + 4\, b\, k\, z - 2\, b\, m\, z)^2}{4\, (c + 2\, b\, k - b\, m)}\right) \Bigg) \Bigg) \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+
\end{aligned}
$$

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$$\int z^n \sin^m\left(b\sqrt{z}\right)\cos\left(\sqrt{z}\,c+f\,z\right)dz = (-1)^{n-1}\,i^{-m}\,2^{-m-2n-2}\,e^{-\frac{i c^2}{4f}}\,f^{-2n-2}\left(i^m\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(i\left(c+2f\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)-\right.$$

$$\left.2\,i\,f\sqrt{-\frac{i\left(c+2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)+i^m\,e^{\frac{i c^2}{2f}}\binom{m}{\frac{m}{2}}(m \bmod 2-1)$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(-i\left(c+2f\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\left(c+2f\sqrt{z}\right)\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)+2\sqrt{\frac{i\left(c+2f\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)+$$

$$e^{\frac{i c^2}{4f}}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\left((-1)^m\,e^{\frac{i(c+b m-2 b u)^2}{4f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(c+b\,m-2\,b\,u))^{-h-k+2n}\right.$$

$$\left(-i\left(c+b\,(m-2\,u)+2f\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+b\,(m-2\,u)+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-c-b\,m+2\,b\,u)\left(c+b\,(m-2\,u)+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(c+b\,(m-2\,u)+2f\sqrt{z}\right)^2}{4f}\right)-\right.$$

$$\left.2\,i\,f\sqrt{\frac{i\left(c+b\,(m-2\,u)+2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(c+b\,(m-2\,u)+2f\sqrt{z}\right)^2}{4f}\right)\right)+$$

$$e^{-\frac{i(c-b m+2 b u)^2}{4 f}} \left(e^{\frac{i(c-b m+2 b u)^2}{2 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i(c-b m+2 b u))^{-h-k+2 n} \right.$$

$$\left(-i\left(c-b(m-2 u)+2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c-b(m-2 u)+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((-c+b m-2 b u)\left(c-b(m-2 u)+2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c-b(m-2 u)+2 f \sqrt{z}\right)^2}{4 f}\right) - \right.$$

$$\left. 2 i f \sqrt{\frac{i\left(c-b(m-2 u)+2 f \sqrt{z}\right)^2}{f}} \, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c-b(m-2 u)+2 f \sqrt{z}\right)^2}{4 f}\right)\right) +$$

$$(-1)^m \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i(c-b m+2 b u))^{-h-k+2 n} \left(i\left(c-b(m-2 u)+2 f \sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c-b(m-2 u)+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((-c+b m-2 b u)\left(c-b(m-2 u)+2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \right.\right.$$

$$\left. -\frac{i\left(c-b(m-2 u)+2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{i\left(c-b(m-2 u)+2 f \sqrt{z}\right)^2}{f}}$$

$$\left.\left. f \, i \, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c-b(m-2 u)+2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) +$$

$$e^{-\frac{i(c+b m-2 b u)^2}{4 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i(c+b m-2 b u))^{-h-k+2 n} \left(i\left(c+b(m-2 u)+2 f \sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((-c-b\,m+2\,b\,u)\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+2\,\sqrt{-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}}$$

$$f\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\sin^m\left(b\,z^r+e\right)\cos\left(c\,z^r+f\,z\right)$

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$$\int z^n \sin^m(b z^2+e)\cos(c z^2+f z)\,dz = i^{-m} 2^{-m-2} (i c)^{-n-1} e^{-\frac{i f^2}{4c}} \Bigg((-1)^n i^m \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q} (i(f+2cz))^{q+1} \left(-\frac{i(f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{i(f+2cz)^2}{4c}\right) + (-1)^n i^m e^{\frac{i f^2}{2c}} \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q} (i(f+2cz))^{q+1} \left(\frac{i(f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i(f+2cz)^2}{4c}\right) - (i c)^{n+1} e^{\frac{i f^2}{4c}} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k e^{i(e m-2ek)} \binom{m}{k} \Bigg(e^{-\frac{1}{4} i\left(-\frac{f^2}{c-2bk+bm}+8e(m-2k)-4m\pi\right)} \Bigg(\sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i(f+2(c-2bk+bm)z))^{q+1} \left(\frac{i(f+2(c-2bk+bm)z)^2}{c-2bk+bm}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i(f+2(c-2bk+bm)z)^2}{4(c-2bk+bm)}\right)\Bigg) (-i(c-2bk+bm))^{-n-1} + e^{-\frac{i f^2}{4(c-2bk+bm)}} (i(c-2bk+bm))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i(f+2(c-2bk+bm)z))^{q+1} \left(-\frac{i(f+2(c-2bk+bm)z)^2}{c-2bk+bm}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{i(f+2(c-2bk+bm)z)^2}{4(c-2bk+bm)}\right) + e^{\frac{i f^2}{4(c+2bk-bm)}} (-i(c+2bk-bm))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i(f+2cz+4bkz-2bmz))^{q+1} \left(\frac{i(f+2cz+4bkz-2bmz)^2}{c+2bk-bm}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i(f+2cz+4bkz-2bmz)^2}{4(c+2bk-bm)}\right) + e^{\frac{1}{4} i\left(-\frac{f^2}{c+2bk-bm}+8e(2k-m)+4m\pi\right)} (i(c+2bk-bm))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i(f+2cz+4bkz-2bmz))^{q+1} \left(-\frac{i(f+2cz+4bkz-2bmz)^2}{c+2bk-bm}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{i(f+2cz+4bkz-2bmz)^2}{4(c+2bk-bm)}\right)\Bigg)\Bigg) /;\; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

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$$\int z^n \sin^m(\sqrt{z}\, b+e)\cos(\sqrt{z}\, c+f z)\,dz =$$

$$(-1)^{n-1} i^{-m} 2^{-m-2n-2} e^{-\frac{i c^2}{4f}} f^{-2n-2} \Bigg(i^m \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2n} \left(i\left(c+2f\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(c\left(c+2 f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)-\right.$$

$$\left.\left. 2 i f \sqrt{-\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) + i^m e^{\frac{i c^2}{2 f}} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1)$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-i c)^{-h-k+2 n}\left(-i\left(c+2 f \sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(c\left(c+2 f \sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)+2\sqrt{\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right)+$$

$$e^{\frac{i c^2}{4 f}} \sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u e^{-i(m-2u)e}\binom{m}{u}\left((-1)^m e^{\frac{i(c+b m-2 b u)^2}{4 f}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-i(c+b m-2 b u))^{-h-k+2 n}\right.$$

$$\left(-i\left(c+b(m-2u)+2 f \sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+b(m-2u)+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((-c-b m+2 b u)\left(c+b(m-2u)+2 f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+b(m-2u)+2 f \sqrt{z}\right)^2}{4 f}\right)-\right.$$

$$\left.\left. 2 i f \sqrt{\frac{i\left(c+b(m-2u)+2 f \sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+b(m-2u)+2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right)+$$

$$e^{-\frac{i(c-b m+2 b u)^2}{4 f}}\left(e^{\frac{1}{2} i\left(\frac{(c-b m+2 b u)^2}{f}+4 e(m-2u)\right)} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-i(c-b m+2 b u))^{-h-k+2 n}\right.$$

$$\left(-i\left(c-b(m-2u)+2 f \sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c-b(m-2u)+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((-c+b\,m-2\,b\,u)\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)-\right.$$

$$\left.2\,i\,f\,\sqrt{\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)\right)+$$

$$(-1)^m\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(c-b\,m+2\,b\,u))^{-h-k+2\,n}\left(i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-c+b\,m-2\,b\,u)\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+2\,\sqrt{-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}}$$

$$\left.\left.f\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)\right)+$$

$$e^{\frac{1}{4}\,i\left(8\,e\,(m-2\,u)-\frac{(c+b\,m-2\,b\,u)^2}{f}\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(c+b\,m-2\,b\,u))^{-h-k+2\,n}\left(i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((-c-b\,m+2\,b\,u)\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+2\,\sqrt{-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}}$$

$$\left.\left.\left.f\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + d z) \cos(c z^r + f z)$

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$$\int z^n \sin^m\left(b z^2 + d z\right) \cos\left(c z^2 + f z\right) dz = 2^{-m-2} \left((-1)^n (i c)^{-n-1} e^{\frac{i f^2}{4 c}} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \right.$$
$$\left(\sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q} (i (f + 2 c z))^{q+1} \left(\frac{i (f + 2 c z)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f + 2 c z)^2}{4 c} \right) + \right.$$
$$\left. e^{-\frac{i f^2}{2 c}} \sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q} (i (f + 2 c z))^{q+1} \left(-\frac{i (f + 2 c z)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f + 2 c z)^2}{4 c} \right) \right) -$$
$$i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i (f + d (m - 2 k))^2}{-4 c + 8 b k - 4 b m}} \left(\sum_{q=0}^{n} 2^{q-n} (i (-f + 2 d k - d m))^{n-q} (-i (-f + 2 d k - d m - 2 c z + 4 b k z - 2 b m z))^{q+1} \right. \right.$$
$$\left(\frac{i (f + d (m - 2 k) + 2 (c - 2 b k + b m) z)^2}{-c + 2 b k - b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$
$$\left. \Gamma\left(\frac{q+1}{2}, \frac{i (f + d (m - 2 k) + 2 (c - 2 b k + b m) z)^2}{-4 c + 8 b k - 4 b m} \right) \right) (-i (-c + 2 b k - b m))^{-n-1} +$$
$$e^{i \left(m \pi - \frac{(f + d (m - 2 k))^2}{-4 c + 8 b k - 4 b m} \right)} (i (-c + 2 b k - b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (-f + 2 d k - d m))^{n-q}$$
$$(i (-f + 2 d k - d m - 2 c z + 4 b k z - 2 b m z))^{q+1} \left(-\frac{i (f + d (m - 2 k) + 2 (c - 2 b k + b m) z)^2}{-c + 2 b k - b m} \right)^{\frac{1}{2}(-q-1)}$$
$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f + d (m - 2 k) + 2 (c - 2 b k + b m) z)^2}{-4 c + 8 b k - 4 b m} \right) +$$
$$e^{\frac{i (f + 2 d k - d m)^2}{4 c + 8 b k - 4 b m}} (-i (c + 2 b k - b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i (f + 2 d k - d m))^{n-q}$$
$$(-i (f + d (2 k - m) + 2 (c + 2 b k - b m) z))^{q+1} \left(\frac{i (f + d (2 k - m) + 2 (c + 2 b k - b m) z)^2}{c + 2 b k - b m} \right)^{\frac{1}{2}(-q-1)}$$
$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f + d (2 k - m) + 2 (c + 2 b k - b m) z)^2}{4 c + 8 b k - 4 b m} \right) +$$

$$e^{i\left(m\pi-\frac{(f+2dk-dm)^2}{4c+8bk-4bm}\right)} (i(c+2bk-bm))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i(f+2dk-dm))^{n-q}$$

$$(i(f+d(2k-m)+2(c+2bk-bm)z))^{q+1} \left(-\frac{i(f+d(2k-m)+2(c+2bk-bm)z)^2}{c+2bk-bm}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(f+d(2k-m)+2(c+2bk-bm)z)^2}{4c+8bk-4bm}\right)\right)\right) /; n \in \mathbb{N} \wedge m \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d z\right) \cos\left(\sqrt{z}\, c + f z\right) dz =$$

$$2^{-m-2} \left(\frac{1}{c} \left((-1)^n\, i\, 4^{-n} e^{\frac{i c^2}{4 f}} f^{-2n-2} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c)^{-h-k+2n+1} \left(-i\left(c+2f\sqrt{z}\right)\right)^{h+k}\right.\right.\right.$$

$$\left(\frac{i\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(-c\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right) - 2 i f\right.$$

$$\left.\left.\sqrt{\frac{i\left(c+2f\sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right) - e^{-\frac{i c^2}{2 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2n+1}$$

$$\left(i\left(c+2f\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(2 i f \sqrt{-\frac{i\left(c+2f\sqrt{z}\right)^2}{f}}\right.$$

$$\left.\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right) - c\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right)\right)\right) +$$

$$i^{-m} 4^{-n} \sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^u \binom{m}{u} \left(e^{-\frac{i(c+b(m-2u))^2}{4(f+d(m-2u))}} \left((f+d(m-2u))^2\right)^{-2n-1} \left(-(-1)^m e^{\frac{i(c+b(m-2u))^2}{2(f+d(m-2u))}} (i(f+d(m-2u)))^{2n}\right.\right.$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i(c+b(m-2u)))^{-h-k+2n} \left(-i\left(c+b(m-2u)+2(f+d(m-2u))\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\,\right)^2}{f+d\,(m-2\,u)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-c-b\,(m-2\,u))\left(c+b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\,\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\,\right)^2}{4\,(f+d\,(m-2\,u))}\right)-$$

$$2\,i\,(f+d\,(m-2\,u))\sqrt{\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\,\right)^2}{f+d\,(m-2\,u)}}$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\,\right)^2}{4\,(f+d\,(m-2\,u))}\right)\right)-(-i\,(f+d\,(m-2\,u)))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(c+b\,(m-2\,u)))^{-h-k+2\,n}\left(i\left(c+b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\,\right)^2}{f+d\,(m-2\,u)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left((-c-b\,(m-2\,u))\left(c+b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\,\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\,\right)^2}{4\,(f+d\,(m-2\,u))}\right)+$$

$$2\,i\,(f+d\,(m-2\,u))\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\,\right)^2}{4\,(f+d\,(m-2\,u))}\right)$$

$$\left.\left.\sqrt{-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,(m-2\,u))\,\sqrt{z}\,\right)^2}{f+d\,(m-2\,u)}}\,\right)\right)-$$

$$\left((-1)^m e^{\frac{i(-c+b m-2 b u)^2}{-4 f+4 d m-8 d u}} (-i(-f+d m-2 d u))^{-2 n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i(-c+b m-2 b u))^{-h-k+2 n}\right.$$

$$\left(-i\left(-c+b(m-2 u)+2(-f+d m-2 d u) \sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(-c+b(m-2 u)+2(-f+d m-2 d u) \sqrt{z}\right)^2}{-f+d m-2 d u}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k}\left((c-b m+2 b u)\left(-c+b(m-2 u)+2(-f+d m-2 d u) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(-c+b(m-2 u)+2(-f+d m-2 d u) \sqrt{z}\right)^2}{-4 f+4 d m-8 d u}\right)-$$

$$2 i(-f+d m-2 d u) \sqrt{\frac{i\left(-c+b(m-2 u)+2(-f+d m-2 d u) \sqrt{z}\right)^2}{-f+d m-2 d u}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(-c+b(m-2 u)+2(-f+d m-2 d u) \sqrt{z}\right)^2}{-4 f+4 d m-8 d u}\right)\right)\right) \Big/ (-f+d m-2 d u)^2 -$$

$$\left(e^{-\frac{i(-c+b m-2 b u)^2}{-4 f+4 d m-8 d u}} (i(-f+d m-2 d u))^{-2 n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i(-c+b m-2 b u))^{-h-k+2 n}\right.$$

$$\left(i\left(-c+b(m-2 u)+2(-f+d m-2 d u) \sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(-c+b(m-2 u)+2(-f+d m-2 d u) \sqrt{z}\right)^2}{-f+d m-2 d u}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k}\left((c-b m+2 b u)\left(-c+b(m-2 u)+2(-f+d m-2 d u) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(-c+b(m-2 u)+2(-f+d m-2 d u) \sqrt{z}\right)^2}{-4 f+4 d m-8 d u}\right)+$$

$$2\,i\,(-f+d\,m-2\,d\,u)\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(-c+b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{-4\,f+4\,d\,m-8\,d\,u}\right)$$

$$\sqrt{-\frac{i\left(-c+b\,(m-2\,u)+2\,(-f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{-f+d\,m-2\,d\,u}}\Bigg)\Bigg)\Big/\,(-f+d$$

$$m-2\,d\,u)^2\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r+d\,z+e)\cos(c\,z^r+f\,z)$

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$$\int z^n \sin^m(b\,z^2+d\,z+e)\cos(c\,z^2+f\,z)\,dz = i^{-m}\,2^{-m-2}\,(i\,c)^{-n-1}\,e^{-\frac{i\,f^2}{4\,c}}\Bigg((-1)^n\,i^m\binom{m}{\frac{m}{2}}(m \bmod 2-1)$$

$$\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}\left(-\frac{i\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(f+2\,c\,z)^2}{4\,c}\right)+(-1)^n\,i^m\,e^{\frac{i\,f^2}{2\,c}}$$

$$\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}\left(\frac{i\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(f+2\,c\,z)^2}{4\,c}\right)-$$

$$(i\,c)^{n+1}\,e^{\frac{i\,f^2}{4\,c}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{i\,(m-2\,k)\,e}\binom{m}{k}\Bigg(e^{-\frac{1}{4}\,i\left(-\frac{(f-2\,d\,k+d\,m)^2}{c-2\,b\,k+b\,m}+8\,e\,(m-2\,k)-4\,m\,\pi\right)}\Bigg(\sum_{q=0}^{n}2^{q-n}\,(i\,(f-2\,d\,k+d\,m))^{n-q}$$

$$(-i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z))^{q+1}\left(\frac{i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z)^2}{c-2\,b\,k+b\,m}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z)^2}{4\,(c-2\,b\,k+b\,m)}\right)\Bigg)(-i\,(c-2\,b\,k+b\,m))^{-n-1}+$$

$$e^{-\frac{i\,(f-2\,d\,k+d\,m)^2}{4\,(c-2\,b\,k+b\,m)}}\,(i\,(c-2\,b\,k+b\,m))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(f-2\,d\,k+d\,m))^{n-q}$$

$$(i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z))^{q+1}\left(-\frac{i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z)^2}{c-2\,b\,k+b\,m}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z)^2}{4\,(c-2\,b\,k+b\,m)}\right)+$$

$$e^{\frac{i(f+2dk-dm)^2}{4(c+2bk-bm)}} (-i(c+2bk-bm))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i(f+2dk-dm))^{n-q}$$

$$(-i(f+2dk-dm+2cz+4bkz-2bmz))^{q+1} \left(\frac{i(f+2dk-dm+2cz+4bkz-2bmz)^2}{c+2bk-bm}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(f+2dk-dm+2cz+4bkz-2bmz)^2}{4(c+2bk-bm)}\right) +$$

$$e^{\frac{1}{4} i\left(-\frac{(f+2dk-dm)^2}{c+2bk-bm}+8e(2k-m)+4m\pi\right)} (i(c+2bk-bm))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i(f+2dk-dm))^{n-q}$$

$$(i(f+2dk-dm+2cz+4bkz-2bmz))^{q+1} \left(-\frac{i(f+2dk-dm+2cz+4bkz-2bmz)^2}{c+2bk-bm}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(f+2dk-dm+2cz+4bkz-2bmz)^2}{4(c+2bk-bm)}\right)\right)\right)\right) /; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d z + e\right) \cos\left(\sqrt{z}\, c + f z\right) dz ==$$

$$(-1)^{n-1} i^{-m} 2^{-m-2n-2} e^{-\frac{i c^2}{4f}} f^{-2n-2} \left(i^m \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c)^{-h-k+2n} \left(i\left(c+2f\sqrt{z}\right)\right)^{h+k} \right.$$

$$\left(-\frac{i\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\left(c+2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right) - \right.$$

$$\left. 2 i f \sqrt{-\frac{i\left(c+2f\sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right) + i^m e^{\frac{i c^2}{2f}} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1)$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c)^{-h-k+2n} \left(-i\left(c+2f\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\left(c+2f\sqrt{z}\right) \right.$$

$$\left.\left. \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right) + 2\sqrt{\frac{i\left(c+2f\sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right) +$$

$$e^{\frac{i c^2}{4 f}} (i f)^{2 n} f^2 \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u e^{-i (m-2 u) e} \binom{m}{u} \Bigg(e^{-\frac{i (c-b m+2 b u)^2}{4 (f-d m+2 d u)}} \left((f-d m+2 d u)^2\right)^{-2 n-1}$$

$$\Bigg((-1)^m \Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (c-b m+2 b u))^{-h-k+2 n} \left(i \left(c-b (m-2 u)+2 (f-d m+2 d u) \sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i \left(c-b (m-2 u)+2 (f-d m+2 d u) \sqrt{z}\right)^2}{f-d m+2 d u}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\Bigg(2 i (f-d m+2 d u) \sqrt{-\frac{i \left(c-b (m-2 u)+2 (f-d m+2 d u) \sqrt{z}\right)^2}{f-d m+2 d u}}$$

$$\Gamma\left(\frac{1}{2} (h+k+2), -\frac{i \left(c-b (m-2 u)+2 (f-d m+2 d u) \sqrt{z}\right)^2}{4 (f-d m+2 d u)}\right) -$$

$$(c-b m+2 b u) \left(c-b (m-2 u)+2 (f-d m+2 d u) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2} (h+k+1), -\frac{i \left(c-b (m-2 u)+2 (f-d m+2 d u) \sqrt{z}\right)^2}{4 (f-d m+2 d u)}\right)\Bigg)\Bigg)$$

$$(-i (f-d m+2 d u))^{2 n} + e^{\frac{1}{2} i \left(\frac{(c-b m+2 b u)^2}{f-d m+2 d u}+4 e (m-2 u)\right)} (i (f-d m+2 d u))^{2 n}$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (c-b m+2 b u))^{-h-k+2 n} \left(-i \left(c-b (m-2 u)+2 (f-d m+2 d u) \sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i \left(c-b (m-2 u)+2 (f-d m+2 d u) \sqrt{z}\right)^2}{f-d m+2 d u}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\Bigg(-(c-b m+2 b u) \left(c-b (m-2 u)+2 (f-d m+2 d u) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2} (h+k+1), \frac{i \left(c-b (m-2 u)+2 (f-d m+2 d u) \sqrt{z}\right)^2}{4 (f-d m+2 d u)}\right) -$$

$$2\,i\,(f-d\,m+2\,d\,u)\sqrt{\frac{i\left(c-b\,(m-2\,u)+2\,(f-d\,m+2\,d\,u)\sqrt{z}\right)^2}{f-d\,m+2\,d\,u}}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c-b\,(m-2\,u)+2\,(f-d\,m+2\,d\,u)\sqrt{z}\right)^2}{4\,(f-d\,m+2\,d\,u)}\right)\right)\right)+$$

$$\frac{1}{(f+d\,m-2\,d\,u)^2}\left((-1)^m\,e^{\frac{i\,(c+b\,m-2\,b\,u)^2}{4\,(f+d\,m-2\,d\,u)}}\,(-i\,(f+d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(-i\,(c+b\,m-2\,b\,u))^{-h-k+2\,n}\left(-i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-(c+b\,m-2\,b\,u)\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)-$$

$$2\,i\,(f+d\,m-2\,d\,u)\sqrt{\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)\right)\right)+$$

$$\frac{1}{(f+d\,m-2\,d\,u)^2}\left(e^{\frac{1}{4}\,i\left(8\,e\,(m-2\,u)-\frac{(c+b\,m-2\,b\,u)^2}{f+d\,m-2\,d\,u}\right)}\,(i\,(f+d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(i\,(c+b\,m-2\,b\,u))^{-h-k+2\,n}\left(i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\, i\, (f + d\, m - 2\, d\, u) \sqrt{-\frac{i\left(c + b\, (m - 2\, u) + 2\, (f + d\, m - 2\, d\, u)\sqrt{z}\right)^2}{f + d\, m - 2\, d\, u}}\right.$$

$$\Gamma\left(\frac{1}{2}\, (h + k + 2),\, -\frac{i\left(c + b\, (m - 2\, u) + 2\, (f + d\, m - 2\, d\, u)\sqrt{z}\right)^2}{4\, (f + d\, m - 2\, d\, u)}\right) -$$

$$(c + b\, m - 2\, b\, u)\left(c + b\, (m - 2\, u) + 2\, (f + d\, m - 2\, d\, u)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\, (h + k + 1),\right.$$

$$\left.\left.-\frac{i\left(c + b\, (m - 2\, u) + 2\, (f + d\, m - 2\, d\, u)\sqrt{z}\right)^2}{4\, (f + d\, m - 2\, d\, u)}\right)\right)\right)\right)\right) /;\, n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+$$

Involving $z^n \sin^m(d\, z) \cos\left(c\, z^r + f\, z + g\right)$

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$$\int z^n \sin^m(d\,z)\cos\left(c\,z^2+f\,z+g\right)dz = i^{-m}\,2^{-m-2}\,(i\,c)^{-n-1}\,e^{-\frac{i\left(f^2+4\,c\,g\right)}{4\,c}}\Bigg((-1)^n\,i^m\,e^{2\,i\,g}\binom{m}{\frac{m}{2}}(m \bmod 2-1)$$

$$\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}\left(-\frac{i\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(f+2\,c\,z)^2}{4\,c}\right)+(-1)^n\,i^m\,e^{\frac{i\,f^2}{2\,c}}$$

$$\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}\left(\frac{i\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(f+2\,c\,z)^2}{4\,c}\right)-$$

$$(i\,c)^{n+1}\,e^{\frac{i\,f^2}{4\,c}+2\,i\,g}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{\frac{i\,(f+2\,d\,k-d\,m)^2}{4\,c}-2\,i\,g}\Bigg(\sum_{q=0}^{n}2^{q-n}\,(i\,(f+2\,d\,k-d\,m))^{n-q}\,(-i\,(f+2\,d\,k-d\,m+2\,c\,z))^{q+1}$$

$$\left(\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z)^2}{4\,c}\right)\Bigg)(-i\,c)^{-n-1}+$$

$$e^{-\frac{1}{4}\,i\left(-\frac{(f-2\,d\,k+d\,m)^2}{c}+8\,g-4\,m\,\pi\right)}\Bigg(\sum_{q=0}^{n}2^{q-n}\,(i\,(f-2\,d\,k+d\,m))^{n-q}\,(-i\,(f+d\,(m-2\,k)+2\,c\,z))^{q+1}$$

$$\left(\frac{i\,(f+d\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(f+d\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\Bigg)(-i\,c)^{-n-1}+$$

$$(i\,c)^{-n-1}\,e^{\frac{1}{4}\,i\left(4\,m\,\pi-\frac{(f+2\,d\,k-d\,m)^2}{c}\right)}\sum_{q=0}^{n}2^{q-n}\,(-i\,(f+2\,d\,k-d\,m))^{n-q}\,(i\,(f+2\,d\,k-d\,m+2\,c\,z))^{q+1}$$

$$\left(-\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z)^2}{4\,c}\right)+$$

$$(i\,c)^{-n-1}\,e^{-\frac{i\,(f-2\,d\,k+d\,m)^2}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(-i\,(f-2\,d\,k+d\,m))^{n-q}\,(i\,(f+d\,(m-2\,k)+2\,c\,z))^{q+1}$$

$$\left(-\frac{i\,(f+d\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(f+d\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

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$$\int z^n \sin^m(d\,z)\cos\left(\sqrt{z}\,c+f\,z+g\right)dz =$$

$$(-1)^{n-1}\,i^{-m}\,2^{-m-2\,n-2}\,e^{-\frac{i\left(c^2+4\,f\,g\right)}{4\,f}}\,f^{-2\,n-2}\Bigg(i^m\,e^{2\,i\,g}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(i\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(c\left(c+2 f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)-\right.$$

$$\left.\left. 2 i f \sqrt{-\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) + i^m e^{\frac{i c^2}{2 f}} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1)$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-i c)^{-h-k+2n}\left(-i\left(c+2 f \sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(c\left(c+2 f \sqrt{z}\right)\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)+2\sqrt{\frac{i\left(c+2 f \sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\right)+$$

$$e^{\frac{i c^2}{4 f}} (-1)^n f^{2n+2} \sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^u \binom{m}{u}\left(e^{-\frac{i c^2}{4(f-d m+2 d u)}}\left((f-d m+2 d u)^2\right)^{-2n-1}\left((-1)^m e^{2 i g}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k\right.\right.\right.$$

$$(i c)^{-h-k+2n}\left(i\left(c+2(f-d m+2 d u)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2(f-d m+2 d u)\sqrt{z}\right)^2}{f-d m+2 d u}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2 i (f-d m+2 d u)\sqrt{-\frac{i\left(c+2(f-d m+2 d u)\sqrt{z}\right)^2}{f-d m+2 d u}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2(f-d m+2 d u)\sqrt{z}\right)^2}{4(f-d m+2 d u)}\right)-c\left(c+2(f-d m+2 d u)\sqrt{z}\right)$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2(f-d m+2 d u)\sqrt{z}\right)^2}{4(f-d m+2 d u)}\right)\right)\right)\right)(-i(f-d m+2 d u))^{2n}+$$

$$e^{\frac{i c^2}{2(f-d m+2 d u)}} (i(f-d m+2 d u))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-i c)^{-h-k+2n}\left(-i\left(c+2(f-d m+2 d u)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c+2(f-d\,m+2\,d\,u)\sqrt{z}\right)^2}{f-d\,m+2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-c\left(c+2(f-d\,m+2\,d\,u)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(c+2(f-d\,m+2\,d\,u)\sqrt{z}\right)^2}{4(f-d\,m+2\,d\,u)}\right)-2\,i\,(f-d\,m+2\,d\,u)$$

$$\left.\left.\sqrt{\frac{i\left(c+2(f-d\,m+2\,d\,u)\sqrt{z}\right)^2}{f-d\,m+2\,d\,u}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c+2(f-d\,m+2\,d\,u)\sqrt{z}\right)^2}{4(f-d\,m+2\,d\,u)}\right)\right)\right)+$$

$$\frac{1}{(f+d\,m-2\,d\,u)^2}\left((-1)^m\,e^{\frac{i\,c^2}{4(f+d\,m-2\,d\,u)}}\,(-i\,(f+d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\right.$$

$$\left(-i\left(c+2(f+d\,m-2\,d\,u)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-c\left(c+2(f+d\,m-2\,d\,u)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(c+2(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4(f+d\,m-2\,d\,u)}\right)-\right.$$

$$2\,i\,(f+d\,m-2\,d\,u)\sqrt{\frac{i\left(c+2(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c+2(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4(f+d\,m-2\,d\,u)}\right)\right)\right)+$$

$$\frac{1}{(f+d\,m-2\,d\,u)^2}\left(e^{\frac{1}{4}i\left(8\,g-\frac{c^2}{f+d\,m-2\,d\,u}\right)}\,(i\,(f+d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\right.$$

$$\left(i\left(c+2(f+d\,m-2\,d\,u)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(f+d\,m-2\,d\,u)\sqrt{-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)-c\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)\right)\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\cos\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \sin^m(d z+e)\cos\left(c z^2+f z+g\right) dz = i^{-m} 2^{-m-2} (i c)^{-n-1} e^{-\frac{i\left(f^2+4 c g\right)}{4 c}} \Bigg((-1)^n i^m e^{2 i g} \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{q=0}^n (-1)^q 2^{q-n} (i f)^{n-q} (i (f+2 c z))^{q+1} \left(-\frac{i (f+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+2 c z)^2}{4 c}\right) + (-1)^n i^m e^{\frac{i f^2}{2 c}} \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{q=0}^n (-1)^q 2^{q-n} (i f)^{n-q} (i (f+2 c z))^{q+1} \left(\frac{i (f+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+2 c z)^2}{4 c}\right) - (i c)^{n+1} e^{\frac{i\left(f^2+4 c g\right)}{4 c}} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k e^{i (g-2 e k+e m)} \binom{m}{k} \Bigg(e^{\frac{i (f+2 d k-d m)^2}{4 c}-2 i g} \Bigg(\sum_{q=0}^n 2^{q-n} (i (f+2 d k-d m))^{n-q} (-i (f+2 d k-d m+2 c z))^{q+1} \left(\frac{i (f+2 d k-d m+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+2 d k-d m+2 c z)^2}{4 c}\right)\Bigg) (-i c)^{-n-1} + e^{-\frac{1}{4} i\left(-\frac{(f-2 d k+d m)^2}{c}+8 g+8 e (m-2 k)-4 m \pi\right)} \Bigg(\sum_{q=0}^n 2^{q-n} (i (f-2 d k+d m))^{n-q} (-i (f+d (m-2 k)+2 c z))^{q+1} \left(\frac{i (f+d (m-2 k)+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+d (m-2 k)+2 c z)^2}{4 c}\right)\Bigg) (-i c)^{-n-1} + (i c)^{-n-1} e^{\frac{1}{4} i\left(-\frac{(f+2 d k-d m)^2}{c}+8 e (2 k-m)+4 m \pi\right)} \sum_{q=0}^n 2^{q-n} (-i (f+2 d k-d m))^{n-q} (i (f+2 d k-d m+2 c z))^{q+1} \left(-\frac{i (f+2 d k-d m+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+2 d k-d m+2 c z)^2}{4 c}\right) + (i c)^{-n-1} e^{-\frac{i (f-2 d k+d m)^2}{4 c}} \sum_{q=0}^n 2^{q-n} (-i (f-2 d k+d m))^{n-q} (i (f+d (m-2 k)+2 c z))^{q+1} \left(-\frac{i (f+d (m-2 k)+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+d (m-2 k)+2 c z)^2}{4 c}\right)\Bigg)\Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0891.01

$$\int z^n \sin^m(d z+e)\cos\left(\sqrt{z}\, c+f z+g\right) dz = (-1)^{n-1} i^{-m} 2^{-m-2n-2} e^{-\frac{i\left(c^2+4 f g\right)}{4 f}} f^{-2n-2} \left(i^m e^{2 i g} \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (i c)^{-h-k+2n} \left(i\left(c+2 f\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(c+2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(c\left(c+2 f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2 f\sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{-\frac{i\left(c+2 f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2 f\sqrt{z}\right)^2}{4 f}\right)\right) + i^m e^{\frac{i c^2}{2 f}} \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (-i c)^{-h-k+2n} \left(-i\left(c+2 f\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c+2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(c\left(c+2 f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2 f\sqrt{z}\right)^2}{4 f}\right) + 2\sqrt{\frac{i\left(c+2 f\sqrt{z}\right)^2}{f}}\, f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2 f\sqrt{z}\right)^2}{4 f}\right)\right) + e^{\frac{i\left(c^2+4 f g\right)}{4 f}} (-1)^n f^{2n+2} \sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^u e^{-i(g+e m-2 e u)} \binom{m}{u} \left(e^{-\frac{i c^2}{4(f-d m+2 d u)}} \left((f-d m+2 d u)^2\right)^{-2n-1} \left((-1)^m e^{2 i g} \left(\sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (i c)^{-h-k+2n} \left(i\left(c+2(f-d m+2 d u)\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(c+2(f-d m+2 d u)\sqrt{z}\right)^2}{f-d m+2 d u}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2 i (f-d m+2 d u) \sqrt{-\frac{i\left(c+2(f-d m+2 d u)\sqrt{z}\right)^2}{f-d m+2 d u}}\, \Gamma\left(\frac{1}{2}(h+k+2),\right.\right.\right.\right.\right.\right.$$

$$-\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\Bigg)-c\left(c+2(f-dm+2du)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),$$

$$-\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\Bigg)\Bigg)\Bigg)(-i(f-dm+2du))^{2n}+e^{\frac{1}{2}i\left(\frac{c^2}{f-dm+2du}+4e(m-2u)\right)}$$

$$(i(f-dm+2du))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(-i\left(c+2(f-dm+2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{f-dm+2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(-c\left(c+2(f-dm+2du)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\right)-2i(f-dm+2du)$$

$$\sqrt{\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{f-dm+2du}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(c+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(f+dm-2du)^2}\Bigg((-1)^m\,e^{\frac{i c^2}{4(f+dm-2du)}}\,(-i(f+dm-2du))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}$$

$$\left(-i\left(c+2(f+dm-2du)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2(f+dm-2du)\sqrt{z}\right)^2}{f+dm-2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(-c\left(c+2(f+dm-2du)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(c+2(f+dm-2du)\sqrt{z}\right)^2}{4(f+dm-2du)}\right)-$$

$$2i(f+dm-2du)\sqrt{\frac{i\left(c+2(f+dm-2du)\sqrt{z}\right)^2}{f+dm-2du}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(c+2(f+dm-2du)\sqrt{z}\right)^2}{4(f+dm-2du)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(f+d\,m-2\,d\,u)^2}\left(e^{\frac{1}{4}i\left(-\frac{c^2}{f+d\,m-2\,d\,u}+8\,g+8\,e\,(m-2\,u)\right)}\,(i\,(f+d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(i\,c)^{-h-k+2\,n}\left(i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(f+d\,m-2\,d\,u)\,\sqrt{-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)-c\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)\right)\right)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\sin^m(b\,z^r)\cos(c\,z^r+f\,z+g)$

01.07.21.0892.01

$$\int z^n \sin^m(b z^2) \cos(c z^2 + f z + g) \, dz = i^{-m} 2^{-m-2} (i c)^{-n-1} e^{-\frac{i(f^2+4 c g)}{4 c}} \left((-1)^n i^m e^{2 i g} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q} (i (f + 2 c z))^{q+1} \left(-\frac{i (f+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+2 c z)^2}{4 c}\right) + (-1)^n i^m e^{\frac{i f^2}{2 c}} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q} (i (f+2 c z))^{q+1} \left(\frac{i (f+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+2 c z)^2}{4 c}\right) - (i c)^{n+1} e^{\frac{i(f^2+4 c g)}{4 c}} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{i g} \binom{m}{k} \left(e^{-\frac{1}{4} i \left(-\frac{f^2}{c-2 b k+b m}+8 g-4 m \pi\right)} \left(\sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i (f + 2 (c - 2 b k + b m) z))^{q+1} \left(\frac{i (f+2 (c-2 b k+b m) z)^2}{c-2 b k+b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+2 (c-2 b k+b m) z)^2}{4 (c-2 b k+b m)}\right) \right) (-i (c-2 b k+b m))^{-n-1} + e^{-\frac{i f^2}{4 (c-2 b k+b m)}} (i (c-2 b k+b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i (f+2 (c-2 b k+b m) z))^{q+1} \left(-\frac{i (f+2 (c-2 b k+b m) z)^2}{c-2 b k+b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+2 (c-2 b k+b m) z)^2}{4 (c-2 b k+b m)}\right) + e^{\frac{i f^2}{4 (c+2 b k-b m)}-2 i g} (-i (c+2 b k-b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i f)^{n-q} (-i (f+2 c z+4 b k z-2 b m z))^{q+1} \left(\frac{i (f+2 c z+4 b k z-2 b m z)^2}{c+2 b k-b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+2 c z+4 b k z-2 b m z)^2}{4 (c+2 b k-b m)}\right) + e^{\frac{1}{4} i \left(4 m \pi-\frac{f^2}{c+2 b k-b m}\right)} (i (c+2 b k-b m))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i f)^{n-q} (i (f+2 c z+4 b k z-2 b m z))^{q+1} \left(-\frac{i (f+2 c z+4 b k z-2 b m z)^2}{c+2 b k-b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+2 c z+4 b k z-2 b m z)^2}{4 (c+2 b k-b m)}\right) \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0893.01

$$\int z^n \sin^m\left(\sqrt{z}\, b\right) \cos\left(\sqrt{z}\, c + f\, z + g\right) dz ==$$

$$(-1)^{n-1}\, i^{-m}\, 2^{-m-2n-2}\, e^{-\frac{i\left(c^2+4 f g\right)}{4 f}}\, f^{-2n-2} \left(i^m\, e^{2 i g} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, c)^{-h-k+2n} \left(i\left(c + 2 f \sqrt{z}\right)\right)^{h+k} \right.$$

$$\left(-\frac{i\left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\left(c + 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right) - \right.$$

$$\left.\left. 2\, i\, f \sqrt{-\frac{i\left(c + 2 f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) + i^m\, e^{\frac{i c^2}{2 f}} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1)$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, c)^{-h-k+2n} \left(-i\left(c + 2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\left(c + 2 f \sqrt{z}\right)\right.$$

$$\left. \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{\frac{i\left(c + 2 f \sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right) +$$

$$e^{\frac{i c^2}{4 f}} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \left((-1)^m\, e^{\frac{i (c + b m - 2 b u)^2}{4 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, (c + b m - 2 b u))^{-h-k+2n} \right.$$

$$\left(-i\left(c + b\,(m - 2u) + 2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c + b\,(m - 2u) + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((-c - b\, m + 2 b\, u)\left(c + b\,(m - 2u) + 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c + b\,(m - 2u) + 2 f \sqrt{z}\right)^2}{4 f}\right) - \right.$$

$$\left.\left. 2\, i\, f \sqrt{\frac{i\left(c + b\,(m - 2u) + 2 f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c + b\,(m - 2u) + 2 f \sqrt{z}\right)^2}{4 f}\right)\right) + \right.$$

$$e^{-\frac{i(c-bm+2bu)^2}{4f}}\Bigg(e^{\frac{i(c-bm+2bu)^2}{2f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(c-b\,m+2\,b\,u))^{-h-k+2n}$$

$$\left(-i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-c+b\,m-2\,b\,u)\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)-$$

$$2\,i\,f\,\sqrt{\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+$$

$$(-1)^m\,e^{2\,i\,g}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(c-b\,m+2\,b\,u))^{-h-k+2n}\left(i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-c+b\,m-2\,b\,u)\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+k+1),$$

$$-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)+2\,\sqrt{-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}}$$

$$f\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)+$$

$$e^{\frac{1}{4}i\left(8g-\frac{(c+bm-2bu)^2}{f}\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(c+b\,m-2\,b\,u))^{-h-k+2n}\left(i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg((-c-b\,m+2\,b\,u)\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+2\,\sqrt{-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}}$$

$$f\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r+e\right)\cos\left(c\,z^r+f\,z+g\right)$

01.07.21.0894.01

$$\int z^n \sin^m\left(b z^2+e\right) \cos\left(c z^2+f z+g\right) dz = i^{-m} 2^{-m-2} (i c)^{-n-1} e^{-\frac{i\left(f^2+4 c g\right)}{4 c}} \left((-1)^n i^m e^{2 i g} \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{q=0}^n (-1)^q 2^{q-n} (i f)^{n-q} (i (f+2 c z))^{q+1} \left(-\frac{i (f+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+2 c z)^2}{4 c}\right) + (-1)^n i^m e^{\frac{i f^2}{2 c}} \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{q=0}^n (-1)^q 2^{q-n} (i f)^{n-q} (i (f+2 c z))^{q+1} \left(\frac{i (f+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+2 c z)^2}{4 c}\right) - (i c)^{n+1} e^{\frac{i\left(f^2+4 c g\right)}{4 c}} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k e^{i (g-2 e k+e m)} \binom{m}{k} \left(e^{-\frac{1}{4} i \left(-\frac{f^2}{c-2 b k+b m}+8 g+8 e (m-2 k)-4 m \pi\right)} \left(\sum_{q=0}^n 2^{q-n} (i f)^{n-q} (-i (f+2 (c-2 b k+b m) z))^{q+1} \left(\frac{i (f+2 (c-2 b k+b m) z)^2}{c-2 b k+b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+2 (c-2 b k+b m) z)^2}{4 (c-2 b k+b m)}\right)\right) (-i (c-2 b k+b m))^{-n-1} + e^{-\frac{i f^2}{4 (c-2 b k+b m)}} (i (c-2 b k+b m))^{-n-1} \sum_{q=0}^n 2^{q-n} (-i f)^{n-q} (i (f+2 (c-2 b k+b m) z))^{q+1} \left(-\frac{i (f+2 (c-2 b k+b m) z)^2}{c-2 b k+b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+2 (c-2 b k+b m) z)^2}{4 (c-2 b k+b m)}\right) + e^{\frac{i f^2}{4 (c+2 b k-b m)}-2 i g} (-i (c+2 b k-b m))^{-n-1} \sum_{q=0}^n 2^{q-n} (i f)^{n-q} (-i (f+2 c z+4 b k z-2 b m z))^{q+1} \left(\frac{i (f+2 c z+4 b k z-2 b m z)^2}{c+2 b k-b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f+2 c z+4 b k z-2 b m z)^2}{4 (c+2 b k-b m)}\right) + e^{\frac{1}{4} i \left(-\frac{f^2}{c+2 b k-b m}+8 e (2 k-m)+4 m \pi\right)} (i (c+2 b k-b m))^{-n-1} \sum_{q=0}^n 2^{q-n} (-i f)^{n-q} (i (f+2 c z+4 b k z-2 b m z))^{q+1} \left(-\frac{i (f+2 c z+4 b k z-2 b m z)^2}{c+2 b k-b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f+2 c z+4 b k z-2 b m z)^2}{4 (c+2 b k-b m)}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.07.21.0895.01

$$\int z^n \sin^m\left(\sqrt{z}\, b+e\right)\cos\left(\sqrt{z}\, c+f z+g\right) dz = (-1)^{n-1} i^{-m} 2^{-m-2n-2} e^{-\frac{i\left(c^2+4 f g\right)}{4 f}} f^{-2n-2} \left(i^m e^{2 i g} \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (i c)^{-h-k+2n} \left(i\left(c+2 f \sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(c+2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(c\left(c+2 f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2 f\sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{-\frac{i\left(c+2 f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2 f\sqrt{z}\right)^2}{4 f}\right)\right) + i^m e^{\frac{i c^2}{2 f}} \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (-i c)^{-h-k+2n} \left(-i\left(c+2 f\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c+2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(c\left(c+2 f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2 f\sqrt{z}\right)^2}{4 f}\right) + 2\sqrt{\frac{i\left(c+2 f\sqrt{z}\right)^2}{f}}\, f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2 f\sqrt{z}\right)^2}{4 f}\right)\right) + e^{\frac{i\left(c^2+4 f g\right)}{4 f}} \sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^u e^{-i(g+e m-2 e u)} \binom{m}{u} \left((-1)^m e^{\frac{i(c+b m-2 b u)^2}{4 f}} \sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (-i(c+b m-2 b u))^{-h-k+2n} \left(-i\left(c+b(m-2u)+2 f\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c+b(m-2u)+2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((-c-b m+2 b u)\left(c+b(m-2u)+2 f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+b(m-2u)+2 f\sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{\frac{i\left(c+b(m-2u)+2 f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+b(m-2u)+2 f\sqrt{z}\right)^2}{4 f}\right)\right) +$$

$$e^{-\frac{i(c-bm+2bu)^2}{4f}}\left(e^{\frac{1}{2}i\left(\frac{(c-bm+2bu)^2}{f}+4e(m-2u)\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(c-b\,m+2\,b\,u))^{-h-k+2n}\right.$$

$$\left(-i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-c+b\,m-2\,b\,u)\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)-\right.$$

$$\left.2\,i\,f\,\sqrt{\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)+$$

$$(-1)^m\,e^{2\,i\,g}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(c-b\,m+2\,b\,u))^{-h-k+2n}\left(i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-c+b\,m-2\,b\,u)\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+2\,\sqrt{-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{f}}$$

$$\left.\left.f\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c-b\,(m-2\,u)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)\right)+$$

$$e^{\frac{1}{4}i\left(-\frac{(c+bm-2bu)^2}{f}+8g+8e(m-2u)\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(c+b\,m-2\,b\,u))^{-h-k+2n}\left(i\left(c+b\,(m-2\,u)+2\,f\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c+b(m-2u)+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((-c-bm+2bu)\left(c+b(m-2u)+2f\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(c+b(m-2u)+2f\sqrt{z}\right)^2}{4f}\right)+2\sqrt{-\frac{i\left(c+b(m-2u)+2f\sqrt{z}\right)^2}{f}}$$

$$f\,i\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c+b(m-2u)+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r + d z\right)\cos\left(c z^r + f z + g\right)$

01.07.21.0896.01

$$\int z^n \sin^m\left(b z^2+d z\right)\cos\left(c z^2+f z+g\right)dz = i^{-m}\,2^{-m-2}\,(i c)^{-n-1}\,e^{-\frac{i\left(f^2+4cg\right)}{4c}}\Bigg((-1)^n\,i^m\,e^{2ig}\binom{m}{\frac{m}{2}}(m \bmod 2-1)$$

$$\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i f)^{n-q}\,(i(f+2cz))^{q+1}\left(-\frac{i(f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(f+2cz)^2}{4c}\right)+(-1)^n\,i^m\,e^{\frac{if^2}{2c}}$$

$$\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i f)^{n-q}\,(i(f+2cz))^{q+1}\left(\frac{i(f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(f+2cz)^2}{4c}\right)-$$

$$(i c)^{n+1}\,e^{\frac{i\left(f^2+4cg\right)}{4c}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{ig}\binom{m}{k}\Bigg(e^{-\frac{1}{4}i\left(-\frac{(f-2dk+dm)^2}{c-2bk+bm}+8g-4m\pi\right)}\Bigg(\sum_{q=0}^{n}2^{q-n}\,(i(f-2dk+dm))^{n-q}$$

$$(-i(f+d(m-2k)+2(c-2bk+bm)z))^{q+1}\left(\frac{i(f+d(m-2k)+2(c-2bk+bm)z)^2}{c-2bk+bm}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(f+d(m-2k)+2(c-2bk+bm)z)^2}{4(c-2bk+bm)}\right)\Bigg)(-i(c-2bk+bm))^{-n-1}+$$

$$e^{-\frac{i(f-2dk+dm)^2}{4(c-2bk+bm)}}\,(i(c-2bk+bm))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i(f-2dk+dm))^{n-q}$$

$$(i(f+d(m-2k)+2(c-2bk+bm)z))^{q+1}\left(-\frac{i(f+d(m-2k)+2(c-2bk+bm)z)^2}{c-2bk+bm}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(f+d(m-2k)+2(c-2bk+bm)z)^2}{4(c-2bk+bm)}\right)+$$

$$e^{\frac{i(f+2dk-dm)^2}{4(c+2bk-bm)}-2ig}\,(-i(c+2bk-bm))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i(f+2dk-dm))^{n-q}$$

$$(-i(f+2dk-dm+2cz+4bkz-2bmz))^{q+1}\left(\frac{i(f+2dk-dm+2cz+4bkz-2bmz)^2}{c+2bk-bm}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i(f+2dk-dm+2cz+4bkz-2bmz)^2}{4(c+2bk-bm)}\right)+$$

$$e^{\frac{1}{4}i\left(4m\pi-\frac{(f+2dk-dm)^2}{c+2bk-bm}\right)}\,(i(c+2bk-bm))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i(f+2dk-dm))^{n-q}$$

$$(i(f+2dk-dm+2cz+4bkz-2bmz))^{q+1}\left(-\frac{i(f+2dk-dm+2cz+4bkz-2bmz)^2}{c+2bk-bm}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i(f+2dk-dm+2cz+4bkz-2bmz)^2}{4(c+2bk-bm)}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

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$$\int z^n\sin^m\left(\sqrt{z}\,b+dz\right)\cos\left(\sqrt{z}\,c+fz+g\right)dz=$$

$$(-1)^{n-1}\,i^{-m}\,2^{-m-2n-2}\,e^{-\frac{i\left(c^2+4fg\right)}{4f}}\,f^{-2n-2}\Bigg(i^m\,e^{2ig}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(ic)^{-h-k+2n}\left(i\left(c+2f\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(c\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)-$$

$$2if\sqrt{-\frac{i\left(c+2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)+i^m\,e^{\frac{ic^2}{2f}}\binom{m}{\frac{m}{2}}(m\bmod 2-1)$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-ic)^{-h-k+2n}\left(-i\left(c+2f\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(c\left(c+2f\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)+2\sqrt{\frac{i\left(c+2f\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)+$$

$$e^{\frac{i(c^2+4fg)}{4f}} (i\, f)^{2n} f^2 \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u e^{-i g} \binom{m}{u} \left(e^{-\frac{i(c-b m+2 b u)^2}{4(f-d m+2 d u)}} \left((f-d m+2 d u)^2\right)^{-2n-1} \right.$$

$$\left((-1)^m e^{2 i g} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (c-b m+2 b u))^{-h-k+2n} \left(i \left(c - b(m-2u) + 2(f-d m+2 d u) \sqrt{z}\right)\right)^{h+k} \right.\right.$$

$$\left(-\frac{i\left(c-b(m-2u)+2(f-d m+2 d u)\sqrt{z}\right)^2}{f-d m+2 d u}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k} \left((-c+b m-2 b u)\left(c-b(m-2u)+2(f-d m+2 d u)\sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c-b(m-2u)+2(f-d m+2 d u)\sqrt{z}\right)^2}{4(f-d m+2 d u)}\right) +$$

$$2 i (f-d m+2 d u)\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c-b(m-2u)+2(f-d m+2 d u)\sqrt{z}\right)^2}{4(f-d m+2 d u)}\right)$$

$$\left.\left.\sqrt{-\frac{i\left(c-b(m-2u)+2(f-d m+2 d u)\sqrt{z}\right)^2}{f-d m+2 d u}}\right)\right) (-i (f-d m+2 d u))^{2n} +$$

$$e^{\frac{i(c-b m+2 b u)^2}{2(f-d m+2 d u)}} (i (f-d m+2 d u))^{2n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (c-b m+2 b u))^{-h-k+2n} \left(-i \left(c - b(m-2u) + \right.\right.$$

$$\left.\left. 2(f-d m+2 d u)\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c-b(m-2u)+2(f-d m+2 d u)\sqrt{z}\right)^2}{f-d m+2 d u}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((-c+b m-2 b u)\left(c-b(m-2u)+2(f-d m+2 d u)\sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c-b(m-2u)+2(f-d m+2 d u)\sqrt{z}\right)^2}{4(f-d m+2 d u)}\right) -$$

$$2\,i\,(f-d\,m+2\,d\,u)\sqrt{\frac{i\left(c-b\,(m-2\,u)+2\,(f-d\,m+2\,d\,u)\,\sqrt{z}\right)^2}{f-d\,m+2\,d\,u}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c-b\,(m-2\,u)+2\,(f-d\,m+2\,d\,u)\,\sqrt{z}\right)^2}{4\,(f-d\,m+2\,d\,u)}\right)\right)\right)\right)+$$

$$\frac{1}{(f+d\,m-2\,d\,u)^2}\left((-1)^m\,e^{\frac{i\,(c+b\,m-2\,b\,u)^2}{4\,(f+d\,m-2\,d\,u)}}\,(-i\,(f+d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(-i\,(c+b\,m-2\,b\,u))^{-h-k+2\,n}\left(-i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-c-b\,m+2\,b\,u)\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)-$$

$$2\,i\,(f+d\,m-2\,d\,u)\sqrt{\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)\right)\right)\right)+$$

$$\frac{1}{(f+d\,m-2\,d\,u)^2}\left(e^{\frac{1}{4}\,i\left(8\,g-\frac{(c+b\,m-2\,b\,u)^2}{f+d\,m-2\,d\,u}\right)}\,(i\,(f+d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(i\,(c+b\,m-2\,b\,u))^{-h-k+2\,n}\left(i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((-c-b\,m+2\,b\,u)\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)+$$

$$2\,i\,(f+d\,m-2\,d\,u)\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)$$

$$\sqrt{-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\sin^m(b\,z^r+d\,z+e)\cos(c\,z^r+f\,z+g)$

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$$\int z^n\sin^m(b\,z^2+d\,z+e)\cos(c\,z^2+f\,z+g)\,dz = i^{-m}\,2^{-m-2}\,(i\,c)^{-n-1}\,e^{-\frac{i(f^2+4\,c\,g)}{4\,c}}\Bigg((-1)^n\,i^m\,e^{2\,i\,g}\binom{m}{\frac{m}{2}}(m\bmod 2-1)$$

$$\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}\left(-\frac{i\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(f+2\,c\,z)^2}{4\,c}\right)+(-1)^n\,i^m\,e^{\frac{i\,f^2}{2\,c}}$$

$$\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}\left(\frac{i\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(f+2\,c\,z)^2}{4\,c}\right)-$$

$$(i\,c)^{n+1}\,e^{\frac{i(f^2+4\,c\,g)}{4\,c}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{i\,(g-2\,e\,k+e\,m)}\binom{m}{k}\Bigg(e^{-\frac{1}{4}\,i\left(-\frac{(f-2\,d\,k+d\,m)^2}{c-2\,b\,k+b\,m}+8\,g+8\,e\,(m-2\,k)-4\,m\,\pi\right)}\Bigg(\sum_{q=0}^{n}2^{q-n}\,(i\,(f-2\,d\,k+d\,m))^{n-q}$$

$$(-i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z))^{q+1}\left(\frac{i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z)^2}{c-2\,b\,k+b\,m}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z)^2}{4\,(c-2\,b\,k+b\,m)}\right)\Bigg)(-i\,(c-2\,b\,k+b\,m))^{-n-1}+$$

$$e^{-\frac{i\,(f-2\,d\,k+d\,m)^2}{4\,(c-2\,b\,k+b\,m)}}\,(i\,(c-2\,b\,k+b\,m))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(f-2\,d\,k+d\,m))^{n-q}$$

$$(i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z))^{q+1}\left(-\frac{i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z)^2}{c-2\,b\,k+b\,m}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(f+d\,(m-2\,k)+2\,(c-2\,b\,k+b\,m)\,z)^2}{4\,(c-2\,b\,k+b\,m)}\right)+$$

$$e^{\frac{i\,(f+2\,d\,k-d\,m)^2}{4\,(c+2\,b\,k-b\,m)}-2\,i\,g}\,(-i\,(c+2\,b\,k-b\,m))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i\,(f+2\,d\,k-d\,m))^{n-q}$$

$$(-i\,(f+2\,d\,k-d\,m+2\,c\,z+4\,b\,k\,z-2\,b\,m\,z))^{q+1}\left(\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z+4\,b\,k\,z-2\,b\,m\,z)^2}{c+2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z+4\,b\,k\,z-2\,b\,m\,z)^2}{4\,(c+2\,b\,k-b\,m)}\right)+$$

$$e^{\frac{1}{4}\,i\left(-\frac{(f+2\,d\,k-d\,m)^2}{c+2\,b\,k-b\,m}+8\,e\,(2\,k-m)+4\,m\,\pi\right)}\,(i\,(c+2\,b\,k-b\,m))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(f+2\,d\,k-d\,m))^{n-q}$$

$$(i\,(f+2\,d\,k-d\,m+2\,c\,z+4\,b\,k\,z-2\,b\,m\,z))^{q+1}\left(-\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z+4\,b\,k\,z-2\,b\,m\,z)^2}{c+2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(f+2\,d\,k-d\,m+2\,c\,z+4\,b\,k\,z-2\,b\,m\,z)^2}{4\,(c+2\,b\,k-b\,m)}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

01.07.21.0899.01

$$\int z^n\sin^m\left(\sqrt{z}\,b+d\,z+e\right)\cos\left(\sqrt{z}\,c+f\,z+g\right)dz=$$

$$(-1)^{n-1}\,i^{-m}\,2^{-m-2\,n-2}\,e^{-\frac{i\left(c^2+4\,f\,g\right)}{4\,f}}\,f^{-2\,n-2}\left(i^m\,e^{2\,i\,g}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(i\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\left(c+2\,f\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),-\frac{i\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)-\right.$$

$$\left.\left.2\,i\,f\sqrt{-\frac{i\left(c+2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),-\frac{i\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)+i^m\,e^{\frac{i\,c^2}{2\,f}}\binom{m}{\frac{m}{2}}(m\bmod 2-1)$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\left(-i\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\left(c+2\,f\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)+2\sqrt{\frac{i\left(c+2f\sqrt{z}\right)^2}{f}}\ f\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)+$$

$$e^{\frac{i\left(c^2+4fg\right)}{4f}}(i\,f)^{2n}f^2\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u e^{-i(g+em-2eu)}\binom{m}{u}\Bigg(e^{-\frac{i(c-bm+2bu)^2}{4(f-dm+2du)}}\left((f-dm+2du)^2\right)^{-2n-1}$$

$$\Bigg((-1)^m e^{2ig}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i(c-bm+2bu))^{-h-k+2n}\left(i\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)^2}{f-dm+2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(2i(f-dm+2du)\sqrt{-\frac{i\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)^2}{f-dm+2du}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\right)-$$

$$(c-bm+2bu)\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\right)\Bigg)\Bigg)$$

$$(-i(f-dm+2du))^{2n}+e^{\frac{1}{2}i\left(\frac{(c-bm+2bu)^2}{f-dm+2du}+4e(m-2u)\right)}(i(f-dm+2du))^{2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(c-bm+2bu))^{-h-k+2n}\left(-i\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)^2}{f-dm+2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(-(c-bm+2bu)\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\right)-$$

$$2\,i\,(f-dm+2du)\sqrt{\frac{i\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)^2}{f-dm+2du}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c-b(m-2u)+2(f-dm+2du)\sqrt{z}\right)^2}{4(f-dm+2du)}\right)\right)\right)+$$

$$\frac{1}{(f+dm-2du)^2}\left((-1)^m e^{\frac{i(c+bm-2bu)^2}{4(f+dm-2du)}}(-i(f+dm-2du))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(-i(c+bm-2bu))^{-h-k+2n}\left(-i\left(c+b(m-2u)+2(f+dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c+b(m-2u)+2(f+dm-2du)\sqrt{z}\right)^2}{f+dm-2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-(c+bm-2bu)\left(c+b(m-2u)+2(f+dm-2du)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(c+b(m-2u)+2(f+dm-2du)\sqrt{z}\right)^2}{4(f+dm-2du)}\right)-$$

$$2\,i\,(f+dm-2du)\sqrt{\frac{i\left(c+b(m-2u)+2(f+dm-2du)\sqrt{z}\right)^2}{f+dm-2du}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c+b(m-2u)+2(f+dm-2du)\sqrt{z}\right)^2}{4(f+dm-2du)}\right)\right)\right)+$$

$$\frac{1}{(f+dm-2du)^2}\left(e^{\frac{1}{4}i\left(-\frac{(c+bm-2bu)^2}{f+dm-2du}+8g+8e(m-2u)\right)}(i(f+dm-2du))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(i(c+bm-2bu))^{-h-k+2n}\left(i\left(c+b(m-2u)+2(f+dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,(f+d\,m-2\,d\,u)\sqrt{-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{f+d\,m-2\,d\,u}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)-$$

$$(c+b\,m-2\,b\,u)\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.$$

$$\left.\left.-\frac{i\left(c+b\,(m-2\,u)+2\,(f+d\,m-2\,d\,u)\,\sqrt{z}\right)^2}{4\,(f+d\,m-2\,d\,u)}\right)\right)\Bigg)\Bigg)\Bigg) \,/;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving trigonometric and exponential functions

Involving sin and exp

Involving $e^{p\,z}\sin(c\,z)\cos^{\nu}(a\,z)$

01.07.21.0900.01

$$\int e^{p\,z}\sin(c\,z)\cos(a\,z)\,dz = \left(e^{p\,z}\left(a\sin(a\,z)\left(\left(a^2+p^2-c^2\right)\sin(c\,z)-2\,p\,c\cos(c\,z)\right)+\cos(a\,z)\left(p\left(a^2+p^2+c^2\right)\sin(c\,z)-c\left(-a^2+p^2+c^2\right)\cos(c\,z)\right)\right)\right)\Big/ \left(a^4+2\left(p^2-c^2\right)a^2+\left(p^2+c^2\right)^2\right)$$

01.07.21.0901.01

$$\int e^{c\,z}\sin(c\,z)\cos(a\,z)\,dz = \frac{1}{a^4+4\,c^4}\left(e^{c\,z}\left(a\sin(a\,z)\left(a^2\sin(c\,z)-2\,c^2\cos(c\,z)\right)+c\cos(a\,z)\left(\left(a^2-2\,c^2\right)\cos(c\,z)+\left(a^2+2\,c^2\right)\sin(c\,z)\right)\right)\right)$$

Involving $e^{p\,z}\sin^{\mu}(c\,z+d)\cos(a\,z)$

01.07.21.0902.01

$$\int e^{p z} \sin(d + c z) \cos(a z)\, dz = \frac{1}{2} e^{p z} \left(\frac{\cos((a - c) z)\, ((a - c) \cos(d) + p \sin(d))}{a^2 - 2 c a + c^2 + p^2} + \frac{(p \cos(d) + (a + c) \sin(d)) \sin((a + c) z)}{a^2 + 2 c a + c^2 + p^2} - \frac{\cos((a + c) z)\, ((a + c) \cos(d) - p \sin(d))}{a^2 + 2 c a + c^2 + p^2} - \frac{(p \cos(d) - (a - c) \sin(d)) \sin((a - c) z)}{a^2 - 2 c a + c^2 + p^2} \right)$$

Involving $e^{p z} \sin(c z) \cos(a z + b)$

01.07.21.0903.01

$$\int e^{p z} \sin(c z) \cos(b + a z)\, dz = \frac{1}{2} e^{p z} \left(\frac{\cos((a - c) z)\, ((a - c) \cos(b) - p \sin(b))}{a^2 - 2 c a + c^2 + p^2} + \frac{(p \cos(b) + (a + c) \sin(b)) \sin((a + c) z)}{a^2 + 2 c a + c^2 + p^2} - \frac{\cos((a + c) z)\, ((a + c) \cos(b) - p \sin(b))}{a^2 + 2 c a + c^2 + p^2} - \frac{(p \cos(b) + (a - c) \sin(b)) \sin((a - c) z)}{a^2 - 2 c a + c^2 + p^2} \right)$$

Involving $e^{p z} \sin(c z + d) \cos(a z + b)$

01.07.21.0904.01

$$\int e^{p z} \sin(d + c z) \cos(b + a z)\, dz = \frac{1}{2} e^{p z} \left(\frac{\cos((a - c) z)\, ((a - c) \cos(b - d) - p \sin(b - d))}{a^2 - 2 c a + c^2 + p^2} + \frac{(p \cos(b + d) + (a + c) \sin(b + d)) \sin((a + c) z)}{a^2 + 2 c a + c^2 + p^2} - \frac{\cos((a + c) z)\, ((a + c) \cos(b + d) - p \sin(b + d))}{a^2 + 2 c a + c^2 + p^2} - \frac{(p \cos(b - d) + (a - c) \sin(b - d)) \sin((a - c) z)}{a^2 - 2 c a + c^2 + p^2} \right)$$

Involving $e^{p z^r} \sin(b z^2) \cos(c z)$

01.07.21.0905.01

$$\int e^{p z^2} \sin(b z^2) \cos(c z)\, dz = \frac{1}{8} i \sqrt{\pi} \left(\frac{e^{\frac{c^2}{4 (-i b + p)}} \left(\operatorname{erfi}\left(\frac{-i c + 2 (-i b + p) z}{2 \sqrt{-i b + p}} \right) + \operatorname{erfi}\left(\frac{i c + 2 (-i b + p) z}{2 \sqrt{-i b + p}} \right) \right)}{\sqrt{-i b + p}} - \frac{e^{\frac{c^2}{4 (i b + p)}} \left(\operatorname{erfi}\left(\frac{-i c + 2 (i b + p) z}{2 \sqrt{i b + p}} \right) + \operatorname{erfi}\left(\frac{i c + 2 (i b + p) z}{2 \sqrt{i b + p}} \right) \right)}{\sqrt{i b + p}} \right)$$

01.07.21.0906.01

$$\int e^{p\sqrt{z}}\sin\left(b\sqrt{z}\right)\cos(c\,z)\,dz = \frac{1}{8}i\left(\frac{e^{\frac{i(b+i p)^2}{4c}}(-i\,b+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{\sqrt{-i\,c}\left(b+i\,p+2\,c\sqrt{z}\right)}{2\,c}\right)c^2}{(-i\,c)^{7/2}}+\frac{e^{\frac{i(b-i p)^2}{4c}}(i\,b+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{i\,b+p-2\,i\,c\sqrt{z}}{2\sqrt{-i\,c}}\right)}{(-i\,c)^{3/2}}+\frac{e^{-\frac{i(b+i p)^2}{4c}}\,i\,(b+i\,p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-i\,b+p+2\,i\,c\sqrt{z}}{2\sqrt{i\,c}}\right)}{(i\,c)^{3/2}}+\frac{e^{\frac{i(i b+p)^2}{4c}}(i\,b+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{i\,b+p+2\,i\,c\sqrt{z}}{2\sqrt{i\,c}}\right)}{(i\,c)^{3/2}}-\frac{8\,i\,e^{p\sqrt{z}}\sin\left(b\sqrt{z}\right)\sin(c\,z)}{c}\right)$$

Involving $e^{p\,z^r}\sin(b\,z)\cos(c\,z)$

01.07.21.0907.01

$$\int e^{p\,z^2}\sin(b\,z)\cos(c\,z)\,dz = \frac{1}{8\sqrt{p}}\left(e^{\frac{(b-c)^2}{4p}}\sqrt{\pi}\left(e^{\frac{b\,c}{p}}\operatorname{erf}\left(\frac{b+c+2\,i\,p\,z}{2\sqrt{p}}\right)+e^{\frac{b\,c}{p}}\operatorname{erf}\left(\frac{b+c-2\,i\,p\,z}{2\sqrt{p}}\right)-i\left(\operatorname{erfi}\left(\frac{i\,b-i\,c+2\,p\,z}{2\sqrt{p}}\right)-\operatorname{erfi}\left(\frac{-i\,b+i\,c+2\,p\,z}{2\sqrt{p}}\right)\right)\right)\right)$$

01.07.21.0908.01

$$\int e^{p\sqrt{z}}\sin(b\,z)\cos(c\,z)\,dz = \frac{1}{8}i\left(-\frac{e^{\frac{i p^2}{4c-4b}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-2\,i\,(b-c)\sqrt{z}}{2\sqrt{-i\,(b-c)}}\right)}{(-i\,(b-c))^{3/2}}+\frac{e^{\frac{i p^2}{4b-4c}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+2\,i\,(b-c)\sqrt{z}}{2\sqrt{i\,(b-c)}}\right)}{(i\,(b-c))^{3/2}}+\frac{e^{\frac{i p^2}{4(b+c)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+2\,i\,(b+c)\sqrt{z}}{2\sqrt{i\,(b+c)}}\right)}{(i\,(b+c))^{3/2}}+\frac{8\,e^{p\sqrt{z}}\,i\,(b\cos(b\,z)\cos(c\,z)+c\sin(b\,z)\sin(c\,z))}{(b-c)\,(b+c)}-\frac{e^{-\frac{i p^2}{4(b+c)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-2\,i\,(b+c)\sqrt{z}}{2\sqrt{-i\,(b+c)}}\right)}{(-i\,(b+c))^{3/2}}\right)$$

Involving $e^{p\,z}\sin\left(b\,z^r\right)\cos(c\,z)$

01.07.21.0909.01

$$\int e^{p\,z}\sin\left(b\,z^2\right)\cos(c\,z)\,dz = \frac{1}{8\sqrt{b}}\left(\sqrt[4]{-1}\,e^{-\frac{i\left(c^2-2\,i\,p\,c+p^2\right)}{4b}}\sqrt{\pi}\left(e^{\frac{(2c+i p)p}{2b}}\operatorname{erfi}\left(\frac{(-1)^{3/4}(-i\,c+p+2\,i\,b\,z)}{2\sqrt{b}}\right)+e^{\frac{i p^2}{2b}}\operatorname{erfi}\left(\frac{(-1)^{3/4}(i\,c+p+2\,i\,b\,z)}{2\sqrt{b}}\right)+e^{\frac{i c^2}{2b}}\,i\,\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(-i\,c+p-2\,i\,b\,z)}{2\sqrt{b}}\right)+e^{\frac{c(i c+2 p)}{2b}}\,i\,\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(i\,c+p-2\,i\,b\,z)}{2\sqrt{b}}\right)\right)\right)$$

01.07.21.0910.01

$$\int e^{p z} \sin\left(b \sqrt{z}\right) \cos(c z) \, dz = \frac{1}{8} \left(\frac{b \, e^{\frac{b^2}{-4 i c+4 p}} \, i \sqrt{\pi} \, \operatorname{erf}\left(\frac{b+2 (c+i p) \sqrt{z}}{2 \sqrt{-i c+p}}\right)}{(-i c+p)^{3/2}} + \frac{8 e^{p z} \sin\left(b \sqrt{z}\right) (p \cos(c z)+c \sin(c z))}{c^2+p^2} - \frac{b \, e^{\frac{b^2}{-4 i c+4 p}} \sqrt{\pi} \, \operatorname{erfi}\left(\frac{i b+2 (-i c+p) \sqrt{z}}{2 \sqrt{-i c+p}}\right)}{(-i c+p)^{3/2}} - \frac{b \, e^{\frac{b^2}{4 (i c+p)}} \sqrt{\pi} \, \operatorname{erfi}\left(\frac{-i b+2 (i c+p) \sqrt{z}}{2 \sqrt{i c+p}}\right)}{(i c+p)^{3/2}} - \frac{b \, e^{\frac{b^2}{4 (i c+p)}} \sqrt{\pi} \, \operatorname{erfi}\left(\frac{i b+2 (i c+p) \sqrt{z}}{2 \sqrt{i c+p}}\right)}{(i c+p)^{3/2}} \right)$$

Involving $e^{p z} \sin(b z) \cos(c z^r)$

01.07.21.0911.01

$$\int e^{p z} \sin(b z) \cos\left(c z^2\right) dz = \frac{1}{8 \sqrt{c}} \left(\sqrt[4]{-1} \, e^{-\frac{i\left(b^2-2 i p b+p^2\right)}{4 c}} \sqrt{\pi} \left(-e^{\frac{(2 b+i p) p}{2 c}} \operatorname{erfi}\left(\frac{(-1)^{3/4} (-i b+p+2 i c z)}{2 \sqrt{c}}\right) + e^{\frac{i p^2}{2 c}} \operatorname{erfi}\left(\frac{(-1)^{3/4} (i b+p+2 i c z)}{2 \sqrt{c}}\right) + e^{\frac{i b^2}{2 c}} \, i \operatorname{erfi}\left(\frac{\sqrt[4]{-1} (-i b+p-2 i c z)}{2 \sqrt{c}}\right) - i \, e^{\frac{b (i b+2 p)}{2 c}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1} (i b+p-2 i c z)}{2 \sqrt{c}}\right) \right) \right)$$

01.07.21.0912.01

$$\int e^{p z} \sin(b z) \cos\left(c \sqrt{z}\right) dz = \frac{1}{8} i \left(\frac{4 e^{(-i b+p) z} \cos\left(c \sqrt{z}\right)}{-i b+p} - \frac{4 e^{(i b+p) z} \cos\left(c \sqrt{z}\right)}{i b+p} + \frac{c \, e^{\frac{c^2}{4 (-i b+p)}} \, i \sqrt{\pi} \, \operatorname{erfi}\left(\frac{-i c+2 (-i b+p) \sqrt{z}}{2 \sqrt{-i b+p}}\right)}{(-i b+p)^{3/2}} + \frac{c \, e^{\frac{c^2}{4 (-i b+p)}+i \pi} \, i \sqrt{\pi} \, \operatorname{erfi}\left(\frac{i c+2 (-i b+p) \sqrt{z}}{2 \sqrt{-i b+p}}\right)}{(-i b+p)^{3/2}} - \frac{i c \, e^{\frac{c^2}{4 (i b+p)}} \sqrt{\pi} \, \operatorname{erfi}\left(\frac{-i c+2 (i b+p) \sqrt{z}}{2 \sqrt{i b+p}}\right)}{(i b+p)^{3/2}} - \frac{i c \, e^{\frac{c^2}{4 (i b+p)}-i \pi} \sqrt{\pi} \, \operatorname{erfi}\left(\frac{i c+2 (i b+p) \sqrt{z}}{2 \sqrt{i b+p}}\right)}{(i b+p)^{3/2}} \right)$$

Involving $e^{p z^r} \sin(b z) \cos(c z^r)$

01.07.21.0913.01

$$\int e^{p z^2} \sin(b z) \cos\left(c z^2\right) dz = \frac{1}{8 \left(c^2+p^2\right)} \left(\sqrt{\pi} \left(e^{\frac{b^2}{4 (-i c+p)}} \sqrt{-i c+p} \, (i c+p) \operatorname{erf}\left(\frac{b+2 (c+i p) z}{2 \sqrt{-i c+p}}\right) + e^{\frac{b^2}{4 (-i c+p)}} \sqrt{-i c+p} \, (c-i p) \operatorname{erfi}\left(\frac{i b+2 (-i c+p) z}{2 \sqrt{-i c+p}}\right) + e^{\frac{b^2}{4 (i c+p)}} \sqrt{i c+p} \, (c+i p) \left(\operatorname{erfi}\left(\frac{-i b+2 (i c+p) z}{2 \sqrt{i c+p}}\right) - \operatorname{erfi}\left(\frac{i b+2 (i c+p) z}{2 \sqrt{i c+p}}\right) \right) \right) \right)$$

01.07.21.0914.01

$$\int e^{p\sqrt{z}}\sin(b\,z)\cos\left(c\sqrt{z}\right)dz = \frac{1}{4}\,i\left(\frac{4\,e^{p\sqrt{z}}\,i\cos\left(c\sqrt{z}\right)\cos(b\,z)}{b}+\frac{e^{\frac{i(-i\,c+p)^2}{4\,b}}(-i\,c+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-i\,c+p+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{2\,(i\,b)^{3/2}}+\frac{e^{\frac{i(i\,c+p)^2}{4\,b}}(i\,c+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{i\,c+p+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{2\,(i\,b)^{3/2}}-\frac{e^{-\frac{i(-i\,c+p)^2}{4\,b}}(-i\,c+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-i\,c+p-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{2\,(-i\,b)^{3/2}}-\frac{e^{-\frac{i(i\,c+p)^2}{4\,b}}(i\,c+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{i\,c+p-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{2\,(-i\,b)^{3/2}}\right)$$

Involving $e^{p\,z}\sin\left(b\,z^r\right)\cos\left(c\,z^r\right)$

01.07.21.0915.01

$$\int e^{p\,z}\sin\left(b\,z^2\right)\cos\left(c\,z^2\right)dz = \frac{1}{8}\sqrt[4]{-1}\,\sqrt{\pi}\left(\frac{e^{\frac{i\,p^2}{4\,b-4\,c}}\left(\operatorname{erfi}\left(\frac{(-1)^{3/4}\,(p+2\,(b-c)\,i\,z)}{2\sqrt{b-c}}\right)+e^{\frac{i\,p^2}{2\,c-2\,b}}\,i\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,\,(p-2\,i\,(b-c)\,z)}{2\sqrt{b-c}}\right)\right)}{\sqrt{b-c}}+\frac{e^{-\frac{i\,p^2}{4\,(b+c)}}\left(e^{\frac{i\,p^2}{2\,(b+c)}}\operatorname{erfi}\left(\frac{(-1)^{3/4}\,(p+2\,(b+c)\,i\,z)}{2\sqrt{b+c}}\right)+i\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,\,(p-2\,i\,(b+c)\,z)}{2\sqrt{b+c}}\right)\right)}{\sqrt{b+c}}\right)$$

01.07.21.0916.01

$$\int e^{p\,z}\sin\left(b\sqrt{z}\right)\cos\left(c\sqrt{z}\right)dz = -\frac{1}{8}\,i\left(\frac{(b-c)\,e^{\frac{(b-c)^2}{4\,p}}\sqrt{\pi}\left(\operatorname{erf}\left(\frac{b-c-2\,i\,p\sqrt{z}}{2\sqrt{p}}\right)-\operatorname{erf}\left(\frac{b-c+2\,i\,p\sqrt{z}}{2\sqrt{p}}\right)\right)}{p^{3/2}}+\frac{(b+c)\,e^{\frac{(b+c)^2}{4\,p}}\sqrt{\pi}\left(\operatorname{erf}\left(\frac{b+c-2\,i\,p\sqrt{z}}{2\sqrt{p}}\right)-\operatorname{erf}\left(\frac{b+c+2\,i\,p\sqrt{z}}{2\sqrt{p}}\right)\right)}{p^{3/2}}+\frac{8\,e^{p\,z}\,i\cos\left(c\sqrt{z}\right)\sin\left(b\sqrt{z}\right)}{p}\right)$$

Involving $e^{p\,z^r}\sin\left(b\,z^r\right)\cos\left(c\,z^r\right)$

01.07.21.0917.01

$$\int e^{p z^r} \sin(b z^r) \cos(c z^r) \, dz = \frac{1}{4r} \left(i z \left(-\Gamma\left(\frac{1}{r}, i (b - c + i p) z^r\right) (i (b - c + i p) z^r)^{-1/r} - (i (b + c + i p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i (b + c + i p) z^r\right) + (-i (b - c - i p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -i (b - c - i p) z^r\right) + (-i (b + c - i p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -i (b + c - i p) z^r\right)\right)\right)$$

01.07.21.0918.01

$$\int e^{p z^2} \sin(b z^2) \cos(c z^2) \, dz = \frac{1}{8} \sqrt{\pi} \left(\frac{1}{b^2 - 2 c b + c^2 + p^2} \left(\sqrt{-i b + i c + p} \, (-b + c + i p) \operatorname{erfi}\left(\sqrt{-i b + i c + p} \, z\right) + \sqrt{i b - i c + p} \, (-b + c - i p) \operatorname{erfi}\left(\sqrt{i b - i c + p} \, z\right)\right) - \frac{1}{b^2 + 2 c b + c^2 + p^2} \left(\sqrt{i b + i c + p} \, (b + c + i p) \operatorname{erfi}\left(\sqrt{i b + i c + p} \, z\right) + \sqrt{-i (b + c + i p)} \, (b + c - i p) \operatorname{erfi}\left(\sqrt{-i (b + c + i p)} \, z\right)\right)\right)$$

01.07.21.0919.01

$$\int e^{p \sqrt{z}} \sin\left(b \sqrt{z}\right) \cos\left(c \sqrt{z}\right) dz = \frac{1}{2} i \left(e^{(-i b + i c + p) \sqrt{z}} \left(\frac{\sqrt{z}}{-i b + i c + p} + \frac{1}{(b - c + i p)^2} \right) - e^{(i b + i c + p) \sqrt{z}} \left(\frac{\sqrt{z}}{i b + i c + p} + \frac{1}{(b + c - i p)^2} \right) + e^{(-i b - i c + p) \sqrt{z}} \left(\frac{\sqrt{z}}{-i b - i c + p} + \frac{1}{(b + c + i p)^2} \right) - e^{(i b - i c + p) \sqrt{z}} \left(\frac{\sqrt{z}}{i b - i c + p} + \frac{1}{(-b + c + i p)^2} \right)\right)$$

Involving $e^{b z^r + e} \sin(a z^r + q) \cos(c z^r + g)$

01.07.21.0920.01

$$\int e^{b z^r + e} \sin(a z^r + q) \cos(c z^r + g) \, dz = \frac{1}{4r} \left(i e^{e - i (g + q)} z \left(-e^{2 i g} \Gamma\left(\frac{1}{r}, i (a - c + i b) z^r\right) (i (a - c + i b) z^r)^{-1/r} + e^{2 i q} (-i (a - i b - c) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -i (a - i b - c) z^r\right) - (i (a + c + i b) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i (a + c + i b) z^r\right) + e^{2 i (g + q)} (-i (a - i b + c) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -i (a - i b + c) z^r\right)\right)\right)$$

01.07.21.0921.01

$$\int e^{b z^2 + e} \sin\left(a z^2 + q\right) \cos\left(c z^2 + g\right) dz = \frac{1}{8} i \sqrt{\pi} \left(\frac{e^{e + i g - i q} \operatorname{erfi}\left(\sqrt{b - i a + i c} \, z\right)}{\sqrt{b - i a + i c}} + \frac{e^{e - i g - i q} \operatorname{erfi}\left(\sqrt{b - i c - i a} \, z\right)}{\sqrt{b - i c - i a}} - \frac{e^{e + i g + i q} \operatorname{erfi}\left(\sqrt{b + i a + i c} \, z\right)}{\sqrt{b + i a + i c}} - \frac{e^{e - i g + i q} \operatorname{erfi}\left(\sqrt{b - i c + i a} \, z\right)}{\sqrt{b - i c + i a}} \right)$$

01.07.21.0922.01

$$\int e^{\sqrt{z}\, b+e} \sin\left(\sqrt{z}\, a+q\right) \cos\left(\sqrt{z}\, c+g\right) dz = \frac{1}{2} i \left(\frac{e^{\sqrt{z}\, (b-i a+i c)+e+i g-i q} \left((b-i a+i c) \sqrt{z}-1\right)}{(b-i a+i c)^2} + \frac{e^{\sqrt{z}\, (b-i c-i a)+e-i g-i q} \left((b-i c-i a) \sqrt{z}-1\right)}{(b-i c-i a)^2} - \frac{e^{\sqrt{z}\, (b+i a+i c)+e+i g+i q} \left((b+i a+i c) \sqrt{z}-1\right)}{(b+i a+i c)^2} - \frac{e^{\sqrt{z}\, (b-i c+i a)+e-i g+i q} \left((b-i c+i a) \sqrt{z}-1\right)}{(b-i c+i a)^2} \right)$$

Involving $e^{b z^r+d z+e} \sin\left(a z^r+p z+q\right) \cos\left(c z^r+f z+g\right)$

01.07.21.0923.01

$$\int e^{b z^2+d z+e} \sin\left(a z^2+p z+q\right) \cos\left(c z^2+f z+g\right) dz = \frac{1}{8} \sqrt{\pi} \left(\frac{1}{a^2+2 c a+b^2+c^2} \left((b+i a+i c) \sqrt{-i (a+c+i b)}\, e^{-\frac{i (d-i (f+p))^2}{4 (a+c+i b)}+e-i g-i q} \operatorname{erf}\left(\frac{f+i d+p+2 a z+2 c z+2 i b z}{2 \sqrt{-i (a+c+i b)}} \right) - \sqrt{b+i a+i c}\, (a+c+i b)\, e^{\frac{i (d+i (f+p))^2}{4 (a-i b+c)}+e+i g+i q} \operatorname{erfi}\left(\frac{d+i (f+p+2 (a-i b+c) z)}{2 \sqrt{b+i a+i c}} \right) \right) - \frac{1}{a^2-2 c a+b^2+c^2} \left((a-i b-c) \sqrt{b-i a+i c}\, e^{-\frac{i (d+i (f-p))^2}{4 (a-c+i b)}+e+i g-i q} \operatorname{erfi}\left(\frac{d-i (-f+p+2 (a-c+i b) z)}{2 \sqrt{b-i a+i c}} \right) + (a-c+i b) \sqrt{b-i c+i a}\, e^{\frac{i (d-i (f-p))^2}{4 (a-i b-c)}+e-i g+i q} \operatorname{erfi}\left(\frac{d+i (-f+p+2 (a-i b-c) z)}{2 \sqrt{b-i c+i a}} \right) \right) \right)$$

01.07.21.0924.01

$$\int e^{\sqrt{z}\, b+d z+e} \sin\left(\sqrt{z}\, a+p z+q\right) \cos\left(\sqrt{z}\, c+f z+g\right) dz = \frac{1}{4} e^{e-i (g+q)}\, i \left(-\frac{e^{\sqrt{z}\, (b-i c+i a)+2 i q+(d-i (f-p)) z}}{d-i (f-p)}-\frac{e^{\sqrt{z}\, (b+i a+i c)+2 i g+2 i q+(d+i (f+p)) z}}{d+i (f+p)}+\frac{e^{-i (a+c+i b) \sqrt{z}+(d-i (f+p)) z}}{d-i (f+p)}+\frac{e^{\sqrt{z}\, (b-i a+i c)+2 i g+(d+i (f-p)) z}}{d+i (f-p)}\right)+\frac{1}{8} \left(\frac{(-b-i c+i a)\, e^{\frac{(a-c+i b)^2}{4 (d+i (f-p))}+e+i g-i q} \operatorname{erf}\left(\frac{a-c+i b+2 (-f+i d+p) \sqrt{z}}{2 \sqrt{d+i (f-p)}}\right)}{(d+i (f-p))^{3/2}}+\frac{(-b+i a+i c)\, e^{\frac{(a+c+i b)^2}{4 (d-i (f+p))}+e-i g-i q} \operatorname{erf}\left(\frac{a+c+i b+2 (f+i d+p) \sqrt{z}}{2 \sqrt{d-i (f+p)}}\right)}{(d-i (f+p))^{3/2}}-\frac{(a-i b-c)\, e^{\frac{(-a+c+i b)^2}{4 (d-i (f-p))}+e-i g+i q} \operatorname{erfi}\left(\frac{b+i a-i \left(c+2 (f+i d-p) \sqrt{z}\right)}{2 \sqrt{d-i (f-p)}}\right)}{(d-i (f-p))^{3/2}}-\frac{(a-i b+c)\, e^{\frac{(a-i b+c)^2}{4 (d+i (f+p))}+e+i g+i q} \operatorname{erfi}\left(\frac{b+i a+i c+2 (d+i (f+p)) \sqrt{z}}{2 \sqrt{d+i (f+p)}}\right)}{(d+i (f+p))^{3/2}}\right) \sqrt{\pi}$$

Involving sin and rational functions of exp

Involving $\sin(e\, z) \cos(c\, z) \left(a+b\, e^{d z}\right)^{-n}$

01.07.21.0925.01

$$\int \frac{\sin(e\, z) \cos(c\, z)}{\left(a+b\, e^{d z}\right)^n}\, dz = \frac{1}{4}\, i\, a^{-n} \left(\frac{i\, e^{-i (c+e) z}}{c+e} \left(e^{2 i (c+e) z}\, {}_2F_1\left(\frac{i (c+e)}{d}, n; \frac{d+i c+i e}{d}; -\frac{b\, e^{d z}}{a}\right)+{}_2F_1\left(-\frac{i (c+e)}{d}, n; -\frac{i (c+e+i d)}{d}; -\frac{b\, e^{d z}}{a}\right)\right)-\frac{i\, e^{-i (c-e) z}}{c-e} \left(e^{2 i (c-e) z}\, {}_2F_1\left(\frac{i (c-e)}{d}, n; \frac{d-i e+i c}{d}; -\frac{b\, e^{d z}}{a}\right)+{}_2F_1\left(-\frac{i (c-e)}{d}, n; \frac{d-i c+i e}{d}; -\frac{b\, e^{d z}}{a}\right)\right)\right) /; n \in \mathbb{N}^+$$

Involving $e^{p z} \sin(e\, z) \cos(c\, z) \left(a+b\, e^{d z}\right)^{-n}$

01.07.21.0926.01

$$\int \frac{e^{p z} \sin(e z) \cos(c z)}{\left(a+b e^{d z}\right)^n} \, dz = \frac{1}{4} i a^{-n} \left(-\frac{1}{c^2-2 e c+e^2+p^2} \left(e^{(-i c+i e+p) z} (i c-i e+p) \, {}_2F_1\left(\frac{-i c+i e+p}{d}, n; \frac{d-i c+i e+p}{d}; -\frac{b e^{d z}}{a} \right) + e^{(i c-i e+p) z} i (c-e+i p) \, {}_2F_1\left(\frac{i c-i e+p}{d}, n; \frac{d-i e+i c+p}{d}; -\frac{b e^{d z}}{a} \right) \right) + \frac{1}{c^2+2 e c+e^2+p^2} \left(i \left(e^{(i c+i e+p) z} (c+e+i p) \, {}_2F_1\left(\frac{i c+i e+p}{d}, n; \frac{d+i c+i e+p}{d}; -\frac{b e^{d z}}{a} \right) + e^{-i (c+e+i p) z} (c+e-i p) \, {}_2F_1\left(-\frac{i (c+e+i p)}{d}, n; \frac{d-i e-i c+p}{d}; -\frac{b e^{d z}}{a} \right) \right) \right) \right) /; n \in \mathbb{N}^+$$

Involving sin and algebraic functions of exp

Involving $\left(a+b e^{d z}\right)^\beta \sin(e z) \cos(c z)$

01.07.21.0927.01

$$\int \left(a+b e^{d z}\right)^\beta \sin(e z) \cos(c z) \, dz = \frac{1}{4} i \left(a+b e^{d z}\right)^\beta \left(\frac{e^{d z} b}{a}+1 \right)^{-\beta} \left(\frac{i e^{-i (c+e) z}}{c+e} \left(e^{2 i (c+e) z} \, {}_2F_1\left(\frac{i (c+e)}{d}, -\beta; \frac{d+i c+i e}{d}; -\frac{b e^{d z}}{a} \right) + {}_2F_1\left(-\frac{i (c+e)}{d}, -\beta; -\frac{i (c+e+i d)}{d}; -\frac{b e^{d z}}{a} \right) \right) - \frac{i e^{-i (c-e) z}}{c-e} \left(e^{2 i (c-e) z} \, {}_2F_1\left(\frac{i (c-e)}{d}, -\beta; \frac{d-i e+i c}{d}; -\frac{b e^{d z}}{a} \right) + {}_2F_1\left(-\frac{i (c-e)}{d}, -\beta; \frac{d-i c+i e}{d}; -\frac{b e^{d z}}{a} \right) \right) \right)$$

Involving $e^{p z}\left(a+b e^{d z}\right)^\beta \sin(e z) \cos(c z)$

01.07.21.0928.01

$$\int e^{p z} \left(a+b e^{d z}\right)^\beta \sin(e z) \cos(c z) \, dz = \frac{1}{4} i \left(a+b e^{d z}\right)^\beta \left(\frac{e^{d z} b}{a}+1 \right)^{-\beta} \left(\frac{1}{c^2+2 e c+e^2+p^2} i \left(e^{(i c+i e+p) z} (c+e+i p) \, {}_2F_1\left(\frac{i c+i e+p}{d}, -\beta; \frac{d+i c+i e+p}{d}; -\frac{b e^{d z}}{a} \right) + e^{-i (c+e+i p) z} (c+e-i p) \, {}_2F_1\left(-\frac{i (c+e+i p)}{d}, -\beta; \frac{d-i e-i c+p}{d}; -\frac{b e^{d z}}{a} \right) \right) - \frac{1}{c^2-2 e c+e^2+p^2} \left(e^{(-i c+i e+p) z} (i c-i e+p) \, {}_2F_1\left(\frac{-i c+i e+p}{d}, -\beta; \frac{d-i c+i e+p}{d}; -\frac{b e^{d z}}{a} \right) + e^{(i c-i e+p) z} i (c-e+i p) \, {}_2F_1\left(\frac{i c-i e+p}{d}, -\beta; \frac{d-i e+i c+p}{d}; -\frac{b e^{d z}}{a} \right) \right) \right)$$

Involving powers of sin and exp

Involving $e^{p z} \sin^{\mu}(c z) \cos(a z)$

01.07.21.0929.01

$$\int e^{p z} \sin^{\mu}(c z) \cos(a z) \, dz = \frac{1}{2} i \left(1 - e^{2 i c z}\right)^{-\mu} \sin^{\mu}(c z) \left(\frac{e^{(p + i a) z}}{-a + i p + c \mu} \, {}_2F_1\left(\frac{a - i p - c \mu}{2 c}, -\mu; \frac{a - i p + 2 c - c \mu}{2 c}; e^{2 i c z} \right) + \frac{e^{(p - i a) z}}{a + i p + c \mu} \, {}_2F_1\left(-\frac{a + i p + c \mu}{2 c}, -\mu; -\frac{a + i p + c (\mu - 2)}{2 c}; e^{2 i c z} \right) \right)$$

01.07.21.0930.01

$$\int e^{p z} \sin^{m}(c z) \cos(a z) \, dz = -2^{-m} e^{p z} \left(\frac{(m \bmod 2 - 1) (p \cos(a z) + a \sin(a z))}{a^2 + p^2} \binom{m}{\frac{m}{2}} + 2 \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^k \binom{m}{k} \left(\cos(a z) \left(\cos(c (m - 2 k) z) \left(p \left(-a^2 - p^2 - c^2 (m - 2 k)^2\right) \cos\left(\frac{m \pi}{2}\right) - c (2 k - m) \left(-a^2 + p^2 + c^2 (m - 2 k)^2\right) \sin\left(\frac{m \pi}{2}\right) \right) + \left(c (2 k - m) \left(-a^2 + p^2 + c^2 (m - 2 k)^2\right) \cos\left(\frac{m \pi}{2}\right) + p \left(-a^2 - p^2 - c^2 (m - 2 k)^2\right) \sin\left(\frac{m \pi}{2}\right) \right) \sin(c (m - 2 k) z) \right) + a \sin(a z) \left(-\cos(c (m - 2 k) z) \left(\left(a^2 + p^2 - c^2 (m - 2 k)^2\right) \cos\left(\frac{m \pi}{2}\right) + 2 p c (2 k - m) \sin\left(\frac{m \pi}{2}\right) \right) - \left(\left(a^2 + p^2 - c^2 (m - 2 k)^2\right) \sin\left(\frac{m \pi}{2}\right) - 2 p c (2 k - m) \cos\left(\frac{m \pi}{2}\right) \right) \sin(c (m - 2 k) z) \right) \right) \right) \Big/ \left(a^4 + 2 \left(p^2 - c^2 (m - 2 k)^2\right) a^2 + \left(p^2 + c^2 (m - 2 k)^2\right)^2 \right) \right) /; m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^{\mu}(c z + d) \cos(a z)$

01.07.21.0931.01

$$\int e^{p z} \sin^{\mu}(d + c z) \cos(a z) \, dz = \frac{1}{2} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} \sin^{\mu}(d + c z) \left(\frac{i e^{(-i a + p) z}}{a + i p + c \mu} \, {}_2F_1\left(-\frac{a + i p + c \mu}{2 c}, -\mu; -\frac{a + i p + c (\mu - 2)}{2 c}; e^{2 i (d + c z)} \right) - \frac{i e^{(i a + p) z}}{a - i p - c \mu} \, {}_2F_1\left(\frac{a - i p - c \mu}{2 c}, -\mu; \frac{a + 2 c - i p - c \mu}{2 c}; e^{2 i (d + c z)} \right) \right)$$

01.07.21.0932.01

$$\int e^{p z} \sin^m(d + c z) \cos(a z) \, dz = 2^{-m} e^{p z} \left(2 \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^k \binom{m}{k} \left(\cos\left(2 d k - d m + \frac{m \pi}{2}\right) \left(c (2 k - m) \sin(c (m - 2 k) z) \left(\left(a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(a z) - 2 a p \sin(a z)\right) - \cos(c (m - 2 k) z) \left(p \left(-a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(a z) - a \left(a^2 - c^2 (m - 2 k)^2 + p^2\right) \sin(a z)\right)\right) - \sin\left(2 d k - d m + \frac{m \pi}{2}\right) \left(c (2 k - m) \cos(c (m - 2 k) z) \left(\left(a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(a z) - 2 a p \sin(a z)\right) + \left(p \left(-a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(a z) - a \left(a^2 - c^2 (m - 2 k)^2 + p^2\right) \sin(a z)\right) \sin(c (m - 2 k) z)\right)\right)\right) \Big/ \left(a^4 - 2 \left(c^2 (m - 2 k)^2 - p^2\right) a^2 + \left(c^2 (m - 2 k)^2 + p^2\right)^2\right) - \frac{\binom{m}{\frac{m}{2}} (m \bmod 2 - 1) (p \cos(a z) + a \sin(a z))}{a^2 + p^2} \right) /; m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^{\mu}(c z) \cos(a z + b)$

01.07.21.0933.01

$$\int e^{p z} \sin^{\mu}(c z) \cos(b + a z) \, dz = \frac{1}{2} e^{-i b} \left(1 - e^{2 i c z}\right)^{-\mu} \sin^{\mu}(c z) \left(\frac{i e^{(-i a + p) z}}{a + i p + c \mu} \, {}_2F_1\left(-\frac{a + i p + c \mu}{2 c}, -\mu; -\frac{a + i p + c (\mu - 2)}{2 c}; e^{2 i c z}\right) - \frac{i e^{2 i b + (i a + p) z}}{a - i p - c \mu} \, {}_2F_1\left(\frac{a - i p - c \mu}{2 c}, -\mu; \frac{a + 2 c - i p - c \mu}{2 c}; e^{2 i c z}\right) \right)$$

01.07.21.0934.01

$$\int e^{p z} \sin^m(c z) \cos(b + a z) \, dz = 2^{-m} e^{p z} \left(2 \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{m\pi}{2}\right) \left(c (2 k - m) \sin(c (m - 2 k) z) \left(\left(a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(b + a z) - 2 a p \sin(b + a z)\right) - \cos(c (m - 2 k) z) \left(p \left(-a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(b + a z) - a \left(a^2 - c^2 (m - 2 k)^2 + p^2\right) \sin(b + a z)\right)\right) - \sin\left(\frac{m\pi}{2}\right) \left(c (2 k - m) \cos(c (m - 2 k) z) \left(\left(a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(b + a z) - 2 a p \sin(b + a z)\right) + \sin(c (m - 2 k) z) \left(p \left(-a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(b + a z) - a \left(a^2 - c^2 (m - 2 k)^2 + p^2\right) \sin(b + a z)\right)\right)\right) \Big/ \left(a^4 - 2 \left(c^2 (m - 2 k)^2 - p^2\right) a^2 + \left(c^2 (m - 2 k)^2 + p^2\right)^2\right) \right) - \frac{(m \bmod 2 - 1) (p \cos(b + a z) + a \sin(b + a z))}{a^2 + p^2} \binom{m}{\frac{m}{2}} \right) /; m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^{\mu}(c z + d) \cos(a z + b)$

01.07.21.0935.01

$$\int e^{p z} \sin^{\mu}(d + c z) \cos(b + a z) \, dz = \frac{1}{2} e^{-i b} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} \sin^{\mu}(d + c z) \left(\frac{i e^{(-i a + p) z}}{a + i p + c \mu} \, {}_2F_1\left(-\frac{a + i p + c \mu}{2 c}, -\mu; -\frac{a + i p + c (\mu - 2)}{2 c}; e^{2 i (d + c z)}\right) - \frac{i e^{2 i b + (i a + p) z}}{a - i p - c \mu} \, {}_2F_1\left(\frac{a - i p - c \mu}{2 c}, -\mu; \frac{a + 2 c - i p - c \mu}{2 c}; e^{2 i (d + c z)}\right) \right)$$

01.07.21.0936.01

$$\int e^{p z} \sin^m(d + c z) \cos(b + a z)\, dz = 2^{-m} e^{p z} \left(2 \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^k \binom{m}{k} \left(\cos\left(2 d k - d m + \frac{m \pi}{2}\right) \left(c (2 k - m) \sin(c (m - 2 k) z) \left(\left(a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(b + a z) - 2 a p \sin(b + a z)\right) - \cos(c (m - 2 k) z) \left(p \left(-a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(b + a z) - a \left(a^2 - c^2 (m - 2 k)^2 + p^2\right) \sin(b + a z)\right)\right) - \sin\left(2 d k - d m + \frac{m \pi}{2}\right) \left(c (2 k - m) \cos(c (m - 2 k) z) \left(\left(a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(b + a z) - 2 a p \sin(b + a z)\right) + \sin(c (m - 2 k) z) \left(p \left(-a^2 - c^2 (m - 2 k)^2 - p^2\right) \cos(b + a z) - a \left(a^2 - c^2 (m - 2 k)^2 + p^2\right) \sin(b + a z)\right)\right)\right)\right) \Big/ \left(a^4 - 2 \left(c^2 (m - 2 k)^2 - p^2\right) a^2 + \left(c^2 (m - 2 k)^2 + p^2\right)^2\right) - \frac{(m \bmod 2 - 1) (p \cos(b + a z) + a \sin(b + a z))}{a^2 + p^2} \binom{m}{\frac{m}{2}} \right) /; m \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin^m\left(b z^r\right) \cos(c z)$

01.07.21.0937.01

$$\int e^{p z^2} \sin^m\left(b z^2\right) \cos(c z)\, dz = \frac{2^{-m-2} \sqrt{\pi} \binom{m}{\frac{m}{2}} \left(e^{\frac{c^2}{4 p}} \operatorname{erfi}\left(\frac{-i c + 2 p z}{2 \sqrt{p}}\right) + e^{\frac{c^2}{4 p}} \operatorname{erfi}\left(\frac{i c + 2 p z}{2 \sqrt{p}}\right)\right) (1 - m \bmod 2)}{\sqrt{p}} + 2^{-m-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\left(\left(e^{-\frac{2 i m (p - i b (2 k - m)) \pi - c^2}{4 (p - i b (2 k - m))}} \sqrt{p - i b (2 k - m)}\, (b i (2 k - m) + p) \operatorname{erfi}\left(\frac{-i c - 2 i b (2 k - m) z + 2 p z}{2 \sqrt{p - i b (2 k - m)}}\right) + e^{-\frac{-c^2 - 2 i m (b i (2 k - m) + p) \pi}{4 (b i (2 k - m) + p)}} (p - i b (2 k - m)) \sqrt{b i (2 k - m) + p}\, \operatorname{erfi}\left(\frac{i c + 2 (b i (2 k - m) + p) z}{2 \sqrt{b i (2 k - m) + p}}\right)\right) \Big/ ((p - i b (2 k - m)) (b i (2 k - m) + p)) + \left(e^{-\frac{-c^2 - 2 i m (p - i b (m - 2 k)) \pi}{4 (p - i b (m - 2 k))}} \sqrt{p - i b (m - 2 k)}\, (b i (m - 2 k) + p) \operatorname{erfi}\left(\frac{-i c - 2 i b (m - 2 k) z + 2 p z}{2 \sqrt{p - i b (m - 2 k)}}\right) + e^{-\frac{2 i m (b i (m - 2 k) + p) \pi - c^2}{4 (b i (m - 2 k) + p)}} (p - i b (m - 2 k)) \sqrt{b i (m - 2 k) + p}\, \operatorname{erfi}\left(\frac{i c + 2 (b i (m - 2 k) + p) z}{2 \sqrt{b i (m - 2 k) + p}}\right)\right) \Big/ ((p - i b (m - 2 k)) (b i (m - 2 k) + p)) \right) /; m \in \mathbb{N}$$

01.07.21.0938.01

$$\int e^{p\sqrt{z}} \sin^m\left(b\sqrt{z}\right)\cos(c\,z)\,dz = 2^{-m-1}(-i)^m \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(-\frac{(-1)^m e^{-\frac{i(2ibk-ibm+p)^2}{4c}}(2ibk-ibm+p)\sqrt{\pi}\,\mathrm{erfi}\left(\frac{2ibk-ibm+p-2ic\sqrt{z}}{2\sqrt{-ic}}\right)}{2(-ic)^{3/2}} - \frac{e^{-\frac{i(bi(m-2k)+p)^2}{4c}}(bi(m-2k)+p)\sqrt{\pi}\,\mathrm{erfi}\left(\frac{ib(m-2k)+p-2ic\sqrt{z}}{2\sqrt{-ic}}\right)}{2(-ic)^{3/2}} - \frac{(-1)^m e^{\frac{i(2ibk-ibm+p)^2}{4c}}(2ibk-ibm+p)\sqrt{\pi}\,\mathrm{erfi}\left(\frac{2ibk-ibm+p+2ic\sqrt{z}}{2\sqrt{ic}}\right)}{2(ic)^{3/2}} - \frac{e^{\frac{i(bi(m-2k)+p)^2}{4c}}(bi(m-2k)+p)\sqrt{\pi}\,\mathrm{erfi}\left(\frac{ib(m-2k)+p+2ic\sqrt{z}}{2\sqrt{ic}}\right)}{2(ic)^{3/2}} + \frac{2(-1)^m e^{(2ibk-ibm+p)\sqrt{z}}\sin(c\,z)}{c} + \frac{2e^{(bi(m-2k)+p)\sqrt{z}}\sin(c\,z)}{c}\right) + 2^{-m}\left(\frac{p\sqrt{\pi}}{4(ic)^{3/2}}e^{\frac{ip^2}{4c}}\left(e^{-\frac{ip^2}{2c}}\mathrm{erf}\left(\frac{-p+2ic\sqrt{z}}{2\sqrt{ic}}\right) - \mathrm{erfi}\left(\frac{p+2ic\sqrt{z}}{2\sqrt{ic}}\right)\right) + \frac{e^{p\sqrt{z}}\sin(c\,z)}{c}\right)\binom{m}{\frac{m}{2}}(1-m \bmod 2)\;/;\; m\in\mathbb{N}^+$$

Involving $e^{p\,z^r}\sin^m(b\,z)\cos(c\,z)$

01.07.21.0939.01

$$\int e^{p z^2} \sin^m(b z) \cos(c z)\, dz = \frac{2^{-m-2} \sqrt{\pi} \binom{m}{\frac{m}{2}} \left(e^{\frac{c^2}{4 p}} \operatorname{erfi}\left(\frac{-i c+2 p z}{2 \sqrt{p}}\right) + e^{\frac{c^2}{4 p}} \operatorname{erfi}\left(\frac{i c+2 p z}{2 \sqrt{p}}\right)\right) (1 - m \bmod 2)}{\sqrt{p}} + \frac{1}{\sqrt{p}} \left(2^{-m-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{(i c+i b (2 k-m))^2-2 \pi i m p}{4 p}} \operatorname{erfi}\left(\frac{i c+i b (2 k-m)+2 p z}{2 \sqrt{p}}\right) + e^{-\frac{(-i c-i b (2 k-m))^2+2 \pi i m p}{4 p}} \operatorname{erfi}\left(\frac{-i c-i b (2 k-m)+2 p z}{2 \sqrt{p}}\right) + e^{-\frac{(i c+i b (m-2 k))^2+2 \pi i m p}{4 p}} \operatorname{erfi}\left(\frac{i c+i b (m-2 k)+2 p z}{2 \sqrt{p}}\right) + e^{-\frac{(-i c-i b (m-2 k))^2-2 \pi i m p}{4 p}} \operatorname{erfi}\left(\frac{-i c-i b (m-2 k)+2 p z}{2 \sqrt{p}}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0940.01

$$\int e^{p \sqrt{z}} \sin^m(b z) \cos(c z)\, dz = 2^{-m-1} (-i)^m \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{i m \pi} \left(-\frac{e^{\frac{p^2}{4 i c-8 i b k+4 i b m}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p-2 (i c-2 i b k+i b m) \sqrt{z}}{2 \sqrt{-i c+i b (2 k-m)}}\right)}{2 (-i c+i b (2 k-m))^{3/2}} - \frac{e^{p \sqrt{z} -(i c-2 i b k+i b m) z}}{i c+i b (m-2 k)}\right) + e^{i m \pi} \left(\frac{e^{\sqrt{z}\ p+(i c+2 i b k-i b m) z}}{i c+i b (2 k-m)} - \frac{e^{\frac{p^2}{-4 i c-8 i b k+4 i b m}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{2 \sqrt{z}\ (i c+2 i b k-i b m)+p}{2 \sqrt{i c+i b (2 k-m)}}\right)}{2 (i c+i b (2 k-m))^{3/2}}\right) - \frac{e^{p \sqrt{z} -(i c+i b (2 k-m)) z}}{i c+i b (2 k-m)} - \frac{e^{\frac{p^2}{4 i c+8 i b k-4 i b m}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p-2 (i c+i b (2 k-m)) \sqrt{z}}{2 \sqrt{-i c+i b (m-2 k)}}\right)}{2 (-i c+i b (m-2 k))^{3/2}} + \frac{e^{\sqrt{z}\ p+(i c+i b (m-2 k)) z}}{i c+i b (m-2 k)} - \frac{e^{\frac{p^2}{-4 i c+8 i b k-4 i b m}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{2 \sqrt{z}\ (i c+i b (m-2 k))+p}{2 \sqrt{i c+i b (m-2 k)}}\right)}{2 (i c+i b (m-2 k))^{3/2}}\right) + 2^{-m} \left(\frac{p \sqrt{\pi}}{4 (i c)^{3/2}} e^{\frac{i p^2}{4 c}} \left(e^{-\frac{i p^2}{2 c}} \operatorname{erf}\left(\frac{-p+2 i c \sqrt{z}}{2 \sqrt{i c}}\right) - \operatorname{erfi}\left(\frac{p+2 i c \sqrt{z}}{2 \sqrt{i c}}\right)\right) + \frac{e^{p \sqrt{z}} \sin(c z)}{c}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) /;\ m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^m\left(b z^r\right) \cos(c z)$

01.07.21.0941.01

$$\int e^{p z} \sin^m\left(b z^2\right) \cos(c z)\, dz = \frac{2^{-m} e^{p z} (1 - m \bmod 2) (-p \cos(c z) - c \sin(c z))}{(i c - p)(i c + p)} \binom{m}{\frac{m}{2}} + \frac{2^{-m-2} i \sqrt{\pi}}{b} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{2k - m} \left((-1)^k \binom{m}{k} \left(e^{-\frac{i\left((-i c + p)^2 + 2 b (2k - m) m \pi\right)}{4 b (2k - m)}} \sqrt{-i b (2k - m)}\, \operatorname{erfi}\left(\frac{-i c + p - 2 i b (2k - m) z}{2 \sqrt{-i b (2k - m)}} \right) - e^{\frac{i\left((i c + p)^2 + 2 b (2k - m) m \pi\right)}{4 b (2k - m)}} \sqrt{i b (2k - m)}\, \operatorname{erfi}\left(\frac{i c + p + 2 i b (2k - m) z}{2 \sqrt{i b (2k - m)}} \right) - e^{-\frac{i\left((-i c + p)^2 - 2 b m (m - 2k) \pi\right)}{4 b (m - 2k)}} \sqrt{-i b (m - 2k)}\, \operatorname{erfi}\left(\frac{-i c + p - 2 i b (m - 2k) z}{2 \sqrt{-i b (m - 2k)}} \right) + e^{\frac{i\left((i c + p)^2 - 2 b m (m - 2k) \pi\right)}{4 b (m - 2k)}} \sqrt{i b (m - 2k)}\, \operatorname{erfi}\left(\frac{i c + p + 2 i b (m - 2k) z}{2 \sqrt{i b (m - 2k)}} \right) \right) \right) /;\ m \in \mathbb{N}^+$$

01.07.21.0942.01

$$\int e^{p z} \sin^m\left(b \sqrt{z}\right) \cos(c z)\, dz = 2^{-m-1} (-i)^m \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{i m \pi} \left(\frac{b\, e^{-\frac{b^2 (m - 2k)^2}{4 (i c - p)}}\, i (m - 2k) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b i (2k - m) + 2 (-i c + p) \sqrt{z}}{2 \sqrt{-i c + p}} \right)}{2 (-i c + p)^{3/2}} + \frac{e^{b i \sqrt{z} (2k - m) + (-i c + p) z}}{-i c + p} \right) + e^{i m \pi} \left(\frac{b\, e^{\frac{b^2 (m - 2k)^2}{4 (i c + p)}}\, i (m - 2k) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b i (2k - m) + 2 (i c + p) \sqrt{z}}{2 \sqrt{i c + p}} \right)}{2 (i c + p)^{3/2}} + \frac{e^{b i \sqrt{z} (2k - m) + (i c + p) z}}{i c + p} \right) + \frac{e^{b i \sqrt{z} (m - 2k) + (-i c + p) z}}{-i c + p} - \frac{i b\, e^{-\frac{b^2 (m - 2k)^2}{4 (i c - p)}} (m - 2k) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b i (m - 2k) + 2 (-i c + p) \sqrt{z}}{2 \sqrt{-i c + p}} \right)}{2 (-i c + p)^{3/2}} + \frac{e^{b i \sqrt{z} (m - 2k) + (i c + p) z}}{i c + p} - \frac{i b\, e^{\frac{b^2 (m - 2k)^2}{4 (i c + p)}} (m - 2k) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b i (m - 2k) + 2 (i c + p) \sqrt{z}}{2 \sqrt{i c + p}} \right)}{2 (i c + p)^{3/2}} \right) + \frac{2^{-m} e^{p z} (1 - m \bmod 2) (p \cos(c z) + c \sin(c z))}{c^2 + p^2} \binom{m}{\frac{m}{2}} /;\ m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^m(b z) \cos\left(c z^r\right)$

01.07.21.0943.01

$$\int e^{p z} \sin^m(b z) \cos\left(c z^2\right) dz = \frac{i\, 2^{-m-2} \sqrt{\pi}\, (1 - m \bmod 2)}{c} \binom{m}{\frac{m}{2}} \left(\sqrt{-i c}\, e^{-\frac{i p^2}{4 c}} \operatorname{erfi}\left(\frac{p - 2 i c z}{2 \sqrt{-i c}}\right) - \sqrt{i c}\, e^{\frac{i p^2}{4 c}} \operatorname{erfi}\left(\frac{p + 2 i c z}{2 \sqrt{i c}}\right)\right) + \frac{i\, 2^{-m-2} \sqrt{\pi}}{c} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\sqrt{-i c}\, e^{-\frac{i\left((p - i b (2 k - m))^2 + 2 c m \pi\right)}{4 c}} \operatorname{erfi}\left(\frac{-i b (2 k - m) + p - 2 i c z}{2 \sqrt{-i c}}\right) + \sqrt{-i c}\, e^{-\frac{i\left((p - i b (m - 2 k))^2 - 2 c m \pi\right)}{4 c}} \operatorname{erfi}\left(\frac{-i b (m - 2 k) + p - 2 i c z}{2 \sqrt{-i c}}\right) - \sqrt{i c}\, e^{\frac{i\left((b i (2 k - m) + p)^2 + 2 c m \pi\right)}{4 c}} \operatorname{erfi}\left(\frac{b i (2 k - m) + p + 2 i c z}{2 \sqrt{i c}}\right) - \sqrt{i c}\, e^{\frac{i\left((b i (m - 2 k) + p)^2 - 2 c m \pi\right)}{4 c}} \operatorname{erfi}\left(\frac{b i (m - 2 k) + p + 2 i c z}{2 \sqrt{i c}}\right)\right) /;\ m \in \mathbb{N}^+$$

01.07.21.0944.01

$$\int e^{p z} \sin^m(b z) \cos\left(c \sqrt{z}\right) dz = 2^{-m-2} \left(\frac{4 e^{p z} \cos\left(c \sqrt{z}\right)}{p} + \frac{c\, e^{\frac{c^2}{4 p}}\, i \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{-i c + 2 p \sqrt{z}}{2 \sqrt{p}}\right) - \operatorname{erfi}\left(\frac{i c + 2 p \sqrt{z}}{2 \sqrt{p}}\right)\right)}{p^{3/2}}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{1}{2} i m \pi} \left(\frac{c\, e^{\frac{c^2}{4 (-2 b i k + i b m + p)}}\, i \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-i c + 2 (-2 b i k + i b m + p) \sqrt{z}}{2 \sqrt{-2 b i k + i b m + p}}\right)}{(-2 b i k + i b m + p)^{3/2}} + \frac{2 e^{-i c \sqrt{z} + (-2 b i k + i b m + p) z}}{-2 b i k + i b m + p} + \frac{2 e^{i m \pi + i c \sqrt{z} + (2 i b k - i b m + p) z}}{2 i b k - i b m + p} - \frac{i c\, e^{\frac{c^2}{4 (2 i b k - i b m + p)} + i m \pi} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i c + 2 (2 i b k - i b m + p) \sqrt{z}}{2 \sqrt{2 i b k - i b m + p}}\right)}{(2 i b k - i b m + p)^{3/2}}\right) + e^{\frac{i m \pi}{2}} \left(\frac{c\, e^{\frac{c^2}{4 (2 i b k - i b m + p)}}\, i \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-i c + 2 (2 i b k - i b m + p) \sqrt{z}}{2 \sqrt{2 i b k - i b m + p}}\right)}{(2 i b k - i b m + p)^{3/2}} + \frac{2 e^{-i m \pi + i c \sqrt{z} + (-2 b i k + i b m + p) z}}{-2 b i k + i b m + p} - \frac{i c\, e^{\frac{c^2}{4 (-2 b i k + i b m + p)} - i m \pi} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i c + 2 (-2 b i k + i b m + p) \sqrt{z}}{2 \sqrt{-2 b i k + i b m + p}}\right)}{(-2 b i k + i b m + p)^{3/2}} + \frac{2 e^{-i c \sqrt{z} + (2 i b k - i b m + p) z}}{2 i b k - i b m + p}\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin^m(b z) \cos\left(c z^r\right)$

01.07.21.0945.01

$$\int e^{p z^2} \sin^m(b z) \cos(c z^2)\, dz = \frac{1}{(-i c+p)(i c+p)} \left(2^{-m-2} \sqrt{\pi} \binom{m}{\frac{m}{2}} \left(\sqrt{-i c+p}\, (i c+p) \operatorname{erfi}\left(\frac{2 p z - 2 i c z}{2 \sqrt{-i c+p}} \right) + (-i c+p) \sqrt{i c+p}\, \operatorname{erfi}\left(\sqrt{i c+p}\, z \right) \right) (1 - m \bmod 2) \right) + 2^{-m-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(-i c+p)(i c+p)} \left(e^{-\frac{2 i m (-i c+p) \pi - b^2 (2k-m)^2}{4(-i c+p)}} \sqrt{-i c+p}\, (i c+p) \operatorname{erfi}\left(\frac{-i b (2k-m) - 2 i c z + 2 p z}{2 \sqrt{-i c+p}} \right) + e^{-\frac{-b^2 (2k-m)^2 - 2 i m (i c+p) \pi}{4(i c+p)}} (-i c+p) \sqrt{i c+p}\, \operatorname{erfi}\left(\frac{b i (2k-m) + 2(i c+p) z}{2 \sqrt{i c+p}} \right) \right) + \frac{1}{(-i c+p)(i c+p)} \left(e^{-\frac{-b^2 (m-2k)^2 - 2 i m (-i c+p) \pi}{4(-i c+p)}} \sqrt{-i c+p}\, (i c+p) \operatorname{erfi}\left(\frac{-i b (m-2k) - 2 i c z + 2 p z}{2 \sqrt{-i c+p}} \right) + e^{-\frac{2 i m (i c+p) \pi - b^2 (m-2k)^2}{4(i c+p)}} (-i c+p) \sqrt{i c+p}\, \operatorname{erfi}\left(\frac{b i (m-2k) + 2(i c+p) z}{2 \sqrt{i c+p}} \right) \right) \right) /;\, m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.0946.01

$$\int e^{p \sqrt{z}} \sin^m(b z) \cos\left(c \sqrt{z}\right) dz = \frac{1}{\left(c^2+p^2\right)^2} \left(2^{1-m} e^{p \sqrt{z}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\left(\sqrt{z}\, p^3 - p^2 + c^2 \sqrt{z}\, p + c^2 \right) \cos\left(c \sqrt{z}\right) + c \left(\sqrt{z}\, c^2 - 2 p + p^2 \sqrt{z} \right) \sin\left(c \sqrt{z}\right) \right) \right) + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i m \pi}{2}} \left(\frac{i\, e^{(-i c+p)\sqrt{z} - i b (m-2k) z}}{b (m-2k)} - \frac{e^{-\frac{i(-i c+p)^2}{4 b (m-2k)}} (-i c+p) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-i c+p-2 i b (m-2k) \sqrt{z}}{2 \sqrt{-i b (m-2k)}} \right)}{2(-i b (m-2k))^{3/2}} \right) + e^{\frac{i m \pi}{2}} \left(\frac{i\, e^{(i c+p)\sqrt{z} - i b (m-2k) z}}{b (m-2k)} - \frac{e^{-\frac{i(i c+p)^2}{4 b (m-2k)}} (i c+p) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i c+p-2 i b (m-2k) \sqrt{z}}{2 \sqrt{-i b (m-2k)}} \right)}{2(-i b (m-2k))^{3/2}} \right) - e^{-\frac{1}{2} i m \pi} \left(\frac{i\, e^{\sqrt{z}\,(-i c+p) + b i (m-2k) z}}{b (m-2k)} + \frac{e^{\frac{i(-i c+p)^2}{4 b (m-2k)}} (-i c+p) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-i c+p+2 i b (m-2k) \sqrt{z}}{2 \sqrt{i b (m-2k)}} \right)}{2(i b (m-2k))^{3/2}} \right) - e^{-\frac{1}{2} i m \pi} \left(\frac{i\, e^{\sqrt{z}\,(i c+p) + b i (m-2k) z}}{b (m-2k)} + \frac{e^{\frac{i(i c+p)^2}{4 b (m-2k)}} (i c+p) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i c+p+2 i b (m-2k) \sqrt{z}}{2 \sqrt{i b (m-2k)}} \right)}{2(i b (m-2k))^{3/2}} \right) \right) /;\, m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^m(b z^r) \cos(c z^r)$

01.07.21.0947.01

$$\int e^{p z} \sin^m(b z^2) \cos(c z^2) \, dz = \frac{1}{\sqrt{c^2}} 2^{-m-2} e^{-\frac{i p^2}{4 c}} \sqrt{\pi} \left(\sqrt{c^2} \, e^{\frac{i p^2}{4 c}} (-i)^m \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{e^{i m \pi - \frac{i p^2}{4 (c-2 b k+b m)}} \operatorname{erfi}\left(\frac{p-2 i (c-2 b k+b m) z}{2 \sqrt{-i (c-2 b k+b m)}} \right)}{\sqrt{-i (c-2 b k+b m)}} + \frac{e^{\frac{i p^2}{4 (c-2 b k+b m)}} \operatorname{erfi}\left(\frac{p+2 i (c-2 b k+b m) z}{2 \sqrt{i (c-2 b k+b m)}} \right)}{\sqrt{i (c-2 b k+b m)}} + \frac{e^{-\frac{i p^2}{4 (c+2 b k-b m)}} \operatorname{erfi}\left(\frac{p-2 i (c+2 b k-b m) z}{2 \sqrt{-i (c+2 b k-b m)}} \right)}{\sqrt{-i (c+2 b k-b m)}} + \frac{e^{\frac{1}{4} i \left(\frac{p^2}{c+2 b k-b m} + 4 m \pi \right)} \operatorname{erfi}\left(\frac{p+2 i (c+2 b k-b m) z}{2 \sqrt{i (c+2 b k-b m)}} \right)}{\sqrt{i (c+2 b k-b m)}} \right) + \binom{m}{\frac{m}{2}} \left(\sqrt{i c} \operatorname{erfi}\left(\frac{p-2 i c z}{2 \sqrt{-i c}} \right) + \sqrt{-i c} \, e^{\frac{i p^2}{2 c}} \operatorname{erfi}\left(\frac{p+2 i c z}{2 \sqrt{i c}} \right) \right) (1 - m \bmod 2) \right) /; m \in \mathbb{N}^+$$

01.07.21.0948.01

$$\int e^{p z} \sin^m\left(b \sqrt{z}\right) \cos\left(c \sqrt{z}\right) dz = 2^{-m-2} \left(\sqrt{\pi} \left(\frac{i\, c\, e^{\frac{c^2}{4 p}} \operatorname{erfi}\left(\frac{-i\, c+2 p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}} - \frac{i\, c\, e^{\frac{c^2}{4 p}} \operatorname{erfi}\left(\frac{i\, c+2 p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}}\right) + \frac{4 e^{p z} \cos\left(c \sqrt{z}\right)}{p}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) +$$
$$2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{1}{2} i m \pi} \left(\frac{4 e^{\frac{i \pi m}{2} + p z} \cos\left(\frac{\pi m}{2} + (c + 2 b k - b m) \sqrt{z}\right)}{p} - \right.\right.$$
$$\frac{1}{p^{3/2}} \left(e^{i m \pi - \frac{(i c + 2 i b k - i b m)^2}{4 p}} (i\, c + 2\, i\, b\, k - i\, b\, m) \sqrt{\pi} \operatorname{erfi}\left(\frac{i\, c + i\, b\, (2 k - m) + 2 p \sqrt{z}}{2 \sqrt{p}}\right)\right) -$$
$$\left.\frac{1}{p^{3/2}} \left(e^{-\frac{(-i c - 2 i b k + i b m)^2}{4 p}} (-i\, c - 2\, i\, b\, k + i\, b\, m) \sqrt{\pi} \operatorname{erfi}\left(\frac{-i\, c + i\, b\, (m - 2 k) + 2 p \sqrt{z}}{2 \sqrt{p}}\right)\right)\right) +$$
$$e^{\frac{i m \pi}{2}} \left(\frac{4 e^{p z - \frac{i m \pi}{2}} \cos\left(\frac{\pi m}{2} + (-c + 2 b k - b m) \sqrt{z}\right)}{p} - \right.$$
$$\frac{1}{p^{3/2}} \left(e^{-\frac{(-i c + 2 i b k - i b m)^2}{4 p}} (-i\, c + 2\, i\, b\, k - i\, b\, m) \sqrt{\pi} \operatorname{erfi}\left(\frac{-i\, c + i\, b\, (2 k - m) + 2 p \sqrt{z}}{2 \sqrt{p}}\right)\right) -$$
$$\left.\left.\frac{1}{p^{3/2}} \left(e^{-\frac{(i c + i b (m - 2 k))^2}{4 p} - i m \pi} (i\, c + i\, b\, (m - 2 k)) \sqrt{\pi} \operatorname{erfi}\left(\frac{i\, c + i\, b\, (m - 2 k) + 2 p \sqrt{z}}{2 \sqrt{p}}\right)\right)\right)\right) /; m \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin^m(b z^r) \cos(c z^r)$

01.07.21.0949.01

$$\int e^{p z^r} \sin^m(b z^r) \cos(c z^r) dz = -\frac{2^{-m-1} z}{r} \left(\binom{m}{\frac{m}{2}} \left(\Gamma\left(\frac{1}{r}, (-i\, c - p) z^r\right) ((-i\, c - p) z^r)^{-1/r} + (i\, (c + i\, p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i\, (c + i\, p) z^r\right)\right) (1 - m \bmod 2) + i^{-m} \right.$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{i m \pi} \Gamma\left(\frac{1}{r}, i\, (c - 2 b k + b m + i\, p) z^r\right) (i\, (c - 2 b k + b m + i\, p) z^r)^{-1/r} + (i\, (c + 2 b k - b m + i\, p) z^r)^{-1/r}\right.$$
$$\Gamma\left(\frac{1}{r}, i\, (c + 2 b k - b m + i\, p) z^r\right) + (-i\, (c - 2 b k + b m - i\, p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -i\, (c - 2 b k + b m - i\, p) z^r\right) +$$
$$\left.\left. e^{i m \pi} (-i\, (c + 2 b k - b m - i\, p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -i\, (c + 2 b k - b m - i\, p) z^r\right)\right)\right) /; m \in \mathbb{N}^+$$

01.07.21.0950.01

$$\int e^{b z^2} \sin^m(b z^2) \cos(c z^2)\, dz == 2^{-m-2} \left(\frac{\operatorname{erfi}\left(\sqrt{b+i c}\; z\right)}{\sqrt{b+i c}} + \frac{\operatorname{erfi}\left(\sqrt{b-i c}\; z\right)}{\sqrt{b-i c}} \right) \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{e^{-\frac{1}{2} i m \pi} \operatorname{erfi}\left(\sqrt{i (m-2k) b + b + i c}\; z\right)}{\sqrt{i (m-2k) b + b + i c}} + \frac{e^{-\frac{1}{2} i m \pi} \operatorname{erfi}\left(\sqrt{i (m-2k) b + b - i c}\; z\right)}{\sqrt{i (m-2k) b + b - i c}} + \frac{e^{\frac{i m \pi}{2}} \operatorname{erfi}\left(\sqrt{-i (m-2k) b + b + i c}\; z\right)}{\sqrt{-i (m-2k) b + b + i c}} + \frac{e^{\frac{i m \pi}{2}} \operatorname{erfi}\left(\sqrt{-i (m-2k) b + b - i c}\; z\right)}{\sqrt{-i (m-2k) b + b - i c}} \right) /;\ m \in \mathbb{N}^+$$

01.07.21.0951.01

$$\int e^{b \sqrt{z}} \sin^m\left(b \sqrt{z}\right) \cos\left(c \sqrt{z}\right) dz == 2^{-m} \left(\frac{e^{(b+i c)\sqrt{z}} \left((b+i c)\sqrt{z} - 1\right)}{(b+i c)^2} + \frac{e^{(b-i c)\sqrt{z}} \left((b-i c)\sqrt{z} - 1\right)}{(b-i c)^2} \right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{(i (m-2k) b + b + i c)\sqrt{z} - \frac{i m \pi}{2}} \left((i (m-2k) b + b + i c)\sqrt{z} - 1\right)}{(i (m-2k) b + b + i c)^2} + \frac{e^{(i (m-2k) b + b - i c)\sqrt{z} - \frac{i m \pi}{2}} \left((i (m-2k) b + b - i c)\sqrt{z} - 1\right)}{(i (m-2k) b + b - i c)^2} + \frac{e^{\frac{i \pi m}{2} + (-i (m-2k) b + b + i c)\sqrt{z}} \left((-i (m-2k) b + b + i c)\sqrt{z} - 1\right)}{(-i (m-2k) b + b + i c)^2} + \frac{e^{\frac{i \pi m}{2} + (-i (m-2k) b + b - i c)\sqrt{z}} \left((-i (m-2k) b + b - i c)\sqrt{z} - 1\right)}{(-i (m-2k) b + b - i c)^2} \right) \binom{m}{k} /;\ m \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \sin^m(a z^r + q) \cos(c z^r + g)$

01.07.21.0952.01

$$\int e^{b z^r+e}\sin^m(a z^r+q)\cos(c z^r+g)\,dz = -\frac{2^{-m-1} z}{r}\left(e^{e-i g}\binom{m}{\frac{m}{2}}\left(e^{2 i g}\,\Gamma\!\left(\frac{1}{r}, -(b+i c) z^r\right)(-(b+i c) z^r)^{-1/r}+(-(b-i c) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, -(b-i c) z^r\right)\right)(1-m \bmod 2)+\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\right.$$

$$e^{-\frac{1}{2} i (2 g+2 i e+4 k q+2 m q+m \pi)}\binom{m}{k}\left(e^{2 i (g+m q)}\,\Gamma\!\left(\frac{1}{r}, -(b+i (c-2 a k+a m)) z^r\right)(-(b+i (c-2 a k+a m)) z^r)^{-1/r}+\right.$$

$$e^{i (\pi m+4 k q)}\,(-(b-i (c-2 a k+a m)) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, -(b-i (c-2 a k+a m)) z^r\right)+$$

$$e^{i (2 g+4 k q+m \pi)}\,(-(b+i (c+2 a k-a m)) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, -(b+i (c+2 a k-a m)) z^r\right)+$$

$$\left.\left.e^{2 i m q}\,(-(b-i (c+2 a k-a m)) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, -(b-i (c+2 a k-a m)) z^r\right)\right)\right)\;/;\; m\in\mathbb{N}^+$$

01.07.21.0953.01

$$\int e^{b z^2+e}\sin^m\!\left(a z^2+q\right)\cos\!\left(c z^2+g\right)dz = 2^{-m-2}\left(\frac{e^{2 i g}\,\mathrm{erfi}\!\left(\sqrt{b+i c}\; z\right)}{\sqrt{b+i c}}+\frac{\mathrm{erfi}\!\left(\sqrt{b-i c}\; z\right)}{\sqrt{b-i c}}\right)e^{e-i g}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)+$$

$$2^{-m-2}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{e^{e+i g+i (m-2 k) q-\frac{i m \pi}{2}}\,\mathrm{erfi}\!\left(\sqrt{b+i c+a i (m-2 k)}\; z\right)}{\sqrt{b+i c+a i (m-2 k)}}+\right.$$

$$\frac{e^{e-i g+i (m-2 k) q-\frac{i m \pi}{2}}\,\mathrm{erfi}\!\left(\sqrt{b-i c+a i (m-2 k)}\; z\right)}{\sqrt{b-i c+a i (m-2 k)}}+\frac{e^{e+i g-i (m-2 k) q+\frac{i m \pi}{2}}\,\mathrm{erfi}\!\left(\sqrt{b+i c-i a (m-2 k)}\; z\right)}{\sqrt{b+i c-i a (m-2 k)}}+$$

$$\left.\frac{e^{e-i g-i (m-2 k) q+\frac{i m \pi}{2}}\,\mathrm{erfi}\!\left(\sqrt{b-i c-i a (m-2 k)}\; z\right)}{\sqrt{b-i c-i a (m-2 k)}}\right)\;/;\; m\in\mathbb{N}^+$$

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$$\int e^{\sqrt{z}\, b+e} \sin^m\left(\sqrt{z}\, a+q\right) \cos\left(\sqrt{z}\, c+g\right) dz = 2^{-m}\left(\frac{e^{\sqrt{z}\,(b+i c)+e+i g}\left((b+i c)\sqrt{z}-1\right)}{(b+i c)^2}+\frac{e^{\sqrt{z}\,(b-i c)+e-i g}\left((b-i c)\sqrt{z}-1\right)}{(b-i c)^2}\right)\binom{m}{\frac{m}{2}}(1-m \bmod 2)+$$
$$2^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{e^{e+i g+i(m-2k)q+(b+i c+a i(m-2k))\sqrt{z}-\frac{i m\pi}{2}}\left((b+i c+a i(m-2k))\sqrt{z}-1\right)}{(b+i c+a i(m-2k))^2}+\right.$$
$$\frac{e^{e-i g+i(m-2k)q+(b-i c+a i(m-2k))\sqrt{z}-\frac{i m\pi}{2}}\left((b-i c+a i(m-2k))\sqrt{z}-1\right)}{(b-i c+a i(m-2k))^2}+$$
$$\frac{e^{e+i g-i(m-2k)q+(b+i c-i a(m-2k))\sqrt{z}+\frac{i m\pi}{2}}\left((b+i c-i a(m-2k))\sqrt{z}-1\right)}{(b+i c-i a(m-2k))^2}+$$
$$\left.\frac{e^{e-i g-i(m-2k)q+(b-i c-i a(m-2k))\sqrt{z}+\frac{i m\pi}{2}}\left((b-i c-i a(m-2k))\sqrt{z}-1\right)}{(b-i c-i a(m-2k))^2}\right) /;\ m\in\mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \sin^m\left(a z^r+p z+q\right) \cos\left(c z^r+f z+g\right)$

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$$\int e^{b z^2+d z+e} \sin^m(a z^2+p z+q) \cos(c z^2+f z+g) \, dz = 2^{-m-2} \sqrt{\pi} \left(\frac{1}{(b-i c)(b+i c)} \left(\binom{m}{\frac{m}{2}} \left(\sqrt{b+i c} \, (b-i c) \, e^{-\frac{(d+i f)^2}{4(b+i c)}+e+i g} \operatorname{erfi}\left(\frac{d+i f+2(b+i c) z}{2\sqrt{b+i c}}\right) + (b+i c) \sqrt{b-i c} \, e^{-\frac{(d-i f)^2}{4(b-i c)}+e-i g} \operatorname{erfi}\left(\frac{d-i f+2 b z-2 i c z}{2\sqrt{b-i c}}\right)\right) (1-m \bmod 2) \right) + \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\left(e^{-\frac{(d+i f+i(2k-m)p)^2}{4(b+i c+a i(2k-m))}+e+i g+i(2k-m)q+\frac{i m \pi}{2}} \sqrt{b+i c+a i(2k-m)} \, (b-i c-2 i a k+i a m) \operatorname{erfi}\left(\frac{d+i f+i(2k-m)p+2(b+i c+a i(2k-m))z}{2\sqrt{b+i c+a i(2k-m)}}\right) + e^{\frac{(-f-i d+(m-2k)p)^2}{4(b-i c-2 i a k+i a m)}+e-i g-i(2k-m)q-\frac{i m \pi}{2}} (b+i c+a i(2k-m)) \sqrt{b-i c-2 i a k+i a m} \operatorname{erfi}\left(\frac{d-i f-2 i k p+i m p+2 b z-2 i c z-4 i a k z+2 i a m z}{2\sqrt{b-i c-2 i a k+i a m}}\right)\right) \Big/ ((b+i c+a i(2k-m))(b-i c-2 i a k+i a m)) + \left(e^{-\frac{(d+i f+i(m-2k)p)^2}{4(b+i c+a i(m-2k))}+e+i g-i(2k-m)q-\frac{i m \pi}{2}} \sqrt{b+i c+a i(m-2k)} \, (b-i c-i a(m-2k)) \operatorname{erfi}\left(\frac{d+i f+i(m-2k)p+2(b+i c+a i(m-2k))z}{2\sqrt{b+i c+a i(m-2k)}}\right) + e^{-\frac{(-d+i f+i(m-2k)p)^2}{4(b-i c-i a(m-2k))}+e-i g+i(2k-m)q+\frac{i m \pi}{2}} (b+i c+a i(m-2k)) \sqrt{b-i c-i a(m-2k)} \operatorname{erfi}\left(\frac{d-i f-i(m-2k)p+2 b z-2(i c+i a(m-2k))z}{2\sqrt{b-i c-i a(m-2k)}}\right)\right) \Big/ ((b-i c-i a(m-2k))(b+i c+a i(m-2k))) \right) \right) /; m \in \mathbb{N}^+$$

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$$\int e^{\sqrt{z}\,b+d\,z+e}\sin^m\left(\sqrt{z}\,a+p\,z+q\right)\cos\left(\sqrt{z}\,c+f\,z+g\right)dz ==$$

$$2^{-m-2}\,e^{e-i\,g}\left(\sqrt{\pi}\left(-\frac{(b+i\,c)\,e^{2\,i\,g-\frac{(b+i\,c)^2}{4\,(d+i\,f)}}\,\text{erfi}\left(\frac{b+i\,c+2\,(d+i\,f)\sqrt{z}}{2\sqrt{d+i\,f}}\right)}{(d+i\,f)^{3/2}}-\frac{(b-i\,c)\,e^{-\frac{(b-i\,c)^2}{4\,(d-i\,f)}}\,\text{erfi}\left(\frac{b-i\,c+2\,(d-i\,f)\sqrt{z}}{2\sqrt{d-i\,f}}\right)}{(d-i\,f)^{3/2}}\right)+\right.$$

$$\left.\frac{2\,e^{\sqrt{z}\,(b+i\,c)+2\,i\,g+(d+i\,f)\,z}}{d+i\,f}+\frac{2\,e^{\sqrt{z}\,(b-i\,c)+(d-i\,f)\,z}}{d-i\,f}\right)\binom{m}{\frac{m}{2}}(1-m\bmod 2)+$$

$$2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{e-i\,g-i\,(m-2\,k)\,q+\frac{i\,m\,\pi}{2}}\left(\frac{2\,e^{2\,i\,g-i\,m\,\pi+2\,i\,(m-2\,k)\,q+(b+i\,c-2\,i\,a\,k+i\,a\,m)\sqrt{z}+(d+i\,f-2\,i\,k\,p+i\,m\,p)\,z}}{d+i\,f-2\,i\,k\,p+i\,m\,p}-\right.\right.$$

$$\left(e^{-\frac{(b+i\,c+a\,i\,(m-2\,k))^2}{4\,(d+i\,f-2\,i\,k\,p+i\,m\,p)}+2\,i\,g+2\,i\,(m-2\,k)\,q-i\,m\,\pi}\,(b+i\,c+a\,i\,(m-2\,k))\sqrt{\pi}\right.$$

$$\left.\left.\text{erfi}\left(\frac{b+i\,c+a\,i\,(m-2\,k)+2\,(d+i\,f-2\,i\,k\,p+i\,m\,p)\sqrt{z}}{2\sqrt{d+i\,f-2\,i\,k\,p+i\,m\,p}}\right)\right)\Big/(d+i\,f-2\,i\,k\,p+i\,m\,p)^{3/2}+\right.$$

$$\frac{2\,e^{\sqrt{z}\,(b-i\,c+2\,i\,a\,k-i\,a\,m)+(d-i\,f+2\,i\,k\,p-i\,m\,p)\,z}}{d-i\,f+2\,i\,k\,p-i\,m\,p}-\left(e^{-\frac{(b-i\,c+2\,i\,a\,k-i\,a\,m)^2}{4\,(d-i\,f+2\,i\,k\,p-i\,m\,p)}}\,(b-i\,c+2\,i\,a\,k-i\,a\,m)\sqrt{\pi}\right.$$

$$\left.\left.\text{erfi}\left(\frac{b-i\,c+a\,i\,(2\,k-m)+2\,(d-i\,f+2\,i\,k\,p-i\,m\,p)\sqrt{z}}{2\sqrt{d-i\,f+2\,i\,k\,p-i\,m\,p}}\right)\right)\Big/(d-i\,f+2\,i\,k\,p-i\,m\,p)^{3/2}\right)+$$

$$e^{e-i\,g-i\,(2\,k-m)\,q-\frac{i\,m\,\pi}{2}}\left(\frac{2\,e^{\sqrt{z}\,(b-i\,c-2\,i\,a\,k+i\,a\,m)+(d-i\,f-2\,i\,k\,p+i\,m\,p)\,z}}{d-i\,f-2\,i\,k\,p+i\,m\,p}-\left(e^{-\frac{(b-i\,c-2\,i\,a\,k+i\,a\,m)^2}{4\,(d-i\,f-2\,i\,k\,p+i\,m\,p)}}\,(b-i\,c-2\,i\,a\,k+i\,a\,m)\right.\right.$$

$$\left.\sqrt{\pi}\,\text{erfi}\left(\frac{b-i\,c+a\,i\,(m-2\,k)+2\,(d-i\,f-2\,i\,k\,p+i\,m\,p)\sqrt{z}}{2\sqrt{d-i\,f-2\,i\,k\,p+i\,m\,p}}\right)\right)\Big/$$

$$(d-i\,f-2\,i\,k\,p+i\,m\,p)^{3/2}+\frac{2\,e^{2\,i\,g+i\,m\,\pi+4\,i\,k\,q-2\,i\,m\,q+(b+i\,c+2\,i\,a\,k-i\,a\,m)\sqrt{z}+(d+i\,f+2\,i\,k\,p-i\,m\,p)\,z}}{d+i\,f+2\,i\,k\,p-i\,m\,p}-$$

$$\left(e^{-\frac{(b+i\,c+2\,i\,a\,k-i\,a\,m)^2}{4\,(d+i\,f+2\,i\,k\,p-i\,m\,p)}+2\,i\,g+4\,i\,k\,q-2\,i\,m\,q+i\,m\,\pi}\,(b+i\,c+2\,i\,a\,k-i\,a\,m)\sqrt{\pi}\,\text{erfi}\left(\right.\right.$$

$$\left.\left.\left.\left.\frac{b+i\,c+a\,i\,(2\,k-m)+2\,(d+i\,f+2\,i\,k\,p-i\,m\,p)\sqrt{z}}{2\sqrt{d+i\,f+2\,i\,k\,p-i\,m\,p}}\right)\right)\Big/(d+i\,f+2\,i\,k\,p-i\,m\,p)^{3/2}\right)\right)\ /;\ m\in\mathbb{N}^+$$

Involving powers of sin and rational functions of exp

Involving $\sin^m(e z)\cos(c z)\left(a+b\,e^{d z}\right)^{-n}$

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$$\int \frac{\sin^m(e z)\cos(c z)}{\left(a+b\,e^{d z}\right)^n}\,dz = 2^{-m-1}a^{-n}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(\Bigg(\frac{1}{i c+2 i e k-i e m}\Bigg(e^{(i c+2 i e k-i e m) z}\,{}_2F_1\Bigg(\frac{i c+2 i e k-i e m}{d}, n; \frac{d+i c+2 i e k-i e m}{d}; -\frac{b e^{d z}}{a}\Bigg)-e^{(-i c-2 i e k+i e m) z}\,{}_2F_1\Bigg(\frac{-i c-2 i e k+i e m}{d}, n; \frac{d-i c-2 i e k+i e m}{d}; -\frac{b e^{d z}}{a}\Bigg)\Bigg)+\frac{1}{-i c+2 i e k-i e m}\Bigg(e^{(-i c+2 i e k-i e m) z}\,{}_2F_1\Bigg(\frac{-i c+2 i e k-i e m}{d}, n; \frac{d-i c+2 i e k-i e m}{d}; -\frac{b e^{d z}}{a}\Bigg)-e^{(i c-2 i e k+i e m) z}\,{}_2F_1\Bigg(\frac{i c-2 i e k+i e m}{d}, n; \frac{d+i c-2 i e k+i e m}{d}; -\frac{b e^{d z}}{a}\Bigg)\Bigg)\Bigg)\cos\left(\frac{m\pi}{2}\right)+i\Bigg(\frac{1}{i c+2 i e k-i e m}\Bigg(e^{(-i c-2 i e k+i e m) z}\,{}_2F_1\Bigg(\frac{-i c-2 i e k+i e m}{d}, n; \frac{d-i c-2 i e k+i e m}{d}; -\frac{b e^{d z}}{a}\Bigg)+e^{(i c+2 i e k-i e m) z}\,{}_2F_1\Bigg(\frac{i c+2 i e k-i e m}{d}, n; \frac{d+i c+2 i e k-i e m}{d}; -\frac{b e^{d z}}{a}\Bigg)\Bigg)+\frac{1}{-i c+2 i e k-i e m}\Bigg(e^{(i c-2 i e k+i e m) z}\,{}_2F_1\Bigg(\frac{i c-2 i e k+i e m}{d}, n; \frac{d+i c-2 i e k+i e m}{d}; -\frac{b e^{d z}}{a}\Bigg)+e^{(-i c+2 i e k-i e m) z}\,{}_2F_1\Bigg(\frac{-i c+2 i e k-i e m}{d}, n; \frac{d-i c+2 i e k-i e m}{d}; -\frac{b e^{d z}}{a}\Bigg)\Bigg)\Bigg)\sin\left(\frac{m\pi}{2}\right)\Bigg)-\frac{i\,2^{-m-1}a^{-n}\,(1-m \bmod 2)}{c}\binom{m}{\frac{m}{2}}\Bigg(e^{i c z}\,{}_2F_1\Bigg(\frac{i c}{d}, n; \frac{d+i c}{d}; -\frac{b e^{d z}}{a}\Bigg)-e^{-i c z}\,{}_2F_1\Bigg(-\frac{i c}{d}, n; \frac{d-i c}{d}; -\frac{b e^{d z}}{a}\Bigg)\Bigg)\,/;\, n\in\mathbb{N}^+\land m\in\mathbb{N}^+$$

Involving $e^{p z}\sin^m(e z)\cos(c z)\left(a+b\,e^{d z}\right)^{-n}$

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$$\begin{aligned}
&\int \frac{e^{p z} \sin^m(e z) \cos(c z)}{\left(a + b\, e^{d z}\right)^n} \, dz = \\
&2^{-m-1} a^{-n} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Bigg(\Bigg(\Bigg(\Bigg(e^{(i c+2 i e k-i e m+p) z} (i c+2 i e k-i e m-p)\, {}_2F_1\!\left(\frac{i c+2 i e k-i e m+p}{d}, n; \frac{d+i c+2 i e k-i e m+p}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(-i c-2 i e k+i e m+p) z} (i c+2 i e k-i e m+p)\, {}_2F_1 \\
&\left(\frac{-i c-2 i e k+i e m+p}{d}, n; \frac{d-i c-2 i e k+i e m+p}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \Bigg/ \\
&((i c+2 i e k-i e m-p) (i c+2 i e k-i e m+p)) + \Bigg(e^{(-i c+2 i e k-i e m+p) z} (-i c+2 i e k-i e m-p) \\
&{}_2F_1\!\left(\frac{-i c+2 i e k-i e m+p}{d}, n; \frac{d-i c+2 i e k-i e m+p}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(i c-2 i e k+i e m+p) z} \\
&(-i c+2 i e k-i e m+p)\, {}_2F_1\!\left(\frac{i c-2 i e k+i e m+p}{d}, n; \frac{d+i c-2 i e k+i e m+p}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \Bigg/ \\
&((-i c+2 i e k-i e m-p) (-i c+2 i e k-i e m+p))\Bigg) \cos\!\left(\frac{m \pi}{2}\right) + \\
&i \Bigg(\Bigg(e^{(-i c-2 i e k+i e m+p) z} (i c+2 i e k-i e m+p)\, {}_2F_1\!\left(\frac{-i c-2 i e k+i e m+p}{d}, n; \frac{d-i c-2 i e k+i e m+p}{d}; \right. \\
&\left. -\frac{b\, e^{d z}}{a}\right) + e^{(i c+2 i e k-i e m+p) z} (i c+2 i e k-i e m-p)\, {}_2F_1\!\left(\frac{i c+2 i e k-i e m+p}{d}, n; \right. \\
&\left. \frac{d+i c+2 i e k-i e m+p}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \Bigg/ ((i c+2 i e k-i e m-p) (i c+2 i e k-i e m+p)) + \\
&\Bigg(e^{(i c-2 i e k+i e m+p) z} (-i c+2 i e k-i e m+p)\, {}_2F_1\!\left(\frac{i c-2 i e k+i e m+p}{d}, n; \right. \\
&\left. \frac{d+i c-2 i e k+i e m+p}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{(-i c+2 i e k-i e m+p) z} (-i c+2 i e k-i e m-p)\, {}_2F_1 \\
&\left(\frac{-i c+2 i e k-i e m+p}{d}, n; \frac{d-i c+2 i e k-i e m+p}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \Bigg/ \\
&((-i c+2 i e k-i e m-p) (-i c+2 i e k-i e m+p))\Bigg) \sin\!\left(\frac{m \pi}{2}\right)\Bigg) + \\
&\frac{2^{-m-1} a^{-n}}{(i c-p) (i c+p)} \binom{m}{\frac{m}{2}} \left(e^{(i c+p) z} (i c-p)\, {}_2F_1\!\left(\frac{i c+p}{d}, n; \frac{d+i c+p}{d}; -\frac{b\, e^{d z}}{a}\right) - \right. \\
&\quad e^{(-i c+p) z} \\
&\quad (i c+p) \\
&\quad \left. {}_2F_1\!\left(\frac{-i c+p}{d}, n; \frac{d-i c+p}{d}; -\frac{b\, e^{d z}}{a}\right)\right) (1 - m \\
&\quad \bmod 2) \;/;\; n \in \mathbb{N}^+ \land m \in \mathbb{N}^+
\end{aligned}$$

Involving powers of sin and algebraic functions of exp

Involving $\left(a+b\, e^{d\, z}\right)^{\beta} \sin^{m}(e\, z) \cos(c\, z)$

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$$\int \left(a+b\, e^{d\, z}\right)^{\beta} \sin^{m}(e\, z) \cos(c\, z)\, dz = 2^{-m-1} \left(a+b\, e^{d\, z}\right)^{\beta} \left(\frac{e^{d\, z}\, b}{a}+1\right)^{-\beta} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k} \binom{m}{k} \Bigg(\Bigg(\frac{1}{i\, c+2\, i\, e\, k-i\, e\, m} \Bigg(e^{(i\, c+2\, i\, e\, k-i\, e\, m)\, z}\, {}_2F_1\Bigg(\frac{i\, c+2\, i\, e\, k-i\, e\, m}{d}, -\beta; \frac{d+i\, c+2\, i\, e\, k-i\, e\, m}{d}; -\frac{b\, e^{d\, z}}{a}\Bigg) - e^{(-i\, c-2\, i\, e\, k+i\, e\, m)\, z}\, {}_2F_1\Bigg(\frac{-i\, c-2\, i\, e\, k+i\, e\, m}{d}, -\beta; \frac{d-i\, c-2\, i\, e\, k+i\, e\, m}{d}; -\frac{b\, e^{d\, z}}{a}\Bigg)\Bigg) + \frac{1}{-i\, c+2\, i\, e\, k-i\, e\, m} \Bigg(e^{(-i\, c+2\, i\, e\, k-i\, e\, m)\, z}\, {}_2F_1\Bigg(\frac{-i\, c+2\, i\, e\, k-i\, e\, m}{d}, -\beta; \frac{d-i\, c+2\, i\, e\, k-i\, e\, m}{d}; -\frac{b\, e^{d\, z}}{a}\Bigg) - e^{(i\, c-2\, i\, e\, k+i\, e\, m)\, z}\, {}_2F_1\Bigg(\frac{i\, c-2\, i\, e\, k+i\, e\, m}{d}, -\beta; \frac{d+i\, c-2\, i\, e\, k+i\, e\, m}{d}; -\frac{b\, e^{d\, z}}{a}\Bigg)\Bigg)\Bigg) \cos\left(\frac{m\, \pi}{2}\right) + i \Bigg(\frac{1}{i\, c+2\, i\, e\, k-i\, e\, m} \Bigg(e^{(-i\, c-2\, i\, e\, k+i\, e\, m)\, z}\, {}_2F_1\Bigg(\frac{-i\, c-2\, i\, e\, k+i\, e\, m}{d}, -\beta; \frac{d-i\, c-2\, i\, e\, k+i\, e\, m}{d}; -\frac{b\, e^{d\, z}}{a}\Bigg) + e^{(i\, c+2\, i\, e\, k-i\, e\, m)\, z}\, {}_2F_1\Bigg(\frac{i\, c+2\, i\, e\, k-i\, e\, m}{d}, -\beta; \frac{d+i\, c+2\, i\, e\, k-i\, e\, m}{d}; -\frac{b\, e^{d\, z}}{a}\Bigg)\Bigg) + \frac{1}{-i\, c+2\, i\, e\, k-i\, e\, m} \Bigg(e^{(i\, c-2\, i\, e\, k+i\, e\, m)\, z}\, {}_2F_1\Bigg(\frac{i\, c-2\, i\, e\, k+i\, e\, m}{d}, -\beta; \frac{d+i\, c-2\, i\, e\, k+i\, e\, m}{d}; -\frac{b\, e^{d\, z}}{a}\Bigg) + e^{(-i\, c+2\, i\, e\, k-i\, e\, m)\, z}\, {}_2F_1\Bigg(\frac{-i\, c+2\, i\, e\, k-i\, e\, m}{d}, -\beta; \frac{d-i\, c+2\, i\, e\, k-i\, e\, m}{d}; -\frac{b\, e^{d\, z}}{a}\Bigg)\Bigg)\Bigg) \sin\left(\frac{m\, \pi}{2}\right)\Bigg) - \frac{i\, 2^{-m-1}}{c} \left(a+b\, e^{d\, z}\right)^{\beta} \left(\frac{e^{d\, z}\, b}{a}+1\right)^{-\beta} \binom{m}{\frac{m}{2}} \left(e^{i\, c\, z}\, {}_2F_1\left(\frac{i\, c}{d}, -\beta; \frac{d+i\, c}{d}; -\frac{b\, e^{d\, z}}{a}\right) - e^{-i\, c\, z}\, {}_2F_1\left(-\frac{i\, c}{d}, -\beta; \frac{d-i\, c}{d}; -\frac{b\, e^{d\, z}}{a}\right)\right) (1 - m \bmod 2) \;/;\; m \in \mathbb{N}^{+}$$

Involving $e^{p\, z} \left(a+b\, e^{d\, z}\right)^{\beta} \sin^{m}(e\, z) \cos(c\, z)$

01.07.21.0960.01

$$\int e^{p z} \left(a + b\, e^{d z}\right)^{\beta} \sin^m(e\, z) \cos(c\, z)\, dz = 2^{-m-1} \left(a + b\, e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\left(\left(\left(e^{(i c + 2 i e k - i e m + p) z} (i c + 2 i e k - i e m - p)\, {}_2F_1\left(\frac{i c + 2 i e k - i e m + p}{d}, -\beta; \frac{d + i c + 2 i e k - i e m + p}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(-i c - 2 i e k + i e m + p) z} (i c + 2 i e k - i e m + p)\, {}_2F_1\left(\frac{-i c - 2 i e k + i e m + p}{d}, -\beta; \frac{d - i c - 2 i e k + i e m + p}{d}; -\frac{b\, e^{d z}}{a}\right)\right) \Big/ ((i c + 2 i e k - i e m - p)(i c + 2 i e k - i e m + p)) + \left(e^{(-i c + 2 i e k - i e m + p) z} (-i c + 2 i e k - i e m - p)\, {}_2F_1\left(\frac{-i c + 2 i e k - i e m + p}{d}, -\beta; \frac{d - i c + 2 i e k - i e m + p}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(i c - 2 i e k + i e m + p) z} (-i c + 2 i e k - i e m + p)\, {}_2F_1\left(\frac{i c - 2 i e k + i e m + p}{d}, -\beta; \frac{d + i c - 2 i e k + i e m + p}{d}; -\frac{b\, e^{d z}}{a}\right)\right) \Big/ ((-i c + 2 i e k - i e m - p)(-i c + 2 i e k - i e m + p))\right) \cos\left(\frac{m \pi}{2}\right) + i \left(\left(e^{(-i c - 2 i e k + i e m + p) z} (i c + 2 i e k - i e m + p)\, {}_2F_1\left(\frac{-i c - 2 i e k + i e m + p}{d}, -\beta; \frac{d - i c - 2 i e k + i e m + p}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{(i c + 2 i e k - i e m + p) z} (i c + 2 i e k - i e m - p)\, {}_2F_1\left(\frac{i c + 2 i e k - i e m + p}{d}, -\beta; \frac{d + i c + 2 i e k - i e m + p}{d}; -\frac{b\, e^{d z}}{a}\right)\right) \Big/ ((i c + 2 i e k - i e m - p)(i c + 2 i e k - i e m + p)) + \left(e^{(i c - 2 i e k + i e m + p) z} (-i c + 2 i e k - i e m + p)\, {}_2F_1\left(\frac{i c - 2 i e k + i e m + p}{d}, -\beta; \frac{d + i c - 2 i e k + i e m + p}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{(-i c + 2 i e k - i e m + p) z} (-i c + 2 i e k - i e m - p)\, {}_2F_1\left(\frac{-i c + 2 i e k - i e m + p}{d}, -\beta; \frac{d - i c + 2 i e k - i e m + p}{d}; -\frac{b\, e^{d z}}{a}\right)\right) \Big/ ((-i c + 2 i e k - i e m - p)(-i c + 2 i e k - i e m + p))\right) \sin\left(\frac{m \pi}{2}\right)\right) + \frac{2^{-m-1}}{(i c - p)(i c + p)} \left(a + b\, e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} \binom{m}{\frac{m}{2}} \left(e^{(i c + p) z} (i c - p)\, {}_2F_1\left(\frac{i c + p}{d}, -\beta; \frac{d + i c + p}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(-i c + p) z} (i c + p)\, {}_2F_1\left(\frac{-i c + p}{d}, -\beta; \frac{d - i c + p}{d}; -\frac{b\, e^{d z}}{a}\right)\right) (1 - m \bmod 2) \,/;\, m \in \mathbb{N}^+$$

Involving products of sin and exp

01.07.21.0961.01

$$\int e^{p z} \sin(a z) \sin(b z) \cos(c z) \, dz = -\frac{1}{4} e^{p z} \left(\frac{(-a+b+c)\sin((a-b-c)z) - p\cos((a-b-c)z)}{(a-b+i(i c-p))(a-b+i(i c+p))} + \frac{p\cos((a+b-c)z) + (a+b-c)\sin((a+b-c)z)}{(a+b+i(i c-p))(a+b+i(i c+p))} + \frac{(-a+b-c)\sin((a-b+c)z) - p\cos((a-b+c)z)}{a^2-2(b-c)a+b^2+c^2+p^2-2bc} + \frac{p\cos((a+b+c)z) + (a+b+c)\sin((a+b+c)z)}{(a+b-i(i c-p))(a+b-i(i c+p))} \right)$$

Involving rational functions of sin and exp

Involving $\frac{e^{p z} \cos(c z)}{a+b \sin(d z)}$

01.07.21.0962.01

$$\int \frac{e^{p z} \cos(c z)}{a+b \sin(d z)} \, dz = \frac{1}{2 b \sqrt{a^2-b^2}} \left(\frac{1}{c-d+i p} \left(e^{(-i c+i d+p) z} \left(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(\frac{-c+d-i p}{d}, 1; -\frac{c-2d+i p}{d}; \frac{i b e^{i d z}}{a-\sqrt{a^2-b^2}}\right) + \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(\frac{-c+d-i p}{d}, 1; -\frac{c-2d+i p}{d}; \frac{i b e^{i d z}}{a+\sqrt{a^2-b^2}}\right) \right) \right) - \frac{1}{c+d-i p} \left(e^{(i c+i d+p) z} \left(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(\frac{c+d-i p}{d}, 1; \frac{c+2d-i p}{d}; \frac{i b e^{i d z}}{a-\sqrt{a^2-b^2}}\right) + \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(\frac{c+d-i p}{d}, 1; \frac{c+2d-i p}{d}; \frac{i b e^{i d z}}{a+\sqrt{a^2-b^2}}\right) \right) \right) \right)$$

Involving $e^{p z} (a+b \sin(d z))^{-n} \cos(c z)$

01.07.21.0963.01

$$\int \frac{e^{p z} \cos(c z)}{(a + b \sin(d z))^2} \, dz = \frac{1}{2 b \left(a^2 - b^2\right)^{3/2}} \left(i \left(\frac{1}{-i c + i d + p} \left(e^{(-i c + i d + p) z} \left(-a \left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\!\left(\frac{-c + d - i p}{d}, 1; -\frac{c - 2 d + i p}{d}; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}} \right) + \right.\right.\right.\right.$$

$$a \left(a - \sqrt{a^2 - b^2} \right) {}_2F_1\!\left(\frac{-c + d - i p}{d}, 1; -\frac{c - 2 d + i p}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) +$$

$$\left(a^2 + \sqrt{a^2 - b^2} \, a - b^2 \right) {}_2F_1\!\left(\frac{-c + d - i p}{d}, 2; -\frac{c - 2 d + i p}{d}; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}} \right) +$$

$$\left.\left.\left(-a^2 + \sqrt{a^2 - b^2} \, a + b^2 \right) {}_2F_1\!\left(\frac{-c + d - i p}{d}, 2; -\frac{c - 2 d + i p}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right)\right) +$$

$$\frac{1}{i c + i d + p} \left(e^{(i c + i d + p) z} \left(-a \left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\!\left(\frac{c + d - i p}{d}, 1; \frac{c + 2 d - i p}{d}; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}} \right) + \right.\right.$$

$$a \left(a - \sqrt{a^2 - b^2} \right) {}_2F_1\!\left(\frac{c + d - i p}{d}, 1; \frac{c + 2 d - i p}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) +$$

$$\left(a^2 + \sqrt{a^2 - b^2} \, a - b^2 \right) {}_2F_1\!\left(\frac{c + d - i p}{d}, 2; \frac{c + 2 d - i p}{d}; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}} \right) +$$

$$\left.\left.\left.\left.\left(-a^2 + \sqrt{a^2 - b^2} \, a + b^2 \right) {}_2F_1\!\left(\frac{c + d - i p}{d}, 2; \frac{c + 2 d - i p}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right)\right)\right)\right)$$

Involving $\frac{e^{p z} \cos(c z)}{a + b \sin^2(d z)}$

01.07.21.0964.01

$$\int \frac{e^{p z} \cos(c z)}{a + b \sin^2(d z)} \, dz = \frac{1}{2 \sqrt{a} \, b \sqrt{a + b}} \left(-\frac{1}{c + 2 d + i p} \left(i e^{(-i c - 2 i d + p) z} \left(\left(-2 a + 2 \sqrt{a + b} \sqrt{a} - b \right) {}_2F_1\left(\frac{c + 2 d + i p}{2 d}, 1; \frac{c + 4 d + i p}{2 d}; \frac{b e^{-2 i d z}}{2 a + 2 \sqrt{a + b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a + b} \sqrt{a} + b \right) {}_2F_1\left(\frac{c + 2 d + i p}{2 d}, 1; \frac{c + 4 d + i p}{2 d}; \frac{b e^{-2 i d z}}{2 a - 2 \sqrt{a + b} \sqrt{a} + b} \right) \right) \right) - \frac{1}{i c - 2 i d + p} \left(e^{(i c - 2 i d + p) z} \left(\left(-2 a + 2 \sqrt{a + b} \sqrt{a} - b \right) {}_2F_1\left(1 - \frac{c - i p}{2 d}, 1; 2 - \frac{c - i p}{2 d}; \frac{b e^{-2 i d z}}{2 a + 2 \sqrt{a + b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a + b} \sqrt{a} + b \right) {}_2F_1\left(1 - \frac{c - i p}{2 d}, 1; 2 - \frac{c - i p}{2 d}; \frac{b e^{-2 i d z}}{2 a - 2 \sqrt{a + b} \sqrt{a} + b} \right) \right) \right) \right)$$

Involving $e^{p z} \left(a + b \sin^2(d z)\right)^{-n} \cos(c z)$

01.07.21.0965.01

$$\int \frac{e^{p z} \cos(c z)}{\left(a + b \sin^2(d z)\right)^2} \, dz = \frac{1}{4 a^{3/2} b (a + b)^{3/2}} \left(-\frac{1}{i c + 2 i d + p} \left(e^{(i c + 2 i d + p) z} \left((2 a + b) \left(-2 a + 2 \sqrt{a + b} \sqrt{a} - b \right) {}_2F_1\left(\frac{c + 2 d - i p}{2 d}, 1; \frac{c + 4 d - i p}{2 d}; \frac{b e^{2 i d z}}{2 a + 2 \sqrt{a + b} \sqrt{a} + b} \right) + (2 a + b) \left(2 a + 2 \sqrt{a + b} \sqrt{a} + b \right) {}_2F_1\left(\frac{c + 2 d - i p}{2 d}, 1; \frac{c + 4 d - i p}{2 d}; \frac{b e^{2 i d z}}{2 a - 2 \sqrt{a + b} \sqrt{a} + b} \right) + 2 \sqrt{a} \left(\left(2 a^{3/2} - 2 \sqrt{a + b} \, a + 2 b \sqrt{a} - b \sqrt{a + b} \right) {}_2F_1\left(\frac{c + 2 d - i p}{2 d}, 2; \frac{c + 4 d - i p}{2 d}; \frac{b e^{2 i d z}}{2 a + 2 \sqrt{a + b} \sqrt{a} + b} \right) - \left(2 a^{3/2} + 2 \sqrt{a + b} \, a + 2 b \sqrt{a} + b \sqrt{a + b} \right) {}_2F_1\left(\frac{c + 2 d - i p}{2 d}, 2; \frac{c + 4 d - i p}{2 d}; \frac{b e^{2 i d z}}{2 a - 2 \sqrt{a + b} \sqrt{a} + b} \right) \right) \right) \right) - \frac{1}{-i c + 2 i d + p} \left(e^{(-i c + 2 i d + p) z} \left((2 a + b) \left(-2 a + 2 \sqrt{a + b} \sqrt{a} - b \right) {}_2F_1\left(-\frac{c - 2 d + i p}{2 d}, 1; -\frac{c - 4 d + i p}{2 d}; \frac{b e^{2 i d z}}{2 a + 2 \sqrt{a + b} \sqrt{a} + b} \right) + (2 a + b) \left(2 a + 2 \sqrt{a + b} \sqrt{a} + b \right) {}_2F_1\left(-\frac{c - 2 d + i p}{2 d}, 1; -\frac{c - 4 d + i p}{2 d}; \frac{b e^{2 i d z}}{2 a - 2 \sqrt{a + b} \sqrt{a} + b} \right) + 2 \sqrt{a} \left(\left(2 a^{3/2} - 2 \sqrt{a + b} \, a + 2 b \sqrt{a} - b \sqrt{a + b} \right) {}_2F_1\left(-\frac{c - 2 d + i p}{2 d}, 2; -\frac{c - 4 d + i p}{2 d}; \frac{b e^{2 i d z}}{2 a + 2 \sqrt{a + b} \sqrt{a} + b} \right) - \left(2 a^{3/2} + 2 \sqrt{a + b} \, a + 2 b \sqrt{a} + b \sqrt{a + b} \right) {}_2F_1\left(-\frac{c - 2 d + i p}{2 d}, 2; -\frac{c - 4 d + i p}{2 d}; \frac{b e^{2 i d z}}{2 a - 2 \sqrt{a + b} \sqrt{a} + b} \right) \right) \right) \right) \right)$$

Involving $\frac{e^{pz}\sin(ez)\cos(cz)}{a+b\sin(dz)}$

01.07.21.0966.01

$$\int \frac{e^{pz}\sin(ez)\cos(cz)}{a+b\sin(dz)}\,dz = -\frac{1}{4b\sqrt{a^2-b^2}}\left(i\left(\frac{1}{c+d-e-ip}\left(e^{i(c+d-e-ip)z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d-e-ip}{d},1;\frac{c+2d-e-ip}{d};\frac{ib e^{idz}}{a-\sqrt{a^2-b^2}}\right)+\right.\right.\right.\right.$$
$$\left.\left.\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d-e-ip}{d},1;\frac{c+2d-e-ip}{d};\frac{ib e^{idz}}{a+\sqrt{a^2-b^2}}\right)\right)\right)+$$
$$\frac{1}{c-d-e+ip}\left(e^{(-ic+id+ie+p)z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{-c+d+e-ip}{d},1;\frac{-c+2d+e-ip}{d};\frac{ib e^{idz}}{a-\sqrt{a^2-b^2}}\right)+\right.\right.$$
$$\left.\left.\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{-c+d+e-ip}{d},1;\frac{-c+2d+e-ip}{d};\frac{ib e^{idz}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-$$
$$\frac{1}{c+d+e-ip}\left(e^{i(c+d+e-ip)z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d+e-ip}{d},1;\frac{c+2d+e-ip}{d};\frac{ib e^{idz}}{a-\sqrt{a^2-b^2}}\right)+\right.\right.$$
$$\left.\left.\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d+e-ip}{d},1;\frac{c+2d+e-ip}{d};\frac{ib e^{idz}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-$$
$$\frac{1}{c-d+e+ip}\left(e^{-i(c-d+e+ip)z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{c-d+e+ip}{d},1;-\frac{c-2d+e+ip}{d};\frac{ib e^{idz}}{a-\sqrt{a^2-b^2}}\right)+\right.\right.$$
$$\left.\left.\left.\left.\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{c-d+e+ip}{d},1;-\frac{c-2d+e+ip}{d};\frac{ib e^{idz}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)$$

Involving $e^{pz}\sin(ez)\cos(cz)(a+b\sin(dz))^{-n}$

01.07.21.0967.01

$$\int \frac{e^{pz}\sin(ez)\cos(cz)}{(a+b\sin(dz))^2}\,dz = -\frac{1}{4b\left(a^2-b^2\right)^{3/2}}$$
$$\left(-\frac{1}{c+d-e-ip}\left(i\,e^{i(c+d-e-ip)z}\left(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d-e-ip}{d},1;\frac{c+2d-e-ip}{d};\frac{ib e^{idz}}{a-\sqrt{a^2-b^2}}\right)+\right.\right.\right.$$
$$a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d-e-ip}{d},1;\frac{c+2d-e-ip}{d};\frac{ib e^{idz}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\;a-b^2\right){}_2F_1\!\left(\frac{c+d-e-i\,p}{d},2;\frac{c+2\,d-e-i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\!\left(\frac{c+d-e-i\,p}{d},2;\frac{c+2\,d-e-i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{c+d+e-i\,p}\Bigg(i\,e^{i\,(c+d+e-i\,p)\,z}\Bigg(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(\frac{c+d+e-i\,p}{d},1;\frac{c+2\,d+e-i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\!\left(\frac{c+d+e-i\,p}{d},1;\frac{c+2\,d+e-i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\;a-b^2\right){}_2F_1\!\left(\frac{c+d+e-i\,p}{d},2;\frac{c+2\,d+e-i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\!\left(\frac{c+d+e-i\,p}{d},2;\frac{c+2\,d+e-i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)+$$

$$\frac{1}{c-d+e+i\,p}\Bigg(i\,e^{-i\,(c-d+e+i\,p)\,z}\Bigg(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(-\frac{c-d+e+i\,p}{d},1;-\frac{c-2\,d+e+i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\!\left(-\frac{c-d+e+i\,p}{d},1;-\frac{c-2\,d+e+i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\;a-b^2\right){}_2F_1\!\left(-\frac{c-d+e+i\,p}{d},2;-\frac{c-2\,d+e+i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\!\left(-\frac{c-d+e+i\,p}{d},2;-\frac{c-2\,d+e+i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)-$$

$$\frac{1}{-i\,c+i\,d+i\,e+p}\Bigg(e^{(-i\,c+i\,d+i\,e+p)\,z}\Bigg(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(\frac{-c+d+e-i\,p}{d},1;\frac{-c+2\,d+e-i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\!\left(\frac{-c+d+e-i\,p}{d},1;\frac{-c+2\,d+e-i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\;a-b^2\right){}_2F_1\!\left(\frac{-c+d+e-i\,p}{d},2;\frac{-c+2\,d+e-i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\!\left(\frac{-c+d+e-i\,p}{d},2;\frac{-c+2\,d+e-i\,p}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

Involving $\frac{e^{pz}\sin(ez)\cos(cz)}{a+b\sin^2(dz)}$

01.07.21.0968.01

$$\int \frac{e^{pz}\sin(ez)\cos(cz)}{a+b\sin^2(dz)}\,dz = \frac{1}{4\sqrt{a}\,b\sqrt{a+b}}\left(-\frac{1}{c+2d-e+i p}\left(e^{(-i c-2 i d+i e+p)z}\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{c+2d-e+i p}{2d},1;\frac{c+4d-e+i p}{2d};\frac{b e^{-2 i d z}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{c+2d-e+i p}{2d},1;\frac{c+4d-e+i p}{2d};\frac{b e^{-2 i d z}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{-c+2d+e+i p}\left(e^{(i c-2 i d-i e+p)z}\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{-c+2d+e+i p}{2d},1;\frac{-c+4d+e+i p}{2d};\frac{b e^{-2 i d z}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{-c+2d+e+i p}{2d},1;\frac{-c+4d+e+i p}{2d};\frac{b e^{-2 i d z}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{c+2d+e+i p}\left(e^{-i(c+2d+e+i p)z}\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{c+2d+e+i p}{2d},1;\frac{c+4d+e+i p}{2d};\frac{b e^{-2 i d z}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{c+2d+e+i p}{2d},1;\frac{c+4d+e+i p}{2d};\frac{b e^{-2 i d z}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{c-2d+e-i p}\left(e^{i(c-2d+e-i p)z}\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{c+e-i p}{2d},1;2-\frac{c+e-i p}{2d};\frac{b e^{-2 i d z}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(1-\frac{c+e-i p}{2d},1;2-\frac{c+e-i p}{2d};\frac{b e^{-2 i d z}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right)$$

Involving $e^{pz}\sin(ez)\cos(cz)\left(a+b\sin^2(dz)\right)^{-n}$

01.07.21.0969.01

$$\int \frac{e^{pz}\sin(ez)\cos(cz)}{\left(b\sin^2(dz)+a\right)^2}\,dz =$$

$$-\frac{1}{8a^{3/2}\,b\,(a+b)^{3/2}}\left(i\left(\frac{1}{i c+2 i d-i e+p}\left(e^{(i c+2 i d-i e+p)z}\left((2a+b)\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{c+2d-e-i p}{2d},1;\frac{c+4d-e-i p}{2d};\frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+(2a+b)\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{c+2d-e-i p}{2d},1;\frac{c+4d-e-i p}{2d};\frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)+\right.\right.\right.\right.$$

$$2\sqrt{a}\left(\left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(\frac{c+2d-e-i p}{2d},2;\frac{c+4d-e-i p}{2d};\right.\right.$$
$$\left.\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1$$
$$\left.\left.\left.\left.\left(\frac{c+2d-e-i p}{2d},2;\frac{c+4d-e-i p}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right)\right)+$$
$$\frac{1}{c+2d+e-i p}\left(i\,e^{i(c+2d+e-i p)z}\left((2a+b)\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{c+2d+e-i p}{2d},1;\right.\right.\right.$$
$$\left.\frac{c+4d+e-i p}{2d};\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+(2a+b)\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)$$
$${}_2F_1\left(\frac{c+2d+e-i p}{2d},1;\frac{c+4d+e-i p}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(\frac{c+2d+e-i p}{2d},2;\frac{c+4d+e-i p}{2d};\right.\right.$$
$$\left.\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1$$
$$\left.\left.\left.\left.\left(\frac{c+2d+e-i p}{2d},2;\frac{c+4d+e-i p}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right)\right)+$$
$$\frac{1}{c-2d+e+i p}\left(i\,e^{-i(c-2d+e+i p)z}\left((2a+b)\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(-\frac{c-2d+e+i p}{2d},1;\right.\right.\right.$$
$$\left.-\frac{c-4d+e+i p}{2d};\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+(2a+b)\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)$$
$${}_2F_1\left(-\frac{c-2d+e+i p}{2d},1;-\frac{c-4d+e+i p}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(-\frac{c-2d+e+i p}{2d},2;-\frac{c-4d+e+i p}{2d};\right.\right.$$
$$\left.\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1$$
$$\left.\left.\left.\left.\left(-\frac{c-2d+e+i p}{2d},2;-\frac{c-4d+e+i p}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right)\right)-$$
$$\frac{1}{-i c+2i d+i e+p}\left(e^{(-i c+2i d+i e+p)z}\left((2a+b)\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{-c+2d+e-i p}{2d},\right.\right.\right.$$
$$\left.1;\frac{-c+4d+e-i p}{2d};\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+(2a+b)\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)$$
$${}_2F_1\left(\frac{-c+2d+e-i p}{2d},1;\frac{-c+4d+e-i p}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(\frac{-c+2d+e-i p}{2d},2;\frac{-c+4d+e-i p}{2d};\frac{b\,e^{2 i d z}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(\frac{-c+2d+e-i p}{2d},2;\frac{-c+4d+e-i p}{2d};\frac{b\,e^{2 i d z}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

Involving algebraic functions of sin and exp

Involving $e^{p z}(a+b\sin(d z))^{\beta}\cos(c z)$

01.07.21.0970.01

$$\int e^{p z}(a+b\sin(d z))^{\beta}\cos(c z)\,dz = -\left(i\,e^{(-i c+p)z}\left(1+\frac{i b e^{i d z}}{\sqrt{a^2-b^2}-a}\right)^{-\beta}\left(1-\frac{i b e^{i d z}}{a+\sqrt{a^2-b^2}}\right)^{-\beta}\left((c-i p-d\beta)F_1\left(-\frac{c+i p+d\beta}{d};-\beta,-\beta;-\frac{c+i p+d(\beta-1)}{d};\frac{i b e^{i d z}}{a+\sqrt{a^2-b^2}},\frac{i b e^{i d z}}{a-\sqrt{a^2-b^2}}\right)-e^{2 i c z}(c+i p+d\beta)F_1\left(\frac{c-i p-d\beta}{d};-\beta,-\beta;\frac{c+d-i p-d\beta}{d};\frac{i b e^{i d z}}{a+\sqrt{a^2-b^2}},\frac{i b e^{i d z}}{a-\sqrt{a^2-b^2}}\right)\right)(a+b\sin(d z))^{\beta}\right)\Big/(2(-c+i p+d\beta)(c+i p+d\beta))$$

Involving $e^{p z}\left(a+b\sin^2(d z)\right)^{\beta}\cos(c z)$

01.07.21.0971.01

$$\int e^{p z}\left(a+b\sin^2(d z)\right)^{\beta}\cos(c z)\,dz = \left(i\,e^{(-i c+p)z}\left(1-\frac{b e^{2 i d z}}{2a+b-2\sqrt{a(a+b)}}\right)^{-\beta}\left(1-\frac{b e^{2 i d z}}{2a+b+2\sqrt{a(a+b)}}\right)^{-\beta}\left(a-\frac{1}{4}b\,e^{-2 i d z}\left(-1+e^{2 i d z}\right)^2\right)^{\beta}\left(e^{2 i c z}(c+i p+2d\beta)F_1\left(\frac{c-i p-2d\beta}{2d};-\beta,-\beta;\frac{c+2d-i p-2d\beta}{2d};\frac{b e^{2 i d z}}{2a+b+2\sqrt{a(a+b)}},\frac{b e^{2 i d z}}{2a+b-2\sqrt{a(a+b)}}\right)+(-c+i p+2d\beta)F_1\left(-\frac{c+i p+2d\beta}{2d};-\beta,-\beta;-\frac{c+i p+2d(\beta-1)}{2d};\frac{b e^{2 i d z}}{2a+b+2\sqrt{a(a+b)}},\frac{b e^{2 i d z}}{2a+b-2\sqrt{a(a+b)}}\right)\right)\right)\Big/(2(-c+i p+2d\beta)(c+i p+2d\beta))$$

Involving $e^{p z} \sin(e z) \cos(c z) (a + b \sin(d z))^{\beta}$

01.07.21.0972.01

$$\int e^{p z} \sin(e z) (a + b \sin(d z))^{\beta} \cos(c z)\, dz = -\frac{1}{4} i \left(1 - \frac{i b e^{-i d z}}{\sqrt{a^2 - b^2} - a}\right)^{-\beta} \left(1 + \frac{i b e^{-i d z}}{a + \sqrt{a^2 - b^2}}\right)^{-\beta} (a + b \sin(d z))^{\beta}$$
$$\left(\frac{e^{(-i c - i e + p) z}}{i c + i e - p - i d \beta} F_1\left(-\frac{i (i c + i e - p - i d \beta)}{d}; -\beta, -\beta; -\frac{\beta d - d + i (i c + i e - p)}{d}; -\frac{i b e^{-i d z}}{a + \sqrt{a^2 - b^2}}, -\frac{i b e^{-i d z}}{a - \sqrt{a^2 - b^2}}\right) + \right.$$
$$\frac{e^{(-i c + i e + p) z}}{-i c + i e + p + i d \beta} F_1\left(\frac{i (-i c + i e + p)}{d} - \beta; -\beta, -\beta; \frac{i (-i c + i e + p)}{d} - \beta + 1; -\frac{i b e^{-i d z}}{a + \sqrt{a^2 - b^2}}, -\frac{i b e^{-i d z}}{a - \sqrt{a^2 - b^2}}\right) +$$
$$\frac{e^{(i c + i e + p) z}}{i c + i e + p + i d \beta} F_1\left(\frac{i (i c + i e + p)}{d} - \beta; -\beta, -\beta; \frac{i (i c + i e + p)}{d} - \beta + 1; -\frac{i b e^{-i d z}}{a + \sqrt{a^2 - b^2}}, -\frac{i b e^{-i d z}}{a - \sqrt{a^2 - b^2}}\right) -$$
$$\left.\frac{e^{(i c - i e + p) z}}{i c - i e + p + i d \beta} F_1\left(\frac{i (i c - i e + p)}{d} - \beta; -\beta, -\beta; \frac{i (i c - i e + p)}{d} - \beta + 1; -\frac{i b e^{-i d z}}{a + \sqrt{a^2 - b^2}}, -\frac{i b e^{-i d z}}{a - \sqrt{a^2 - b^2}}\right)\right)$$

Involving $e^{p z} \sin(e z) \cos(c z) \left(a + b \sin^2(d z)\right)^{\beta}$

01.07.21.0973.01

$$\int e^{p z} \sin(e z) \left(a + b \sin^2(d z)\right)^{\beta} \cos(c z)\, dz =$$
$$-\frac{1}{4} i \left(1 - \frac{b e^{-2 i d z}}{2 a + b - 2 \sqrt{a (a + b)}}\right)^{-\beta} \left(1 - \frac{b e^{-2 i d z}}{2 a + b + 2 \sqrt{a (a + b)}}\right)^{-\beta} \left(a - \frac{1}{4} b e^{2 i d z} \left(-1 + e^{-2 i d z}\right)^2\right)^{\beta}$$
$$\left(\frac{e^{(-i c - i e + p) z}}{i c + i e - p - 2 i d \beta} F_1\left(-\frac{i (i c + i e - p - 2 i d \beta)}{2 d}; -\beta, -\beta; -\frac{i (i c + i e - p)}{2 d} - \beta + 1; \frac{b e^{-2 i d z}}{2 a + b + 2 \sqrt{a (a + b)}}, \right.\right.$$
$$\left.\frac{b e^{-2 i d z}}{2 a + b - 2 \sqrt{a (a + b)}}\right) + \frac{e^{(i c + i e + p) z}}{i c + i e + p + 2 i d \beta} F_1\left(\frac{i (i c + i e + p)}{2 d} - \beta; -\beta, -\beta; \frac{i (i c + i e + p)}{2 d} - \beta + 1; \right.$$
$$\left.\frac{b e^{-2 i d z}}{2 a + b + 2 \sqrt{a (a + b)}}, \frac{b e^{-2 i d z}}{2 a + b - 2 \sqrt{a (a + b)}}\right) - \frac{e^{(i c - i e + p) z}}{i c - i e + p + 2 i d \beta} F_1\left(\frac{i (i c - i e + p)}{2 d} - \beta; -\beta, \right.$$
$$\left.-\beta; \frac{i (i c - i e + p)}{2 d} - \beta + 1; \frac{b e^{-2 i d z}}{2 a + b + 2 \sqrt{a (a + b)}}, \frac{b e^{-2 i d z}}{2 a + b - 2 \sqrt{a (a + b)}}\right) - \frac{e^{(-i c + i e + p) z}}{i c - i e - p - 2 i d \beta}$$
$$\left.F_1\left(\frac{i (-i c + i e + p)}{2 d} - \beta; -\beta, -\beta; \frac{i (-i c + i e + p)}{2 d} - \beta + 1; \frac{b e^{-2 i d z}}{2 a + b + 2 \sqrt{a (a + b)}}, \frac{b e^{-2 i d z}}{2 a + b - 2 \sqrt{a (a + b)}}\right)\right)$$

Involving trigonometric, exponential and a power functions

Involving sin, exp and power

Involving $z^{\alpha-1} e^{b z} \sin(c z) \cos(a z)$

01.07.21.0974.01

$$\int z^{\alpha-1} e^{p z} \sin(c z) \cos(a z) \, dz = \frac{1}{4} i z^{\alpha} \left(E_{1-\alpha}(i (a-c+i p) z) - E_{1-\alpha}(i (a+c+i p) z) - E_{1-\alpha}(-i (a-c-i p) z) + E_{1-\alpha}(-i (a+c-i p) z)\right)$$

Involving $z^{\alpha-1} e^{p z} \sin(c z + d) \cos(a z)$

01.07.21.0975.01

$$\int z^{\alpha-1} e^{p z} \sin(c z + d) \cos(a z) \, dz = \frac{1}{4} i e^{-i d} z^{\alpha} \left(e^{2 i d} E_{1-\alpha}(i (a-c+i p) z) - E_{1-\alpha}(i (a+c+i p) z) - E_{1-\alpha}(-i (a-c-i p) z) + e^{2 i d} E_{1-\alpha}(-i (a+c-i p) z)\right)$$

Involving $z^{\alpha-1} e^{p z} \sin(c z) \cos(a z + b)$

01.07.21.0976.01

$$\int z^{\alpha-1} e^{p z} \sin(c z) \cos(b + a z) \, dz = \frac{1}{4} i e^{-i b} z^{\alpha} \left(E_{1-\alpha}(i (a-c+i p) z) - E_{1-\alpha}(i (a+c+i p) z) - e^{2 i b} E_{1-\alpha}(-i (a-c-i p) z) + e^{2 i b} E_{1-\alpha}(-i (a+c-i p) z)\right)$$

Involving $z^{\alpha-1} e^{p z} \sin(c z + d) \cos(a z + b)$

01.07.21.0977.01

$$\int z^{\alpha-1} e^{p z} \sin(d + c z) \cos(b + a z) \, dz = \frac{1}{4} i e^{-i (b+d)} z^{\alpha} \left(e^{2 i d} E_{1-\alpha}(i (a-c+i p) z) - E_{1-\alpha}(i (a+c+i p) z) - e^{2 i b} E_{1-\alpha}(-i (a-c-i p) z) + e^{2 i (b+d)} E_{1-\alpha}(-i (a+c-i p) z)\right)$$

Involving $z^{n} e^{p z^{r}} \sin\left(b z^{r}\right) \cos(c z)$

01.07.21.0978.01

$$\int z^n e^{p z^2} \sin\left(b z^2\right) \cos(c z)\, dz = \frac{i}{8\sqrt{-i b+p}\,\sqrt{i b+p}}\left(-e^{\frac{c^2}{-4 i b+4 p}}\sqrt{i b+p}\left(\sum_{q=0}^{n} 2^{q-n}(-i c)^{n-q}(-i b+p)^{-n-\frac{1}{2}}(i c+2(-i b+p) z)^{q+1}\left(-\frac{(i c+2(-i b+p) z)^2}{-i b+p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(i c+2(-i b+p) z)^2}{4(-i b+p)}\right)+\sum_{q=0}^{n} 2^{q-n}(i c)^{n-q}(-i b+p)^{-n-\frac{1}{2}}\left(-\frac{(i c+2 i b z-2 p z)^2}{-i b+p}\right)^{\frac{1}{2}(-q-1)}(2(-i b+p) z-i c)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(i c+2 i b z-2 p z)^2}{4(-i b+p)}\right)\right)+ e^{\frac{c^2}{4 i b+4 p}}\sqrt{-i b+p}\sum_{q=0}^{n} 2^{q-n}(-i c)^{n-q}(i b+p)^{-n-\frac{1}{2}}(i c+2(i b+p) z)^{q+1}\left(-\frac{(i c+2(i b+p) z)^2}{i b+p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(i c+2(i b+p) z)^2}{4(i b+p)}\right)+e^{\frac{c^2}{4 i b+4 p}}\sqrt{-i b+p}\sum_{q=0}^{n} 2^{q-n}(i c)^{n-q}(i b+p)^{-n-\frac{1}{2}}\left(-\frac{(i c-2 i b z-2 p z)^2}{i b+p}\right)^{\frac{1}{2}(-q-1)}(2(i b+p) z-i c)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(i c-2 i b z-2 p z)^2}{4(i b+p)}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0979.01

$$\int z^n e^{p\sqrt{z}} \sin\left(b\sqrt{z}\right)\cos(c z)\, dz = i\, 2^{-2n-3}(i c)^{-2(n+1)} e^{\frac{i\left(b^2+4 i p b+2 p^2\right)}{4 c}}\left(e^{-\frac{i\left(2 b^2+6 i p b+p^2\right)}{4 c}}\sum_{r=0}^{n}\sum_{q=0}^{r} -(-1)^{r-q} 4^r(-i b+p)^{2n-q-r}\left(\frac{\left(b+i\left(p+2 i c\sqrt{z}\right)\right)^2}{i c}\right)^{\frac{1}{2}(-q-r-1)}\left(-i b+p+2 i c\sqrt{z}\right)^{q+r}\binom{n}{r}\binom{r}{q}\left((b+i p)\left(b+i\left(p+2 i c\sqrt{z}\right)\right)\Gamma\left(\frac{1}{2}(q+r+1), \frac{\left(b+i\left(p+2 i c\sqrt{z}\right)\right)^2}{4 i c}\right)-2 i c\sqrt{\frac{\left(b+i\left(p+2 i c\sqrt{z}\right)\right)^2}{i c}}\,\Gamma\left(\frac{1}{2}(q+r+2), \frac{\left(b+i\left(p+2 i c\sqrt{z}\right)\right)^2}{4 i c}\right)\right)+ e^{-\frac{i(p(2 i b+3 p))}{4 c}}\sum_{r=0}^{n}\sum_{q=0}^{r} -(-1)^{r-q} 4^r(-i b+p)^{2n-q-r}\left(-i b+p-2 i c\sqrt{z}\right)^{q+r}\left(\frac{\left(-i b+p-2 i c\sqrt{z}\right)^2}{i c}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\left((b+i\,p)\left(b+i\left(p-2\,i\,c\sqrt{z}\right)\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{\left(-i\,b+p-2\,i\,c\sqrt{z}\right)^2}{4\,i\,c}\right)+\right.$$

$$\left.2\,c\sqrt{\frac{\left(-i\,b+p-2\,i\,c\sqrt{z}\right)^2}{i\,c}}\;i\,\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{\left(-i\,b+p-2\,i\,c\sqrt{z}\right)^2}{4\,i\,c}\right)\right)\right)-$$

$$e^{-\frac{i(3\,p(2\,i\,b+p))}{4\,c}}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,(i\,b+p)^{2\,n-q-r}\left(i\,b+p-2\,i\,c\sqrt{z}\right)^{q+r}\left(\frac{\left(i\,b+p-2\,i\,c\sqrt{z}\right)^2}{i\,c}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\left((i\,b+p)\left(i\,b+p-2\,i\,c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{\left(i\,b+p-2\,i\,c\sqrt{z}\right)^2}{4\,i\,c}\right)-\right.$$

$$\left.2\,i\,c\sqrt{\frac{\left(i\,b+p-2\,i\,c\sqrt{z}\right)^2}{i\,c}}\;\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{\left(i\,b+p-2\,i\,c\sqrt{z}\right)^2}{4\,i\,c}\right)\right)\right)-$$

$$e^{-\frac{i\left(2\,b^2+2\,i\,p\,b+p^2\right)}{4\,c}}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,(i\,b+p)^{2\,n-q-r}\left(i\,b+p+2\,i\,c\sqrt{z}\right)^{q+r}\left(-\frac{\left(i\,b+p+2\,i\,c\sqrt{z}\right)^2}{i\,c}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\left((i\,b+p)\left(i\,b+p+2\,i\,c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\,-\frac{\left(i\,b+p+2\,i\,c\sqrt{z}\right)^2}{4\,i\,c}\right)+\right.$$

$$\left.2\,c\sqrt{-\frac{\left(i\,b+p+2\,i\,c\sqrt{z}\right)^2}{i\,c}}\;i\,\Gamma\left(\frac{1}{2}(q+r+2),\,-\frac{\left(i\,b+p+2\,i\,c\sqrt{z}\right)^2}{4\,i\,c}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z^r}\sin(b\,z)\cos(c\,z)$

01.07.21.0980.01

$$\int z^n e^{p z^2} \sin(b z) \cos(c z)\, dz = \frac{1}{8\sqrt{p}} \left(i\, e^{\frac{b^2+c^2}{2p}} \left(e^{\frac{(i c - i b)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} (-i c - i b)^{n-q} p^{-n-\frac{1}{2}} (i c + i b + 2 p z)^{q+1} \left(-\frac{(i c + i b + 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i c + i b + 2 p z)^2}{4p}\right) - e^{\frac{(i c + i b)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} (i b - i c)^{n-q} p^{-n-\frac{1}{2}} (i c - i b + 2 p z)^{q+1} \left(-\frac{(i c - i b + 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i c - i b + 2 p z)^2}{4p}\right) - e^{\frac{(i c - i b)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} (i c + i b)^{n-q} p^{-n-\frac{1}{2}} \left(-\frac{(i c + i b - 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} (-i c - i b + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i c + i b - 2 p z)^2}{4p}\right) + e^{\frac{(i c + i b)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} (i c - i b)^{n-q} p^{-n-\frac{1}{2}} \left(-\frac{(i c - i b - 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} (-i c + i b + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i c - i b - 2 p z)^2}{4p}\right) \right) \right) /;\ n \in \mathbb{N}$$

01.07.21.0981.01

$$\int z^n e^{p\sqrt{z}} \sin(b z) \cos(c z)\, dz = -i\, 2^{-2n-3} \left(e^{\frac{i p^2}{4b-4c}} \left(\sum_{r=0}^{n} \sum_{q=0}^{r} (-1)^{r-q} 4^r p^{2n-q-r} \left(p - 2 i (c-b)\sqrt{z}\right)^{q+r} \left(\frac{i\left(p - 2 i (c-b)\sqrt{z}\right)^2}{b-c}\right)^{\frac{1}{2}(-q-r-1)} \binom{n}{r} \binom{r}{q} \left(p \left(p - 2 i (c-b)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(q+r+1), \frac{i\left(p - 2 i (c-b)\sqrt{z}\right)^2}{4(b-c)}\right) - 2 i (c-b) \sqrt{\frac{i\left(p - 2 i (c-b)\sqrt{z}\right)^2}{b-c}}\; \Gamma\left(\frac{1}{2}(q+r+2), \frac{i\left(p - 2 i (c-b)\sqrt{z}\right)^2}{4(b-c)}\right) \right) \right) (-i c + i b)^{-2(n+1)} - (-i c - i b)^{-2(n+1)} e^{\frac{p^2}{4 i c + 4 i b}} \sum_{r=0}^{n} \sum_{q=0}^{r} (-1)^{r-q} 4^r p^{2n-q-r} \left(p - 2 (i c + i b)\sqrt{z}\right)^{q+r} \left(\frac{\left(p - 2 (i c + i b)\sqrt{z}\right)^2}{i c + i b}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\left(p\left(p-2(i c+i b)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\ \frac{\left(p-2(i c+i b)\sqrt{z}\right)^2}{4(i c+i b)}\right)-\right.$$

$$\left.2(i c+i b)\sqrt{\frac{\left(p-2(i c+i b)\sqrt{z}\right)^2}{i c+i b}}\ \Gamma\left(\frac{1}{2}(q+r+2),\ \frac{\left(p-2(i c+i b)\sqrt{z}\right)^2}{4(i c+i b)}\right)\right)+$$

$$(i c+i b)^{-2(n+1)}\, e^{\frac{p^2}{-4 i c-4 i b}} \sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\, 4^r\, p^{2n-q-r}\left(2\sqrt{z}\,(i c+i b)+p\right)^{q+r}\left(-\frac{\left(2\sqrt{z}\,(i c+i b)+p\right)^2}{i c+i b}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\left(p\left(2\sqrt{z}\,(i c+i b)+p\right)\Gamma\left(\frac{1}{2}(q+r+1),\ -\frac{\left(2\sqrt{z}\,(i c+i b)+p\right)^2}{4(i c+i b)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(i c+i b)+p\right)^2}{i c+i b}}\ (i c+i b)\,\Gamma\left(\frac{1}{2}(q+r+2),\ -\frac{\left(2\sqrt{z}\,(i c+i b)+p\right)^2}{4(i c+i b)}\right)\right)-$$

$$(i c-i b)^{-2(n+1)}\, e^{\frac{p^2}{-4 i c+4 i b}} \sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\, 4^r\, p^{2n-q-r}\left(2\sqrt{z}\,(i c-i b)+p\right)^{q+r}\left(-\frac{\left(2\sqrt{z}\,(i c-i b)+p\right)^2}{i c-i b}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\left(p\left(2\sqrt{z}\,(i c-i b)+p\right)\Gamma\left(\frac{1}{2}(q+r+1),\ -\frac{\left(2\sqrt{z}\,(i c-i b)+p\right)^2}{4(i c-i b)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(i c-i b)+p\right)^2}{i c-i b}}\ (i c-i b)\,\Gamma\left(\frac{1}{2}(q+r+2),\ -\frac{\left(2\sqrt{z}\,(i c-i b)+p\right)^2}{4(i c-i b)}\right)\right)\right)\ /;\ n\in\mathbb{N}$$

Involving $z^n e^{p z} \sin\left(b z^r\right) \cos(c z)$

01.07.21.0982.01

$$\int z^n e^{p z} \sin\left(b z^2\right) \cos(c z) \, dz = \frac{1}{8 b} e^{-\frac{i (i c+p)^2}{4 b}} \left(\sqrt{i b} \left(e^{\frac{i\left(-c^2+p^2\right)}{2 b}} \sum_{q=0}^{n} 2^{q-n} (i b)^{-n-\frac{1}{2}} (i c - p)^{n-q} (-i c + p + 2 i b z)^{q+1} \left(\frac{i (-i c + p + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (-i c + p + 2 i b z)^2}{4 b}\right) + e^{\frac{i (i c+p)^2}{2 b}} \sum_{q=0}^{n} 2^{q-n} (i b)^{-n-\frac{1}{2}} (-i c - p)^{n-q} (i c + p + 2 i b z)^{q+1} \left(\frac{i (i c + p + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (i c + p + 2 i b z)^2}{4 b}\right)\right) + \sqrt{-i b} \, e^{-\frac{c p}{b}} \sum_{q=0}^{n} 2^{q-n} (-i b)^{-n-\frac{1}{2}} (i c - p)^{n-q} (-i c + p - 2 i b z)^{q+1} \left(-\frac{i (i c - p + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (i c - p + 2 i b z)^2}{4 b}\right) + \sqrt{-i b} \sum_{q=0}^{n} 2^{q-n} (-i b)^{-n-\frac{1}{2}} (-i c - p)^{n-q} (i c + p - 2 i b z)^{q+1} \left(-\frac{i (i c + p - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (i c + p - 2 i b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.07.21.0983.01

$$\int z^n e^{p z} \sin\left(b \sqrt{z}\right) \cos(c z) \, dz = -i \, 2^{-2 n-3} \left(-e^{\frac{b^2}{4 p-4 i c}} \left(\sum_{r=0}^{n} \sum_{q=0}^{r} -(-1)^{r-q} 4^r (-i b)^{2 n-q-r} \left(\frac{\left(i b + 2 (i c - p) \sqrt{z}\right)^2}{i c - p}\right)^{\frac{1}{2}(-q-r-1)} \left(-i b + 2 (p - i c) \sqrt{z}\right)^{q+r} \binom{n}{r} \binom{r}{q} \left(b \left(b - 2 i (i c - p) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(q+r+1), \frac{\left(i b + 2 (i c - p) \sqrt{z}\right)^2}{4 (i c - p)}\right) + 2 \sqrt{\frac{\left(i b + 2 (i c - p) \sqrt{z}\right)^2}{i c - p}} \, (i c - p) \, \Gamma\left(\frac{1}{2}(q+r+2), \frac{\left(i b + 2 (i c - p) \sqrt{z}\right)^2}{4 (i c - p)}\right)\right)\right) (p - i c)^{-2 (n+1)} + e^{\frac{b^2}{4 p-4 i c}} \left(\sum_{r=0}^{n} \sum_{q=0}^{r} -(-1)^{r-q} 4^r (i b)^{2 n-q-r} \left(i b + 2 (p - i c) \sqrt{z}\right)^{q+r} \left(\frac{\left(i b + 2 (p - i c) \sqrt{z}\right)^2}{i c - p}\right)^{\frac{1}{2}(-q-r-1)}\right.\right.$$

$$\binom{n}{r}\binom{r}{q}\left(b\left(b+2\,i\,(i\,c-p)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{\left(i\,b+2\,(p-i\,c)\sqrt{z}\right)^2}{4\,(i\,c-p)}\right)+\right.$$

$$\left.\left.2\sqrt{\frac{\left(i\,b+2\,(p-i\,c)\sqrt{z}\right)^2}{i\,c-p}}\,(i\,c-p)\,\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{\left(i\,b+2\,(p-i\,c)\sqrt{z}\right)^2}{4\,(i\,c-p)}\right)\right)\right)(p-i\,c)^{-2(n+1)}+$$

$$e^{\frac{b^2}{4(i\,c+p)}}\,(i\,c+p)^{-2(n+1)}\left(\sum_{r=0}^{n}\sum_{q=0}^{r}-(-1)^{r-q}\,4^r\,(i\,b)^{2n-q-r}\left(\frac{\left(b-2\,i\,(i\,c+p)\sqrt{z}\right)^2}{i\,c+p}\right)^{\frac{1}{2}(-q-r-1)}\left(i\,b+2\,(i\,c+p)\sqrt{z}\right)^{q+r}\right.$$

$$\binom{n}{r}\binom{r}{q}\left(b\left(b-2\,i\,(i\,c+p)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{\left(b-2\,i\,(i\,c+p)\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)-\right.$$

$$\left.2\,(i\,c+p)\sqrt{\frac{\left(b-2\,i\,(i\,c+p)\sqrt{z}\right)^2}{i\,c+p}}\,\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{\left(b-2\,i\,(i\,c+p)\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)\right)-$$

$$\sum_{r=0}^{n}\sum_{q=0}^{r}-(-1)^{r-q}\,4^r\,(-i\,b)^{2n-q-r}\left(\frac{\left(b+2\,i\,(i\,c+p)\sqrt{z}\right)^2}{i\,c+p}\right)^{\frac{1}{2}(-q-r-1)}\left(-i\,b+2\,(i\,c+p)\sqrt{z}\right)^{q+r}$$

$$\binom{n}{r}\binom{r}{q}\left(b\left(b+2\,i\,(i\,c+p)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{\left(b+2\,i\,(i\,c+p)\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)-\right.$$

$$\left.\left.2\,(i\,c+p)\sqrt{\frac{\left(b+2\,i\,(i\,c+p)\sqrt{z}\right)^2}{i\,c+p}}\,\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{\left(b+2\,i\,(i\,c+p)\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\,\sin(b\,z)\cos(c\,z^r)$

01.07.21.0984.01

$$\int z^n e^{p z} \sin(b z) \cos(c z^2)\, dz = -i\, 2^{-n-4} (-i c)^{-n-1} e^{-\frac{b^2+4 i p b+2 p^2}{4 i c}} \left(e^{\frac{p(2 i b+3 p)}{4 i c}} \sum_{q=0}^{n} (i b-p)^{n-q} (-i b+p-2 i c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(\frac{(-i b+p-2 i c z)^2}{4 i c}\right) - 2^n e^{\frac{3 p(2 i b+p)}{4 i c}} \sum_{q=0}^{n} 2^{-n} (-i b-p)^{n-q} (i b+p-2 i c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(\frac{(i b+p-2 i c z)^2}{4 i c}\right) + (-1)^n e^{\frac{2 b^2+2 i p b+p^2}{4 i c}} \left(2^n \sum_{q=0}^{n} 2^{-n} (-i b-p)^{n-q} (i b+p+2 i c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(-\frac{(i b+p+2 i c z)^2}{4 i c}\right) - e^{\frac{b p}{c}} \sum_{q=0}^{n} (i b-p)^{n-q} (-i b+p+2 i c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(\frac{(b+i(p+2 i c z))^2}{4 i c}\right)\right)\right) /;\ n \in \mathbb{N}$$

01.07.21.0985.01

$$\int z^n e^{p z} \sin(b z) \cos(c \sqrt{z})\, dz = i\, 2^{-2 n-3} \left(e^{\frac{c^2}{4(-i b+p)}} \left(\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-i c)^{-h-i+2 n} \left(-i c+2(-i b+p)\sqrt{z}\right)^{h+i} \left(-\frac{\left(-i c+2(-i b+p)\sqrt{z}\right)^2}{-i b+p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i} \left(2(-i b+p) \sqrt{-\frac{\left(-i c+2(-i b+p)\sqrt{z}\right)^2}{-i b+p}}\ \Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(-i c+2(-i b+p)\sqrt{z}\right)^2}{4(-i b+p)}\right) - i c\left(-i c+2(-i b+p)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(-i c+2(-i b+p)\sqrt{z}\right)^2}{4(-i b+p)}\right)\right)\right) (-i b+p)^{-2(n+1)} + e^{\frac{c^2}{4(-i b+p)}} \left(\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (i c)^{-h-i+2 n} \left(i c+2(-i b+p)\sqrt{z}\right)^{h+i} \left(-\frac{\left(i c+2(-i b+p)\sqrt{z}\right)^2}{-i b+p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i} \left(c\, i \left(i c+2(-i b+p)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(i c+2(-i b+p)\sqrt{z}\right)^2}{4(-i b+p)}\right) + 2 \sqrt{-\frac{\left(i c+2(-i b+p)\sqrt{z}\right)^2}{-i b+p}}\ (-i b+p) \Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(i c+2(-i b+p)\sqrt{z}\right)^2}{4(-i b+p)}\right)\right)\right) (-i b+p)^{-2(n+1)} - \right.$$

$$e^{\frac{c^2}{4(i b+p)}} (i b+p)^{-2(n+1)} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-i c)^{-h-i+2n} \left(-i c+2 (i b+p) \sqrt{z}\right)^{h+i} \left(-\frac{\left(-i c+2 (i b+p) \sqrt{z}\right)^2}{i b+p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h} \binom{n}{i} \left(2 (i b+p) \sqrt{-\frac{\left(-i c+2 (i b+p) \sqrt{z}\right)^2}{i b+p}}\; \Gamma\left(\frac{1}{2} (h+i+2), -\frac{\left(-i c+2 (i b+p) \sqrt{z}\right)^2}{4 (i b+p)}\right) - \right.$$

$$\left. i c \left(-i c+2 (i b+p) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+i+1), -\frac{\left(-i c+2 (i b+p) \sqrt{z}\right)^2}{4 (i b+p)}\right)\right) -$$

$$e^{\frac{c^2}{4(i b+p)}} (i b+p)^{-2(n+1)} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (i c)^{-h-i+2n} \left(i c+2 (i b+p) \sqrt{z}\right)^{h+i} \left(-\frac{\left(i c+2 (i b+p) \sqrt{z}\right)^2}{i b+p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h} \binom{n}{i} \left(c\, i \left(i c+2 (i b+p) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+i+1), -\frac{\left(i c+2 (i b+p) \sqrt{z}\right)^2}{4 (i b+p)}\right) + \right.$$

$$\left. 2 \sqrt{-\frac{\left(i c+2 (i b+p) \sqrt{z}\right)^2}{i b+p}}\; (i b+p) \Gamma\left(\frac{1}{2} (h+i+2), -\frac{\left(i c+2 (i b+p) \sqrt{z}\right)^2}{4 (i b+p)}\right)\right)\Bigg) \text{/; } n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \sin(b z) \cos\left(c z^r\right)$

01.07.21.0986.01

$$\int z^n e^{p z^2} \sin(b z) \cos(c z^2)\, dz = \frac{i}{8\sqrt{p-i c}\,\sqrt{i c+p}} e^{\frac{b^2}{4p-4ic}} \left(-\sqrt{i c+p} \sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (p-i c)^{-n-\frac{1}{2}} \left(\frac{(i b+2(i c-p) z)^2}{i c-p}\right)^{\frac{1}{2}(-q-1)} (-i b+2(p-i c) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(i b+2(i c-p) z)^2}{4(i c-p)}\right) + \sqrt{i c+p} \sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (p-i c)^{-n-\frac{1}{2}} (i b-2 i c z+2 p z)^{q+1} \left(\frac{(i b-2 i c z+2 p z)^2}{i c-p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(i b-2 i c z+2 p z)^2}{4(i c-p)}\right) + e^{-\frac{i c b^2}{2(c^2+p^2)}} \sqrt{p-i c} \left(\sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (i c+p)^{-n-\frac{1}{2}} \left(\frac{(b-2 i (i c+p) z)^2}{i c+p}\right)^{\frac{1}{2}(-q-1)} (i b+2(i c+p) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b-2 i (i c+p) z)^2}{4(i c+p)}\right) - \sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (i c+p)^{-n-\frac{1}{2}} \left(\frac{(b+2 i (i c+p) z)^2}{i c+p}\right)^{\frac{1}{2}(-q-1)} (-i b+2(i c+p) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b+2 i (i c+p) z)^2}{4(i c+p)}\right)\right)\right) /; n \in \mathbb{N}$$

01.07.21.0987.01

$$\int z^n e^{p\sqrt{z}} \sin(b z) \cos(c\sqrt{z})\, dz = i\, 2^{-2n-3} (i b)^{-2(n+1)} \left(-e^{\frac{i(-i c+p)^2}{4b}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-i c+p)^{-h-i+2n} \left(-i c+p+2 i b\sqrt{z}\right)^{h+i} \left(\frac{i\left(-i c+p+2 i b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i} \left((-i c+p)\left(-i c+p+2 i b\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), \frac{i\left(-i c+p+2 i b\sqrt{z}\right)^2}{4b}\right) + 2\sqrt{\frac{i\left(-i c+p+2 i b\sqrt{z}\right)^2}{b}}\, b\, i\, \Gamma\left(\frac{1}{2}(h+i+2), \frac{i\left(-i c+p+2 i b\sqrt{z}\right)^2}{4b}\right)\right) - e^{\frac{i(i c+p)^2}{4b}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (i c+p)^{-h-i+2n} \left(i c+p+2 i b\sqrt{z}\right)^{h+i} \left(\frac{i\left(i c+p+2 i b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-i-1)}\right.$$

$$\binom{i}{h}\binom{n}{i}\left((i c+p)\left(i c+p+2 i b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1), \frac{i\left(i c+p+2 i b\sqrt{z}\right)^2}{4 b}\right)+\right.$$

$$\left.\left. 2\sqrt{\frac{i\left(i c+p+2 i b\sqrt{z}\right)^2}{b}}\; b\, i\,\Gamma\left(\frac{1}{2}(h+i+2), \frac{i\left(i c+p+2 i b\sqrt{z}\right)^2}{4 b}\right)\right)\right)+$$

$$e^{-\frac{i(-i c+p)^2}{4 b}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\, 4^i\, (-i c+p)^{-h-i+2 n}\left(-i c+p-2 i b\sqrt{z}\right)^{h+i}\left(-\frac{i\left(-i c+p-2 i b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((-i c+p)\left(-i c+p-2 i b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1), -\frac{i\left(-i c+p-2 i b\sqrt{z}\right)^2}{4 b}\right)-\right.$$

$$\left.\left. 2 i b\sqrt{-\frac{i\left(-i c+p-2 i b\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+i+2), -\frac{i\left(-i c+p-2 i b\sqrt{z}\right)^2}{4 b}\right)\right)\right)+$$

$$e^{-\frac{i(i c+p)^2}{4 b}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\, 4^i\, (i c+p)^{-h-i+2 n}\left(i c+p-2 i b\sqrt{z}\right)^{h+i}\left(-\frac{i\left(i c+p-2 i b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((i c+p)\left(i c+p-2 i b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1), -\frac{i\left(i c+p-2 i b\sqrt{z}\right)^2}{4 b}\right)-\right.$$

$$\left.\left.\left. 2 i b\sqrt{-\frac{i\left(i c+p-2 i b\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+i+2), -\frac{i\left(i c+p-2 i b\sqrt{z}\right)^2}{4 b}\right)\right)\right)\right)\; /;\; n\in\mathbb{N}$$

Involving $z^n\, e^{p z}\sin\left(b z^r\right)\cos\left(c z^r\right)$

01.07.21.0988.01

$$\int z^n e^{p z} \sin\left(b z^2\right) \cos\left(c z^2\right) dz = -\frac{1}{8} i \left(\frac{1}{\sqrt{-i c - i b}} \left(e^{\frac{p^2}{4 i c + 4 i b}} \sum_{q=0}^{n} 2^{q-n} (-i c - i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p - 2 (i c + i b) z)^{q+1} \left(\frac{(p - 2 (i c + i b) z)^2}{i c + i b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p - 2 (i c + i b) z)^2}{4 (i c + i b)} \right) \right) - \frac{1}{\sqrt{i c + i b}} \left(e^{\frac{p^2}{-4 i c - 4 i b}} \sum_{q=0}^{n} 2^{q-n} (i c + i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p + 2 i c z + 2 i b z)^{q+1} \left(-\frac{(p + 2 i c z + 2 i b z)^2}{i c + i b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + 2 i c z + 2 i b z)^2}{4 (i c + i b)} \right) \right) - \frac{1}{\sqrt{i b - i c}} \left(e^{\frac{p^2}{4 i c - 4 i b}} \sum_{q=0}^{n} 2^{q-n} (i b - i c)^{-n-\frac{1}{2}} (-p)^{n-q} (p - 2 i c z + 2 i b z)^{q+1} \left(\frac{(p - 2 i c z + 2 i b z)^2}{i c - i b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p - 2 i c z + 2 i b z)^2}{4 (i c - i b)} \right) \right) + \frac{1}{\sqrt{i c - i b}} \left(e^{\frac{p^2}{4 i b - 4 i c}} \sum_{q=0}^{n} 2^{q-n} (i c - i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p + 2 (i c - i b) z)^{q+1} \left(-\frac{(p + 2 (i c - i b) z)^2}{i c - i b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + 2 (i c - i b) z)^2}{4 (i c - i b)} \right) \right) \right) /; n \in \mathbb{N}$$

01.07.21.0989.01

$$\int z^n e^{p z} \sin\left(b \sqrt{z}\right) \cos\left(c \sqrt{z}\right) dz = -i\, 2^{-2 n-3} p^{-2 (n+1)} \left(-e^{-\frac{(-i b + i c)^2}{4 p}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-i b + i c)^{-h-i+2 n} \left(-i b + i c + 2 p \sqrt{z}\right)^{h+i} \left(-\frac{\left(-i b + i c + 2 p \sqrt{z}\right)^2}{p} \right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i} \left((-i b + i c) \left(-i b + i c + 2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+i+1), -\frac{\left(-i b + i c + 2 p \sqrt{z}\right)^2}{4 p} \right) + 2 \sqrt{-\frac{\left(-i b + i c + 2 p \sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2} (h+i+2), -\frac{\left(-i b + i c + 2 p \sqrt{z}\right)^2}{4 p} \right) \right) + e^{-\frac{(i b + i c)^2}{4 p}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (i b + i c)^{-h-i+2 n} \left(i b + i c + 2 p \sqrt{z}\right)^{h+i} \left(-\frac{\left(i b + i c + 2 p \sqrt{z}\right)^2}{p} \right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((i\,b+i\,c)\left(i\,b+i\,c+2\,p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(i\,b+i\,c+2\,p\sqrt{z}\right)^2}{4\,p}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(i\,b+i\,c+2\,p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(i\,b+i\,c+2\,p\sqrt{z}\right)^2}{4\,p}\right)\right)\right)-$$

$$e^{-\frac{(-i\,b-i\,c)^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,b-i\,c)^{-h-i+2\,n}\left(-i\,b-i\,c+2\,p\sqrt{z}\right)^{h+i}\left(-\frac{\left(-i\,b-i\,c+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((-i\,b-i\,c)\left(-i\,b-i\,c+2\,p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(-i\,b-i\,c+2\,p\sqrt{z}\right)^2}{4\,p}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(-i\,b-i\,c+2\,p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(-i\,b-i\,c+2\,p\sqrt{z}\right)^2}{4\,p}\right)\right)+$$

$$e^{-\frac{(i\,b-i\,c)^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,b-i\,c)^{-h-i+2\,n}\left(i\,b-i\,c+2\,p\sqrt{z}\right)^{h+i}\left(-\frac{\left(i\,b-i\,c+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((i\,b-i\,c)\left(i\,b-i\,c+2\,p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(i\,b-i\,c+2\,p\sqrt{z}\right)^2}{4\,p}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(i\,b-i\,c+2\,p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(i\,b-i\,c+2\,p\sqrt{z}\right)^2}{4\,p}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\,e^{p\,z^r}\sin(b\,z^r)\cos(c\,z^r)$

01.07.21.0990.01

$$\int z^{\alpha-1}\,e^{p\,z^r}\sin(b\,z^r)\cos(c\,z^r)\,dz ==$$

$$\frac{i\,z^\alpha}{4\,r}\left(-\Gamma\left(\frac{\alpha}{r},\,(-i\,c+i\,b-p)\,z^r\right)((-i\,c+i\,b-p)\,z^r)^{-\frac{\alpha}{r}}-((i\,c+i\,b-p)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(i\,c+i\,b-p)\,z^r\right)+\right.$$

$$\left.((-i\,c-i\,b-p)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(-i\,c-i\,b-p)\,z^r\right)+((i\,c-i\,b-p)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(i\,c-i\,b-p)\,z^r\right)\right)$$

01.07.21.0991.01

$$\int z^n e^{p z^2} \sin(b z^2) \cos(c z^2) \, dz = -\frac{1}{8} i z^{n+1} \Big(-\Gamma\Big(\frac{n+1}{2}, (-i b + i c - p) z^2\Big) ((-i b + i c - p) z^2)^{\frac{1}{2}(-n-1)} + ((i b + i c - p) z^2)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (i b + i c - p) z^2\Big) - ((-i b - i c - p) z^2)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (-i b - i c - p) z^2\Big) + ((i b - i c - p) z^2)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (i b - i c - p) z^2\Big)\Big) \; /; \; n \in \mathbb{N}$$

01.07.21.0992.01

$$\int z^n e^{p \sqrt{z}} \sin(b \sqrt{z}) \cos(c \sqrt{z}) \, dz = \frac{1}{2} i z^{n+1} \Big(\Gamma\big(2(n+1), (-i b + i c - p) \sqrt{z}\big) \big((-i b + i c - p) \sqrt{z}\big)^{-2(n+1)} - \big((i b + i c - p) \sqrt{z}\big)^{-2(n+1)} \Gamma\big(2(n+1), (i b + i c - p) \sqrt{z}\big) + \big((-i b - i c - p) \sqrt{z}\big)^{-2(n+1)} \Gamma\big(2(n+1), (-i b - i c - p) \sqrt{z}\big) - \big((i b - i c - p) \sqrt{z}\big)^{-2(n+1)} \Gamma\big(2(n+1), (i b - i c - p) \sqrt{z}\big)\Big) \; /; \; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \sin(a z^r + q) \cos(c z^r + g)$

01.07.21.0993.01

$$\int z^{\alpha-1} e^{b z^r + e} \sin(a z^r + q) \cos(c z^r + g) \, dz = -\frac{i z^\alpha}{4 r} \Big(-e^{e - i g + i q} \Gamma\Big(\frac{\alpha}{r}, (-b - i a + i c) z^r\Big) ((-b - i a + i c) z^r)^{-\frac{\alpha}{r}} + e^{e - i g - i q} ((-b + i a + i c) z^r)^{-\frac{\alpha}{r}} \Gamma\Big(\frac{\alpha}{r}, (-b + i a + i c) z^r\Big) - e^{e + i g + i q} ((-b - i c - i a) z^r)^{-\frac{\alpha}{r}} \Gamma\Big(\frac{\alpha}{r}, (-b - i c - i a) z^r\Big) + e^{e + i g - i q} ((-b - i c + i a) z^r)^{-\frac{\alpha}{r}} \Gamma\Big(\frac{\alpha}{r}, (-b - i c + i a) z^r\Big)\Big)$$

01.07.21.0994.01

$$\int z^n e^{b z^2 + e} \sin(a z^2 + q) \cos(c z^2 + g) \, dz = -\frac{1}{8} i z^{n+1} \Big(-e^{e - i g + i q} \Gamma\Big(\frac{n+1}{2}, (-b - i a + i c) z^2\Big) ((-b - i a + i c) z^2)^{\frac{1}{2}(-n-1)} + e^{e - i g - i q} ((-b + i a + i c) z^2)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (-b + i a + i c) z^2\Big) - e^{e + i g + i q} ((-b - i c - i a) z^2)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (-b - i c - i a) z^2\Big) + e^{e + i g - i q} ((-b - i c + i a) z^2)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (-b - i c + i a) z^2\Big)\Big) \; /; \; n \in \mathbb{N}$$

01.07.21.0995.01

$$\int z^n e^{\sqrt{z} b + e} \sin(\sqrt{z} a + q) \cos(\sqrt{z} c + g) \, dz = \frac{1}{2} i \Big(e^{e - i g + i q} \Gamma\big(2(n+1), (-b - i a + i c) \sqrt{z}\big) (-b - i a + i c)^{-2(n+1)} - (-b + i a + i c)^{-2(n+1)} e^{e - i g - i q} \Gamma\big(2(n+1), (-b + i a + i c) \sqrt{z}\big) + (-b - i c - i a)^{-2(n+1)} e^{e + i g + i q} \Gamma\big(2(n+1), (-b - i c - i a) \sqrt{z}\big) - (-b - i c + i a)^{-2(n+1)} e^{e + i g - i q} \Gamma\big(2(n+1), (-b - i c + i a) \sqrt{z}\big)\Big) \; /; \; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \sin(a z^r + p z + q) \cos(c z^r + f z + g)$

01.07.21.0996.01

$$\int z^n e^{b z^2+d z+e} \sin\left(a z^2+p z+q\right) \cos\left(c z^2+f z+g\right) dz = -\frac{1}{8} i e^{e-i(g+q)} \Bigg(-i e^{-\frac{i(d-i(f+p))^2}{4(a+c+i b)}}$$

$$\Bigg(\sum_{j=0}^{n} 2^{j-n} (i(f+p)-d)^{n-j} (f+i d+p+2 a z+2 c z+2 i b z) \left(\frac{i(f+i d+p+2 a z+2 c z+2 i b z)^2}{a+c+i b}\right)^{\frac{1}{2}(-j-1)}$$

$$(d-i(f+p+2(a+c+i b) z))^j \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f+i d+p+2 a z+2 c z+2 i b z)^2}{4(a+c+i b)}\right)\Bigg) (-i(a+c+i b))^{-n-1} +$$

$$(b-i a+i c)^{-n-1} e^{2 i g-\frac{i(d+i(f-p))^2}{4(a-c+i b)}} \sum_{j=0}^{n} 2^{j-n} (-d-i(f-p))^{n-j} \left(\frac{i(-f+i d+p+2 a z-2 c z+2 i b z)^2}{a-c+i b}\right)^{\frac{1}{2}(-j-1)}$$

$$(d-i(-f+p+2(a-c+i b) z))^{j+1} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-f+i d+p+2 a z-2 c z+2 i b z)^2}{4(a-c+i b)}\right) -$$

$$(b-i c+i a)^{-n-1} e^{\frac{1}{4} i\left(\frac{(d-i f+i p)^2}{a-i b-c}+8 q\right)} \sum_{j=0}^{n} 2^{j-n} (i(f-p)-d)^{n-j} \left(-\frac{i(f+i d-p-2 a z+2 c z+2 i b z)^2}{a-i b-c}\right)^{\frac{1}{2}(-j-1)}$$

$$(d+i(-f+p+2(a-i b-c) z))^{j+1} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f+i d-p-2 a z+2 c z+2 i b z)^2}{4(a-i b-c)}\right) + \frac{1}{a-i b+c}$$

$$\Bigg(i(b+i a+i c)^{-n} e^{\frac{1}{4} i\left(\frac{(d+i(f+p))^2}{a-i b+c}+8 g+8 q\right)} \sum_{j=0}^{n} 2^{j-n} (-d-i(f+p))^{n-j} \left(-\frac{i(f-i d+p+2 a z-2 i b z+2 c z)^2}{a-i b+c}\right)^{\frac{1}{2}(-j-1)}$$

$$(d+i(f+p+2(a-i b+c) z))^{j+1} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f-i d+p+2 a z-2 i b z+2 c z)^2}{4(a-i b+c)}\right)\Bigg)\Bigg) /; n \in \mathbb{N}$$

01.07.21.0997.01

$$\int z^n e^{\sqrt{z}\, b+e+d z} \sin\left(\sqrt{z}\, a+q+p z\right) \cos\left(\sqrt{z}\, c+g+f z\right) dz =$$

$$i\, 2^{-2 n-3} e^{e-i(g+q)} \Bigg(e^{\frac{(a-c+i b)^2}{4(d+i(f-p))}+2 i g} \Bigg(\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (b-i a+i c)^{-h-i+2 n}$$

$$\left(b-i a+i c+2(d+i(f-p)) \sqrt{z}\right)^{h+i} \left(-\frac{\left(b-i a+i c+2(d+i(f-p)) \sqrt{z}\right)^2}{d+i(f-p)}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((b-i a+i c)\left(b-i a+i c+2(d+i(f-p))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\right.\right.$$

$$\left.-\frac{\left(b-i a+i c+2(d+i(f-p))\sqrt{z}\right)^2}{4(d+i(f-p))}\right)+2\sqrt{-\frac{\left(b-i a+i c+2(d+i(f-p))\sqrt{z}\right)^2}{d+i(f-p)}}$$

$$\left.\left.(d+i(f-p))\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(b-i a+i c+2(d+i(f-p))\sqrt{z}\right)^2}{4(d+i(f-p))}\right)\right)\right)(d+i(f-p))^{-2(n+1)}-$$

$$e^{\frac{(-a+c+i b)^2}{4(d-i(f-p))}+2 i q}(d-i(f-p))^{-2(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}4^i(b-i c+i a)^{-h-i+2n}\left(b+i a-i\left(c+2(f+i d-p)\sqrt{z}\right)\right)^{h+i}$$

$$\left(-\frac{\left(b+i a-i\left(c+2(f+i d-p)\sqrt{z}\right)\right)^2}{d-i(f-p)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b-i c+i a)\left(b+i a-i\left(c+2(f+i d-p)\sqrt{z}\right)\right)\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(b+i a-i\left(c+2(f+i d-p)\sqrt{z}\right)\right)^2}{4(d-i(f-p))}\right)+\right.$$

$$2\sqrt{-\frac{\left(b+i a-i\left(c+2(f+i d-p)\sqrt{z}\right)\right)^2}{d-i(f-p)}}(d-i(f-p))$$

$$\left.\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(b+i a-i\left(c+2(f+i d-p)\sqrt{z}\right)\right)^2}{4(d-i(f-p))}\right)\right)-$$

$$e^{\frac{(a-i b+c)^2}{4(d+i(f+p))}+2 i g+2 i q}(d+i(f+p))^{-2(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}4^i(b+i a+i c)^{-h-i+2n}$$

$$\left(b+i a+i c+2(d+i(f+p))\sqrt{z}\right)^{h+i}\left(-\frac{\left(b+i a+i c+2(d+i(f+p))\sqrt{z}\right)^2}{d+i(f+p)}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((b+i a+i c)\left(b+i a+i c+2(d+i(f+p))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\right.\right.$$

$$-\frac{\left(b+i\,a+i\,c+2\,(d+i\,(f+p))\,\sqrt{z}\right)^2}{4\,(d+i\,(f+p))}\Bigg)+2\,\sqrt{-\frac{\left(b+i\,a+i\,c+2\,(d+i\,(f+p))\,\sqrt{z}\right)^2}{d+i\,(f+p)}}$$

$$(d+i\,(f+p))\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+i\,a+i\,c+2\,(d+i\,(f+p))\,\sqrt{z}\right)^2}{4\,(d+i\,(f+p))}\right)\Bigg)\Bigg)+$$

$$e^{\frac{(a+c+i\,b)^2}{4\,(d-i\,(f+p))}}\,(d-i\,(f+p))^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,(a+c+i\,b))^{-h-i+2\,n}\left(b-i\,a-i\left(c+2\,(f+i\,d+p)\,\sqrt{z}\right)\right)^{h+i}$$

$$\left(\frac{\left(a+c+i\,b+2\,f\,\sqrt{z}+2\,i\,d\,\sqrt{z}+2\,p\,\sqrt{z}\right)^2}{d-i\,(f+p)}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg(2\,(d-i\,(f+p))\,\sqrt{\frac{\left(a+c+i\,b+2\,f\,\sqrt{z}+2\,i\,d\,\sqrt{z}+2\,p\,\sqrt{z}\right)^2}{d-i\,(f+p)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,\frac{\left(a+c+i\,b+2\,f\,\sqrt{z}+2\,i\,d\,\sqrt{z}+2\,p\,\sqrt{z}\right)^2}{4\,(d-i\,(f+p))}\right)-(a+c+i\,b)\left(a+c+i\,b+2\,f\,\sqrt{z}+\right.$$

$$\left.2\,i\,d\,\sqrt{z}+2\,p\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,\frac{\left(a+c+i\,b+2\,f\,\sqrt{z}+2\,i\,d\,\sqrt{z}+2\,p\,\sqrt{z}\right)^2}{4\,(d-i\,(f+p))}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}$$

Involving powers of sin, exp and power

Involving $z^{\alpha-1}\,e^{p\,z}\,\sin^{\mu}(c\,z)\,\cos(a\,z)$

01.07.21.0998.01

$$\int z^{\alpha-1} e^{p z} \sin^m(c z) \cos(a z) \, dz = 2^{-m-1} z^\alpha \left(((-p - i a) z)^{-\alpha} (i (a + i p) z)^{-\alpha} \binom{m}{\frac{m}{2}} (\Gamma(\alpha, i a z - p z) ((-p - i a) z)^\alpha + (i (a + i p) z)^\alpha \Gamma(\alpha, -p z - i a z)) (m \bmod 2 - 1) - \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^k (-i (a - i p + 2 c k - c m) z)^{-\alpha} (i (a + i p + 2 c k - c m) z)^{-\alpha} (-i (a - i p + c (m - 2k)) z)^{-\alpha} (i (a + i p + c (m - 2k)) z)^{-\alpha} \binom{m}{k} \left(\left((i (a + i p - 2 c k + c m) z)^\alpha \Gamma(\alpha, i (a + i p + 2 c k - c m) z) \left(\cos\left(\frac{m \pi}{2}\right) - i \sin\left(\frac{m \pi}{2}\right) \right) (-i (a - i p - 2 c k + c m) z)^\alpha + (i (a + i p + 2 c k - c m) z)^\alpha \left(\Gamma(\alpha, -i (a - i p - 2 c k + c m) z) \left(\cos\left(\frac{m \pi}{2}\right) - i \sin\left(\frac{m \pi}{2}\right) \right) (i (a + i p - 2 c k + c m) z)^\alpha + (-i (a - i p - 2 c k + c m) z)^\alpha \Gamma(\alpha, i (a + i p - 2 c k + c m) z) \left(\cos\left(\frac{m \pi}{2}\right) + i \sin\left(\frac{m \pi}{2}\right) \right) \right) \right) (-i (a - i p + 2 c k - c m) z)^\alpha + (i (a + i p + 2 c k - c m) z)^\alpha (i (a + i p + c (m - 2k)) z)^\alpha (-i (a - i p + c (m - 2k)) z)^\alpha \Gamma(\alpha, -i (a - i p + 2 c k - c m) z) \left(\cos\left(\frac{m \pi}{2}\right) + i \sin\left(\frac{m \pi}{2}\right) \right) \right) \right) /; m \in \mathbb{N}^+$$

01.07.21.0999.01

$$\int z^n e^{p z} \sin^\mu(c z) \cos(a z) \, dz = \frac{1}{2} \left(1 - e^{2 i c z}\right)^{-\mu} n! \sin^\mu(c z) \left(e^{(i a + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i a + p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-a + i p + c \mu}{2 c}, \ldots, -\frac{-a + i p + c \mu}{2 c}, -\mu; 1 - \frac{-a + i p + c \mu}{2 c}, \ldots, 1 - \frac{-a + i p + c \mu}{2 c}; e^{2 i c z} \right) + e^{(-i a + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i a + p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{a + i p + c \mu}{2 c}, \ldots, -\frac{a + i p + c \mu}{2 c}, -\mu; 1 - \frac{a + i p + c \mu}{2 c}, \ldots, 1 - \frac{a + i p + c \mu}{2 c}; e^{2 i c z} \right) \right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sin^\mu(c z + d) \cos(a z)$

01.07.21.1000.01

$$\int z^{\alpha-1} e^{p z} \sin^m(d + c z) \cos(a z)\, dz = 2^{-m-1} z^\alpha \left(((-i a - p) z)^{-\alpha} (i (a + i p) z)^{-\alpha} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) (\Gamma(\alpha, i a z - p z) ((-i a - p) z)^\alpha + (i (a + i p) z)^\alpha \Gamma(\alpha, -i a z - p z)) - \right.$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k (-i (a + 2 c k - c m - i p) z)^{-\alpha} (-i (a + c (m - 2 k) - i p) z)^{-\alpha}$$
$$(i (a + 2 c k - c m + i p) z)^{-\alpha} (i (a + c (m - 2 k) + i p) z)^{-\alpha} \binom{m}{k}$$
$$\left(\left(\left(\Gamma(\alpha, -i (a - 2 c k + c m - i p) z) (i (a + 2 c k - c m + i p) z)^\alpha + (-i (a - 2 c k + c m - i p) z)^\alpha \right.\right.\right.$$
$$\left. \Gamma(\alpha, i (a + 2 c k - c m + i p) z) \right) \left(\cos\left(d (m - 2 k) - \frac{m \pi}{2}\right) + i \sin\left(d (m - 2 k) - \frac{m \pi}{2}\right) \right)$$
$$(-i (a + 2 c k - c m - i p) z)^\alpha + (i (a + 2 c k - c m + i p) z)^\alpha (-i (a + c (m - 2 k) - i p) z)^\alpha$$
$$\left. \Gamma(\alpha, -i (a + 2 c k - c m - i p) z) \left(\cos\left(2 d k - d m + \frac{m \pi}{2}\right) + i \sin\left(2 d k - d m + \frac{m \pi}{2}\right) \right) \right)$$
$$(i (a + c (m - 2 k) + i p) z)^\alpha + (i (a + 2 c k - c m + i p) z)^\alpha (-i (a + 2 c k - c m - i p) z)^\alpha$$
$$(-i (a + c (m - 2 k) - i p) z)^\alpha \Gamma(\alpha, i (a + c (m - 2 k) + i p) z)$$
$$\left.\left. \left(\cos\left(-2 d k + d m - \frac{m \pi}{2}\right) - i \sin\left(-2 d k + d m - \frac{m \pi}{2}\right) \right) \right) \right) /; m \in \mathbb{N}^+$$

01.07.21.1001.01

$$\int z^n e^{p z} \sin^\mu(d + c z) \cos(a z)\, dz =$$
$$\frac{1}{2} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} n! \sin^\mu(d + c z) \left(e^{(i a + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i a + p - i c \mu)^{-j-1}}{(n - j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-a + i p + c \mu}{2 c}, \ldots, -\frac{-a + i p + c \mu}{2 c}, \right.\right.$$
$$\left. -\mu; 1 - \frac{-a + i p + c \mu}{2 c}, \ldots, 1 - \frac{-a + i p + c \mu}{2 c}; e^{2 i (d + c z)} \right) + e^{(-i a + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i a + p - i c \mu)^{-j-1}}{(n - j)!}$$
$$\left. {}_{j+2}F_{j+1}\left(-\frac{a + i p + c \mu}{2 c}, \ldots, -\frac{a + i p + c \mu}{2 c}, -\mu; 1 - \frac{a + i p + c \mu}{2 c}, \ldots, 1 - \frac{a + i p + c \mu}{2 c}; e^{2 i (d + c z)} \right) \right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sin^\mu(c z) \cos(a z + b)$

01.07.21.1002.01

$$\int z^{\alpha-1} e^{p z} \sin^m(c z) \cos(b + a z) \, dz = 2^{-m-1} z^\alpha \Bigg(((-i a - p) z)^{-\alpha} (i (a + i p) z)^{-\alpha} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) (\Gamma(\alpha, i a z - p z) (\cos(b) - i \sin(b)) ((-i a - p) z)^\alpha + (i (a + i p) z)^\alpha \Gamma(\alpha, -i a z - p z) (\cos(b) + i \sin(b))) - \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^k (-i (a + 2 c k - c m - i p) z)^{-\alpha} (-i (a + c (m - 2 k) - i p) z)^{-\alpha} (i (a + 2 c k - c m + i p) z)^{-\alpha} (i (a + c (m - 2 k) + i p) z)^{-\alpha} \binom{m}{k} \Bigg(\Bigg(\Bigg(\cos\left(\frac{m \pi}{2}\right) - i \sin\left(\frac{m \pi}{2}\right) \Bigg) \Big(\Gamma(\alpha, -i (a - 2 c k + c m - i p) z) (\cos(b) + i \sin(b)) (i (a + 2 c k - c m + i p) z)^\alpha + (-i (a - 2 c k + c m - i p) z)^\alpha \Gamma(\alpha, i (a + 2 c k - c m + i p) z) (\cos(b) - i \sin(b)) \Big) (-i (a + 2 c k - c m - i p) z)^\alpha + (i (a + 2 c k - c m + i p) z)^\alpha (-i (a + c (m - 2 k) - i p) z)^\alpha \Gamma(\alpha, -i (a + 2 c k - c m - i p) z) \left(\cos\left(b + \frac{m \pi}{2}\right) + i \sin\left(b + \frac{m \pi}{2}\right) \right) \Bigg) (i (a + c (m - 2 k) + i p) z)^\alpha + (i (a + 2 c k - c m + i p) z)^\alpha (-i (a + 2 c k - c m - i p) z)^\alpha (-i (a + c (m - 2 k) - i p) z)^\alpha \Gamma(\alpha, i (a + c (m - 2 k) + i p) z) \left(\cos\left(b - \frac{m \pi}{2}\right) - i \sin\left(b - \frac{m \pi}{2}\right) \right) \Bigg) \Bigg) \;/;\; m \in \mathbb{N}^+$$

01.07.21.1003.01

$$\int z^n e^{p z} \sin^\mu(c z) \cos(b + a z) \, dz = \frac{1}{2} \left(1 - e^{2 i c z}\right)^{-\mu} n! \sin^\mu(c z) \Bigg(e^{i b + (i a + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i a + p - i c \mu)^{-j-1}}{(n - j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-a + i p + c \mu}{2 c}, \ldots, -\frac{-a + i p + c \mu}{2 c}, -\mu; 1 - \frac{-a + i p + c \mu}{2 c}, \ldots, 1 - \frac{-a + i p + c \mu}{2 c}; e^{2 i c z} \right) + e^{-i b + (-i a + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i a + p - i c \mu)^{-j-1}}{(n - j)!} \, {}_{j+2}F_{j+1}\left(-\frac{a + i p + c \mu}{2 c}, \ldots, -\frac{a + i p + c \mu}{2 c}, -\mu; 1 - \frac{a + i p + c \mu}{2 c}, \ldots, 1 - \frac{a + i p + c \mu}{2 c}; e^{2 i c z} \right) \Bigg) \;/;\; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sin^\mu(c z + d) \cos(a z + b)$

01.07.21.1004.01

$$\int z^{\alpha-1} e^{pz} \sin^m(d+cz)\cos(b+az)\,dz = 2^{-m-1} z^\alpha \Bigg(((-i a - p) z)^{-\alpha} (i (a + i p) z)^{-\alpha} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \big(\Gamma(\alpha, i a z - p z) (\cos(b) - i \sin(b)) ((-i a - p) z)^\alpha + (i (a + i p) z)^\alpha \Gamma(\alpha, -i a z - p z) (\cos(b) + i \sin(b))\big) - \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k (-i (a + 2 c k - c m - i p) z)^{-\alpha} (-i (a + c (m - 2 k) - i p) z)^{-\alpha} (i (a + 2 c k - c m + i p) z)^{-\alpha} (i (a + c (m - 2 k) + i p) z)^{-\alpha} \binom{m}{k} \Bigg(\Bigg(\Bigg(\cos\left(d (m - 2 k) - \frac{m\pi}{2}\right) + i \sin\left(d (m - 2 k) - \frac{m\pi}{2}\right) \Bigg) \Big(\Gamma(\alpha, -i (a - 2 c k + c m - i p) z) (\cos(b) + i \sin(b)) (i (a + 2 c k - c m + i p) z)^\alpha + (-i (a - 2 c k + c m - i p) z)^\alpha \Gamma(\alpha, i (a + 2 c k - c m + i p) z) (\cos(b) - i \sin(b)) \Big) (-i (a + 2 c k - c m - i p) z)^\alpha + (i (a + 2 c k - c m + i p) z)^\alpha (-i (a + c (m - 2 k) - i p) z)^\alpha \Gamma(\alpha, -i (a + 2 c k - c m - i p) z) \left(\cos\left(b + 2 d k - d m + \frac{m\pi}{2}\right) + i \sin\left(b + 2 d k - d m + \frac{m\pi}{2}\right) \right) \Bigg) (i (a + c (m - 2 k) + i p) z)^\alpha + (i (a + 2 c k - c m + i p) z)^\alpha (-i (a + 2 c k - c m - i p) z)^\alpha (-i (a + c (m - 2 k) - i p) z)^\alpha \Gamma(\alpha, i (a + c (m - 2 k) + i p) z) \left(\cos\left(b - 2 d k + d m - \frac{m\pi}{2}\right) - i \sin\left(b - 2 d k + d m - \frac{m\pi}{2}\right) \right) \Bigg) \Bigg) /; m \in \mathbb{N}^+$$

01.07.21.1005.01

$$\int z^n e^{pz} \sin^\mu(d+cz)\cos(b+az)\,dz = \frac{1}{2} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} n! \sin^\mu(d + c z) \left(e^{i b + (i a + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i a + p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-a + i p + c\mu}{2c}, \ldots, -\frac{-a + i p + c\mu}{2c}, -\mu; 1 - \frac{-a + i p + c\mu}{2c}, \ldots, 1 - \frac{-a + i p + c\mu}{2c}; e^{2 i (d + c z)} \right) + e^{-i b + (-i a + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i a + p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{a + i p + c\mu}{2c}, \ldots, -\frac{a + i p + c\mu}{2c}, -\mu; 1 - \frac{a + i p + c\mu}{2c}, \ldots, 1 - \frac{a + i p + c\mu}{2c}; e^{2 i (d + c z)} \right) \right) /; n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \sin^m(b z^r) \cos^v(c z)$

01.07.21.1006.01

$$\int z^n e^{p z^2} \sin^m(b z^2) \cos(c z)\,dz = \frac{1}{\sqrt{p}} \left(2^{-m-2} \left(\sqrt{p} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-\frac{1}{\sqrt{2 i b k - i b m + p}} \left(e^{i \left(\frac{c^2}{-8 b k + 4 b m + 4 i p} + m\pi \right)} \sum_{q=0}^{n} 2^{q-n} (-i c)^{n-q} (2 i b k - i b m + p)^{-n-\frac{1}{2}} \left(-\frac{i (c + 4 b k z - 2 b m z - 2 i p z)^2}{2 b k - b m - i p} \right)^{\frac{1}{2}(-q-1)} (i c + 2 (2 i b k - i b m + p) z)^{q+1} \right.\right.\right.\right.\right.$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i\,(c+4\,b\,k\,z-2\,b\,m\,z-2\,i\,p\,z)^2}{8\,b\,k-4\,b\,m-4\,i\,p}\right)\Bigg) - \frac{1}{\sqrt{-2\,b\,i\,k+i\,b\,m+p}}$$

$$\Bigg(e^{\frac{i\,c^2}{8\,b\,k-4\,b\,m+4\,i\,p}}\sum_{q=0}^{n} 2^{q-n}\,(i\,c)^{n-q}\,(-2\,b\,i\,k+i\,b\,m+p)^{-n-\frac{1}{2}}\,(-i\,(c+4\,b\,k\,z-2\,b\,m\,z+2\,i\,p\,z))^{q+1}$$

$$\left(\frac{i\,(c+4\,b\,k\,z-2\,b\,m\,z+2\,i\,p\,z)^2}{2\,b\,k-b\,m+i\,p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i\,(c+4\,b\,k\,z-2\,b\,m\,z+2\,i\,p\,z)^2}{8\,b\,k-4\,b\,m+4\,i\,p}\right)\Bigg) -$$

$$\frac{1}{\sqrt{-2\,b\,i\,k+i\,b\,m+p}}\Bigg(e^{\frac{i\,c^2}{8\,b\,k-4\,b\,m+4\,i\,p}}\sum_{q=0}^{n} 2^{q-n}\,(-i\,c)^{n-q}\,(-2\,b\,i\,k+i\,b\,m+p)^{-n-\frac{1}{2}}$$

$$\left(\frac{i\,(c-4\,b\,k\,z+2\,b\,m\,z-2\,i\,p\,z)^2}{2\,b\,k-b\,m+i\,p}\right)^{\frac{1}{2}(-q-1)}(i\,c+2\,(-2\,b\,i\,k+i\,b\,m+p)\,z)^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i\,(c-4\,b\,k\,z+2\,b\,m\,z-2\,i\,p\,z)^2}{8\,b\,k-4\,b\,m+4\,i\,p}\right)\Bigg) -$$

$$\frac{1}{\sqrt{2\,i\,b\,k-i\,b\,m+p}}\Bigg(e^{i\left(\frac{c^2}{-8\,b\,k+4\,b\,m+4\,i\,p}+m\,\pi\right)}\sum_{q=0}^{n} 2^{q-n}\,(i\,c)^{n-q}\,(2\,i\,b\,k-i\,b\,m+p)^{-n-\frac{1}{2}}$$

$$(-i\,(c-4\,b\,k\,z+2\,b\,m\,z+2\,i\,p\,z))^{q+1}\left(-\frac{i\,(c-4\,b\,k\,z+2\,b\,m\,z+2\,i\,p\,z)^2}{2\,b\,k-b\,m-i\,p}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i\,(c-4\,b\,k\,z+2\,b\,m\,z+2\,i\,p\,z)^2}{8\,b\,k-4\,b\,m-4\,i\,p}\right)\Bigg)\Bigg)\Bigg)(-i)^m +$$

$$e^{\frac{c^2}{4\,p}}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{q=0}^{n} 2^{q-n}\,(i\,c)^{n-q}\,p^{-n-\frac{1}{2}}\left(\frac{(c+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(-i\,c+2\,p\,z)^{q+1}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2}, \frac{(c+2\,i\,p\,z)^2}{4\,p}\right) +$$

$$e^{\frac{c^2}{4\,p}}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{q=0}^{n} 2^{q-n}\,(-i\,c)^{n-q}\,p^{-n-\frac{1}{2}}\left(\frac{(c-2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(i\,c+2\,p\,z)^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{(c-2\,i\,p\,z)^2}{4\,p}\right)\Bigg)\Bigg)\ /;\ m\in\mathbb{N}^+\land n\in\mathbb{N}$$

01.07.21.1007.01

$$\int z^n e^{p\sqrt{z}} \sin^m\left(b\sqrt{z}\right)\cos(c\,z)\,dz ==$$

$$\frac{1}{c^2}\left(2^{-m-2n-2}\,(i\,c)^{-2n}\,e^{-\frac{i\,p^2}{4c}}\left(\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,p^{2n-q-r}\left(p-2\,i\,c\sqrt{z}\right)^{q+r}\right.\right.$$

$$\left(\frac{i\left(2\sqrt{z}\,c+i\,p\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}\binom{n}{r}\binom{r}{q}\left(p\left(p-2\,i\,c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{i\left(2\sqrt{z}\,c+i\,p\right)^2}{4c}\right)-\right.$$

$$\left.\left.2\,i\,c\sqrt{\frac{i\left(2\sqrt{z}\,c+i\,p\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{i\left(2\sqrt{z}\,c+i\,p\right)^2}{4c}\right)\right)+\right.$$

$$e^{\frac{i\,p^2}{2c}}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,p^{2n-q-r}\left(p+2\,i\,c\sqrt{z}\right)^{q+r}\left(\frac{i\left(p+2\,i\,c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\left(p\left(p+2\,i\,c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{i\left(p+2\,i\,c\sqrt{z}\right)^2}{4c}\right)+\right.$$

$$\left.\left.2\sqrt{\frac{i\left(p+2\,i\,c\sqrt{z}\right)^2}{c}}\;c\,i\,\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{i\left(p+2\,i\,c\sqrt{z}\right)^2}{4c}\right)\right)\right)-e^{\frac{i\,p^2}{2c}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k$$

$$e^{-\frac{i\left(b^2(m-2k)^2+5p^2-2\,i\,b\,(2k-m)\,p+2\,c\,m\,\pi\right)}{4c}}\binom{m}{k}\left(e^{\frac{i\left(2b^2(m-2k)^2+3p^2\right)}{4c}}\left(e^{i\,\pi\,m+\frac{b\,(2k-m)\,p}{c}}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,(2\,i\,b\,k-i\,b\,m+p)^{2n-q-r}\right.\right.$$

$$\left(2\,i\,b\,k-i\,b\,m+p-2\,i\,c\sqrt{z}\right)^{q+r}\left(\frac{i\left(2\sqrt{z}\,c-2\,b\,k+b\,m+i\,p\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}\binom{n}{r}$$

$$\binom{r}{q}\left((2\,i\,b\,k-i\,b\,m+p)\left(2\,i\,b\,k-i\,b\,m+p-2\,i\,c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\right.\right.$$

$$\left.\frac{i\left(2\sqrt{z}\,c-2\,b\,k+b\,m+i\,p\right)^2}{4c}\right)-2\,i\,c\sqrt{\frac{i\left(2\sqrt{z}\,c-2\,b\,k+b\,m+i\,p\right)^2}{c}}$$

$$\Gamma\left(\frac{1}{2}(q+r+2), \frac{i\left(2\sqrt{z}\,c-2\,b\,k+b\,m+i\,p\right)^2}{4\,c}\right)\Bigg)\Bigg)+$$

$$\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,(-2\,b\,i\,k+i\,b\,m+p)^{2\,n-q-r}\left(-2\,i\,b\,k+i\,b\,m+p-2\,i\,c\sqrt{z}\right)^{q+r}$$

$$\left(\frac{i\left(2\sqrt{z}\,c+2\,b\,k-b\,m+i\,p\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}\binom{n}{r}\binom{r}{q}\Bigg(-(2\,b\,k-b\,m+i\,p)$$

$$\left(2\sqrt{z}\,c+2\,b\,k-b\,m+i\,p\right)\Gamma\left(\frac{1}{2}(q+r+1), \frac{i\left(2\sqrt{z}\,c+2\,b\,k-b\,m+i\,p\right)^2}{4\,c}\right)-2\,i\,c$$

$$\sqrt{\frac{i\left(2\sqrt{z}\,c+2\,b\,k-b\,m+i\,p\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(q+r+2), \frac{i\left(2\sqrt{z}\,c+2\,b\,k-b\,m+i\,p\right)^2}{4\,c}\right)\Bigg)\Bigg)+$$

$$e^{\frac{(8\,b\,k-4\,b\,m+5\,i\,p)\,p}{4\,c}}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,(-2\,b\,i\,k+i\,b\,m+p)^{2\,n-q-r}\left(-2\,i\,b\,k+i\,b\,m+p+2\,i\,c\sqrt{z}\right)^{q+r}$$

$$\left(-\frac{i\left(2\sqrt{z}\,c-2\,b\,k+b\,m-i\,p\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}\binom{n}{r}\binom{r}{q}\Bigg((-2\,b\,i\,k+i\,b\,m+p)$$

$$\left(-2\,i\,b\,k+i\,b\,m+p+2\,i\,c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1), -\frac{i\left(2\sqrt{z}\,c-2\,b\,k+b\,m-i\,p\right)^2}{4\,c}\right)+$$

$$2\sqrt{-\frac{i\left(2\sqrt{z}\,c-2\,b\,k+b\,m-i\,p\right)^2}{c}}\;c\,i\,\Gamma\Bigg(\frac{1}{2}(q+r+2),$$

$$-\frac{i\left(2\sqrt{z}\,c-2\,b\,k+b\,m-i\,p\right)^2}{4\,c}\Bigg)\Bigg)+e^{\frac{5\,i\,p^2}{4\,c}+i\,m\,\pi}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,(2\,i\,b\,k-i\,b\,m+p)^{2\,n-q-r}$$

$$\left(-\frac{i\left(-2\sqrt{z}\,c-2\,b\,k+b\,m+i\,p\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}\left(2\,i\,b\,k-i\,b\,m+p+2\,i\,c\sqrt{z}\right)^{q+r}$$

$$\binom{n}{r}\binom{r}{q}\left((2\,i\,b\,k-i\,b\,m+p)\left(2\,i\,b\,k-i\,b\,m+p+2\,i\,c\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\right.\right.$$

$$\left.-\frac{i\left(-2\sqrt{z}\;c-2\,b\,k+b\,m+i\,p\right)^2}{4\,c}\right)+2\sqrt{-\frac{i\left(-2\sqrt{z}\;c-2\,b\,k+b\,m+i\,p\right)^2}{c}}$$

$$\left.\left.c\,i\,\Gamma\left(\frac{1}{2}(q+r+2),\,-\frac{i\left(-2\sqrt{z}\;c-2\,b\,k+b\,m+i\,p\right)^2}{4\,c}\right)\right)\right)\Bigg)\Bigg)\Bigg)\;/;\;m\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\, e^{p\,z^r}\,\sin^m(b\,z)\cos(c\,z)$

01.07.21.1008.01

$$\int z^n e^{p z^2} \sin^m(b z)\cos(c z)\,dz = \frac{1}{\sqrt{p}}\Bigg(2^{-m-2}\Bigg(e^{\frac{c^2}{4p}}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{q=0}^{n} 2^{q-n}(i c)^{n-q} p^{-n-\frac{1}{2}}\left(\frac{(c+2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(-i c+2 p z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(c+2 i p z)^2}{4p}\right)+$$

$$e^{\frac{c^2}{4p}}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{q=0}^{n} 2^{q-n}(-i c)^{n-q} p^{-n-\frac{1}{2}}\left(\frac{(c-2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(i c+2 p z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(c-2 i p z)^2}{4p}\right)-$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{\frac{c^2+b^2(m-2k)^2-i m p \pi}{2p}}\binom{m}{k}\Bigg(e^{i m \pi-\frac{(c+2bk-bm)^2}{4p}}\sum_{q=0}^{n} 2^{q-n}(i(c-2bk+bm))^{n-q} p^{-n-\frac{1}{2}}(-i(c-2bk+bm+2 i p$$

$$z))^{q+1}\left(\frac{(c-2bk+bm+2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(c-2bk+bm+2 i p z)^2}{4p}\right)+$$

$$e^{-\frac{(c-2bk+bm)^2}{4p}}\sum_{q=0}^{n} 2^{q-n}(i(c+2bk-bm))^{n-q} p^{-n-\frac{1}{2}}(-i(c+2bk-bm+2 i p z))^{q+1}$$

$$\left(\frac{(c+2bk-bm+2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(c+2bk-bm+2 i p z)^2}{4p}\right)+$$

$$e^{-\frac{(c+2bk-bm)^2}{4p}}\sum_{q=0}^{n} 2^{q-n}(-i(c-2bk+bm))^{n-q} p^{-n-\frac{1}{2}}(i(c-2bk+bm-2 i p z))^{q+1}$$

$$\left(\frac{(c-2bk+bm-2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(c-2bk+bm-2 i p z)^2}{4p}\right)+$$

$$e^{i m \pi-\frac{(c-2bk+bm)^2}{4p}}\sum_{q=0}^{n} 2^{q-n}(-i(c+2bk-bm))^{n-q} p^{-n-\frac{1}{2}}(i(c+2bk-bm-2 i p z))^{q+1}$$

$$\left(\frac{(c+2bk-bm-2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(c+2bk-bm-2 i p z)^2}{4p}\right)\Bigg)\Bigg)\Bigg) /;\ m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.07.21.1009.01

$$\int z^n e^{p\sqrt{z}} \sin^m(b z)\cos(c z)\,dz =$$

$$\frac{1}{c^2}\Bigg((-i)^m 2^{-m-2n-2}(i c)^{-2n} e^{-\frac{i p^2}{4c}}\Bigg(i^m e^{\frac{i p^2}{2c}}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q} 4^r p^{2n-q-r}\left(p+2 i c\sqrt{z}\right)^{q+r}$$

$$\left(\frac{i\left(p+2\,i\,c\,\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}\binom{n}{r}\binom{r}{q}\left(p\left(p+2\,i\,c\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{i\left(p+2\,i\,c\,\sqrt{z}\right)^2}{4\,c}\right)+\right.$$

$$\left.\left.2\sqrt{\frac{i\left(p+2\,i\,c\,\sqrt{z}\right)^2}{c}}\;c\,i\,\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{i\left(p+2\,i\,c\,\sqrt{z}\right)^2}{4\,c}\right)\right)\right)+i^m\binom{m}{\frac{m}{2}}(m\bmod 2-1)$$

$$\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,p^{2n-q-r}\left(p-2\,i\,c\,\sqrt{z}\right)^{q+r}\left(\frac{i\left(2\sqrt{z}\;c+i\,p\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}\binom{n}{r}\binom{r}{q}\left(p\left(p-2\,i\,c\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\left.\frac{1}{2}(q+r+1),\,\frac{i\left(2\sqrt{z}\;c+i\,p\right)^2}{4\,c}\right)-2\,i\,c\sqrt{\frac{i\left(2\sqrt{z}\;c+i\,p\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{i\left(2\sqrt{z}\;c+i\,p\right)^2}{4\,c}\right)\right)+$$

$$(i\,c)^{2n}\,c^2\,e^{\frac{i\,p^2}{4\,c}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{i\,p^2}{4(c-2\,b\,k+b\,m)}}\left((c-2\,b\,k+b\,m)^2\right)^{-2n-1}\left(-e^{\frac{i\,p^2}{2(c-2\,b\,k+b\,m)}}\left(\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\right.\right.\right.$$

$$p^{2n-q-r}\left(2\,i\sqrt{z}\;(c-2\,b\,k+b\,m)+p\right)^{q+r}\left(\frac{i\left(2\,i\sqrt{z}\;(c-2\,b\,k+b\,m)+p\right)^2}{c-2\,b\,k+b\,m}\right)^{\frac{1}{2}(-q-r-1)}\binom{n}{r}$$

$$\binom{r}{q}\left(p\left(2\,i\sqrt{z}\;(c-2\,b\,k+b\,m)+p\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{i\left(2\,i\sqrt{z}\;(c-2\,b\,k+b\,m)+p\right)^2}{4\,(c-2\,b\,k+b\,m)}\right)+\right.$$

$$2\,i\sqrt{\frac{i\left(2\,i\sqrt{z}\;(c-2\,b\,k+b\,m)+p\right)^2}{c-2\,b\,k+b\,m}}\;(c-2\,b\,k+b\,m)$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{i\left(2\,i\sqrt{z}\;(c-2\,b\,k+b\,m)+p\right)^2}{4\,(c-2\,b\,k+b\,m)}\right)\right)\right)\right)$$

$$(-i\,(c-2\,b\,k+b\,m))^{2n}-e^{i\,m\,\pi}\,(i\,(c-2\,b\,k+b\,m))^{2n}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,p^{2n-q-r}$$

$$\left(p-2\,i\,(c-2\,b\,k+b\,m)\sqrt{z}\right)^{q+r}\left(\frac{i\left(2\sqrt{z}\;(c-2\,b\,k+b\,m)+i\,p\right)^2}{c-2\,b\,k+b\,m}\right)^{\frac{1}{2}(-q-r-1)}\binom{n}{r}\binom{r}{q}$$

$$\left(p\left(p-2\,i\,(c-2\,b\,k+b\,m)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(q+r+1),\,\frac{i\left(2\sqrt{z}\,(c-2\,b\,k+b\,m)+i\,p\right)^2}{4\,(c-2\,b\,k+b\,m)}\right)-\right.$$

$$2\,i\,(c-2\,b\,k+b\,m)\sqrt{\frac{i\left(2\sqrt{z}\,(c-2\,b\,k+b\,m)+i\,p\right)^2}{c-2\,b\,k+b\,m}}$$

$$\left.\left.\left.\Gamma\!\left(\frac{1}{2}(q+r+2),\,\frac{i\left(2\sqrt{z}\,(c-2\,b\,k+b\,m)+i\,p\right)^2}{4\,(c-2\,b\,k+b\,m)}\right)\right)\right)\right)-$$

$$\frac{1}{(c+2\,b\,k-b\,m)^2}\left(e^{i\left(\frac{p^2}{4c+8bk-4bm}+m\pi\right)}(i\,(c+2\,b\,k-b\,m))^{-2n}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,p^{2n-q-r}\right.$$

$$\left(2\,i\sqrt{z}\,(c+2\,b\,k-b\,m)+p\right)^{q+r}\left(\frac{i\left(2\,i\sqrt{z}\,(c+2\,b\,k-b\,m)+p\right)^2}{c+2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-r-1)}\binom{n}{r}\binom{r}{q}$$

$$\left(p\left(2\,i\sqrt{z}\,(c+2\,b\,k-b\,m)+p\right)\Gamma\!\left(\frac{1}{2}(q+r+1),\,\frac{i\left(2\,i\sqrt{z}\,(c+2\,b\,k-b\,m)+p\right)^2}{4\,(c+2\,b\,k-b\,m)}\right)+\right.$$

$$2\,i\sqrt{\frac{i\left(2\,i\sqrt{z}\,(c+2\,b\,k-b\,m)+p\right)^2}{c+2\,b\,k-b\,m}}\,(c+2\,b\,k-b\,m)$$

$$\left.\left.\left.\Gamma\!\left(\frac{1}{2}(q+r+2),\,\frac{i\left(2\,i\sqrt{z}\,(c+2\,b\,k-b\,m)+p\right)^2}{4\,(c+2\,b\,k-b\,m)}\right)\right)\right)\right)-$$

$$\frac{1}{(c+2\,b\,k-b\,m)^2}\left(e^{\frac{i\,p^2}{-4c-8bk+4bm}}\,(-i\,(c+2\,b\,k-b\,m))^{-2n}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,p^{2n-q-r}\right.$$

$$\left(p-2\,i\,(c+2\,b\,k-b\,m)\sqrt{z}\right)^{q+r}\left(\frac{i\left(2\sqrt{z}\,(c+2\,b\,k-b\,m)+i\,p\right)^2}{c+2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-r-1)}\binom{n}{r}\binom{r}{q}$$

$$\left(p\left(p-2\,i\,(c+2\,b\,k-b\,m)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(q+r+1),\ \frac{i\left(2\sqrt{z}\ (c+2\,b\,k-b\,m)+i\,p\right)^2}{4\,(c+2\,b\,k-b\,m)}\right)-\right.$$

$$2\,i\,(c+2\,b\,k-b\,m)\sqrt{\frac{i\left(2\sqrt{z}\ (c+2\,b\,k-b\,m)+i\,p\right)^2}{c+2\,b\,k-b\,m}}$$

$$\left.\Gamma\left(\frac{1}{2}\,(q+r+2),\ \frac{i\left(2\sqrt{z}\ (c+2\,b\,k-b\,m)+i\,p\right)^2}{4\,(c+2\,b\,k-b\,m)}\right)\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\ /;\ m\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\,\sin^m\!\left(b\,z^r\right)\cos(c\,z)$

01.07.21.1010.01

$$\int z^n e^{p z} \sin^m(b z^2) \cos(c z) \, dz = 2^{-m-2}$$

$$\left(\left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-\frac{1}{\sqrt{i b (2k-m)}} \left(e^{i\left(\frac{(i c+p)^2}{b(8k-4m)}+m\pi\right)} \sum_{q=0}^{n} 2^{q-n} (i b (2k-m))^{-n-\frac{1}{2}} (-i c-p)^{n-q} (i c+p+2 i b (2k-m) z)^{q+1} \right.\right.\right.\right.$$

$$\left(-\frac{i (c-i p+4 b k z-2 b m z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c-i p+4 b k z-2 b m z)^2}{b(8k-4m)}\right)\Bigg) -$$

$$\frac{1}{\sqrt{i b (2k-m)}} \left(e^{i\left(m\pi-\frac{(c+i p)^2}{b(8k-4m)}\right)} \sum_{q=0}^{n} 2^{q-n} (i b (2k-m))^{-n-\frac{1}{2}} (i c-p)^{n-q} (-i c+p+2 i b (2k-m) z)^{q+1} \right.$$

$$\left(-\frac{i (c+i p+2 b (m-2k) z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c+i p+2 b (m-2k) z)^2}{b(8k-4m)}\right)\Bigg) -$$

$$\frac{1}{\sqrt{i b (m-2k)}} \left(e^{\frac{i (i c+p)^2}{4 b (m-2k)}} \sum_{q=0}^{n} 2^{q-n} (i b (m-2k))^{-n-\frac{1}{2}} (-i c-p)^{n-q} (i c+p+2 i b (m-2k) z)^{q+1} \right.$$

$$\left(\frac{i (i c+p+2 i b (m-2k) z)^2}{b(m-2k)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c-i p+2 b (m-2k) z)^2}{b(8k-4m)}\right)\Bigg) -$$

$$\frac{1}{\sqrt{i b (m-2k)}} \left(e^{\frac{i (c+i p)^2}{b(8k-4m)}} \sum_{q=0}^{n} 2^{q-n} (i b (m-2k))^{-n-\frac{1}{2}} (i c-p)^{n-q} \left(\frac{i (c+i p+4 b k z-2 b m z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \right.$$

$$\left.\left.\left.\left.(-i c+p+2 i b (m-2k) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c+i p+4 b k z-2 b m z)^2}{b(8k-4m)}\right)\right)\right)\right) (-i)^m +$$

$$2 z^n \binom{m}{\frac{m}{2}} \left(\frac{((-i c-p) z)^{-n} \Gamma(n+1, -i c z-p z)}{i c+p} - z (i (c+i p) z)^{-n-1} \Gamma(n+1, i c z-p z)\right)$$

$$\left.(1 - m \bmod 2)\right) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.07.21.1011.01

$$\int z^n e^{p z} \sin^m\left(b \sqrt{z}\right) \cos(c z) \, dz = 2^{-m-2}$$

$$\left((-i)^m 4^{-n} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i b^2 (m-2k)^2}{4(c+i p)}} \left(\sum_{r=0}^{n} \sum_{q=0}^{r} (-1)^{r-q} 4^r (i b (m-2k))^{2n-q-r} \left(\frac{i \left(b(2k-m)+2(c+i p)\sqrt{z}\right)^2}{c+i p}\right)^{\frac{1}{2}(-q-r-1)}\right.\right.\right.$$

$$\left(b\,i\,(m-2\,k)+2\,(-i\,c+p)\,\sqrt{z}\right)^{q+r}\binom{n}{r}\binom{r}{q}\left(b\,i\,(m-2\,k)\left(b\,i\,(m-2\,k)+2\,(-i\,c+p)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(q+r+1),\ \frac{i\left(b\,(2\,k-m)+2\,(c+i\,p)\,\sqrt{z}\right)^2}{4\,(c+i\,p)}\right)+2\,(-i\,c+p)$$

$$\left.\left.\sqrt{\frac{i\left(b\,(2\,k-m)+2\,(c+i\,p)\,\sqrt{z}\right)^2}{c+i\,p}}\ \Gamma\left(\frac{1}{2}(q+r+2),\ \frac{i\left(b\,(2\,k-m)+2\,(c+i\,p)\,\sqrt{z}\right)^2}{4\,(c+i\,p)}\right)\right)\right)$$

$$(-i\,c+p)^{-2\,(n+1)}+e^{\frac{b^2\,(m-2\,k)^2}{4\,(i\,c+p)}}\,(i\,c+p)^{-2\,(n+1)}\left(e^{i\,m\,\pi}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,(i\,b\,(2\,k-m))^{2\,n-q-r}\right.$$

$$\left(\frac{\left(b\,(2\,k-m)+2\,(c-i\,p)\,\sqrt{z}\right)^2}{i\,c+p}\right)^{\frac{1}{2}(-q-r-1)}\left(b\,i\,(2\,k-m)+2\,(i\,c+p)\,\sqrt{z}\right)^{q+r}$$

$$\binom{n}{r}\binom{r}{q}\left(2\,(i\,c+p)\,\sqrt{\frac{\left(b\,(2\,k-m)+2\,(c-i\,p)\,\sqrt{z}\right)^2}{i\,c+p}}\right.$$

$$\Gamma\left(\frac{1}{2}(q+r+2),\ \frac{\left(b\,(2\,k-m)+2\,(c-i\,p)\,\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)-i\,b\,(m-2\,k)$$

$$\left.\left(b\,i\,(2\,k-m)+2\,(i\,c+p)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\ \frac{\left(b\,(2\,k-m)+2\,(c-i\,p)\,\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)\right)+$$

$$\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,(i\,b\,(m-2\,k))^{2\,n-q-r}\left(\frac{\left(b\,(2\,k-m)-2\,(c-i\,p)\,\sqrt{z}\right)^2}{i\,c+p}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\left(b\,i\,(m-2\,k)+2\,(i\,c+p)\,\sqrt{z}\right)^{q+r}\binom{n}{r}\binom{r}{q}\left(b\,i\,(m-2\,k)\left(b\,i\,(m-2\,k)+2\,(i\,c+p)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(q+r+1), -\frac{\left(b\,i\,(m-2k)+2\,(i\,c+p)\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)+2\sqrt{\frac{\left(b\,(2k-m)-2\,(c-i\,p)\sqrt{z}\right)^2}{i\,c+p}}$$

$$(i\,c+p)\,\Gamma\left(\frac{1}{2}(q+r+2), -\frac{\left(b\,i\,(m-2k)+2\,(i\,c+p)\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)\Bigg)\Bigg)\Bigg)-$$

$$\frac{1}{(c+i\,p)^2}\Bigg(e^{\frac{1}{4}i\left(\frac{b^2(m-2k)^2}{c+i\,p}+4\,m\,\pi\right)}(-i\,c+p)^{-2n}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,(i\,b\,(2k-m))^{2n-q-r}$$

$$\left(\frac{i\left(b\,(m-2k)+2\,(c+i\,p)\sqrt{z}\right)^2}{c+i\,p}\right)^{\frac{1}{2}(-q-r-1)}\left(b\,i\,(2k-m)+2\,(-i\,c+p)\sqrt{z}\right)^{q+r}$$

$$\binom{n}{r}\binom{r}{q}\Bigg(2\,(-i\,c+p)\sqrt{\frac{i\left(b\,(m-2k)+2\,(c+i\,p)\sqrt{z}\right)^2}{c+i\,p}}$$

$$\Gamma\left(\frac{1}{2}(q+r+2), \frac{i\left(b\,(m-2k)+2\,(c+i\,p)\sqrt{z}\right)^2}{4\,(c+i\,p)}\right)-i\,b\,(m-2k)$$

$$\left(b\,i\,(2k-m)+2\,(-i\,c+p)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1), \frac{i\left(b\,(m-2k)+2\,(c+i\,p)\sqrt{z}\right)^2}{4\,(c+i\,p)}\right)\Bigg)\Bigg)\Bigg)\Bigg)-$$

$$2\binom{m}{\frac{m}{2}}\left(\Gamma(n+1, -i\,c\,z-p\,z)\,(-i\,c-p)^{-n-1}+(i\,c-p)^{-n-1}\,\Gamma(n+1, i\,c\,z-p\,z)\right)$$

$$(1-$$

$$m \bmod 2)\Bigg)\,/;\, m\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\, e^{p\,z}\sin^m(b\,z)\cos(c\,z^r)$

01.07.21.1012.01

$$\int z^n e^{p z} \sin^m(b z) \cos\left(c z^2\right) dz = 2^{-m-2} e^{-\frac{i p^2}{4 c}} \left(-2^{-n-1} i e^{\frac{i p^2}{4 c}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{i\left(b^2 (m-2k)^2+4 p^2-2 i b (2k-m) p+2 c m \pi\right)}{4 c}} \binom{m}{k} \left(-2^n e^{\frac{(8 b k-4 b m+5 i p) p}{4 c}} \left(\sum_{q=0}^{n} 2^{-q} \left(i b \left(k-\frac{m}{2}\right)-\frac{p}{2}\right)^{n-q} (b i (m-2k)+p+2 i c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(\frac{i (b i (m-2k)+p+2 i c z)^2}{4 c}\right)\right) (-i c)^n + (i c)^n e^{\frac{i\left(2 b^2 (m-2k)^2+3 p^2\right)}{4 c}} \left(e^{i \pi m+\frac{b (2k-m) p}{c}} \sum_{q=0}^{n} (i b (m-2k)-p)^{n-q} (2 i b k-i b m+p-2 i c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(\frac{i (-2 b k+b m+i p+2 c z)^2}{4 c}\right) + 2^n \sum_{q=0}^{n} 2^{-q} \left(i b \left(k-\frac{m}{2}\right)-\frac{p}{2}\right)^{n-q} (b i (m-2k)+p-2 i c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(\frac{i (2 b k-b m+i p+2 c z)^2}{4 c}\right)\right) - (-i c)^n e^{\frac{5 i p^2}{4 c}+i m \pi} \sum_{q=0}^{n} (i b (m-2k)-p)^{n-q} (2 i b k-i b m+p+2 i c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(-\frac{i (-2 b k+b m+i p-2 c z)^2}{4 c}\right)\right)\right) c^{-2n-1} + 4 \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{q=0}^{n} 2^{-n+q-2} (-i c)^{-n-1} (-p)^{n-q} (p-2 i c z)^{q+1} \left(\frac{i (i p+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (i p+2 c z)^2}{4 c}\right) + 4 e^{\frac{i p^2}{2 c}} \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{q=0}^{n} 2^{-n+q-2} (i c)^{-n-1} (-p)^{n-q} (p+2 i c z)^{q+1} \left(\frac{i (p+2 i c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (p+2 i c z)^2}{4 c}\right)\right) /; m \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

01.07.21.1013.01

$$\int z^n e^{p z} \sin^m(b z) \cos\left(c \sqrt{z}\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(e^{\frac{c^2}{4 p}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-i c)^{-h-i+2n} \left(-i c+2 p \sqrt{z}\right)^{h+i} \left(-\frac{\left(-i c+2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i} \left(2 p \sqrt{-\frac{\left(-i c+2 p \sqrt{z}\right)^2}{p}} \Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(-i c+2 p \sqrt{z}\right)^2}{4 p}\right) - \right.\right.$$

$$i\,c\left(-i\,c+2\,p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(-i\,c+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)+$$

$$e^{\frac{c^2}{4p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,c)^{-h-i+2n}\left(i\,c+2\,p\,\sqrt{z}\right)^{h+i}\left(-\frac{\left(i\,c+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg(c\,i\left(i\,c+2\,p\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(i\,c+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\,\sqrt{-\frac{\left(i\,c+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(i\,c+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)\Bigg)$$

$$p^{-2(n+1)}+2^{-m-2n-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{\frac{c^2}{4(p-i\,b\,(m-2k))}+\frac{i\,m\,\pi}{2}}\Bigg(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,c)^{-h-i+2n}\left(-i\,c+2\,(p-i\,b\,(m-2\,k))\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(-i\,c+2\,(p-i\,b\,(m-2\,k))\,\sqrt{z}\right)^2}{p-i\,b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg(2\,(p-i\,b\,(m-2\,k))$$

$$\sqrt{-\frac{\left(-i\,c+2\,(p-i\,b\,(m-2\,k))\,\sqrt{z}\right)^2}{p-i\,b\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(-i\,c+2\,(p-i\,b\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(p-i\,b\,(m-2\,k))}\right)-i$$

$$c\left(-i\,c+2\,(p-i\,b\,(m-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(-i\,c+2\,(p-i\,b\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(p-i\,b\,(m-2\,k))}\right)\Bigg)\Bigg)$$

$$(p-i\,b\,(m-2\,k))^{-2(n+1)}+e^{\frac{c^2}{4(p-i\,b\,(m-2k))}+\frac{i\,m\,\pi}{2}}\Bigg(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,c)^{-h-i+2n}\left(i\,c+2\,(p-i\,b\,(m-2\,k))\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(i\,c+2\,(p-i\,b\,(m-2\,k))\,\sqrt{z}\right)^2}{p-i\,b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg(c\,i\left(i\,c+2\,(p-i\,b\,(m-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(i\,c+2\,(p-i\,b\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(p-i\,b\,(m-2\,k))}\right)+2\,\sqrt{-\frac{\left(i\,c+2\,(p-i\,b\,(m-2\,k))\,\sqrt{z}\right)^2}{p-i\,b\,(m-2\,k)}}$$

$$(p - i\, b\, (m - 2\, k))\, \Gamma\!\left(\frac{1}{2}\, (h + i + 2),\, -\frac{\left(i\, c + 2\, (p - i\, b\, (m - 2\, k))\, \sqrt{z}\right)^2}{4\, (p - i\, b\, (m - 2\, k))}\right)\Bigg)\Bigg)\, (p - i\, b\, (m - 2\, k))^{-2\, (n+1)} +$$

$$e^{\frac{c^2}{4\, (b\, i\, (m-2\, k)+p)} - \frac{i\, m\, \pi}{2}}\, (b\, i\, (m - 2\, k) + p)^{-2\, (n+1)} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h}\, 4^i\, (-i\, c)^{-h-i+2\, n} \left(-i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(-i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right)^2}{b\, i\, (m - 2\, k) + p}\right)^{\frac{1}{2}\, (-h-i-1)} \binom{i}{h} \binom{n}{i} \Bigg(2\, (b\, i\, (m - 2\, k) + p)$$

$$\sqrt{-\frac{\left(-i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right)^2}{b\, i\, (m - 2\, k) + p}}\; \Gamma\!\left(\frac{1}{2}\, (h + i + 2),\, -\frac{\left(-i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right)^2}{4\, (b\, i\, (m - 2\, k) + p)}\right) -$$

$$i\, c \left(-i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}\, (h + i + 1),\, -\frac{\left(-i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right)^2}{4\, (b\, i\, (m - 2\, k) + p)}\right)\Bigg) +$$

$$e^{\frac{c^2}{4\, (b\, i\, (m-2\, k)+p)} - \frac{i\, m\, \pi}{2}}\, (b\, i\, (m - 2\, k) + p)^{-2\, (n+1)} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h}\, 4^i\, (i\, c)^{-h-i+2\, n} \left(i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right)^2}{b\, i\, (m - 2\, k) + p}\right)^{\frac{1}{2}\, (-h-i-1)} \binom{i}{h} \binom{n}{i} \Bigg(c\, i \left(i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right) \Gamma\Bigg($$

$$\frac{1}{2}\, (h + i + 1),\, -\frac{\left(i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right)^2}{4\, (b\, i\, (m - 2\, k) + p)}\Bigg) + 2 \sqrt{-\frac{\left(i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right)^2}{b\, i\, (m - 2\, k) + p}}$$

$$(b\, i\, (m - 2\, k) + p)\, \Gamma\!\left(\frac{1}{2}\, (h + i + 2),\, -\frac{\left(i\, c + 2\, (b\, i\, (m - 2\, k) + p)\, \sqrt{z}\right)^2}{4\, (b\, i\, (m - 2\, k) + p)}\right)\Bigg)\Bigg) \;/;\; m \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

Involving $z^n\, e^{p\, z^r}\, \sin^m(b\, z)\, \cos(c\, z^r)$

01.07.21.1014.01

$$\int z^n e^{p z^2} \sin^m(b z) \cos\left(c z^2\right) dz ==$$

$$2^{-m-2} \Bigg(z^{n+1} \binom{m}{\frac{m}{2}} \bigg(-\Big((-i c - p) z^2\Big)^{\frac{1}{2}(-n-1)} \Gamma\bigg(\frac{n+1}{2}, (-i c - p) z^2\bigg) - \Big(i (c + i p) z^2\Big)^{\frac{1}{2}(-n-1)} \Gamma\bigg(\frac{n+1}{2}, i (c + i p) z^2\bigg)\bigg)$$

$$(1 - m \bmod 2) - (-i)^m \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{-i c + p}\, \sqrt{i c + p}} \Bigg((-1)^k e^{\frac{b^2 (m-2k)^2}{4 (i c + p)}} \binom{m}{k}$$

$$\Bigg(e^{i m \pi} \sqrt{-i c + p} \sum_{q=0}^{n} 2^{q-n} (i b (m - 2 k))^{n-q} (i c + p)^{-n-\frac{1}{2}} \left(\frac{(-2 b k + b m - 2 c z + 2 i p z)^2}{i c + p}\right)^{\frac{1}{2}(-q-1)}$$

$$(2 i b k - i b m + 2 i c z + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(-2 b k + b m - 2 c z + 2 i p z)^2}{4 (i c + p)}\right) +$$

$$\sqrt{-i c + p} \sum_{q=0}^{n} \left(i b \left(k - \frac{m}{2}\right)\right)^{n-q} (i c + p)^{-n-\frac{1}{2}} \left(\frac{(-2 b k + b m + 2 c z - 2 i p z)^2}{i c + p}\right)^{\frac{1}{2}(-q-1)}$$

$$(b i (m - 2 k) + 2 (i c + p) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b i (m - 2 k) + 2 (i c + p) z)^2}{4 (i c + p)}\right) + e^{\frac{i b^2 c (m-2k)^2}{2\left(c^2+p^2\right)}}$$

$$\sqrt{i c + p} \sum_{q=0}^{n} \left(i b \left(k - \frac{m}{2}\right)\right)^{n-q} (-i c + p)^{-n-\frac{1}{2}} \left(\frac{i (2 b k - b m + 2 c z + 2 i p z)^2}{c + i p}\right)^{\frac{1}{2}(-q-1)} (-2 b i k + i b m -$$

$$2 i c z + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2 b k - b m + 2 c z + 2 i p z)^2}{4 (c + i p)}\right) + e^{\frac{1}{2} i \left(\frac{b^2 c (m-2k)^2}{c^2+p^2} + 2 m \pi\right)}$$

$$\sqrt{i c + p} \sum_{q=0}^{n} 2^{q-n} (i b (m - 2 k))^{n-q} (-i c + p)^{-n-\frac{1}{2}} \left(\frac{i (b (m - 2 k) + 2 (c + i p) z)^2}{c + i p}\right)^{\frac{1}{2}(-q-1)}$$

$$(b i (2 k - m) + 2 (-i c + p) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (b (m - 2 k) + 2 (c + i p) z)^2}{4 (c + i p)}\right) \Bigg)\Bigg)\Bigg) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.07.21.1015.01

$$\int z^n e^{p \sqrt{z}} \sin^m(b z) \cos\left(c \sqrt{z}\right) dz ==$$

$$2^{-m-2n-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Bigg(e^{\frac{i m \pi}{2} - \frac{i (-i c + p)^2}{4 b (m - 2 k)}} \Bigg(\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-i c + p)^{-h-i+2n} \left(-i c + p - 2 i b (m - 2 k) \sqrt{z}\right)^{h+i}$$

$$\left(-\frac{i\left(-i\,c+p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}\binom{n}{i}\Bigg((-i\,c+p)\left(-i\,c+p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{i\left(-i\,c+p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)-2\,i\,b\,(m-2\,k)$$

$$\sqrt{-\frac{i\left(-i\,c+p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{b\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{i\left(-i\,c+p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)\Bigg)\Bigg)$$

$$(-i\,b\,(m-2\,k))^{-2\,(n+1)}+e^{\frac{i\,m\,\pi}{2}-\frac{i\,(i\,c+p)^2}{4\,b\,(m-2\,k)}}\Bigg(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,c+p)^{-h-i+2\,n}\left(i\,c+p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{i\left(i\,c+p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}\binom{n}{i}\Bigg((i\,c+p)\left(i\,c+p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{i\left(i\,c+p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)-2\,i\,b\,(m-2\,k)$$

$$\sqrt{-\frac{i\left(i\,c+p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{b\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{i\left(i\,c+p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)\Bigg)\Bigg)$$

$$(-i\,b\,(m-2\,k))^{-2\,(n+1)}+e^{\frac{i\,(-i\,c+p)^2}{4\,b\,(m-2\,k)}-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2\,k))^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,c+p)^{-h-i+2\,n}$$

$$\left(-i\,c+p+2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^{h+i}\left(\frac{i\left(-i\,c+p+2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((-i\,c+p)\left(-i\,c+p+2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,\frac{i\left(-i\,c+p+2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)+2\,b\,i\,(m-$$

$$2\,k)\sqrt{\frac{i\left(-i\,c+p+2\,i\,b\,(m-2\,k)\sqrt{z}\right)^2}{b\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,\frac{i\left(-i\,c+p+2\,i\,b\,(m-2\,k)\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,(i\,c+p)^2}{4\,b\,(m-2\,k)}-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2\,k))^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,c+p)^{-h-i+2\,n}\left(i\,c+p+2\,i\,b\,(m-2\,k)\sqrt{z}\right)^{h+i}$$

$$\left(\frac{i\left(i\,c+p+2\,i\,b\,(m-2\,k)\sqrt{z}\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg(\left(i\,c+p\right)\left(i\,c+p+2\,i\,b\,(m-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,\frac{i\left(i\,c+p+2\,i\,b\,(m-2\,k)\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)+2\,b\,i\,(m-2\,k)$$

$$\sqrt{\frac{i\left(i\,c+p+2\,i\,b\,(m-2\,k)\sqrt{z}\right)^2}{b\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,\frac{i\left(i\,c+p+2\,i\,b\,(m-2\,k)\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)\Bigg)\Bigg)\Bigg)-$$

$$2^{-m}\binom{m}{\frac{m}{2}}\left(\Gamma\!\left(2\,(n+1),\,(-i\,c-p)\sqrt{z}\right)(-i\,c-p)^{-2\,(n+1)}+(i\,c-p)^{-2\,(n+1)}\,\Gamma\!\left(2\,(n+1),\,(i\,c-p)\sqrt{z}\right)\right)$$

$$(1-m\bmod 2)\;/;\;m\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\,\sin^m(b\,z^r)\cos(c\,z^r)$

01.07.21.1016.01

$$\int z^n\,e^{p\,z}\,\sin^m(b\,z^2)\cos(c\,z^2)\,dz=2^{-m-2}\Bigg((-i\,c)^{-n-1}\,e^{\frac{i\,p^2}{4\,c}}\binom{m}{\frac{m}{2}}(m\bmod 2-1)$$

$$\Bigg(e^{-\frac{i\,p^2}{2\,c}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(p-2\,i\,c\,z)^{q+1}\left(\frac{i\,(i\,p+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(i\,p+2\,c\,z)^2}{4\,c}\right)-$$

$$(-1)^n\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(p+2\,i\,c\,z)^{q+1}\left(\frac{i\,(p+2\,i\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(p+2\,i\,c\,z)^2}{4\,c}\right)\Bigg)-$$

$$(-i)^m\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\Bigg((-1)^k\,e^{\frac{i\,c\,p^2}{2\,(c+2\,b\,k-b\,m)\,(c+b\,(m-2\,k))}}\binom{m}{k}\Bigg(\sqrt{(c+2\,b\,k-b\,m)^2}\;\Bigg(e^{\frac{1}{2}\,i\left(\left(\frac{1}{-2\,c-4\,b\,k+2\,b\,m}-\frac{1}{c-2\,b\,k+b\,m}\right)p^2+2\,m\,\pi\right)}$$

$$\sqrt{i\,(c-2\,b\,k+b\,m)}\;\sum_{q=0}^{n}2^{q-n}\,(-i\,(c-2\,b\,k+b\,m))^{-n-\frac{1}{2}}\,(-p)^{n-q}\,(p-2\,i\,(c-2\,b\,k+b\,m)\,z)^{q+1}$$

$$\left(\frac{i\,(i\,p+2\,(c-2\,b\,k+b\,m)\,z)^2}{c-2\,b\,k+b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(i\,p+2\,(c-2\,b\,k+b\,m)\,z)^2}{4\,(c-2\,b\,k+b\,m)}\right)+$$

$$e^{\frac{i\,p^2}{-4\,c-8\,b\,k+4\,b\,m}}\sqrt{-i\,(c-2\,b\,k+b\,m)}\sum_{q=0}^{n}2^{q-n}\,(i\,(c-2\,b\,k+b\,m))^{-n-\frac{1}{2}}\,(-p)^{n-q}$$

$$(p+2\,i\,(c-2\,b\,k+b\,m)\,z)^{q+1}\left(\frac{i\,(p+2\,i\,(c-2\,b\,k+b\,m)\,z)^2}{c-2\,b\,k+b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2},\,\frac{i\,(p+2\,i\,(c-2\,b\,k+b\,m)\,z)^2}{4\,(c-2\,b\,k+b\,m)}\right)\Bigg)+e^{-\frac{i\,(3\,c-2\,b\,k+b\,m)\,p^2}{4\,(c+2\,b\,k-b\,m)\,(c-2\,b\,k+b\,m)}}\sqrt{(c-2\,b\,k+b\,m)^2}$$

$$\sqrt{i\,(c+2\,b\,k-b\,m)}\sum_{q=0}^{n}2^{q-n}\,(-i\,(c+2\,b\,k-b\,m))^{-n-\frac{1}{2}}\,(-p)^{n-q}\,(p-2\,i\,(c+2\,b\,k-b\,m)\,z)^{q+1}$$

$$\left(\frac{i\,(i\,p+2\,(c+2\,b\,k-b\,m)\,z)^2}{c+2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(i\,p+2\,(c+2\,b\,k-b\,m)\,z)^2}{4\,(c+2\,b\,k-b\,m)}\right)+$$

$$e^{i\,m\,\pi-\frac{i\,p^2}{4\,(c-2\,b\,k+b\,m)}}\sqrt{-i\,(c+2\,b\,k-b\,m)}\sqrt{(c+b\,(m-2\,k))^2}$$

$$\sum_{q=0}^{n}2^{q-n}\,(i\,(c+2\,b\,k-b\,m))^{-n-\frac{1}{2}}\,(-p)^{n-q}\,(p+2\,i\,(c+2\,b\,k-b\,m)\,z)^{q+1}$$

$$\left(\frac{i\,(p+2\,i\,(c+2\,b\,k-b\,m)\,z)^2}{c+2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(p+2\,i\,(c+2\,b\,k-b\,m)\,z)^2}{4\,(c+2\,b\,k-b\,m)}\right)\Bigg)\Bigg)\Bigg/$$

$$\left(\sqrt{(c+2\,b\,k-b\,m)^2}\sqrt{(c+b\,(m-2\,k))^2}\right)\Bigg)\,/;\,m\in\mathbb{N}^+\land n\in\mathbb{N}$$

01.07.21.1017.01

$$\int z^n\,e^{p\,z}\sin^m\!\left(b\sqrt{z}\right)\cos\!\left(c\sqrt{z}\right)dz=$$

$$2^{-m-2\,n-2}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(e^{\frac{c^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,c)^{-h-i+2\,n}\left(-i\,c+2\,p\sqrt{z}\right)^{h+i}\left(-\frac{\left(-i\,c+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\right.$$

$$\binom{i}{h}\binom{n}{i}\left(2\,p\sqrt{-\frac{\left(-i\,c+2\,p\sqrt{z}\right)^2}{p}}\;\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(-i\,c+2\,p\sqrt{z}\right)^2}{4\,p}\right)-\right.$$

$$i\, c\left(-i\, c+2\, p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\, -\frac{\left(-i\, c+2\, p\sqrt{z}\right)^2}{4\, p}\right)\Bigg)+$$

$$e^{\frac{c^2}{4p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\, 4^i\, (i\, c)^{-h-i+2n}\left(i\, c+2\, p\sqrt{z}\right)^{h+i}\left(-\frac{\left(i\, c+2\, p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg(c\, i\left(i\, c+2\, p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\, -\frac{\left(i\, c+2\, p\sqrt{z}\right)^2}{4\, p}\right)+$$

$$2\sqrt{-\frac{\left(i\, c+2\, p\sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2}(h+i+2),\, -\frac{\left(i\, c+2\, p\sqrt{z}\right)^2}{4\, p}\right)\Bigg)\Bigg)\Bigg)\, p^{-2(n+1)}+2^{-m-2n-2}$$

$$\Bigg(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{-\frac{(-i\, c+i\, b\,(m-2k))^2}{4p}-\frac{i\, m\, \pi}{2}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\, 4^i\, (-i\, c+i\, b\,(m-2\, k))^{-h-i+2n}\left(-i\, c+i\, b\,(m-2\, k)+2\, p\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(-i\, c+i\, b\,(m-2\, k)+2\, p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((-i\, c+i\, b\,(m-2\, k))$$

$$\left(-i\, c+i\, b\,(m-2\, k)+2\, p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\, -\frac{\left(-i\, c+i\, b\,(m-2\, k)+2\, p\sqrt{z}\right)^2}{4\, p}\right)+2$$

$$\sqrt{-\frac{\left(-i\, c+i\, b\,(m-2\, k)+2\, p\sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2}(h+i+2),\, -\frac{\left(-i\, c+i\, b\,(m-2\, k)+2\, p\sqrt{z}\right)^2}{4\, p}\right)\Bigg)+$$

$$e^{-\frac{(i\, c+i\, b\,(m-2k))^2}{4p}-\frac{i\, m\, \pi}{2}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\, 4^i\, (i\, c+i\, b\,(m-2\, k))^{-h-i+2n}\left(i\, c+i\, b\,(m-2\, k)+2\, p\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(i\, c+i\, b\,(m-2\, k)+2\, p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((i c+i b (m-2 k)) \left(i c+i b (m-2 k)+2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+i+1),-\frac{\left(i c+i b (m-2 k)+2 p \sqrt{z}\right)^2}{4 p}\right)+2 \sqrt{-\frac{\left(i c+i b (m-2 k)+2 p \sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2} (h+i+2),-\frac{\left(i c+i b (m-2 k)+2 p \sqrt{z}\right)^2}{4 p}\right)\right)+$$

$$e^{\frac{i m \pi}{2}-\frac{(-i c-i b (m-2 k))^2}{4 p}} \sum_{i=0}^n \sum_{h=0}^i (-1)^{i-h} 4^i (-i c-i b (m-2 k))^{-h-i+2 n} \left(-i c-i b (m-2 k)+2 p \sqrt{z}\right)^{h+i} \left(-\frac{\left(-i c-i b (m-2 k)+2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2} (-h-i-1)} \binom{i}{h} \binom{n}{i} \left((-i c-i b (m-2 k)) \left(-i c-i b (m-2 k)+2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+i+1),-\frac{\left(-i c-i b (m-2 k)+2 p \sqrt{z}\right)^2}{4 p}\right)+2 \sqrt{-\frac{\left(-i c-i b (m-2 k)+2 p \sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2} (h+i+2),-\frac{\left(-i c-i b (m-2 k)+2 p \sqrt{z}\right)^2}{4 p}\right)\right)+$$

$$e^{\frac{i m \pi}{2}-\frac{(i c-i b (m-2 k))^2}{4 p}} \sum_{i=0}^n \sum_{h=0}^i (-1)^{i-h} 4^i (i c-i b (m-2 k))^{-h-i+2 n} \left(i c-i b (m-2 k)+2 p \sqrt{z}\right)^{h+i} \left(-\frac{\left(i c-i b (m-2 k)+2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2} (-h-i-1)} \binom{i}{h} \binom{n}{i} \left((i c-i b (m-2 k)) \left(i c-i b (m-2 k)+2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+i+1),-\frac{\left(i c-i b (m-2 k)+2 p \sqrt{z}\right)^2}{4 p}\right)+2 \sqrt{-\frac{\left(i c-i b (m-2 k)+2 p \sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2} (h+i+2),-\frac{\left(i c-i b (m-2 k)+2 p \sqrt{z}\right)^2}{4 p}\right)\right)\Bigg)\Bigg)\Bigg) p^{-2 (n+1)} \;/;\; m\in \mathbb{N}^+\land n\in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z^r} \sin^m(b z^r) \cos(c z^r)$

01.07.21.1018.01

$$\int z^{\alpha-1} e^{p z^r} \sin^m(b z^r) \cos(c z^r)\, dz = -\frac{2^{-m-1} z^\alpha}{r} \left(\binom{m}{\frac{m}{2}} \left(\Gamma\left(\frac{\alpha}{r}, (-i c - p) z^r\right) ((-i c - p) z^r)^{-\frac{\alpha}{r}} + (i (c + i p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, i (c + i p) z^r\right) \right) (1 - m \bmod 2) + i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{i m \pi} \Gamma\left(\frac{\alpha}{r}, i (c - 2 b k + b m + i p) z^r\right) (i (c - 2 b k + b m + i p) z^r)^{-\frac{\alpha}{r}} + (i (c + 2 b k - b m + i p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, i (c + 2 b k - b m + i p) z^r\right) + (-i (c - 2 b k + b m - i p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -i (c - 2 b k + b m - i p) z^r\right) + e^{i m \pi} (-i (c + 2 b k - b m - i p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -i (c + 2 b k - b m - i p) z^r\right) \right) \right) /; m \in \mathbb{N}^+$$

01.07.21.1019.01

$$\int z^n e^{p z^2} \sin^m(b z^2) \cos(c z^2)\, dz = -2^{-m-2} \binom{m}{\frac{m}{2}} \left(\Gamma\left(\frac{n+1}{2}, (-i c - p) z^2\right) \left((-i c - p) z^2\right)^{\frac{1}{2}(-n-1)} + \left((i c - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i c - p) z^2\right) \right) (1 - m \bmod 2) z^{n+1} - 2^{-m-2} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i m \pi}{2}} \Gamma\left(\frac{n+1}{2}, (-i c + i b (m - 2k) - p) z^2\right) \left((-i c + i b (m - 2k) - p) z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{i m \pi}{2}} \left((i c + i b (m - 2k) - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i c + i b (m - 2k) - p) z^2\right) + e^{-\frac{1}{2} i m \pi} \left((-i c - i b (m - 2k) - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i c - i b (m - 2k) - p) z^2\right) + e^{-\frac{1}{2} i m \pi} \left((i c - i b (m - 2k) - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i c - i b (m - 2k) - p) z^2\right) \right) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.07.21.1020.01

$$\int z^n e^{p \sqrt{z}} \sin^m\left(b \sqrt{z}\right) \cos\left(c \sqrt{z}\right) dz = -2^{-m} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2 (n+1), (-i c - p) \sqrt{z}\right) (-i c - p)^{-2(n+1)} + (i c - p)^{-2(n+1)} \Gamma\left(2 (n+1), (i c - p) \sqrt{z}\right) \right) (1 - m \bmod 2) - 2^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i m \pi}{2}} \Gamma\left(2 (n+1), (-i c + i b (m - 2k) - p) \sqrt{z}\right) (-i c + i b (m - 2k) - p)^{-2(n+1)} + e^{\frac{i m \pi}{2}} (i c + i b (m - 2k) - p)^{-2(n+1)} \Gamma\left(2 (n+1), (i c + i b (m - 2k) - p) \sqrt{z}\right) + e^{-\frac{1}{2} i m \pi} (-i c - i b (m - 2k) - p)^{-2(n+1)} \Gamma\left(2 (n+1), (-i c - i b (m - 2k) - p) \sqrt{z}\right) + e^{-\frac{1}{2} i m \pi} (i c - i b (m - 2k) - p)^{-2(n+1)} \Gamma\left(2 (n+1), (i c - i b (m - 2k) - p) \sqrt{z}\right) \right) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \sin^m(a z^r + q) \cos(c z^r + g)$

01.07.21.1021.01

$$\int z^{\alpha-1} e^{b z^r+e} \sin^m(a z^r+q) \cos(c z^r+g)\, dz = -\frac{2^{-m-1} z^\alpha}{r} \left(e^{e-i g} \binom{m}{\frac{m}{2}} \left(e^{2 i g} \Gamma\left(\frac{\alpha}{r}, -(b+i c) z^r\right) (-(b+i c) z^r)^{-\frac{\alpha}{r}} + (-(b-i c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -(b-i c) z^r\right)\right) (1-m \bmod 2) + \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{1}{2} i (2 g+2 i e+4 k q+2 m q+m \pi)} \binom{m}{k} \left(e^{2 i (g+m q)} \Gamma\left(\frac{\alpha}{r}, -(b+i (c-2 a k+a m)) z^r\right) (-(b+i (c-2 a k+a m)) z^r)^{-\frac{\alpha}{r}} + e^{i (\pi m+4 k q)} (-(b-i (c-2 a k+a m)) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -(b-i (c-2 a k+a m)) z^r\right) + e^{i (2 g+4 k q+m \pi)} (-(b+i (c+2 a k-a m)) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -(b+i (c+2 a k-a m)) z^r\right) + e^{2 i m q} (-(b-i (c+2 a k-a m)) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -(b-i (c+2 a k-a m)) z^r\right)\right)\right) /; m \in \mathbb{N}^+$$

01.07.21.1022.01

$$\int z^n e^{b z^2+e} \sin^m\left(a z^2+q\right) \cos\left(c z^2+g\right) dz = -2^{-m-2} \binom{m}{\frac{m}{2}} \left(e^{e-i g} \Gamma\left(\frac{n+1}{2}, (i c-b) z^2\right) \left((i c-b) z^2\right)^{\frac{1}{2}(-n-1)} + e^{e+i g} \left((-b-i c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-i c) z^2\right)\right) (1-m \bmod 2) z^{n+1} - 2^{-m-2} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{e-i g-i (m-2 k) q+\frac{i m \pi}{2}} \Gamma\left(\frac{n+1}{2}, (-b+i c+a i (m-2 k)) z^2\right) \left((-b+i c+a i (m-2 k)) z^2\right)^{\frac{1}{2}(-n-1)} + e^{e+i g-i (m-2 k) q+\frac{i m \pi}{2}} \left((-b-i c+a i (m-2 k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-i c+a i (m-2 k)) z^2\right) + e^{e-i g+i (m-2 k) q-\frac{i m \pi}{2}} \left((-b+i c-i a (m-2 k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b+i c-i a (m-2 k)) z^2\right) + e^{e+i g+i (m-2 k) q-\frac{i m \pi}{2}} \left((-b-i c-i a (m-2 k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-i c-i a (m-2 k)) z^2\right)\right) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.07.21.1023.01

$$\int z^n e^{\sqrt{z}\, b+e} \sin^m\left(\sqrt{z}\, a+q\right) \cos\left(\sqrt{z}\, c+g\right) dz = -2^{-m} \binom{m}{\frac{m}{2}} \left(e^{e-i g} \Gamma\left(2 (n+1), (i c-b) \sqrt{z}\right) (i c-b)^{-2 (n+1)} + (-b-i c)^{-2 (n+1)} e^{e+i g} \Gamma\left(2 (n+1), (-b-i c) \sqrt{z}\right)\right) (1-m \bmod 2) - 2^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{e-i g-i (m-2 k) q+\frac{i m \pi}{2}} \Gamma\left(2 (n+1), (-b+i c+a i (m-2 k)) \sqrt{z}\right) (-b+i c+a i (m-2 k))^{-2 (n+1)} + e^{e+i g-i (m-2 k) q+\frac{i m \pi}{2}} (-b-i c+a i (m-2 k))^{-2 (n+1)} \Gamma\left(2 (n+1), (-b-i c+a i (m-2 k)) \sqrt{z}\right) + e^{e-i g+i (m-2 k) q-\frac{i m \pi}{2}} (-b+i c-i a (m-2 k))^{-2 (n+1)} \Gamma\left(2 (n+1), (-b+i c-i a (m-2 k)) \sqrt{z}\right) + e^{e+i g+i (m-2 k) q-\frac{i m \pi}{2}} (-b-i c-i a (m-2 k))^{-2 (n+1)} \Gamma\left(2 (n+1), (-b-i c-i a (m-2 k)) \sqrt{z}\right)\right) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \sin^m(a z^r + p z + q) \cos(c z^r + f z + g)$

01.07.21.1024.01

$$\int z^n e^{b z^2 + d z + e} \sin^m(a z^2 + p z + q) \cos(c z^2 + f z + g)\, dz = 2^{-m-2} \Bigg(-\binom{m}{\frac{m}{2}} (1 - m \bmod 2) \Bigg(e^{-\frac{(d + i f)^2}{4(b + i c)} + e + i g} \Bigg(\sum_{j=0}^{n} 2^{j-n} (-d - i f)^{n-j} (d + i f + 2 b z + 2 i c z)^{j+1}$$

$$\left(-\frac{(d + i f + 2 b z + 2 i c z)^2}{b + i c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(d + i f + 2 b z + 2 i c z)^2}{4(b + i c)} \right) \Bigg) (b + i c)^{-n-1} +$$

$$(b - i c)^{-n-1} e^{-\frac{(d - i f)^2}{4(b - i c)} + e - i g} \sum_{j=0}^{n} 2^{j-n} (i f - d)^{n-j} (d - i(f + 2 c z + 2 i b z))^{j+1} \left(-\frac{(d - i(f + 2 c z + 2 i b z))^2}{b - i c} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(d - i(f + 2 c z + 2 i b z))^2}{4(b - i c)} \right) \Bigg) - \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{1}{2} i (2 g + 2 i e + 4 k q - 2 m q + m \pi)} \binom{m}{k}$$

$$\Bigg(e^{\frac{(f - i d - 2 k p + m p)^2}{4(b + i(c - 2 a k + a m))} + 2 i g} \Bigg(\sum_{j=0}^{n} 2^{j-n} (-d - i(f - 2 k p + m p))^{n-j} (d + i f + i(m - 2k) p + 2(b + i(c - 2 a k + a m)) z)^{j+1}$$

$$\left(-\frac{(d + i(f + m p - 2 i b z + 2 c z + 2 a m z - 2 k(p + 2 a z)))^2}{b + i(c - 2 a k + a m)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(d + i(f + m p - 2 i b z + 2 c z + 2 a m z - 2 k(p + 2 a z)))^2}{4(b + i(c - 2 a k + a m))} \right) \Bigg)$$

$$(b + i(c - 2 a k + a m))^{-n-1} + e^{\frac{(f - i d + 2 k p - m p)^2}{4(b + i(c + 2 a k - a m))} + 2 i g + 2 i (2k - m) q + i m \pi} (b + i(c + 2 a k - a m))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-d - i(f + 2 k p - m p))^{n-j} \left(\frac{(f - i d + 2 k p - m p - 2 i b z + 2 c z + 4 a k z - 2 a m z)^2}{b + i(c + 2 a k - a m)} \right)^{\frac{1}{2}(-j-1)}$$

$$(d + i(f + 2 k p - m p - 2 i b z + 2 c z + 4 a k z - 2 a m z))^{j+1} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{i(f - i d + 2 k p - m p - 2 i b z + 2 c z + 4 a k z - 2 a m z)^2}{4(c - i b + 2 a k - a m)} \right) +$$

$$e^{\frac{i(f + i d + 2 k p - m p)^2}{4(c + i b + 2 a k - a m)}} (b - i(c + 2 a k - a m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i(f + 2 k p - m p) - d)^{n-j}$$

$$\left(\frac{(f + i d + 2 k p - m p + 2 c z + 2 i b z + 4 a k z - 2 a m z)^2}{b - i(c + 2 a k - a m)} \right)^{\frac{1}{2}(-j-1)}$$

$$(d-i(f+2kp-mp+2cz+2ibz+4akz-2amz))^{j+1}\binom{n}{j}$$
$$\Gamma\left(\frac{j+1}{2},\frac{i(f+id+2kp-mp+2cz+2ibz+4akz-2amz)^2}{4(c+ib+2ak-am)}\right)+$$
$$e^{\frac{(f+id-2kp+mp)^2}{4(b-i(c-2ak+am))}+2i(2k-m)q+im\pi}(b-i(c-2ak+am))^{-n-1}\sum_{j=0}^{n}2^{j-n}(i(f-2kp+mp)-d)^{n-j}$$
$$(d-i(f+mp+2cz+2ibz+2amz-2k(p+2az)))^{j+1}$$
$$\left(-\frac{(d-i(f+mp+2cz+2ibz+2amz-2k(p+2az)))^2}{b-i(c-2ak+am)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$
$$\Gamma\left(\frac{j+1}{2},-\frac{(d-i(f+mp+2cz+2ibz+2amz-2k(p+2az)))^2}{4(b-i(c-2ak+am))}\right)\Bigg)\Bigg)\Bigg)\Bigg/;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.07.21.1025.01

$$\int z^n e^{\sqrt{z}\,b+dz+e}\sin^m\left(\sqrt{z}\,a+pz+q\right)\cos\left(\sqrt{z}\,c+fz+g\right)dz=$$
$$2^{-m-2n-2}\left(\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(e^{-\frac{(b+ic)^2}{4(d+if)}+e+ig}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}4^i(b+ic)^{-h-i+2n}\left(b+ic+2(d+if)\sqrt{z}\right)^{h+i}\right.\right.\right.$$
$$\left(-\frac{\left(b+ic+2(d+if)\sqrt{z}\right)^2}{d+if}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\left((b+ic)\left(b+ic+2(d+if)\sqrt{z}\right)\right.$$
$$\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(b+ic+2(d+if)\sqrt{z}\right)^2}{4(d+if)}\right)+2\sqrt{-\frac{\left(b+ic+2(d+if)\sqrt{z}\right)^2}{d+if}}\,(d+if)$$
$$\left.\left.\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(b+ic+2(d+if)\sqrt{z}\right)^2}{4(d+if)}\right)\right)\right)(d+if)^{-2(n+1)}+e^{-\frac{(b-ic)^2}{4(d-if)}+e-ig}(d-if)^{-2(n+1)}$$
$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}4^i(b-ic)^{-h-i+2n}\left(b-i\left(c+2(f+id)\sqrt{z}\right)\right)^{h+i}\left(-\frac{\left(b-i\left(c+2(f+id)\sqrt{z}\right)\right)^2}{d-if}\right)^{\frac{1}{2}(-h-i-1)}$$
$$\binom{i}{h}\binom{n}{i}\left((b-ic)\left(b-i\left(c+2(f+id)\sqrt{z}\right)\right)\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(b-i\left(c+2(f+id)\sqrt{z}\right)\right)^2}{4(d-if)}\right)+\right.$$

$$2\sqrt{-\frac{\left(b-i\left(c+2\,(f+i\,d)\sqrt{z}\right)\right)^2}{d-i\,f}}\;(d-i\,f)\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b-i\left(c+2\,(f+i\,d)\sqrt{z}\right)\right)^2}{4\,(d-i\,f)}\right)\Bigg)\Bigg)+$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{1}{2}\,i\,(2\,g+2\,i\,e+4\,k\,q-2\,m\,q+m\,\pi)}\binom{m}{k}\Bigg(e^{2\,i\,g-\frac{i\,(b+i\,(c-2\,a\,k+a\,m))^2}{4\,i\,d-4\,(f-2\,k\,p+m\,p)}}\Bigg(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+i\,(c-2\,a\,k+a\,m))^{-h-i+2\,n}$$

$$\left(-\frac{\left(b+i\left(c+a\,(m-2\,k)+2\,(f-i\,d\,-2\,k\,p+m\,p)\sqrt{z}\right)\right)^2}{d+i\,(f-2\,k\,p+m\,p)}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\left(b+i\,c\,+a\,i\,(m-2\,k)+2\,(d+i\,(f-2\,k\,p+m\,p))\sqrt{z}\right)^{h+i}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((b+i\,(c-2\,a\,k+a\,m))\left(b+i\,c\,+a\,i\,(m-2\,k)+2\,(d+i\,(f-2\,k\,p+m\,p))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+i+1),$$

$$-\frac{\left(b+i\left(c+a\,(m-2\,k)+2\,(f-i\,d\,-2\,k\,p+m\,p)\sqrt{z}\right)\right)^2}{4\,(d+i\,(f-2\,k\,p+m\,p))}\Bigg)+2\,(d+i\,(f-2\,k\,p+m\,p))$$

$$\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+i\left(c+a\,(m-2\,k)+2\,(f-i\,d\,-2\,k\,p+m\,p)\sqrt{z}\right)\right)^2}{4\,(d+i\,(f-2\,k\,p+m\,p))}\right)$$

$$\sqrt{\left(-\left(b+i\left(c+a\,(m-2\,k)+2\,(f-i\,d\,-2\,k\,p+m\,p)\sqrt{z}\right)\right)^2\Big/(d+i\,(f-2\,k\,p+m\,p))\right)}\Bigg)\Bigg)$$

$$(d+i\,(f-2\,k\,p+m\,p))^{-2\,(n+1)}+e^{i\left(\frac{(b-i\,(c-2\,a\,k+a\,m))^2}{-4\,i\,d-4\,(f-2\,k\,p+m\,p)}+4\,k\,q-2\,m\,q+m\,\pi\right)}\,(d-i\,(f-2\,k\,p+m\,p))^{-2\,(n+1)}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-i\,(c-2\,a\,k+a\,m))^{-h-i+2\,n}$$

$$\left(-\frac{\left(b-i\left(c+a\,(m-2\,k)+2\,(f+i\,d\,-2\,k\,p+m\,p)\sqrt{z}\right)\right)^2}{d-i\,(f-2\,k\,p+m\,p)}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\left(b-i\,c+a\,i\,(2\,k-m)+2\,(d-i\,(f-2\,k\,p+m\,p))\sqrt{z}\right)^{h+i}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((b-i\,(c-2\,a\,k+a\,m))\left(b-i\,c+a\,i\,(2\,k-m)+2\,(d-i\,(f-2\,k\,p+m\,p))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+i+1),$$

$$-\frac{\left(b-i\left(c+a\,(m-2\,k)+2\,(f+i\,d\,-2\,k\,p+m\,p)\sqrt{z}\right)\right)^2}{4\,(d-i\,(f-2\,k\,p+m\,p))}\Bigg)+2\,(d-i\,(f-2\,k\,p+m\,p))$$

$$\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b-i\left(c+a\,(m-2\,k)+2\,(f+i\,d\,-2\,k\,p+m\,p)\sqrt{z}\right)\right)^2}{4\,(d-i\,(f-2\,k\,p+m\,p))}\right)$$

$$\sqrt{-\frac{\left(b-i\left(c+a\,(m-2\,k)+2\,(f+i\,d\,-2\,k\,p+m\,p)\sqrt{z}\right)\right)^2}{d-i\,(f-2\,k\,p+m\,p)}}\Bigg)+$$

$$e^{\frac{1}{4}i\left(\frac{(b+i\,(c+2\,a\,k-a\,m))^2}{f-i\,d+2\,k\,p-m\,p}+8\,g+8\,(2\,k-m)\,q+4\,m\,\pi\right)}\,(d+i\,(f+2\,k\,p-m\,p))^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i$$

$$(b+i\,(c+2\,a\,k-a\,m))^{-h-i+2\,n}\left(-\frac{\left(b+i\left(c+a\,(2\,k-m)+2\,(f-i\,d\,+2\,k\,p-m\,p)\sqrt{z}\right)\right)^2}{d+i\,(f+2\,k\,p-m\,p)}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\left(b+i\,c\,+a\,i\,(2\,k-m)+2\,(d+i\,(f+2\,k\,p-m\,p))\sqrt{z}\right)^{h+i}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((b+i\,(c+2\,a\,k-a\,m))\left(b+i\,c\,+a\,i\,(2\,k-m)+2\,(d+i\,(f+2\,k\,p-m\,p))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+i+1),$$

$$-\frac{\left(b+i\left(c+a\,(2\,k-m)+2\,(f-i\,d\,+2\,k\,p-m\,p)\sqrt{z}\right)\right)^2}{4\,(d+i\,(f+2\,k\,p-m\,p))}\Bigg)+2\,(d+i\,(f+2\,k\,p-m\,p))$$

$$\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+i\left(c+a\,(2\,k-m)+2\,(f-i\,d\,+2\,k\,p-m\,p)\sqrt{z}\right)\right)^2}{4\,(d+i\,(f+2\,k\,p-m\,p))}\right)$$

$$\sqrt{-\frac{\left(b+i\left(c+a\,(2\,k-m)+2\,(f-i\,d\,+2\,k\,p-m\,p)\sqrt{z}\right)\right)^2}{d+i\,(f+2\,k\,p-m\,p)}}\Bigg)+$$

$$e^{-\frac{i\,(b-i\,(c+2\,a\,k-a\,m))^2}{4\,(f+i\,d+2\,k\,p-m\,p)}}\,(d-i\,(f+2\,k\,p-m\,p))^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-i\,(c+2\,a\,k-a\,m))^{-h-i+2\,n}$$

$$\left(-\frac{\left(b-i\left(c+a\,(2\,k-m)+2\,(f+i\,d\,+2\,k\,p-m\,p)\sqrt{z}\right)\right)^2}{d-i\,(f+2\,k\,p-m\,p)}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\left(b-i\,c+a\,i\,(m-2\,k)+2\,(d-i\,(f+2\,k\,p-m\,p))\sqrt{z}\right)^{h+i}\binom{i}{h}\binom{n}{i}$$

$$\left((b-i(c+2ak-am))\left(b-ic+ai(m-2k)+2(d-i(f+2kp-mp))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\right.\right.$$

$$\left.-\frac{\left(b-i\left(c+a(2k-m)+2(f+id+2kp-mp)\sqrt{z}\right)\right)^2}{4(d-i(f+2kp-mp))}\right)+2(d-i(f+2kp-mp))$$

$$\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(b-i\left(c+a(2k-m)+2(f+id+2kp-mp)\sqrt{z}\right)\right)^2}{4(d-i(f+2kp-mp))}\right)$$

$$\left.\left.\left.\sqrt{-\frac{\left(b-i\left(c+a(2k-m)+2(f+id+2kp-mp)\sqrt{z}\right)\right)^2}{d-i(f+2kp-mp)}}\right)\right)\right)/;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving functions of the direct function

Involving powers of the direct function

Involving powers of cos

Involving $\cos^{\nu}(a\,z)$

01.07.21.1026.01

$$\int\cos^{\nu}(a\,z)\,dz = -\frac{\cos^{\nu+1}(a\,z)\csc(a\,z)\sqrt{\sin^2(a\,z)}}{\nu\,a+a}\,{}_2F_1\left(\frac{\nu+1}{2},\frac{1}{2};\frac{\nu+3}{2};\cos^2(a\,z)\right)$$

01.07.21.1027.01

$$\int\cos^2(a\,z)\,dz = \frac{2\,a\,z+\sin(2\,a\,z)}{4\,a}$$

01.07.21.1028.01

$$\int\cos^3(a\,z)\,dz = \frac{9\sin(a\,z)+\sin(3\,a\,z)}{12\,a}$$

01.07.21.1029.01

$$\int\cos^4(a\,z)\,dz = \frac{12\,a\,z+8\sin(2\,a\,z)+\sin(4\,a\,z)}{32\,a}$$

01.07.21.1030.01

$$\int\cos^5(a\,z)\,dz = \frac{150\sin(a\,z)+25\sin(3\,a\,z)+3\sin(5\,a\,z)}{240\,a}$$

01.07.21.1031.01

$$\int\cos^6(a\,z)\,dz = \frac{60\,a\,z+45\sin(2\,a\,z)+9\sin(4\,a\,z)+\sin(6\,a\,z)}{192\,a}$$

01.07.21.1032.01

$$\int \cos^7(a\,z)\,dz = \frac{1225\sin(a\,z) + 245\sin(3\,a\,z) + 49\sin(5\,a\,z) + 5\sin(7\,a\,z)}{2240\,a}$$

01.07.21.1033.01

$$\int \cos^8(a\,z)\,dz = \frac{840\,a\,z + 672\sin(2\,a\,z) + 168\sin(4\,a\,z) + 32\sin(6\,a\,z) + 3\sin(8\,a\,z)}{3072\,a}$$

01.07.21.2774.01

$$\int \cos^{2n}(a\,z)\,dz = \frac{\left(\frac{1}{2}\right)_n}{2\,a\,n!}\left(2\,a\,z + \tan(a\,z)\sum_{k=1}^{n}\frac{(k-1)!\cos^{2k}(a\,z)}{\left(\frac{1}{2}\right)_k}\right) /;\ n \in \mathbb{N}$$

01.07.21.2775.01

$$\int \cos^{2n+1}(a\,z)\,dz = \frac{n!\sin^{2n+1}(a\,z)}{a}\sum_{k=0}^{n}\frac{\cot^{2k}(a\,z)}{\left(\frac{3}{2}\right)_{n-k}\,k!} /;\ n \in \mathbb{N}$$

01.07.21.2776.01

$$\int \cos^{2n}(a\,z)\,dz = \frac{\left(\frac{1}{2}\right)_n \sin^{-1}(\cos(a\,z))\sin(a\,z)}{a\,n!\sqrt{\sin^2(a\,z)}} - \frac{\cos^{2n+1}(a\,z)\sin(a\,z)}{a\,(2\,n+1)}\,{}_2F_1\!\left(1,\ n+1;\ n+\frac{3}{2};\ \cos^2(a\,z)\right) + \frac{z\left(\frac{1}{2}\right)_n}{n!} /;\ n \in \mathbb{N}$$

01.07.21.2777.01

$$\int \cos^{2n+1}(a\,z)\,dz = \frac{n!\sqrt{\csc^2(a\,z)}\,\sin(a\,z)}{a\left(\frac{3}{2}\right)_n} - \frac{\cos^{2n+2}(a\,z)\csc(a\,z)}{2\,a\,(n+1)}\,{}_2F_1\!\left(\frac{1}{2},\ 1;\ n+2;\ -\cot^2(a\,z)\right) /;\ n \in \mathbb{N}$$

01.07.21.1034.01

$$\int \cos^{\frac{3}{2}}(a\,z)\,dz = \frac{2\left(F\left(\frac{a\,z}{2}\,\middle|\,2\right) + \cos^{\frac{1}{2}}(a\,z)\sin(a\,z)\right)}{3\,a}$$

01.07.21.1035.01

$$\int \cos^{\frac{1}{2}}(a\,z)\,dz = \frac{2}{a}\,E\!\left(\frac{a\,z}{2}\,\middle|\,2\right)$$

01.07.21.1036.01

$$\int \frac{1}{\cos^{\frac{1}{2}}(a\,z)}\,dz = \frac{2}{a}\,F\!\left(\frac{a\,z}{2}\,\middle|\,2\right)$$

01.07.21.1037.01

$$\int \frac{1}{\cos^{\frac{3}{2}}(a\,z)}\,dz = \frac{2}{a}\left(\frac{\sin(a\,z)}{\cos^{\frac{1}{2}}(a\,z)} - E\!\left(\frac{a\,z}{2}\,\middle|\,2\right)\right)$$

01.07.21.1038.01

$$\int \frac{1}{\sqrt{\cos^3(a\,z)}}\,dz = \frac{\sin(2\,a\,z) - 2\cos^{\frac{3}{2}}(a\,z)\,E\left(\frac{a\,z}{2}\,\middle|\,2\right)}{a\sqrt{\cos^3(a\,z)}}$$

01.07.21.1039.01

$$\int \frac{1}{\cos^{\frac{5}{2}}(a z)} \, dz = \frac{2}{3 a} \left(F\left(\frac{a z}{2} \middle| 2 \right) + \frac{\sin(a z)}{\cos^{\frac{3}{2}}(a z)} \right)$$

01.07.21.1040.01

$$\int \frac{1}{\sqrt{\cos^5(a z)}} \, dz = \frac{2 F\left(\frac{a z}{2} \middle| 2\right) \cos^{\frac{5}{2}}(a z) + \sin(2 a z)}{3 a \sqrt{\cos^5(a z)}}$$

Involving $\cos^{\nu}(a z + b)$

01.07.21.1041.01

$$\int \cos^{\nu}(b + a z) \, dz = -\frac{\cos^{\nu+1}(b + a z) \csc(b + a z) \sqrt{\sin^2(b + a z)}}{a (\nu + 1)} \, {}_2F_1\left(\frac{\nu + 1}{2}, \frac{1}{2}; \frac{\nu + 3}{2}; \cos^2(b + a z) \right)$$

Involving $\cos^{\nu}\left(a z^2 + \frac{b}{z^2}\right)$

01.07.21.1042.01

$$\int \cos^{\nu}\left(a z^2 + \frac{b}{z^2}\right) dz = 2^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{1}{\sqrt{-i a (2 k - \nu)}} \left(e^{-2 \sqrt{-i a (2k-\nu)} \sqrt{-i b (2k-\nu)}} \left(e^{4 \sqrt{-i a (2k-\nu)} \sqrt{-i b (2k-\nu)}} \left(\operatorname{erf}\left(\sqrt{-i a (2 k - \nu)} \, z + \frac{\sqrt{-i b (2 k - \nu)}}{z} \right) - 1 \right) - \operatorname{erf}\left(\frac{\sqrt{-i b (2 k - \nu)}}{z} - \sqrt{-i a (2 k - \nu)} \, z \right) + 1 \right) \right) + \frac{1}{\sqrt{i a (2 k - \nu)}} \left(e^{-2 \sqrt{i a (2k-\nu)} \sqrt{i b (2k-\nu)}} \left(e^{4 \sqrt{i a (2k-\nu)} \sqrt{i b (2k-\nu)}} \left(\operatorname{erf}\left(\sqrt{i a (2 k - \nu)} \, z + \frac{\sqrt{i b (2 k - \nu)}}{z} \right) - 1 \right) - \operatorname{erf}\left(\frac{\sqrt{i b (2 k - \nu)}}{z} - \sqrt{i a (2 k - \nu)} \, z \right) + 1 \right) \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $\cos^{\nu}\left(a z^2 + \frac{b}{z^2} + c\right)$

01.07.21.1043.01

$$\int \cos^{\nu}\left(a z^2 + \frac{b}{z^2} + c\right) dz = 2^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{k} e^{i c(\nu-2k)} \left(\frac{1}{\sqrt{-i a(2k-\nu)}} \left(e^{-2 i c(\nu-2k) - 2\sqrt{-i a(2k-\nu)}\sqrt{-i b(2k-\nu)}} \left(e^{4\sqrt{-i a(2k-\nu)}\sqrt{-i b(2k-\nu)}} \left(\operatorname{erf}\left(\sqrt{-i a(2k-\nu)}\, z + \frac{\sqrt{-i b(2k-\nu)}}{z}\right) - 1\right) - \operatorname{erf}\left(\frac{\sqrt{-i b(2k-\nu)}}{z} - \sqrt{-i a(2k-\nu)}\, z\right) + 1\right)\right) + \frac{1}{\sqrt{i a(2k-\nu)}} \left(e^{-2\sqrt{i a(2k-\nu)}\sqrt{i b(2k-\nu)}} \left(e^{4\sqrt{i a(2k-\nu)}\sqrt{i b(2k-\nu)}} \left(\operatorname{erf}\left(\sqrt{i a(2k-\nu)}\, z + \frac{\sqrt{i b(2k-\nu)}}{z}\right) - 1\right) - \operatorname{erf}\left(\frac{\sqrt{i b(2k-\nu)}}{z} - \sqrt{i a(2k-\nu)}\, z\right) + 1\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos^{\nu}(a z^r)$

01.07.21.1044.01

$$\int \cos^{\nu}(c z^r)\, dz = -2^{-\nu} z \left(\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) + \frac{1}{r} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \left(c^2 (\nu - 2s)^2 z^{2r}\right)^{-1/r} \binom{\nu}{s} \left(\Gamma\left(\frac{1}{r}, i c(2s-\nu) z^r\right) (-i c(2s-\nu) z^r)^{1/r} + (i c(2s-\nu) z^r)^{1/r}\, \Gamma\left(\frac{1}{r}, i c(\nu - 2s) z^r\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1045.01

$$\int \cos^{\nu}(c z^2)\, dz = 2^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + \frac{2^{\frac{1}{2}-\nu}\sqrt{\pi}}{\sqrt{c}} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{1}{\sqrt{2s-\nu}} \binom{\nu}{s} C\left(\sqrt{c}\sqrt{\frac{2}{\pi}}\sqrt{2s-\nu}\, z\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1046.01

$$\int \cos^{\nu}(c\sqrt{z})\, dz = 2^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + \frac{2^{2-\nu}}{c^2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{\binom{\nu}{s}\left(\cos\left((2s-\nu) c\sqrt{z}\right) + c(2s-\nu)\sqrt{z}\, \sin\left((2s-\nu) c\sqrt{z}\right)\right)}{(\nu - 2s)^2} /; \nu \in \mathbb{N}^+$$

Involving $\cos^{\nu}(a (z^r)^p)$

01.07.21.1047.01

$$\int \cos^{\nu}(a (z^r)^p)\, dz = 2^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) - \frac{2^{-\nu} z}{p r} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{k} \left(\Gamma\left(\frac{1}{p r}, -i a(\nu - 2k)(z^r)^p\right) (-i a(\nu-2k)(z^r)^p)^{-\frac{1}{p r}} + (i a(\nu - 2k)(z^r)^p)^{-\frac{1}{p r}}\, \Gamma\left(\frac{1}{p r}, i a(\nu - 2k)(z^r)^p\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1048.01

$$\int \cos^{\nu}\left(a\,(z^r)^{1/r}\right) dz = 2^{-\nu}\,z\left(\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) + \frac{2\,(z^r)^{-1/r}}{a}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{2k-\nu}\binom{\nu}{k}\sin\left(a\,(2k-\nu)\,(z^r)^{1/r}\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1049.01

$$\int \cos^{\nu}\left(a\sqrt{z^2}\right) dz = 2^{-\nu}\,z\left(\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) + \frac{2}{a\sqrt{z^2}}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{2k-\nu}\binom{\nu}{k}\sin\left(a\sqrt{z^2}\,(2k-\nu)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos^{\nu}(a\,z^r+b)$

01.07.21.1050.01

$$\int \cos^{\nu}(a\,z^r+b)\,dz = 2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\,z - \frac{2^{-\nu}\,z}{r}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}$$
$$\left(e^{i\,b\,(\nu-2k)}\,\Gamma\left(\frac{1}{r},\,-i\,a\,(\nu-2k)\,z^r\right)(-i\,a\,(\nu-2k)\,z^r)^{-\frac{1}{r}} + e^{-i\,b\,(\nu-2k)}\,(i\,a\,(\nu-2k)\,z^r)^{-\frac{1}{r}}\,\Gamma\left(\frac{1}{r},\,i\,a\,(\nu-2k)\,z^r\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1051.01

$$\int \cos^{\nu}\left(a\,z^2+b\right) dz = 2^{-\nu}\,z\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) + \frac{2^{\frac{1}{2}-\nu}\sqrt{\pi}}{\sqrt{a}}$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{2s-\nu}}\binom{\nu}{s}\left(\cos(b\,(2s-\nu))\,C\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{2s-\nu}\,z\right) - S\left(\sqrt{a}\,\sqrt{\frac{2}{\pi}}\,\sqrt{2s-\nu}\,z\right)\sin(b\,(2s-\nu))\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1052.01

$$\int \cos^{\nu}\left(\sqrt{z}\,a+b\right) dz =$$
$$2^{-\nu}\,z\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) + \frac{2^{2-\nu}}{a^2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\left(\cos\left((2s-\nu)\left(\sqrt{z}\,a+b\right)\right) + a\,(2s-\nu)\sqrt{z}\,\sin\left((2s-\nu)\left(\sqrt{z}\,a+b\right)\right)\right)}{(\nu-2s)^2}\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos^{\nu}(a\,z^r+b\,z)$

01.07.21.1053.01

$$\int \cos^{\nu}\left(a\,z^2+b\,z\right) dz =$$
$$2^{-\nu}\,z\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) + \frac{2^{\frac{1}{2}-\nu}\sqrt{\pi}}{\sqrt{a}}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{k}\left(\cos\left(\frac{b^2\,(\nu-2k)}{4a}\right)C\left(\frac{\sqrt{\nu-2k}\,(b+2\,a\,z)}{\sqrt{a}\,\sqrt{2\pi}}\right) + S\left(\frac{\sqrt{\nu-2k}\,(b+2\,a\,z)}{\sqrt{a}\,\sqrt{2\pi}}\right)\sin\left(\frac{b^2\,(\nu-2k)}{4a}\right)\right)}{\sqrt{\nu-2k}}\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1054.01

$$\int \cos^{\nu}\left(\sqrt{z}\; a + b\, z\right) dz = 2^{-\nu}\, z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + \frac{2^{-\nu}}{b^{3/2}} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(\nu - 2k)^{3/2}} \binom{\nu}{k} \left(a \sqrt{2\pi}\, (2k - \nu) \left(\cos\left(\frac{a^2 (2k - \nu)}{4b}\right) C\left(\frac{\sqrt{\nu - 2k}\, \left(a + 2b\sqrt{z}\right)}{\sqrt{b}\, \sqrt{2\pi}}\right) - S\left(\frac{\sqrt{\nu - 2k}\, \left(a + 2b\sqrt{z}\right)}{\sqrt{b}\, \sqrt{2\pi}}\right) \sin\left(\frac{a^2 (2k - \nu)}{4b}\right)\right) - 2\sqrt{b}\, \sqrt{\nu - 2k}\, \sin\left((2k - \nu)\left(\sqrt{z}\; a + b\, z\right)\right)\right) /;\; \nu \in \mathbb{N}^+$$

Involving $\cos^{\nu}\left(a\, z^r + b\, z + c\right)$

01.07.21.1055.01

$$\int \cos^{\nu}\left(a\, z^2 + b\, z + c\right) dz = 2^{-\nu}\, z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + \frac{2^{\frac{1}{2}-\nu} \sqrt{\pi}}{\sqrt{a}} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{\nu - 2k}} \left(\binom{\nu}{k} \left(\cos\left(\frac{\left(b^2 - 4ac\right)(\nu - 2k)}{4a}\right) C\left(\frac{\sqrt{\nu - 2k}\, (b + 2az)}{\sqrt{a}\, \sqrt{2\pi}}\right) + S\left(\frac{\sqrt{\nu - 2k}\, (b + 2az)}{\sqrt{a}\, \sqrt{2\pi}}\right) \sin\left(\frac{\left(b^2 - 4ac\right)(\nu - 2k)}{4a}\right)\right)\right) /;\; \nu \in \mathbb{N}^+$$

01.07.21.1056.01

$$\int \cos^{\nu}\left(\sqrt{z}\; a + b\, z + c\right) dz = 2^{-\nu}\, z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + \frac{2^{-\nu}}{b^{3/2}} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(\nu - 2k)^{3/2}} \binom{\nu}{k} \left(a \sqrt{2\pi}\, (2k - \nu) \left(\cos\left(\frac{\left(a^2 - 4bc\right)(2k - \nu)}{4b}\right) C\left(\frac{\sqrt{\nu - 2k}\, \left(a + 2b\sqrt{z}\right)}{\sqrt{b}\, \sqrt{2\pi}}\right) - S\left(\frac{\sqrt{\nu - 2k}\, \left(a + 2b\sqrt{z}\right)}{\sqrt{b}\, \sqrt{2\pi}}\right) \sin\left(\frac{\left(a^2 - 4bc\right)(2k - \nu)}{4b}\right)\right) - 2\sqrt{b}\, \sqrt{\nu - 2k}\, \sin\left((2k - \nu)\left(\sqrt{z}\; a + c + b\, z\right)\right)\right) /;\; \nu \in \mathbb{N}^+$$

Involving products of the direct

Involving products of two direct functions

Involving $\cos(c\, z) \cos(a\, z)$

01.07.21.1057.01

$$\int \cos(c\, z) \cos(a\, z)\, dz = \frac{a \cos(c\, z) \sin(a\, z) - c \cos(a\, z) \sin(c\, z)}{a^2 - c^2}$$

Involving $\cos(c\, z) \cos(a\, z + b)$

01.07.21.1058.01

$$\int \cos(c\,z)\cos(b+a\,z)\,dz = \frac{(a-c)\sin(b+(a+c)\,z)+(a+c)\sin(b+a\,z-c\,z)}{2\,(a-c)\,(a+c)}$$

Involving $\cos(c\,z+d)\cos(a\,z+b)$

01.07.21.1059.01

$$\int \cos(d+c\,z)\cos(b+a\,z)\,dz = \frac{(a-c)\sin(b+d+(a+c)\,z)+(a+c)\sin(b-d+a\,z-c\,z)}{2\,(a-c)\,(a+c)}$$

Involving $\cos(d\,z)\cos(c\,z^r)$

01.07.21.1060.01

$$\int \cos(d\,z)\cos(c\,z^2)\,dz = \frac{1}{2\sqrt{-c}\,\sqrt{c}}\left(\sqrt{\frac{\pi}{2}}\left(\sqrt{c}\,\cos\left(\frac{d^2}{4\,c}\right)C\left(\frac{d-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)+\sqrt{-c}\,\cos\left(\frac{d^2}{4\,c}\right)C\left(\frac{d+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)+\sqrt{-c}\,S\left(\frac{d+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{d^2}{4\,c}\right)-\sqrt{c}\,S\left(\frac{d-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{d^2}{4\,c}\right)\right)\right)$$

01.07.21.1061.01

$$\int \cos(d\,z)\cos\left(c\sqrt{z}\right)dz = \frac{1}{2}\left(\frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4\,d}\right)C\left(\frac{2\,d\sqrt{z}-c}{\sqrt{d}\,\sqrt{2\,\pi}}\right)+S\left(\frac{2\,d\sqrt{z}-c}{\sqrt{d}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,d}\right)\right)}{d^{3/2}}-\frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4\,d}\right)C\left(\frac{c+2\,d\sqrt{z}}{\sqrt{d}\,\sqrt{2\,\pi}}\right)+S\left(\frac{c+2\,d\sqrt{z}}{\sqrt{d}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,d}\right)\right)}{d^{3/2}}+\frac{2\cos\left(c\sqrt{z}\right)\sin(d\,z)}{d}\right)$$

Involving $\cos(d\,z+e)\cos(c\,z^r)$

01.07.21.1062.01

$$\int \cos(e+d\,z)\cos(c\,z^2)\,dz = \frac{1}{2\sqrt{-c}\,\sqrt{c}}\left(\sqrt{\frac{\pi}{2}}\left(\sqrt{c}\,\cos\left(\frac{d^2}{4\,c}+e\right)C\left(\frac{d-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)+\sqrt{-c}\,\cos\left(\frac{d^2}{4\,c}-e\right)C\left(\frac{d+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)+\sqrt{-c}\,S\left(\frac{d+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{d^2}{4\,c}-e\right)-\sqrt{c}\,S\left(\frac{d-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{d^2}{4\,c}+e\right)\right)\right)$$

01.07.21.1063.01

$$\int \cos(d\,z+e)\cos\left(c\sqrt{z}\right)dz = \frac{1}{2}\left(\frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4d}-e\right)C\left(\frac{2d\sqrt{z}-c}{\sqrt{d}\sqrt{2\pi}}\right)+S\left(\frac{2d\sqrt{z}-c}{\sqrt{d}\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4d}-e\right)\right)}{d^{3/2}} - \frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4d}-e\right)C\left(\frac{c+2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right)+S\left(\frac{c+2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4d}-e\right)\right)}{d^{3/2}} + \frac{2\cos\left(c\sqrt{z}\right)\sin(e+d\,z)}{d}\right)$$

Involving $\cos(a\,z^r)\cos(c\,z^r)$

01.07.21.1064.01

$$\int \cos(b\,z^r)\cos(c\,z^r)\,dz = -\frac{1}{4r}\left(z\left(\Gamma\left(\frac{1}{r},(-i\,b+i\,c)\,z^r\right)((-i\,b+i\,c)\,z^r)^{-1/r}+((i\,b+i\,c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(i\,b+i\,c)\,z^r\right)+((-i\,b-i\,c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-i\,b-i\,c)\,z^r\right)+((i\,b-i\,c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(i\,b-i\,c)\,z^r\right)\right)\right)$$

01.07.21.1065.01

$$\int \cos\left(b\,z^2\right)\cos\left(c\,z^2\right)dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{C\left(\sqrt{-b-c}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{-b-c}}+\frac{C\left(\sqrt{c-b}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{c-b}}\right)$$

01.07.21.1066.01

$$\int \cos\left(b\sqrt{z}\right)\cos\left(c\sqrt{z}\right)dz = \frac{\cos\left((-b-c)\sqrt{z}\right)-(b+c)\sqrt{z}\,\sin\left((-b-c)\sqrt{z}\right)}{(b+c)^2}+\frac{\cos\left((c-b)\sqrt{z}\right)+(c-b)\sqrt{z}\,\sin\left((c-b)\sqrt{z}\right)}{(c-b)^2}$$

Involving $\cos(d\,z)\cos(c\,z^r+g)$

01.07.21.1067.01

$$\int \cos(d\,z)\cos\left(c\,z^2+g\right)dz = \frac{1}{2\sqrt{-c}\,\sqrt{c}}\left(\sqrt{\frac{\pi}{2}}\left(\sqrt{c}\,\cos\left(\frac{d^2}{4c}-g\right)C\left(\frac{d-2c\,z}{\sqrt{-c}\,\sqrt{2\pi}}\right)+\sqrt{-c}\,\cos\left(\frac{d^2}{4c}-g\right)C\left(\frac{d+2c\,z}{\sqrt{c}\,\sqrt{2\pi}}\right)+\sqrt{-c}\,S\left(\frac{d+2c\,z}{\sqrt{c}\,\sqrt{2\pi}}\right)\sin\left(\frac{d^2}{4c}-g\right)-\sqrt{c}\,S\left(\frac{d-2c\,z}{\sqrt{-c}\,\sqrt{2\pi}}\right)\sin\left(\frac{d^2}{4c}-g\right)\right)\right)$$

01.07.21.1068.01

$$\int \cos(d\,z)\cos\left(\sqrt{z}\;c+g\right)dz = \frac{1}{2}\left(-\frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4d}-g\right)C\left(\frac{c+2d\sqrt{z}}{\sqrt{d}\;\sqrt{2\pi}}\right)+S\left(\frac{c+2d\sqrt{z}}{\sqrt{d}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4d}-g\right)\right)}{d^{3/2}}+\frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4d}+g\right)C\left(\frac{2d\sqrt{z}-c}{\sqrt{d}\;\sqrt{2\pi}}\right)+S\left(\frac{2d\sqrt{z}-c}{\sqrt{d}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4d}+g\right)\right)}{d^{3/2}}+\frac{2\cos\left(\sqrt{z}\;c+g\right)\sin(d\,z)}{d}\right)$$

Involving $\cos(d\,z+e)\cos\left(c\,z^r+g\right)$

01.07.21.1069.01

$$\int \cos(d\,z+e)\cos\left(c\,z^2+g\right)dz = \frac{1}{2\sqrt{-c}\;\sqrt{c}}\left(\sqrt{\frac{\pi}{2}}\left(\sqrt{c}\;\cos\left(\frac{d^2}{4c}+e-g\right)C\left(\frac{d-2c\,z}{\sqrt{-c}\;\sqrt{2\pi}}\right)+\sqrt{-c}\;\cos\left(\frac{d^2}{4c}-e-g\right)C\left(\frac{d+2c\,z}{\sqrt{c}\;\sqrt{2\pi}}\right)+\sqrt{-c}\;S\left(\frac{d+2c\,z}{\sqrt{c}\;\sqrt{2\pi}}\right)\sin\left(\frac{d^2}{4c}-e-g\right)-\sqrt{c}\;S\left(\frac{d-2c\,z}{\sqrt{-c}\;\sqrt{2\pi}}\right)\sin\left(\frac{d^2}{4c}+e-g\right)\right)\right)$$

01.07.21.1070.01

$$\int \cos(d\,z+e)\cos\left(\sqrt{z}\;c+g\right)dz = \frac{1}{2}\left(-\frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4d}-e-g\right)C\left(\frac{c+2d\sqrt{z}}{\sqrt{d}\;\sqrt{2\pi}}\right)+S\left(\frac{c+2d\sqrt{z}}{\sqrt{d}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4d}-e-g\right)\right)}{d^{3/2}}+\frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4d}-e+g\right)C\left(\frac{2d\sqrt{z}-c}{\sqrt{d}\;\sqrt{2\pi}}\right)+S\left(\frac{2d\sqrt{z}-c}{\sqrt{d}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4d}-e+g\right)\right)}{d^{3/2}}+\frac{2\cos\left(\sqrt{z}\;c+g\right)\sin(e+d\,z)}{d}\right)$$

Involving $\cos\left(a\,z^r\right)\cos\left(c\,z^r+g\right)$

01.07.21.1071.01

$$\int \cos(b\,z^r)\cos(c\,z^r+g)\,dz = -\frac{1}{4r}\left(z\left(e^{-ig}\,\Gamma\left(\frac{1}{r},\,(-i\,b+i\,c)\,z^r\right)((-i\,b+i\,c)\,z^r)^{-1/r}+e^{-ig}\,((i\,b+i\,c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,(i\,b+i\,c)\,z^r\right)+e^{ig}\,((-i\,b-i\,c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,(-i\,b-i\,c)\,z^r\right)+e^{ig}\,((i\,b-i\,c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,(i\,b-i\,c)\,z^r\right)\right)\right)$$

01.07.21.1072.01

$$\int \cos\left(b z^2\right) \cos\left(c z^2 + g\right) dz = \frac{1}{2}\sqrt{\frac{\pi}{2}} \left(\frac{\cos(g)\, C\left(\sqrt{c-b}\,\sqrt{\frac{2}{\pi}}\, z\right) - S\left(\sqrt{c-b}\,\sqrt{\frac{2}{\pi}}\, z\right)\sin(g)}{\sqrt{c-b}} + \frac{\cos(g)\, C\left(\sqrt{-b-c}\,\sqrt{\frac{2}{\pi}}\, z\right) + S\left(\sqrt{-b-c}\,\sqrt{\frac{2}{\pi}}\, z\right)\sin(g)}{\sqrt{-b-c}} \right)$$

01.07.21.1073.01

$$\int \cos\left(b\sqrt{z}\right)\cos\left(\sqrt{z}\, c + g\right) dz = \frac{\cos\left(\sqrt{z}\,(c-b)+g\right) + (c-b)\sqrt{z}\,\sin\left(\sqrt{z}\,(c-b)+g\right)}{(c-b)^2} + \frac{\cos\left(g-(-b-c)\sqrt{z}\right) - (-b-c)\sqrt{z}\,\sin\left(g-(-b-c)\sqrt{z}\right)}{(-b-c)^2}$$

Involving $\cos(a z^r + e)\cos(c z^r + g)$

01.07.21.1074.01

$$\int \cos(b z^r + e)\cos(c z^r + g)\, dz = -\frac{1}{4r}\left(z\left(e^{i e - i g}\,\Gamma\left(\frac{1}{r}, (-i b + i c) z^r\right)\left((-i b + i c) z^r\right)^{-1/r} + e^{-i e - i g}\left((i b + i c) z^r\right)^{-1/r}\Gamma\left(\frac{1}{r}, (i b + i c) z^r\right) + e^{i e + i g}\left((-i b - i c) z^r\right)^{-1/r}\Gamma\left(\frac{1}{r}, (-i b - i c) z^r\right) + e^{-i e + i g}\left((i b - i c) z^r\right)^{-1/r}\Gamma\left(\frac{1}{r}, (i b - i c) z^r\right)\right)\right)$$

01.07.21.1075.01

$$\int \cos\left(b z^2 + e\right)\cos\left(c z^2 + g\right) dz = \frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{\cos(e-g)\, C\left(\sqrt{c-b}\,\sqrt{\frac{2}{\pi}}\, z\right) + S\left(\sqrt{c-b}\,\sqrt{\frac{2}{\pi}}\, z\right)\sin(e-g)}{\sqrt{c-b}} + \frac{\cos(e+g)\, C\left(\sqrt{-b-c}\,\sqrt{\frac{2}{\pi}}\, z\right) + S\left(\sqrt{-b-c}\,\sqrt{\frac{2}{\pi}}\, z\right)\sin(e+g)}{\sqrt{-b-c}}\right)$$

01.07.21.1076.01

$$\int \cos\left(\sqrt{z}\, b + e\right)\cos\left(\sqrt{z}\, c + g\right) dz = \frac{\cos\left(-\sqrt{z}\,(-b-c) + e + g\right) - (-b-c)\sqrt{z}\,\sin\left(-\sqrt{z}\,(-b-c) + e + g\right)}{(-b-c)^2} + \frac{\cos\left(-\sqrt{z}\,(c-b) + e - g\right) - (c-b)\sqrt{z}\,\sin\left(-\sqrt{z}\,(c-b) + e - g\right)}{(c-b)^2}$$

Involving $\cos(d z)\cos(c z^r + f z)$

01.07.21.1077.01

$$\int \cos(d\,z)\cos\left(c\,z^2+f\,z\right)dz = \frac{1}{2\sqrt{-c}\,\sqrt{c}}\left(\sqrt{\frac{\pi}{2}}\left(\sqrt{c}\,\cos\left(\frac{(d-f)^2}{4\,c}\right)C\left(\frac{d-f-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)+\sqrt{-c}\,\cos\left(-\frac{(d+f)^2}{4\,c}\right)C\left(\frac{d+f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)-\sqrt{c}\,S\left(\frac{d-f-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(d-f)^2}{4\,c}\right)+\sqrt{-c}\,S\left(\frac{d+f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(d+f)^2}{4\,c}\right)\right)\right)$$

01.07.21.1078.01

$$\int \cos(d\,z)\cos\left(\sqrt{z}\,c+f\,z\right)dz = \frac{1}{2}\left(\frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4\,(d-f)}\right)C\left(\frac{2\,(d-f)\sqrt{z}-c}{\sqrt{d-f}\,\sqrt{2\,\pi}}\right)+S\left(\frac{2\,(d-f)\sqrt{z}-c}{\sqrt{d-f}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(d-f)}\right)\right)}{(d-f)^{3/2}}-\frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{c^2}{4\,(d+f)}\right)C\left(\frac{c+2\,(d+f)\sqrt{z}}{\sqrt{d+f}\,\sqrt{2\,\pi}}\right)+S\left(\frac{c+2\,(d+f)\sqrt{z}}{\sqrt{d+f}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(d+f)}\right)\right)}{(d+f)^{3/2}}+\frac{\sin\left(\sqrt{z}\,c+(d+f)\,z\right)}{d+f}-\frac{\sin\left(c\sqrt{z}-(d-f)\,z\right)}{d-f}\right)$$

Involving $\cos(d\,z+e)\cos\left(c\,z^r+f\,z\right)$

01.07.21.1079.01

$$\int \cos(d\,z+e)\cos\left(c\,z^2+f\,z\right)dz = \frac{1}{2\sqrt{-c}\,\sqrt{c}}\left(\sqrt{\frac{\pi}{2}}\left(\sqrt{c}\,\cos\left(\frac{(d-f)^2}{4\,c}+e\right)C\left(\frac{d-f-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)+\sqrt{-c}\,\cos\left(-\frac{(d+f)^2}{4\,c}+e\right)C\left(\frac{d+f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)-\sqrt{c}\,S\left(\frac{d-f-2\,c\,z}{\sqrt{-c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(d-f)^2}{4\,c}+e\right)-\sqrt{-c}\,S\left(\frac{d+f+2\,c\,z}{\sqrt{c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(d+f)^2}{4\,c}+e\right)\right)\right)$$

01.07.21.1080.01

$$\int \cos(d z + e)\cos\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{2}\left(\frac{\cos\left(\sqrt{z}\, c + (d+f) z\right)\sin(e)}{d+f} + \frac{\cos\left(c\sqrt{z} - (d-f) z\right)\sin(e)}{d-f} + \frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(e - \frac{c^2}{4(d-f)}\right) C\left(\frac{2(d-f)\sqrt{z} - c}{\sqrt{d-f}\sqrt{2\pi}}\right) - S\left(\frac{2(d-f)\sqrt{z} - c}{\sqrt{d-f}\sqrt{2\pi}}\right)\sin\left(e - \frac{c^2}{4(d-f)}\right)\right)}{(d-f)^{3/2}} - \frac{c\sqrt{\frac{\pi}{2}}\left(\cos\left(e - \frac{c^2}{4(d+f)}\right) C\left(\frac{c + 2(d+f)\sqrt{z}}{\sqrt{d+f}\sqrt{2\pi}}\right) - S\left(\frac{c + 2(d+f)\sqrt{z}}{\sqrt{d+f}\sqrt{2\pi}}\right)\sin\left(e - \frac{c^2}{4(d+f)}\right)\right)}{(d+f)^{3/2}} + \frac{\cos(e)\sin\left(\sqrt{z}\, c + (d+f) z\right)}{d+f} - \frac{\cos(e)\sin\left(c\sqrt{z} - (d-f) z\right)}{d-f}\right)$$

Involving $\cos\left(b z^r\right)\cos\left(c z^r + f z\right)$

01.07.21.1081.01

$$\int \cos\left(b z^2\right)\cos\left(c z^2 + f z\right) dz = \frac{1}{2\sqrt{b-c}\sqrt{b+c}}\left(\sqrt{\frac{\pi}{2}}\left(\sqrt{b+c}\cos\left(\frac{f^2}{4(b-c)}\right) C\left(\frac{-f + 2 b z - 2 c z}{\sqrt{b-c}\sqrt{2\pi}}\right) + \sqrt{b-c}\cos\left(\frac{f^2}{4(b+c)}\right) C\left(\frac{f + 2(b+c) z}{\sqrt{b+c}\sqrt{2\pi}}\right) + \sqrt{b+c}\, S\left(\frac{-f + 2 b z - 2 c z}{\sqrt{b-c}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4(b-c)}\right) + \sqrt{b-c}\, S\left(\frac{f + 2(b+c) z}{\sqrt{b+c}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4(b+c)}\right)\right)\right)$$

01.07.21.1082.01

$$\int \cos\left(b\sqrt{z}\right)\cos\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{2}\left(-\frac{(b-c)\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{(b-c)^2}{4 f}\right) C\left(\frac{b - c - 2 f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right) - S\left(\frac{b - c - 2 f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right)\sin\left(\frac{(b-c)^2}{4 f}\right)\right)}{(-f)^{3/2}} - \frac{(b+c)\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{(b+c)^2}{4 f}\right) C\left(\frac{b + c + 2 f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right) + S\left(\frac{b + c + 2 f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)\sin\left(\frac{(b+c)^2}{4 f}\right)\right)}{f^{3/2}} + \frac{\sin\left(\sqrt{z}\,(b+c) + f z\right) - \sin\left((b-c)\sqrt{z} - f z\right)}{f}\right)$$

Involving $\cos\left(b z^r + e\right)\cos\left(c z^r + f z\right)$

01.07.21.1083.01

$$\int \cos\left(b z^2 + e\right) \cos\left(c z^2 + f z\right) dz = \frac{1}{2\sqrt{b-c}\sqrt{b+c}} \left(\sqrt{\frac{\pi}{2}} \left(\sqrt{b+c} \cos\left(-\frac{f^2}{4(b-c)} + e\right) C\left(\frac{-f + 2bz - 2cz}{\sqrt{b-c}\sqrt{2\pi}}\right) + \sqrt{b-c} \cos\left(-\frac{f^2}{4(b+c)} + e\right) C\left(\frac{f + 2(b+c)z}{\sqrt{b+c}\sqrt{2\pi}}\right) - \sqrt{b+c}\, S\left(\frac{-f + 2bz - 2cz}{\sqrt{b-c}\sqrt{2\pi}}\right) \sin\left(-\frac{f^2}{4(b-c)} + e\right) - \sqrt{b-c}\, S\left(\frac{f + 2(b+c)z}{\sqrt{b+c}\sqrt{2\pi}}\right) \sin\left(-\frac{f^2}{4(b+c)} + e\right)\right)\right)$$

01.07.21.1084.01

$$\int \cos\left(\sqrt{z}\, b + e\right) \cos\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{2} \left(\frac{\cos\left(\sqrt{z}\,(b+c) + f z\right) \sin(e)}{f} - \frac{\cos\left((b-c)\sqrt{z} - f z\right) \sin(e)}{f} - \frac{(b-c)\sqrt{\frac{\pi}{2}} \left(\cos\left(\frac{(b-c)^2}{4f} + e\right) C\left(\frac{b-c-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right) - S\left(\frac{b-c-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right) \sin\left(\frac{(b-c)^2}{4f} + e\right)\right)}{(-f)^{3/2}} - \frac{(b+c)\sqrt{\frac{\pi}{2}} \left(\cos\left(e - \frac{(b+c)^2}{4f}\right) C\left(\frac{b+c+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right) - S\left(\frac{b+c+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right) \sin\left(e - \frac{(b+c)^2}{4f}\right)\right)}{f^{3/2}} + \frac{\cos(e)\left(\sin\left(\sqrt{z}\,(b+c) + f z\right) - \sin\left((b-c)\sqrt{z} - f z\right)\right)}{f}\right)$$

Involving $\cos\left(b z^r + d z\right) \cos\left(c z^r + f z\right)$

01.07.21.1085.01

$$\int \cos\left(b z^2 + d z\right) \cos\left(c z^2 + f z\right) dz = \frac{1}{2\sqrt{b-c}\sqrt{b+c}} \left(\sqrt{\frac{\pi}{2}} \left(\sqrt{b+c} \cos\left(\frac{(d-f)^2}{4(b-c)}\right) C\left(\frac{d - f + 2bz - 2cz}{\sqrt{b-c}\sqrt{2\pi}}\right) + \sqrt{b-c} \cos\left(\frac{(d+f)^2}{4(b+c)}\right) C\left(\frac{d + f + 2(b+c)z}{\sqrt{b+c}\sqrt{2\pi}}\right) + \sqrt{b+c}\, S\left(\frac{d - f + 2bz - 2cz}{\sqrt{b-c}\sqrt{2\pi}}\right) \sin\left(\frac{(d-f)^2}{4(b-c)}\right) + \sqrt{b-c}\, S\left(\frac{d + f + 2(b+c)z}{\sqrt{b+c}\sqrt{2\pi}}\right) \sin\left(\frac{(d+f)^2}{4(b+c)}\right)\right)\right)$$

01.07.21.1086.01

$$\int \cos\left(\sqrt{z}\, b + d\, z\right) \cos\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{2} \left(-\frac{(b-c)\sqrt{\frac{\pi}{2}} \left(\cos\left(\frac{(b-c)^2}{4(d-f)}\right) C\left(\frac{b-c+2(d-f)\sqrt{z}}{\sqrt{d-f}\,\sqrt{2\pi}}\right) + S\left(\frac{b-c+2(d-f)\sqrt{z}}{\sqrt{d-f}\,\sqrt{2\pi}}\right) \sin\left(\frac{(b-c)^2}{4(d-f)}\right)\right)}{(d-f)^{3/2}} - \frac{(b+c)\sqrt{\frac{\pi}{2}} \left(\cos\left(\frac{(b+c)^2}{4(d+f)}\right) C\left(\frac{b+c+2(d+f)\sqrt{z}}{\sqrt{d+f}\,\sqrt{2\pi}}\right) + S\left(\frac{b+c+2(d+f)\sqrt{z}}{\sqrt{d+f}\,\sqrt{2\pi}}\right) \sin\left(\frac{(b+c)^2}{4(d+f)}\right)\right)}{(d+f)^{3/2}} + \frac{\sin\left(\sqrt{z}\,(b-c) + (d-f)\, z\right)}{d-f} + \frac{\sin\left(\sqrt{z}\,(b+c) + (d+f)\, z\right)}{d+f} \right)$$

Involving $\cos(d\, z) \cos\left(c\, z^r + f\, z + g\right)$

01.07.21.1087.01

$$\int \cos(d\, z) \cos\left(c\, z^2 + f\, z + g\right) dz = \frac{1}{2\sqrt{-c}\,\sqrt{c}} \left(\sqrt{\frac{\pi}{2}} \left(\sqrt{c}\, \cos\left(\frac{(d-f)^2}{4c} - g\right) C\left(\frac{d-f-2cz}{\sqrt{-c}\,\sqrt{2\pi}}\right) + \sqrt{-c}\, \cos\left(-\frac{(d+f)^2}{4c} + g\right) C\left(\frac{d+f+2cz}{\sqrt{c}\,\sqrt{2\pi}}\right) - \sqrt{c}\, S\left(\frac{d-f-2cz}{\sqrt{-c}\,\sqrt{2\pi}}\right) \sin\left(\frac{(d-f)^2}{4c} - g\right) - \sqrt{-c}\, S\left(\frac{d+f+2cz}{\sqrt{c}\,\sqrt{2\pi}}\right) \sin\left(-\frac{(d+f)^2}{4c} + g\right)\right)\right)$$

01.07.21.1088.01

$$\int \cos(d\, z) \cos\left(\sqrt{z}\, c + f\, z + g\right) dz = \frac{1}{2} \left(\frac{\cos\left(\sqrt{z}\, c + (d+f)\, z\right) \sin(g)}{d+f} - \frac{\cos\left(c\sqrt{z} - (d-f)\, z\right) \sin(g)}{d-f} + \frac{c\sqrt{\frac{\pi}{2}} \left(\cos\left(\frac{c^2}{4(d-f)} + g\right) C\left(\frac{2(d-f)\sqrt{z} - c}{\sqrt{d-f}\,\sqrt{2\pi}}\right) + S\left(\frac{2(d-f)\sqrt{z} - c}{\sqrt{d-f}\,\sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4(d-f)} + g\right)\right)}{(d-f)^{3/2}} - \frac{c\sqrt{\frac{\pi}{2}} \left(\cos\left(g - \frac{c^2}{4(d+f)}\right) C\left(\frac{c+2(d+f)\sqrt{z}}{\sqrt{d+f}\,\sqrt{2\pi}}\right) - S\left(\frac{c+2(d+f)\sqrt{z}}{\sqrt{d+f}\,\sqrt{2\pi}}\right) \sin\left(g - \frac{c^2}{4(d+f)}\right)\right)}{(d+f)^{3/2}} + \frac{\cos(g) \sin\left(\sqrt{z}\, c + (d+f)\, z\right)}{d+f} - \frac{\cos(g) \sin\left(c\sqrt{z} - (d-f)\, z\right)}{d-f} \right)$$

Involving $\cos(d z + e) \cos(c z^r + f z + g)$

01.07.21.1089.01

$$\int \cos(d z + e) \cos(c z^2 + f z + g) \, dz = \frac{1}{2\sqrt{-c}\sqrt{c}} \left(\sqrt{\frac{\pi}{2}} \left(\sqrt{c} \cos\left(\frac{(d-f)^2}{4c} + e - g \right) C\left(\frac{d - f - 2cz}{\sqrt{-c}\sqrt{2\pi}} \right) + \sqrt{-c} \cos\left(-\frac{(d+f)^2}{4c} + e + g \right) C\left(\frac{d + f + 2cz}{\sqrt{c}\sqrt{2\pi}} \right) - \sqrt{c}\, S\left(\frac{d - f - 2cz}{\sqrt{-c}\sqrt{2\pi}} \right) \sin\left(\frac{(d-f)^2}{4c} + e - g \right) - \sqrt{-c}\, S\left(\frac{d + f + 2cz}{\sqrt{c}\sqrt{2\pi}} \right) \sin\left(-\frac{(d+f)^2}{4c} + e + g \right) \right) \right)$$

01.07.21.1090.01

$$\int \cos(d z + e) \cos(\sqrt{z}\, c + f z + g) \, dz = \frac{1}{2} \left(\frac{\cos(c\sqrt{z} - (d-f) z) \sin(e - g)}{d - f} + \frac{1}{(d-f)^{3/2}} \left(c \sqrt{\frac{\pi}{2}} \left(\cos\left(-\frac{c^2}{4(d-f)} + e - g \right) C\left(\frac{2(d-f)\sqrt{z} - c}{\sqrt{d-f}\sqrt{2\pi}} \right) - S\left(\frac{2(d-f)\sqrt{z} - c}{\sqrt{d-f}\sqrt{2\pi}} \right) \sin\left(-\frac{c^2}{4(d-f)} + e - g \right) \right) \right) + \frac{\cos(\sqrt{z}\, c + (d+f) z) \sin(e + g)}{d + f} - \frac{1}{(d+f)^{3/2}} \left(c \sqrt{\frac{\pi}{2}} \left(\cos\left(-\frac{c^2}{4(d+f)} + e + g \right) C\left(\frac{c + 2(d+f)\sqrt{z}}{\sqrt{d+f}\sqrt{2\pi}} \right) - S\left(\frac{c + 2(d+f)\sqrt{z}}{\sqrt{d+f}\sqrt{2\pi}} \right) \sin\left(-\frac{c^2}{4(d+f)} + e + g \right) \right) \right) + \frac{\cos(e + g) \sin(\sqrt{z}\, c + (d+f) z)}{d + f} - \frac{\cos(e - g) \sin(c\sqrt{z} - (d-f) z)}{d - f} \right)$$

Involving $\cos(b z^r) \cos(c z^r + f z + g)$

01.07.21.1091.01

$$\int \cos(b z^2) \cos(c z^2 + f z + g) \, dz = \frac{1}{2\sqrt{b-c}\sqrt{b+c}} \left(\sqrt{\frac{\pi}{2}} \left(\sqrt{b+c} \cos\left(\frac{f^2}{4(b-c)} + g \right) C\left(\frac{-f + 2bz - 2cz}{\sqrt{b-c}\sqrt{2\pi}} \right) + \sqrt{b-c} \cos\left(-\frac{f^2}{4(b+c)} + g \right) C\left(\frac{f + 2(b+c) z}{\sqrt{b+c}\sqrt{2\pi}} \right) + \sqrt{b+c}\, S\left(\frac{-f + 2bz - 2cz}{\sqrt{b-c}\sqrt{2\pi}} \right) \sin\left(\frac{f^2}{4(b-c)} + g \right) - \sqrt{b-c}\, S\left(\frac{f + 2(b+c) z}{\sqrt{b+c}\sqrt{2\pi}} \right) \sin\left(-\frac{f^2}{4(b+c)} + g \right) \right) \right)$$

01.07.21.1092.01

$$\int \cos\left(\sqrt{z}\, b\right)\cos\left(\sqrt{z}\, c+f\,z+g\right)dz = \frac{1}{2}\left(-\frac{(b-c)\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{(b-c)^2}{4f}-g\right)C\left(\frac{b-c-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right)-S\left(\frac{b-c-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right)\sin\left(\frac{(b-c)^2}{4f}-g\right)\right)}{(-f)^{3/2}}+\frac{\cos\left(\sqrt{z}\,(b+c)+f\,z\right)\sin(g)}{f}+\frac{\cos\left((b-c)\sqrt{z}-f\,z\right)\sin(g)}{f}-\frac{(b+c)\sqrt{\frac{\pi}{2}}\left(\cos\left(g-\frac{(b+c)^2}{4f}\right)C\left(\frac{b+c+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)-S\left(\frac{b+c+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)\sin\left(g-\frac{(b+c)^2}{4f}\right)\right)}{f^{3/2}}+\frac{\cos(g)\sin\left(\sqrt{z}\,(b+c)+f\,z\right)-\cos(g)\sin\left((b-c)\sqrt{z}-f\,z\right)}{f}\right)$$

Involving $\cos(b\,z^r+e)\cos(c\,z^r+f\,z+g)$

01.07.21.1093.01

$$\int \cos\left(b\,z^2+e\right)\cos\left(c\,z^2+f\,z+g\right)dz = \frac{1}{2\sqrt{b-c}\,\sqrt{b+c}}\left(\sqrt{\frac{\pi}{2}}\left(\sqrt{b+c}\,\cos\left(-\frac{f^2}{4(b-c)}+e-g\right)C\left(\frac{-f+2\,b\,z-2\,c\,z}{\sqrt{b-c}\,\sqrt{2\pi}}\right)+\sqrt{b-c}\,\cos\left(-\frac{f^2}{4(b+c)}+e+g\right)C\left(\frac{f+2(b+c)z}{\sqrt{b+c}\,\sqrt{2\pi}}\right)-\sqrt{b+c}\,S\left(\frac{-f+2\,b\,z-2\,c\,z}{\sqrt{b-c}\,\sqrt{2\pi}}\right)\sin\left(-\frac{f^2}{4(b-c)}+e-g\right)-\sqrt{b-c}\,S\left(\frac{f+2(b+c)z}{\sqrt{b+c}\,\sqrt{2\pi}}\right)\sin\left(-\frac{f^2}{4(b+c)}+e+g\right)\right)\right)$$

01.07.21.1094.01

$$\int \cos\left(\sqrt{z}\, b+e\right)\cos\left(\sqrt{z}\, c+f\,z+g\right)dz = \frac{1}{2}\left(-\frac{\cos\left((b-c)\sqrt{z}-f\,z\right)\sin(e-g)}{f}-\frac{1}{(-f)^{3/2}}\left((b-c)\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{(b-c)^2}{4f}+e-g\right)C\left(\frac{b-c-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right)-S\left(\frac{b-c-2f\sqrt{z}}{\sqrt{-f}\sqrt{2\pi}}\right)\sin\left(\frac{(b-c)^2}{4f}+e-g\right)\right)\right)+\frac{\cos\left(\sqrt{z}\,(b+c)+f\,z\right)\sin(e+g)}{f}-\frac{1}{f^{3/2}}\left((b+c)\sqrt{\frac{\pi}{2}}\left(\cos\left(-\frac{(b+c)^2}{4f}+e+g\right)C\left(\frac{b+c+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)-S\left(\frac{b+c+2f\sqrt{z}}{\sqrt{f}\sqrt{2\pi}}\right)\sin\left(-\frac{(b+c)^2}{4f}+e+g\right)\right)\right)+\frac{\cos(e+g)\sin\left(\sqrt{z}\,(b+c)+f\,z\right)-\cos(e-g)\sin\left((b-c)\sqrt{z}-f\,z\right)}{f}\right)$$

Involving $\cos(b z^r + d z)\cos(c z^r + f z + g)$

01.07.21.1095.01

$$\int \cos(b z^2 + d z)\cos(c z^2 + f z + g)\,dz = \frac{1}{2\sqrt{b-c}\sqrt{b+c}} \left(\sqrt{\frac{\pi}{2}}\left(\sqrt{b+c}\cos\left(\frac{(d-f)^2}{4(b-c)}+g\right)C\left(\frac{d-f+2bz-2cz}{\sqrt{b-c}\sqrt{2\pi}}\right)+\sqrt{b-c}\cos\left(-\frac{(d+f)^2}{4(b+c)}+g\right)C\left(\frac{d+f+2(b+c)z}{\sqrt{b+c}\sqrt{2\pi}}\right)+\sqrt{b+c}\,S\left(\frac{d-f+2bz-2cz}{\sqrt{b-c}\sqrt{2\pi}}\right)\sin\left(\frac{(d-f)^2}{4(b-c)}+g\right)-\sqrt{b-c}\,S\left(\frac{d+f+2(b+c)z}{\sqrt{b+c}\sqrt{2\pi}}\right)\sin\left(-\frac{(d+f)^2}{4(b+c)}+g\right)\right)\right)$$

01.07.21.1096.01

$$\int \cos(\sqrt{z}\,b + d z)\cos(\sqrt{z}\,c + f z + g)\,dz = \frac{1}{2}\left(\frac{\cos(\sqrt{z}\,(b+c)+(d+f)z)\sin(g)}{d+f} - \frac{\cos(\sqrt{z}\,(b-c)+(d-f)z)\sin(g)}{d-f} - \frac{1}{(d-f)^{3/2}}\left((b-c)\sqrt{\frac{\pi}{2}}\left(\cos\left(\frac{(b-c)^2}{4(d-f)}+g\right)C\left(\frac{b-c+2(d-f)\sqrt{z}}{\sqrt{d-f}\sqrt{2\pi}}\right)+S\left(\frac{b-c+2(d-f)\sqrt{z}}{\sqrt{d-f}\sqrt{2\pi}}\right)\sin\left(\frac{(b-c)^2}{4(d-f)}+g\right)\right)\right) - \frac{1}{(d+f)^{3/2}}\left((b+c)\sqrt{\frac{\pi}{2}}\left(\cos\left(g-\frac{(b+c)^2}{4(d+f)}\right)C\left(\frac{b+c+2(d+f)\sqrt{z}}{\sqrt{d+f}\sqrt{2\pi}}\right)-S\left(\frac{b+c+2(d+f)\sqrt{z}}{\sqrt{d+f}\sqrt{2\pi}}\right)\sin\left(g-\frac{(b+c)^2}{4(d+f)}\right)\right)\right) + \frac{\cos(g)\sin(\sqrt{z}\,(b-c)+(d-f)z)}{d-f} + \frac{\cos(g)\sin(\sqrt{z}\,(b+c)+(d+f)z)}{d+f}\right)$$

Involving $\cos(b z^r + d z + e)\cos(c z^r + f z + g)$

01.07.21.1097.01

$$\int \cos(b z^2 + d z + e)\cos(c z^2 + f z + g)\,dz = \frac{1}{2\sqrt{b-c}\sqrt{b+c}} \left(\sqrt{\frac{\pi}{2}}\left(\sqrt{b+c}\cos\left(-\frac{(d-f)^2}{4(b-c)}+e-g\right)C\left(\frac{d-f+2bz-2cz}{\sqrt{b-c}\sqrt{2\pi}}\right)+\sqrt{b-c}\cos\left(-\frac{(d+f)^2}{4(b+c)}+e+g\right)C\left(\frac{d+f+2(b+c)z}{\sqrt{b+c}\sqrt{2\pi}}\right)-\sqrt{b+c}\,S\left(\frac{d-f+2bz-2cz}{\sqrt{b-c}\sqrt{2\pi}}\right)\sin\left(-\frac{(d-f)^2}{4(b-c)}+e-g\right)-\sqrt{b-c}\,S\left(\frac{d+f+2(b+c)z}{\sqrt{b+c}\sqrt{2\pi}}\right)\sin\left(-\frac{(d+f)^2}{4(b+c)}+e+g\right)\right)\right)$$

01.07.21.1098.01

$$\int \cos\left(\sqrt{z}\, b + d\, z + e\right) \cos\left(\sqrt{z}\, c + f\, z + g\right) dz = \frac{1}{2}\left(\frac{\cos\left(\sqrt{z}\, (b-c) + (d-f)\, z\right) \sin(e-g)}{d-f} - \frac{1}{(d-f)^{3/2}} \left((b-c)\sqrt{\frac{\pi}{2}} \left(\cos\left(-\frac{(b-c)^2}{4\,(d-f)} + e - g\right) C\left(\frac{b-c+2\,(d-f)\sqrt{z}}{\sqrt{d-f}\,\sqrt{2\,\pi}}\right) - S\left(\frac{b-c+2\,(d-f)\sqrt{z}}{\sqrt{d-f}\,\sqrt{2\,\pi}}\right) \sin\left(-\frac{(b-c)^2}{4\,(d-f)} + e - g\right)\right)\right) + \frac{\cos\left(\sqrt{z}\, (b+c) + (d+f)\, z\right) \sin(e+g)}{d+f} - \frac{1}{(d+f)^{3/2}} \left((b+c)\sqrt{\frac{\pi}{2}} \left(\cos\left(-\frac{(b+c)^2}{4\,(d+f)} + e + g\right) C\left(\frac{b+c+2\,(d+f)\sqrt{z}}{\sqrt{d+f}\,\sqrt{2\,\pi}}\right) - S\left(\frac{b+c+2\,(d+f)\sqrt{z}}{\sqrt{d+f}\,\sqrt{2\,\pi}}\right) \sin\left(-\frac{(b+c)^2}{4\,(d+f)} + e + g\right)\right)\right) + \frac{\cos(e-g) \sin\left(\sqrt{z}\, (b-c) + (d-f)\, z\right)}{d-f} + \frac{\cos(e+g) \sin\left(\sqrt{z}\, (b+c) + (d+f)\, z\right)}{d+f}\right)$$

Involving products of several direct functions

Involving $\cos(a\, z + \alpha) \cos(b\, z + \beta) \cos(c\, z + \gamma)$

01.07.21.1099.01

$$\int \cos(a\, z) \cos(b\, z) \cos(c\, z)\, dz = \frac{1}{4}\left(\frac{\sin((a-b-c)\, z)}{a-b-c} + \frac{\sin((a+b-c)\, z)}{a+b-c} + \frac{\sin((a-b+c)\, z)}{a-b+c} + \frac{\sin((a+b+c)\, z)}{a+b+c}\right)$$

01.07.21.1100.01

$$\int \cos(a\, z + \alpha) \cos(b\, z + \beta) \cos(c\, z + \gamma)\, dz = \frac{1}{4}\left(\frac{\cos(\alpha-\beta-\gamma) \sin((a-b-c)\, z)}{a-b-c} + \frac{\cos(\alpha+\beta-\gamma) \sin((a+b-c)\, z)}{a+b-c} + \frac{\cos(\alpha-\beta+\gamma) \sin((a-b+c)\, z)}{a-b+c} + \frac{\cos(\alpha+\beta+\gamma) \sin((a+b+c)\, z)}{a+b+c} + \frac{\cos((a-b-c)\, z) \sin(\alpha-\beta-\gamma)}{a-b-c} + \frac{\cos((a+b-c)\, z) \sin(\alpha+\beta-\gamma)}{a+b-c} + \frac{\cos((a-b+c)\, z) \sin(\alpha-\beta+\gamma)}{a-b+c} + \frac{\cos((a+b+c)\, z) \sin(\alpha+\beta+\gamma)}{a+b+c}\right)$$

01.07.21.1101.01

$$\int \cos(z) \cos(a+z) \cos(b+z)\, dz = \frac{1}{12}\,(-3 \sin(a-b-z) + 3 \sin(a-b+z) + 3 \sin(a+b+z) + \sin(a+b+3\, z))$$

Involving $\prod_{k=1}^{n} \cos(a_k\, z)$

01.07.21.1102.01

$$\int \prod_{k=1}^{n} \cos(a_k\, z)\, dz = 2^{-n} \sum_{\substack{k_1=-1 \\ \Delta k_1=2}}^{1} \sum_{\substack{k_2=-1 \\ \Delta k_2=2}}^{1} \cdots \sum_{\substack{k_n=-1 \\ \Delta k_n=2}}^{1} \left(\frac{1}{\sum_{j=1}^{n} (k_j\, a_j)} \sin\left(z \sum_{j=1}^{n} k_j\, a_j\right)\right)$$

Involving products of powers of the direct function

Involving product of power of the direct function and the direct function

Involving $\cos(c\,z)\cos^{\nu}(a\,z)$

01.07.21.1103.01

$$\int \cos(c\,z)\cos^{\nu}(a\,z)\,dz = -\frac{i\,e^{-i\,c\,z}}{\left(c^2-a^2\,\nu^2\right)2}\cos^{\nu}(a\,z)\left(1+e^{2\,i\,a\,z}\right)^{-\nu}$$
$$\left(e^{2\,i\,c\,z}\,(c+a\,\nu)\,{}_2F_1\!\left(\frac{c-a\,\nu}{2\,a},-\nu;\frac{1}{2}\left(\frac{c}{a}-\nu+2\right);-e^{2\,i\,a\,z}\right)+(a\,\nu-c)\,{}_2F_1\!\left(-\frac{c+a\,\nu}{2\,a},-\nu;-\frac{c+a\,(\nu-2)}{2\,a};-e^{2\,i\,a\,z}\right)\right)$$

01.07.21.1104.01

$$\int \cos(c\,z)\cos^{\nu}(a\,z)\,dz = \frac{2^{-\nu}}{c}\left(\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(c\,z)+\right.$$
$$\left. c\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\frac{(c+2\,a\,s-a\,\nu)\sin((c-2\,a\,s+a\,\nu)\,z)+(c-2\,a\,s+a\,\nu)\sin((c+2\,a\,s-a\,\nu)\,z)}{(c+2\,a\,s-a\,\nu)\,(c-2\,a\,s+a\,\nu)}\right)/;\nu\in\mathbb{N}^+$$

01.07.21.1105.01

$$\int \cos(c\,z)\cos^{\frac{1}{2}}(a\,z)\,dz = \left(i\,e^{-i\,c\,z}\sqrt{e^{-i\,a\,z}+e^{i\,a\,z}}\left((a-2\,c)\,{}_2F_1\!\left(-\frac{a+2\,c}{4\,a},-\frac{1}{2};\frac{3}{4}-\frac{c}{2\,a};-e^{2\,i\,a\,z}\right)+\right.\right.$$
$$\left.\left.(a+2\,c)\,e^{2\,i\,c\,z}\,{}_2F_1\!\left(\frac{c}{2\,a}-\frac{1}{4},-\frac{1}{2};\frac{c}{2\,a}+\frac{3}{4};-e^{2\,i\,a\,z}\right)\right)\right)\Big/\left(\sqrt{2}\,\left(a^2-4\,c^2\right)\sqrt{1+e^{2\,i\,a\,z}}\right)$$

01.07.21.1106.01

$$\int \frac{\cos(c\,z)}{\cos^{\frac{1}{2}}(a\,z)}\,dz = -\left(i\sqrt{2}\,e^{-i\,c\,z}\sqrt{1+e^{2\,i\,a\,z}}\left((a-2\,c)\,e^{2\,i\,c\,z}\,{}_2F_1\!\left(\frac{a+2\,c}{4\,a},\frac{1}{2};\frac{c}{2\,a}+\frac{5}{4};-e^{2\,i\,a\,z}\right)+\right.\right.$$
$$\left.\left.(a+2\,c)\,{}_2F_1\!\left(\frac{a-2\,c}{4\,a},\frac{1}{2};\frac{5}{4}-\frac{c}{2\,a};-e^{2\,i\,a\,z}\right)\right)\right)\Big/\left(\left(a^2-4\,c^2\right)\sqrt{e^{-i\,a\,z}+e^{i\,a\,z}}\right)$$

01.07.21.1107.01

$$\int \cos((\nu+2)\,z)\cos^{\nu}(z)\,dz = \frac{\cos^{\nu+1}(z)\sin(z\,(\nu+1))}{\nu+1}$$

01.07.21.1108.01

$$\int \cos(a\,z)\cos^{\frac{1}{2}}(2\,a\,z)\,dz = \frac{\sqrt{2}\,\sin^{-1}\!\left(\sqrt{2}\,\sin(a\,z)\right)+2\cos^{\frac{1}{2}}(2\,a\,z)\sin(a\,z)}{4\,a}$$

01.07.21.1109.01

$$\int \frac{\cos(a\,z)}{\cos^{\frac{1}{2}}(2\,a\,z)}\,dz = \frac{\sin^{-1}\!\left(\sqrt{2}\,\sin(a\,z)\right)}{\sqrt{2}\,a}$$

01.07.21.1110.01

$$\int \cos(2\,a\,z)\cos^{\nu}(a\,z)\,dz = \frac{1}{a\,(\nu-2)\,(\nu+2)}\left(i\,2^{-\nu-1}\,e^{-2\,i\,a\,z}\left(e^{-i\,a\,z}+e^{i\,a\,z}\right)^{\nu}\left(1+e^{2\,i\,a\,z}\right)^{-\nu}\right.$$
$$\left.\left((\nu-2)\,{}_2F_1\!\left(-\frac{\nu}{2}-1,-\nu;-\frac{\nu}{2};-e^{2\,i\,a\,z}\right)+e^{4\,i\,a\,z}\,(\nu+2)\,{}_2F_1\!\left(1-\frac{\nu}{2},-\nu;2-\frac{\nu}{2};-e^{2\,i\,a\,z}\right)\right)\right)$$

Involving $\cos(c\,z+d)\cos^{\nu}(a\,z)$

01.07.21.1111.01

$$\int \cos(d+c\,z)\cos^{\nu}(a\,z)\,dz = -\frac{1}{2\,(c-a\,\nu)\,(c+a\,\nu)}\left(i\,e^{-i\,(d+c\,z)}\left(1+e^{2\,i\,a\,z}\right)^{-\nu}\cos^{\nu}(a\,z)\right.$$
$$\left.\left(e^{2\,i\,(d+c\,z)}\,(c+a\,\nu)\,{}_2F_1\!\left(\frac{c-a\,\nu}{2\,a},-\nu;\frac{1}{2}\left(\frac{c}{a}-\nu+2\right);-e^{2\,i\,a\,z}\right)+(a\,\nu-c)\,{}_2F_1\!\left(-\frac{c+a\,\nu}{2\,a},-\nu;-\frac{c+a\,(\nu-2)}{2\,a};-e^{2\,i\,a\,z}\right)\right)\right)$$

01.07.21.1112.01

$$\int \cos(d+c\,z)\cos^{\nu}(a\,z)\,dz =$$
$$\frac{1}{c}\,2^{-\nu}\left(\binom{\nu}{\frac{\nu}{2}}\sin(d+c\,z)\,(1-\nu\bmod 2)+c\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\,((c+2\,a\,s-a\,\nu)\sin(d+(c-2\,a\,s+a\,\nu)\,z)+(c-2\,a\,s+a\,\nu)\right.$$
$$\left.\sin(d+c\,z+2\,a\,s\,z-a\,\nu\,z))\,/\,((c+2\,a\,s-a\,\nu)\,(c-2\,a\,s+a\,\nu))\right)\,/;\,\nu\in\mathbb{N}^{+}$$

Involving $\cos(c\,z)\cos^{\nu}(a\,z+b)$

01.07.21.1113.01

$$\int \cos(c\,z)\cos^{\nu}(b+a\,z)\,dz = -\frac{1}{2\,(c-a\,\nu)\,(c+a\,\nu)}\left(i\,e^{-i\,c\,z}\left(1+e^{2\,i\,(b+a\,z)}\right)^{-\nu}\cos^{\nu}(b+a\,z)\right.$$
$$\left.\left(e^{2\,i\,c\,z}\,(c+a\,\nu)\,{}_2F_1\!\left(\frac{c-a\,\nu}{2\,a},-\nu;\frac{1}{2}\left(\frac{c}{a}-\nu+2\right);-e^{2\,i\,(b+a\,z)}\right)+(a\,\nu-c)\,{}_2F_1\!\left(-\frac{c+a\,\nu}{2\,a},-\nu;-\frac{c+a\,(\nu-2)}{2\,a};-e^{2\,i\,(b+a\,z)}\right)\right)\right)$$

01.07.21.1114.01

$$\int \cos(c\,z)\cos^{\nu}(b+a\,z)\,dz =$$
$$\frac{1}{c}\,2^{-\nu}\left(\binom{\nu}{\frac{\nu}{2}}\sin(c\,z)\,(1-\nu\bmod 2)+c\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\,((c+2\,a\,s-a\,\nu)\sin(b\,(\nu-2\,s)+(c-2\,a\,s+a\,\nu)\,z)+(c-2\,a\,s+a\,\nu)\right.$$
$$\left.\sin(2\,b\,s-b\,\nu+c\,z+2\,a\,s\,z-a\,\nu\,z))\,/\,((c+2\,a\,s-a\,\nu)\,(c-2\,a\,s+a\,\nu))\right)\,/;\,\nu\in\mathbb{N}^{+}$$

Involving $\cos(c\,z+d)\cos^{\nu}(a\,z+b)$

01.07.21.1115.01

$$\int \cos(d+c\,z)\cos^{\nu}(b+a\,z)\,dz = -\frac{1}{2\,(c-a\,\nu)\,(c+a\,\nu)}\left(i\,e^{-i\,(d+c\,z)}\left(1+e^{2\,i\,(b+a\,z)}\right)^{-\nu}\cos^{\nu}(b+a\,z)\left(e^{2\,i\,(d+c\,z)}\,(c+a\,\nu)\,{}_2F_1\!\left(\frac{c-a\,\nu}{2\,a},-\nu;\frac{1}{2}\left(\frac{c}{a}-\nu+2\right);-e^{2\,i\,(b+a\,z)}\right)+(a\,\nu-c)\,{}_2F_1\!\left(-\frac{c+a\,\nu}{2\,a},-\nu;-\frac{c+a\,(\nu-2)}{2\,a};-e^{2\,i\,(b+a\,z)}\right)\right)\right)$$

01.07.21.1116.01

$$\int \cos(d+c\,z)\cos^{\nu}(b+a\,z)\,dz = \frac{1}{c}\,2^{-\nu}\left(\binom{\nu}{\frac{\nu}{2}}\sin(d+c\,z)\,(1-\nu \bmod 2)+c\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\big((c+2\,a\,s-a\,\nu)\sin(d+b\,(\nu-2\,s)+(c-2\,a\,s+a\,\nu)\,z)+(c-2\,a\,s+a\,\nu)\sin(d+2\,b\,s-b\,\nu+c\,z+2\,a\,s\,z-a\,\nu\,z)\big)/((c+2\,a\,s-a\,\nu)\,(c-2\,a\,s+a\,\nu))\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos\left(b\,z^r\right)\cos^{\nu}(c\,z)$

01.07.21.1117.01

$$\int \cos\left(b\,z^2\right)\cos^{\nu}(c\,z)\,dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{\sqrt{b}}\,C\!\left(\sqrt{b}\,\sqrt{\frac{2}{\pi}}\,z\right)+\frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{-b}}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\cos\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,b}\right)C\!\left(\frac{-2\,c\,s+c\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)+\cos\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,b}\right)C\!\left(\frac{2\,c\,s-c\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)-S\!\left(\frac{-2\,c\,s+c\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,b}\right)-S\!\left(\frac{2\,c\,s-c\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,b}\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1118.01

$$\int \cos\left(b\sqrt{z}\right)\cos^{\nu}(c\,z)\,dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos\left(b\sqrt{z}\right)+b\sqrt{z}\,\sin\left(b\sqrt{z}\right)\right)}{b^2}+2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{1}{2\,(2\,c\,k-c\,\nu)^{3/2}}\left(-b\sqrt{2\,\pi}\,\cos\left(\frac{b^2}{4\,(2\,c\,k-c\,\nu)}\right)C\!\left(\frac{b+2\,(2\,c\,k-c\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,c\,k-c\,\nu}}\right)-b\sqrt{2\,\pi}\,S\!\left(\frac{b+2\,(2\,c\,k-c\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,c\,k-c\,\nu}}\right)\sin\left(\frac{b^2}{4\,(2\,c\,k-c\,\nu)}\right)+2\sqrt{2\,c\,k-c\,\nu}\,\sin\left(\sqrt{z}\,b+(2\,c\,k-c\,\nu)\,z\right)\right)+\frac{1}{2\,(2\,c\,k-c\,\nu)^{3/2}}\left(b\sqrt{2\,\pi}\,\cos\left(\frac{b^2}{4\,(2\,c\,k-c\,\nu)}\right)C\!\left(\frac{2\,(2\,c\,k-c\,\nu)\sqrt{z}-b}{\sqrt{2\,\pi}\,\sqrt{2\,c\,k-c\,\nu}}\right)+b\sqrt{2\,\pi}\,S\!\left(\frac{2\,(2\,c\,k-c\,\nu)\sqrt{z}-b}{\sqrt{2\,\pi}\,\sqrt{2\,c\,k-c\,\nu}}\right)\sin\left(\frac{b^2}{4\,(2\,c\,k-c\,\nu)}\right)-2\sqrt{2\,c\,k-c\,\nu}\,\sin\left(b\sqrt{z}-(2\,c\,k-c\,\nu)\,z\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos(b z^r + e) \cos^\nu(c z)$

01.07.21.1119.01

$$\int \cos(b z^2 + e)\cos^\nu(c z)\,dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{\sqrt{b}}\left(\cos(e)\,C\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right) - S\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right)\sin(e)\right) + \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{-b}}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\cos\left(-\frac{(c\nu-2cs)^2}{4b}+e\right)C\left(\frac{-2cs+c\nu-2bz}{\sqrt{-b}\sqrt{2\pi}}\right)+\cos\left(-\frac{(2cs-c\nu)^2}{4b}+e\right)C\left(\frac{2cs-c\nu-2bz}{\sqrt{-b}\sqrt{2\pi}}\right) + S\left(\frac{-2cs+c\nu-2bz}{\sqrt{-b}\sqrt{2\pi}}\right)\sin\left(-\frac{(c\nu-2cs)^2}{4b}+e\right)+S\left(\frac{2cs-c\nu-2bz}{\sqrt{-b}\sqrt{2\pi}}\right)\sin\left(-\frac{(2cs-c\nu)^2}{4b}+e\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.07.21.1120.01

$$\int \cos\left(\sqrt{z}\,b + e\right)\cos^\nu(c z)\,dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos\left(\sqrt{z}\,b+e\right)+b\sqrt{z}\,\sin\left(\sqrt{z}\,b+e\right)\right)}{b^2} + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{1}{2(2ck-c\nu)^{3/2}}\left(-b\sqrt{2\pi}\,\cos\left(e-\frac{b^2}{4(2ck-c\nu)}\right)C\left(\frac{b+2(2ck-c\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2ck-c\nu}}\right) + b\sqrt{2\pi}\,S\left(\frac{b+2(2ck-c\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2ck-c\nu}}\right)\sin\left(e-\frac{b^2}{4(2ck-c\nu)}\right)+2\sqrt{2ck-c\nu}\,\sin\left(\sqrt{z}\,b+e+(2ck-c\nu)z\right)\right) + \frac{1}{2(2ck-c\nu)^{3/2}}\left(b\sqrt{2\pi}\,\cos\left(\frac{b^2}{4(2ck-c\nu)}+e\right)C\left(\frac{2(2ck-c\nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{2ck-c\nu}}\right)+b\sqrt{2\pi}\,S\left(\frac{2(2ck-c\nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{2ck-c\nu}}\right) \sin\left(\frac{b^2}{4(2ck-c\nu)}+e\right)-2\sqrt{2ck-c\nu}\,\sin\left(\sqrt{z}\,b+e-(2ck-c\nu)z\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\cos(b z^r + d z) \cos^\nu(c z)$

01.07.21.1121.01

$$\int \cos(b z^2 + d z)\cos^\nu(c z)\,dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{\sqrt{b}}\left(\cos\left(\frac{d^2}{4b}\right)C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right)+S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right)\sin\left(\frac{d^2}{4b}\right)\right)+\frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{-b}} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\cos\left(\frac{(-d-2cs+c\nu)^2}{4b}\right)C\left(\frac{-d-2cs+c\nu-2bz}{\sqrt{-b}\sqrt{2\pi}}\right)+\cos\left(\frac{(-d+2cs-c\nu)^2}{4b}\right)C\left(\frac{-d+2cs-c\nu-2bz}{\sqrt{-b}\sqrt{2\pi}}\right) - S\left(\frac{-d-2cs+c\nu-2bz}{\sqrt{-b}\sqrt{2\pi}}\right)\sin\left(\frac{(-d-2cs+c\nu)^2}{4b}\right)-S\left(\frac{-d+2cs-c\nu-2bz}{\sqrt{-b}\sqrt{2\pi}}\right)\sin\left(\frac{(-d+2cs-c\nu)^2}{4b}\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.07.21.1122.01

$$\int \cos\left(\sqrt{z}\, b + d\, z\right) \cos^{\nu}(c\, z)\, dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b\sqrt{2\pi} \cos\left(\frac{b^2}{4\, d}\right) C\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) - b\sqrt{2\pi}\, S\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d}\right) + 2\sqrt{d}\, \sin\left(\sqrt{z}\, b + d\, z\right)\right)\right) + 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(b\sqrt{2\pi} \cos\left(\frac{b^2}{4\,(-d - 2\, c\, s + c\, \nu)}\right) C\left(\frac{2\,(-d - 2\, c\, s + c\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{-d - 2\, c\, s + c\, \nu}}\right) + b\sqrt{2\pi}\, S\left(\frac{2\,(-d - 2\, c\, s + c\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{-d - 2\, c\, s + c\, \nu}}\right) \sin\left(\frac{b^2}{4\,(-d - 2\, c\, s + c\, \nu)}\right) - 2\sqrt{-d - 2\, c\, s + c\, \nu}\, \sin\left(\sqrt{z}\, b - (-d - 2\, c\, s + c\, \nu)\, z\right)\right) \Big/ \left(2\,(-d - 2\, c\, s + c\, \nu)^{3/2}\right) + \left(b\sqrt{2\pi} \cos\left(\frac{b^2}{4\,(-d + 2\, c\, s - c\, \nu)}\right) C\left(\frac{2\,(-d + 2\, c\, s - c\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{-d + 2\, c\, s - c\, \nu}}\right) + b\sqrt{2\pi}\, S\left(\frac{2\,(-d + 2\, c\, s - c\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{-d + 2\, c\, s - c\, \nu}}\right) \sin\left(\frac{b^2}{4\,(-d + 2\, c\, s - c\, \nu)}\right) - 2\sqrt{-d + 2\, c\, s - c\, \nu}\, \sin\left(\sqrt{z}\, b - (-d + 2\, c\, s - c\, \nu)\, z\right)\right) \Big/ \left(2\,(-d + 2\, c\, s - c\, \nu)^{3/2}\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos\left(b\, z^r + d\, z + e\right) \cos^{\nu}(c\, z)$

01.07.21.1123.01

$$\int \cos\left(b\, z^2 + d\, z + e\right) \cos^{\nu}(c\, z)\, dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1 - \nu \bmod 2)}{\sqrt{b}} \left(\cos\left(\frac{d^2}{4\, b} - e\right) C\left(\frac{d + 2\, b\, z}{\sqrt{b}\,\sqrt{2\pi}}\right) + S\left(\frac{d + 2\, b\, z}{\sqrt{b}\,\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4\, b} - e\right)\right) + \frac{1}{\sqrt{-b}} \left(\left(2^{-\nu-\frac{1}{2}}\sqrt{\pi}\right) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\cos\left(e - \frac{(-d - 2\, c\, s + c\, \nu)^2}{4\, b}\right) C\left(\frac{-d - 2\, c\, s + c\, \nu - 2\, b\, z}{\sqrt{-b}\,\sqrt{2\pi}}\right) + \cos\left(e - \frac{(-d + 2\, c\, s - c\, \nu)^2}{4\, b}\right) C\left(\frac{-d + 2\, c\, s - c\, \nu - 2\, b\, z}{\sqrt{-b}\,\sqrt{2\pi}}\right) + S\left(\frac{-d - 2\, c\, s + c\, \nu - 2\, b\, z}{\sqrt{-b}\,\sqrt{2\pi}}\right) \sin\left(e - \frac{(-d - 2\, c\, s + c\, \nu)^2}{4\, b}\right) + S\left(\frac{-d + 2\, c\, s - c\, \nu - 2\, b\, z}{\sqrt{-b}\,\sqrt{2\pi}}\right) \sin\left(e - \frac{(-d + 2\, c\, s - c\, \nu)^2}{4\, b}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1124.01

$$\int \cos\left(\sqrt{z}\, b + d\, z + e\right) \cos^{\nu}(c\, z)\, dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b \sqrt{2\pi} \cos\left(\frac{b^2}{4\, d} - e\right) C\left(\frac{b + 2\, d \sqrt{z}}{\sqrt{d} \sqrt{2\pi}}\right) - b \sqrt{2\pi}\, S\left(\frac{b + 2\, d \sqrt{z}}{\sqrt{d} \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d} - e\right) + 2 \sqrt{d} \sin\left(\sqrt{z}\, b + e + d\, z\right)\right)\right) + 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(b \sqrt{2\pi} \cos\left(\frac{b^2}{4 (-d - 2\, c\, s + c\, \nu)} + e\right) C\left(\frac{2 (-d - 2\, c\, s + c\, \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{-d - 2\, c\, s + c\, \nu}}\right) + b \sqrt{2\pi}\, S\left(\frac{2 (-d - 2\, c\, s + c\, \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{-d - 2\, c\, s + c\, \nu}}\right) \sin\left(\frac{b^2}{4 (-d - 2\, c\, s + c\, \nu)} + e\right) - 2 \sqrt{-d - 2\, c\, s + c\, \nu} \sin\left(\sqrt{z}\, b + e - (-d - 2\, c\, s + c\, \nu)\, z\right)\right) \Big/ \left(2 (-d - 2\, c\, s + c\, \nu)^{3/2}\right) + \left(b \sqrt{2\pi} \cos\left(\frac{b^2}{4 (-d + 2\, c\, s - c\, \nu)} + e\right) C\left(\frac{2 (-d + 2\, c\, s - c\, \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{-d + 2\, c\, s - c\, \nu}}\right) + b \sqrt{2\pi}\, S\left(\frac{2 (-d + 2\, c\, s - c\, \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{-d + 2\, c\, s - c\, \nu}}\right) \sin\left(\frac{b^2}{4 (-d + 2\, c\, s - c\, \nu)} + e\right) - 2 \sqrt{-d + 2\, c\, s - c\, \nu} \sin\left(\sqrt{z}\, b + e - (-d + 2\, c\, s - c\, \nu)\, z\right)\right) \Big/ \left(2 (-d + 2\, c\, s - c\, \nu)^{3/2}\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos\left(b\, z^r\right) \cos^{\nu}(f\, z + g)$

01.07.21.1125.01

$$\int \cos\left(b\, z^2\right) \cos^{\nu}(f\, z + g)\, dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{\sqrt{b}}\, C\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) + \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{-b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\cos\left(-\frac{(f\, \nu - 2\, f\, s)^2}{4\, b} + 2\, g\, s - g\, \nu\right) C\left(\frac{-2\, f\, s + f\, \nu - 2\, b\, z}{\sqrt{-b} \sqrt{2\pi}}\right) + \cos\left(-\frac{(2\, f\, s - f\, \nu)^2}{4\, b} - 2\, g\, s + g\, \nu\right) C\left(\frac{2\, f\, s - f\, \nu - 2\, b\, z}{\sqrt{-b} \sqrt{2\pi}}\right) + S\left(\frac{-2\, f\, s + f\, \nu - 2\, b\, z}{\sqrt{-b} \sqrt{2\pi}}\right) \sin\left(-\frac{(f\, \nu - 2\, f\, s)^2}{4\, b} + 2\, g\, s - g\, \nu\right) + S\left(\frac{2\, f\, s - f\, \nu - 2\, b\, z}{\sqrt{-b} \sqrt{2\pi}}\right) \sin\left(-\frac{(2\, f\, s - f\, \nu)^2}{4\, b} - 2\, g\, s + g\, \nu\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1126.01

$$\int \cos\left(b\sqrt{z}\right)\cos^{\nu}(g+f\,z)\,dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos\left(b\sqrt{z}\right)+b\sqrt{z}\,\sin\left(b\sqrt{z}\right)\right)}{b^2} + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{1}{2\,(2\,f\,k-f\,\nu)^{3/2}}\left(-b\sqrt{2\pi}\,\cos\left(-\frac{b^2}{4\,(2\,f\,k-f\,\nu)}+2\,g\,k-g\,\nu\right)C\left(\frac{b+2\,(2\,f\,k-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,f\,k-f\,\nu}}\right)+ b\sqrt{2\pi}\,S\left(\frac{b+2\,(2\,f\,k-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,f\,k-f\,\nu}}\right)\sin\left(-\frac{b^2}{4\,(2\,f\,k-f\,\nu)}+2\,g\,k-g\,\nu\right)+ 2\sqrt{2\,f\,k-f\,\nu}\,\sin\left(\sqrt{z}\,b+2\,g\,k-g\,\nu+(2\,f\,k-f\,\nu)\,z\right)\right)+\frac{1}{2\,(2\,f\,k-f\,\nu)^{3/2}} \left(b\sqrt{2\pi}\,\cos\left(-\frac{b^2}{4\,(2\,f\,k-f\,\nu)}+2\,g\,k-g\,\nu\right)C\left(\frac{2\,(2\,f\,k-f\,\nu)\sqrt{z}-b}{\sqrt{2\pi}\,\sqrt{2\,f\,k-f\,\nu}}\right)-b\sqrt{2\pi}\,S\left(\frac{2\,(2\,f\,k-f\,\nu)\sqrt{z}-b}{\sqrt{2\pi}\,\sqrt{2\,f\,k-f\,\nu}}\right) \sin\left(-\frac{b^2}{4\,(2\,f\,k-f\,\nu)}+2\,g\,k-g\,\nu\right)+2\sqrt{2\,f\,k-f\,\nu}\,\sin\left(-\sqrt{z}\,b+2\,g\,k-g\,\nu+(2\,f\,k-f\,\nu)\,z\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\cos\left(b\,z^r+e\right)\cos^{\nu}(f\,z+g)$

01.07.21.1127.01

$$\int \cos\left(b\,z^2+e\right)\cos^{\nu}(f\,z+g)\,dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{\sqrt{b}}\left(\cos(e)\,C\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right)-S\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right)\sin(e)\right)+\frac{1}{\sqrt{-b}}\left(\left(2^{-\nu-\frac{1}{2}}\sqrt{\pi}\right) \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\cos\left(-\frac{(f\,\nu-2\,f\,s)^2}{4\,b}+e+2\,g\,s-g\,\nu\right)C\left(\frac{-2\,f\,s+f\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\pi}}\right)+\cos\left(-\frac{(2\,f\,s-f\,\nu)^2}{4\,b}+e-2\,g\,s+g\,\nu\right) C\left(\frac{2\,f\,s-f\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\pi}}\right)+S\left(\frac{-2\,f\,s+f\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(f\,\nu-2\,f\,s)^2}{4\,b}+e+2\,g\,s-g\,\nu\right)+ S\left(\frac{2\,f\,s-f\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,f\,s-f\,\nu)^2}{4\,b}+e-2\,g\,s+g\,\nu\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.07.21.1128.01

$$\int \cos\left(\sqrt{z}\, b+e\right) \cos^{\nu}(g+f z)\, dz = \frac{2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\cos\left(\sqrt{z}\, b+e\right)+b \sqrt{z} \sin\left(\sqrt{z}\, b+e\right)\right)}{b^2} + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{1}{2 (2 f k-f \nu)^{3/2}} \left(-b \sqrt{2 \pi} \cos\left(-\frac{b^2}{4 (2 f k-f \nu)}+e+2 g k-g \nu\right) C\left(\frac{b+2 (2 f k-f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 f k-f \nu}}\right) + b \sqrt{2 \pi}\, S\left(\frac{b+2 (2 f k-f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 f k-f \nu}}\right) \sin\left(-\frac{b^2}{4 (2 f k-f \nu)}+e+2 g k-g \nu\right) + 2 \sqrt{2 f k-f \nu} \sin\left(\sqrt{z}\, b+e+2 g k-g \nu+(2 f k-f \nu) z\right)\right) + \frac{1}{2 (2 f k-f \nu)^{3/2}} \left(b \sqrt{2 \pi} \cos\left(\frac{b^2}{4 (2 f k-f \nu)}+e-2 g k+g \nu\right) C\left(\frac{2 (2 f k-f \nu) \sqrt{z}-b}{\sqrt{2 \pi} \sqrt{2 f k-f \nu}}\right) + b \sqrt{2 \pi}\, S\left(\frac{2 (2 f k-f \nu) \sqrt{z}-b}{\sqrt{2 \pi} \sqrt{2 f k-f \nu}}\right) \sin\left(\frac{b^2}{4 (2 f k-f \nu)}+e-2 g k+g \nu\right) - 2 \sqrt{2 f k-f \nu} \sin\left(\sqrt{z}\, b+e-2 g k+g \nu-(2 f k-f \nu) z\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos\left(b z^r + d z\right) \cos^{\nu}(f z+g)$

01.07.21.1129.01

$$\int \cos\left(b z^2+d z\right) \cos^{\nu}(f z+g)\, dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{\sqrt{b}} \left(\cos\left(\frac{d^2}{4 b}\right) C\left(\frac{d+2 b z}{\sqrt{b} \sqrt{2 \pi}}\right)+S\left(\frac{d+2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) \sin\left(\frac{d^2}{4 b}\right)\right) + \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{-b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\cos\left(-\frac{(-d-2 f s+f \nu)^2}{4 b}+2 g s-g \nu\right) C\left(\frac{-d-2 f s+f \nu-2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right)+\cos\left(-\frac{(-d+2 f s-f \nu)^2}{4 b}-2 g s+g \nu\right) C\left(\frac{-d+2 f s-f \nu-2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right)+S\left(\frac{-d-2 f s+f \nu-2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) \sin\left(-\frac{(-d-2 f s+f \nu)^2}{4 b}+2 g s-g \nu\right)+S\left(\frac{-d+2 f s-f \nu-2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) \sin\left(-\frac{(-d+2 f s-f \nu)^2}{4 b}-2 g s+g \nu\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1130.01

$$\int \cos\left(\sqrt{z}\, b + d\, z\right) \cos^{\nu}(f\, z + g)\, dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, d}\right) C\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) - b\sqrt{2\pi}\, S\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d}\right) + 2\sqrt{d}\, \sin\left(\sqrt{z}\, b + d\, z\right)\right)\right) +$$

$$2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\left(b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4(-d - 2\, f\, s + f\, \nu)} + 2\, g\, s - g\, \nu\right) C\left(\frac{2(-d - 2\, f\, s + f\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d - 2\, f\, s + f\, \nu}}\right) + \right.\right.\right.$$

$$b\sqrt{2\pi}\, S\left(\frac{2(-d - 2\, f\, s + f\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{-d - 2\, f\, s + f\, \nu}}\right) \sin\left(\frac{b^2}{4(-d - 2\, f\, s + f\, \nu)} + 2\, g\, s - g\, \nu\right) -$$

$$\left.\left. 2\sqrt{-d - 2\, f\, s + f\, \nu}\, \sin\left(\sqrt{z}\, b + 2\, g\, s - g\, \nu - (-d - 2\, f\, s + f\, \nu)\, z\right)\right) \Big/ \left(2(-d - 2\, f\, s + f\, \nu)^{3/2}\right) +$$

$$\left(b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4(-d + 2\, f\, s - f\, \nu)} - 2\, g\, s + g\, \nu\right) C\left(\frac{2(-d + 2\, f\, s - f\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{-d + 2\, f\, s - f\, \nu}}\right) + \right.$$

$$b\sqrt{2\pi}\, S\left(\frac{2(-d + 2\, f\, s - f\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{-d + 2\, f\, s - f\, \nu}}\right) \sin\left(\frac{b^2}{4(-d + 2\, f\, s - f\, \nu)} - 2\, g\, s + g\, \nu\right) -$$

$$\left.\left. 2\sqrt{-d + 2\, f\, s - f\, \nu}\, \sin\left(\sqrt{z}\, b - 2\, g\, s + g\, \nu - (-d + 2\, f\, s - f\, \nu)\, z\right)\right) \Big/ \left(2(-d + 2\, f\, s - f\, \nu)^{3/2}\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos\left(b\, z^r + d\, z + e\right) \cos^{\nu}(f\, z + g)$

01.07.21.1131.01

$$\int \cos\left(b z^2 + d z + e\right) \cos^\nu(f z + g)\, dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{\sqrt{b}} \left(\cos\left(\frac{d^2}{4 b} - e\right) C\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) + S\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4 b} - e\right)\right) + \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{-b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\cos\left(-\frac{(-d - 2 f s + f \nu)^2}{4 b} + e + 2 g s - g \nu\right) C\left(\frac{-d - 2 f s + f \nu - 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) + \cos\left(-\frac{(-d + 2 f s - f \nu)^2}{4 b} + e - 2 g s + g \nu\right) C\left(\frac{-d + 2 f s - f \nu - 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) + S\left(\frac{-d - 2 f s + f \nu - 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) \sin\left(-\frac{(-d - 2 f s + f \nu)^2}{4 b} + e + 2 g s - g \nu\right) + S\left(\frac{-d + 2 f s - f \nu - 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) \sin\left(-\frac{(-d + 2 f s - f \nu)^2}{4 b} + e - 2 g s + g \nu\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1132.01

$$\int \cos\left(\sqrt{z}\, b + d z + e\right) \cos^\nu(f z + g)\, dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b \sqrt{2\pi} \cos\left(\frac{b^2}{4 d} - e\right) C\left(\frac{b + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2\pi}}\right) - b \sqrt{2\pi}\, S\left(\frac{b + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4 d} - e\right) + 2 \sqrt{d} \sin\left(\sqrt{z}\, b + e + d z\right)\right)\right) + 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(b \sqrt{2\pi} \cos\left(\frac{b^2}{4 (-d - 2 f s + f \nu)} + e + 2 g s - g \nu\right) C\left(\frac{2 (-d - 2 f s + f \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{-d - 2 f s + f \nu}}\right) + b \sqrt{2\pi}\, S\left(\frac{2 (-d - 2 f s + f \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{-d - 2 f s + f \nu}}\right) \sin\left(\frac{b^2}{4 (-d - 2 f s + f \nu)} + e + 2 g s - g \nu\right) - 2 \sqrt{-d - 2 f s + f \nu} \sin\left(\sqrt{z}\, b + e + 2 g s - g \nu - (-d - 2 f s + f \nu) z\right)\right) \Big/ \left(2 (-d - 2 f s + f \nu)^{3/2}\right) + \left(b \sqrt{2\pi} \cos\left(\frac{b^2}{4 (-d + 2 f s - f \nu)} + e - 2 g s + g \nu\right) C\left(\frac{2 (-d + 2 f s - f \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{-d + 2 f s - f \nu}}\right) + b \sqrt{2\pi}\, S\left(\frac{2 (-d + 2 f s - f \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{-d + 2 f s - f \nu}}\right) \sin\left(\frac{b^2}{4 (-d + 2 f s - f \nu)} + e - 2 g s + g \nu\right) - 2 \sqrt{-d + 2 f s - f \nu} \sin\left(\sqrt{z}\, b + e - 2 g s + g \nu - (-d + 2 f s - f \nu) z\right)\right) \Big/ \left(2 (-d + 2 f s - f \nu)^{3/2}\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(b\,z)\cos^{\nu}(c\,z^{r})$

01.07.21.1133.01

$$\int \cos(b\,z)\cos^{\nu}(c\,z^{2})\,dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(b\,z)}{b} + 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\,\nu-2\,c\,s}}\left(\cos\left(\frac{b^{2}}{4\,(c\,\nu-2\,c\,s)}\right)C\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-b}{\sqrt{2\,\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)+S\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-b}{\sqrt{2\,\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)\sin\left(\frac{b^{2}}{4\,(c\,\nu-2\,c\,s)}\right)\right)+\frac{1}{\sqrt{2\,c\,s-c\,\nu}}\left(\cos\left(\frac{b^{2}}{4\,(2\,c\,s-c\,\nu)}\right)C\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-b}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)+S\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-b}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)\sin\left(\frac{b^{2}}{4\,(2\,c\,s-c\,\nu)}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^{+}$$

01.07.21.1134.01

$$\int \cos(b\,z)\cos^{\nu}\left(\sqrt{z}\;c\right)dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(b\,z)}{b} + 2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{2\,(-b)^{3/2}}\left(\sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\cos\left(\frac{(c\,\nu-2\,c\,s)^{2}}{4\,b}\right)C\left(\frac{-2\sqrt{z}\;b-2\,c\,s+c\,\nu}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)+\sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{-2\sqrt{z}\;b-2\,c\,s+c\,\nu}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(c\,\nu-2\,c\,s)^{2}}{4\,b}\right)-2\sqrt{-b}\,\sin\left(b\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)+\frac{1}{2\,(-b)^{3/2}}\left(\sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\cos\left(\frac{(2\,c\,s-c\,\nu)^{2}}{4\,b}\right)C\left(\frac{-2\sqrt{z}\;b+2\,c\,s-c\,\nu}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)+\sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{-2\sqrt{z}\;b+2\,c\,s-c\,\nu}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(2\,c\,s-c\,\nu)^{2}}{4\,b}\right)-2\sqrt{-b}\,\sin\left(b\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^{+}$$

Involving $\cos(d\,z+e)\cos^{\nu}(c\,z^{r})$

01.07.21.1135.01

$$\int \cos(d\,z+e)\cos^{\nu}(c\,z^{2})\,dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(e+d\,z)}{d} + 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\,\nu-2\,c\,s}}\left(\cos\left(\frac{d^{2}}{4\,(c\,\nu-2\,c\,s)}+e\right)C\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)+S\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)\sin\left(\frac{d^{2}}{4\,(c\,\nu-2\,c\,s)}+e\right)\right)+\frac{1}{\sqrt{2\,c\,s-c\,\nu}}\left(\cos\left(\frac{d^{2}}{4\,(2\,c\,s-c\,\nu)}+e\right)C\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)+S\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)\sin\left(\frac{d^{2}}{4\,(2\,c\,s-c\,\nu)}+e\right)\right)\right)\;/;\;\nu\in\mathbb{N}^{+}$$

01.07.21.1136.01

$$\int \cos(d\,z+e)\cos^{\nu}\left(\sqrt{z}\;c\right)dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(e+d\,z)}{d} + 2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{2(-d)^{3/2}}\left(\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\cos\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+e\right)C\left(\frac{-2\sqrt{z}\;d-2\,c\,s+c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)-\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{-2\sqrt{z}\;d-2\,c\,s+c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+e\right)-2\sqrt{-d}\,\sin\left(e+d\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)+\frac{1}{2(-d)^{3/2}}\left(\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cos\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}+e\right)C\left(\frac{-2\sqrt{z}\;d+2\,c\,s-c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)-\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{-2\sqrt{z}\;d+2\,c\,s-c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}+e\right)-2\sqrt{-d}\,\sin\left(e+d\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos(a\,z^r)\cos^{\nu}(c\,z^r)$

01.07.21.1137.01

$$\int \cos(b\,z^r)\cos^{\nu}(c\,z^r)\,dz = -\frac{1}{r}\left(2^{-\nu-1}\,z\binom{\nu}{\frac{\nu}{2}}\left(\Gamma\left(\frac{1}{r},-i\,b\,z^r\right)(-i\,b\,z^r)^{-1/r}+(i\,b\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},i\,b\,z^r\right)\right)(1-\nu \bmod 2)\right)-\frac{2^{-\nu-1}\,z}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\Gamma\left(\frac{1}{r},(-i\,b-2\,i\,c\,s+i\,c\,\nu)\,z^r\right)((-i\,b-2\,i\,c\,s+i\,c\,\nu)\,z^r)^{-1/r}+((i\,b-2\,i\,c\,s+i\,c\,\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(i\,b-2\,i\,c\,s+i\,c\,\nu)\,z^r\right)+((-i\,b+2\,i\,c\,s-i\,c\,\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-i\,b+2\,i\,c\,s-i\,c\,\nu)\,z^r\right)+((i\,b+2\,i\,c\,s-i\,c\,\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(i\,b+2\,i\,c\,s-i\,c\,\nu)\,z^r\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1138.01

$$\int \cos\left(b\,z^2\right)\cos^{\nu}\left(c\,z^2\right)dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{\sqrt{b}}\,C\left(\sqrt{b}\,\sqrt{\frac{2}{\pi}}\;z\right)+2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2\,c\,s+c\,\nu}}\,C\left(\sqrt{\frac{2}{\pi}}\,\sqrt{-b-2\,c\,s+c\,\nu}\;z\right)+\frac{1}{\sqrt{-b+2\,c\,s-c\,\nu}}\,C\left(\sqrt{\frac{2}{\pi}}\,\sqrt{-b+2\,c\,s-c\,\nu}\;z\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1139.01

$$\int \cos\left(\sqrt{z}\, b\right) \cos^{\nu}\left(\sqrt{z}\, c\right) dz = \frac{2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\sqrt{z}\, b\right) + b \sqrt{z} \sin\left(\sqrt{z}\, b\right)\right)}{b^2} +$$
$$2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(c(\nu-2s)-b)^2} \left(\cos\left((c(\nu-2s)-b)\sqrt{z}\right) + (c(\nu-2s)-b)\sqrt{z} \sin\left((c(\nu-2s)-b)\sqrt{z}\right)\right) + \right.$$
$$\left. \frac{1}{(-b-c(\nu-2s))^2} \left(\cos\left((-b-c(\nu-2s))\sqrt{z}\right) + (-b-c(\nu-2s))\sqrt{z} \sin\left((-b-c(\nu-2s))\sqrt{z}\right)\right) \right) /;\, \nu \in \mathbb{N}^+$$

Involving $\cos(a z^r + e) \cos^{\nu}(c z^r)$

01.07.21.1140.01

$$\int \cos(b z^r + e) \cos^{\nu}(c z^r)\, dz = -\frac{1}{r} \left(2^{-\nu-1} z \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(\frac{1}{r}, -i b z^r\right) (-i b z^r)^{-1/r} + e^{-i e} (i b z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, i b z^r\right)\right) (1 - \nu \bmod 2)\right) -$$
$$\frac{2^{-\nu-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{i e}\, \Gamma\left(\frac{1}{r}, (-i b - 2 i c s + i c \nu) z^r\right) ((-i b - 2 i c s + i c \nu) z^r)^{-1/r} + \right.$$
$$e^{-i e} ((i b - 2 i c s + i c \nu) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (i b - 2 i c s + i c \nu) z^r\right) + e^{i e} ((-i b + 2 i c s - i c \nu) z^r)^{-1/r}$$
$$\left. \Gamma\left(\frac{1}{r}, (-i b + 2 i c s - i c \nu) z^r\right) + e^{-i e} ((i b + 2 i c s - i c \nu) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (i b + 2 i c s - i c \nu) z^r\right)\right) /;\, \nu \in \mathbb{N}^+$$

01.07.21.1141.01

$$\int \cos\left(b z^2 + e\right) \cos^{\nu}\left(c z^2\right) dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{\sqrt{b}} \left(\cos(e)\, C\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) - S\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) \sin(e)\right) +$$
$$2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b-2cs+c\nu}} \left(\cos(e)\, C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b-2cs+c\nu}\, z\right) + S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b-2cs+c\nu}\, z\right) \sin(e)\right) + \right.$$
$$\left. \frac{1}{\sqrt{-b+2cs-c\nu}} \left(\cos(e)\, C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b+2cs-c\nu}\, z\right) + S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b+2cs-c\nu}\, z\right) \sin(e)\right)\right) /;\, \nu \in \mathbb{N}^+$$

01.07.21.1142.01

$$\int \cos\left(\sqrt{z}\, b + e\right) \cos^{\nu}\left(\sqrt{z}\, c\right) dz =$$
$$\frac{2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\sqrt{z}\, b + e\right) + b \sqrt{z} \sin\left(\sqrt{z}\, b + e\right)\right)}{b^2} + 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(c(\nu-2s)-b)^2} \right.$$
$$\left(\cos\left(e - (c(\nu-2s)-b)\sqrt{z}\right) - (c(\nu-2s)-b)\sqrt{z} \sin\left(e - (c(\nu-2s)-b)\sqrt{z}\right)\right) + \frac{1}{(-b-c(\nu-2s))^2}$$
$$\left. \left(\cos\left(e - (-b-c(\nu-2s))\sqrt{z}\right) - (-b-c(\nu-2s))\sqrt{z} \sin\left(e - (-b-c(\nu-2s))\sqrt{z}\right)\right)\right) /;\, \nu \in \mathbb{N}^+$$

Involving $\cos(b z^r + d z) \cos^\nu(c z^r)$

01.07.21.1143.01

$$\int \cos(b z^2 + d z) \cos^\nu(c z^2)\, dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4b}\right) C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) + S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4b}\right)\right)}{\sqrt{b}} +$$
$$2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b-2cs+c\nu}} \left(\cos\left(\frac{d^2}{4(-b-2cs+c\nu)}\right) C\left(\frac{2(-b-2cs+c\nu)z-d}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right) + \right.\right.$$
$$S\left(\frac{2(-b-2cs+c\nu)z-d}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right) \sin\left(\frac{d^2}{4(-b-2cs+c\nu)}\right)\right) + \frac{1}{\sqrt{-b+2cs-c\nu}} \left(\cos\left(\frac{d^2}{4(-b+2cs-c\nu)}\right)\right.$$
$$\left.\left.\left. C\left(\frac{2(-b+2cs-c\nu)z-d}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right) + S\left(\frac{2(-b+2cs-c\nu)z-d}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right) \sin\left(\frac{d^2}{4(-b+2cs-c\nu)}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1144.01

$$\int \cos(\sqrt{z}\, b + d z) \cos^\nu(\sqrt{z}\, c)\, dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\right.$$
$$\left.\left(-b\sqrt{2\pi}\cos\left(\frac{b^2}{4d}\right) C\left(\frac{b+2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) - b\sqrt{2\pi}\, S\left(\frac{b+2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d}\right) + 2\sqrt{d}\, \sin(\sqrt{z}\, b + d z)\right)\right) +$$
$$2^{-\nu} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(\frac{1}{2(-d)^{3/2}} \left(\sqrt{2\pi}\,(b+2cs-c\nu) \cos\left(\frac{(-b-2cs+c\nu)^2}{4d}\right) C\left(\frac{-b-2cs+c\nu-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) + \sqrt{2\pi}\,(-b-2cs+\right.\right.$$
$$\left. c\nu)\, S\left(\frac{-b-2cs+c\nu-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{(-b-2cs+c\nu)^2}{4d}\right) - 2\sqrt{-d}\, \sin(dz - (-b-2cs+c\nu)\sqrt{z})\right) +$$
$$\frac{1}{2(-d)^{3/2}} \left(\sqrt{2\pi}\,(b-2cs+c\nu)\cos\left(\frac{(-b+2cs-c\nu)^2}{4d}\right) C\left(\frac{-b+2cs-c\nu-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) + \right.$$
$$\sqrt{2\pi}\,(-b+2cs-c\nu)\, S\left(\frac{-b+2cs-c\nu-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{(-b+2cs-c\nu)^2}{4d}\right) -$$
$$\left.\left. 2\sqrt{-d}\, \sin(dz - (-b+2cs-c\nu)\sqrt{z})\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos(b z^r + d z + e) \cos^\nu(c z^r)$

01.07.21.1145.01

$$\int \cos(b z^2 + d z + e) \cos^\nu(c z^2) \, dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4b} - e\right) C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) + S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4b} - e\right)\right)}{\sqrt{b}} + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b-2cs+c\nu}} \left(\cos\left(\frac{d^2}{4(-b-2cs+c\nu)} + e\right) C\left(\frac{2(-b-2cs+c\nu)z - d}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right) + S\left(\frac{2(-b-2cs+c\nu)z - d}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right) \sin\left(\frac{d^2}{4(-b-2cs+c\nu)} + e\right)\right) + \frac{1}{\sqrt{-b+2cs-c\nu}} \left(\cos\left(\frac{d^2}{4(-b+2cs-c\nu)} + e\right) C\left(\frac{2(-b+2cs-c\nu)z - d}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right) + S\left(\frac{2(-b+2cs-c\nu)z - d}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right) \sin\left(\frac{d^2}{4(-b+2cs-c\nu)} + e\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1146.01

$$\int \cos(\sqrt{z}\, b + d z + e) \cos^\nu(\sqrt{z}\, c) \, dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b\sqrt{2\pi} \cos\left(\frac{b^2}{4d} - e\right) C\left(\frac{b + 2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) - b\sqrt{2\pi}\, S\left(\frac{b + 2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d} - e\right) + 2\sqrt{d} \sin(\sqrt{z}\, b + e + d z)\right)\right) + 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{2(-d)^{3/2}} \left(\sqrt{2\pi}\, (b + 2cs - c\nu) \cos\left(-\frac{(-b-2cs+c\nu)^2}{4d} + e\right) C\left(\frac{-b-2cs+c\nu-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) - \sqrt{2\pi}\, (-b-2cs+c\nu)\, S\left(\frac{-b-2cs+c\nu-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(-\frac{(-b-2cs+c\nu)^2}{4d} + e\right) - 2\sqrt{-d} \sin\left(e + dz - (-b-2cs+c\nu)\sqrt{z}\right)\right) + \frac{1}{2(-d)^{3/2}} \left(\sqrt{2\pi}\, (b - 2cs + c\nu) \cos\left(-\frac{(-b+2cs-c\nu)^2}{4d} + e\right) C\left(\frac{-b+2cs-c\nu-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) - \sqrt{2\pi}\, (-b+2cs-c\nu)\, S\left(\frac{-b+2cs-c\nu-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(-\frac{(-b+2cs-c\nu)^2}{4d} + e\right) - 2\sqrt{-d} \sin\left(e + dz - (-b+2cs-c\nu)\sqrt{z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(d z) \cos^\nu(c z^r + g)$

01.07.21.1147.01

$$\int \cos(d\,z)\cos^{\nu}\left(c\,z^2+g\right)dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(d\,z)}{d} + 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\,\nu-2\,c\,s}}\left(\cos\left(\frac{d^2}{4\,(c\,\nu-2\,c\,s)}+2\,g\,s-g\,\nu\right)C\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)+ S\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)\sin\left(\frac{d^2}{4\,(c\,\nu-2\,c\,s)}+2\,g\,s-g\,\nu\right)\right)+\frac{1}{\sqrt{2\,c\,s-c\,\nu}}\left(\cos\left(\frac{d^2}{4\,(2\,c\,s-c\,\nu)}-2\,g\,s+g\,\nu\right) C\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)+S\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)\sin\left(\frac{d^2}{4\,(2\,c\,s-c\,\nu)}-2\,g\,s+g\,\nu\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.07.21.1148.01

$$\int \cos(d\,z)\cos^{\nu}\left(\sqrt{z}\,c+g\right)dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(d\,z)}{d} + 2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{2\,(-d)^{3/2}}\left(\sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\cos\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+2\,g\,s-g\,\nu\right)C\left(\frac{-2\sqrt{z}\,d-2\,c\,s+c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)- \sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{-2\sqrt{z}\,d-2\,c\,s+c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+2\,g\,s-g\,\nu\right)- 2\sqrt{-d}\,\sin\left(2\,g\,s-g\,\nu+d\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)+\frac{1}{2\,(-d)^{3/2}} \left(\sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\cos\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}-2\,g\,s+g\,\nu\right)C\left(\frac{-2\sqrt{z}\,d+2\,c\,s-c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)- \sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{-2\sqrt{z}\,d+2\,c\,s-c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}-2\,g\,s+g\,\nu\right)- 2\sqrt{-d}\,\sin\left(-2\,g\,s+g\,\nu+d\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\cos(d\,z+e)\cos^{\nu}\left(c\,z^r+g\right)$

01.07.21.1149.01

$$\int \cos(d z+e)\cos^{v}(c z^2+g)\,dz = \frac{2^{-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sin(e+d z)}{d} + 2^{-v-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{\sqrt{c v-2 c s}}\left(\cos\left(\frac{d^2}{4(c v-2 c s)}+e+2 g s-g v\right)C\left(\frac{2(c v-2 c s) z-d}{\sqrt{2\pi}\sqrt{c v-2 c s}}\right)+S\left(\frac{2(c v-2 c s) z-d}{\sqrt{2\pi}\sqrt{c v-2 c s}}\right)\sin\left(\frac{d^2}{4(c v-2 c s)}+e+2 g s-g v\right)\right)+\frac{1}{\sqrt{2 c s-c v}}\left(\cos\left(\frac{d^2}{4(2 c s-c v)}+e-2 g s+g v\right)C\left(\frac{2(2 c s-c v) z-d}{\sqrt{2\pi}\sqrt{2 c s-c v}}\right)+S\left(\frac{2(2 c s-c v) z-d}{\sqrt{2\pi}\sqrt{2 c s-c v}}\right)\sin\left(\frac{d^2}{4(2 c s-c v)}+e-2 g s+g v\right)\right)\right) /;\ v\in\mathbb{N}^+$$

01.07.21.1150.01

$$\int \cos(d z+e)\cos^{v}(\sqrt{z}\,c+g)\,dz = \frac{2^{-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sin(e+d z)}{d} + 2^{-v}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{2(-d)^{3/2}}\left(\sqrt{2\pi}\,(2 c s-c v)\cos\left(-\frac{(c v-2 c s)^2}{4 d}+e+2 g s-g v\right)C\left(\frac{-2\sqrt{z}\,d-2 c s+c v}{\sqrt{-d}\sqrt{2\pi}}\right)-\sqrt{2\pi}\,(c v-2 c s)S\left(\frac{-2\sqrt{z}\,d-2 c s+c v}{\sqrt{-d}\sqrt{2\pi}}\right)\sin\left(-\frac{(c v-2 c s)^2}{4 d}+e+2 g s-g v\right)-2\sqrt{-d}\,\sin\left(e+2 g s-g v+d z-(c v-2 c s)\sqrt{z}\right)\right)+\frac{1}{2(-d)^{3/2}}\left(\sqrt{2\pi}\,(c v-2 c s)\cos\left(-\frac{(2 c s-c v)^2}{4 d}+e-2 g s+g v\right)C\left(\frac{-2\sqrt{z}\,d+2 c s-c v}{\sqrt{-d}\sqrt{2\pi}}\right)-\sqrt{2\pi}\,(2 c s-c v)S\left(\frac{-2\sqrt{z}\,d+2 c s-c v}{\sqrt{-d}\sqrt{2\pi}}\right)\sin\left(-\frac{(2 c s-c v)^2}{4 d}+e-2 g s+g v\right)-2\sqrt{-d}\,\sin\left(e-2 g s+g v+d z-(2 c s-c v)\sqrt{z}\right)\right)\right) /;\ v\in\mathbb{N}^+$$

Involving $\cos(a z^r)\cos^{v}(c z^r+g)$

01.07.21.1151.01

$$\int \cos(b z^r) \cos^\nu(c z^r + g)\, dz = -\frac{1}{r}\left(2^{-\nu-1} z \binom{\nu}{\frac{\nu}{2}}\left(\Gamma\left(\frac{1}{r}, -i b z^r\right)(-i b z^r)^{-1/r} + (i b z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i b z^r\right)\right)(1-\nu \bmod 2)\right) - \frac{2^{-\nu-1} z}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{2 i g s - i g \nu}\,\Gamma\left(\frac{1}{r}, (-i b - 2 i c s + i c \nu) z^r\right)((-i b - 2 i c s + i c \nu) z^r)^{-1/r} + e^{2 i g s - i g \nu}((i b - 2 i c s + i c \nu) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (i b - 2 i c s + i c \nu) z^r\right) + e^{-2 i g s + i g \nu}((-i b + 2 i c s - i c \nu) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (-i b + 2 i c s - i c \nu) z^r\right) + e^{-2 i g s + i g \nu}((i b + 2 i c s - i c \nu) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (i b + 2 i c s - i c \nu) z^r\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1152.01

$$\int \cos(b z^2) \cos^\nu(c z^2 + g)\, dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{\sqrt{b}}\, C\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\, z\right) + 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2 c s + c \nu}}\left(\cos(g(2s-\nu))\, C\left(\sqrt{\frac{2}{\pi}}\sqrt{-b-2 c s + c \nu}\, z\right) + S\left(\sqrt{\frac{2}{\pi}}\sqrt{-b-2 c s + c \nu}\, z\right)\sin(g(2s-\nu))\right) + \frac{1}{\sqrt{-b+2 c s - c \nu}}\left(\cos(g(2s-\nu))\, C\left(\sqrt{\frac{2}{\pi}}\sqrt{-b+2 c s - c \nu}\, z\right) - S\left(\sqrt{\frac{2}{\pi}}\sqrt{-b+2 c s - c \nu}\, z\right)\sin(g(2s-\nu))\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1153.01

$$\int \cos\left(b\sqrt{z}\right) \cos^\nu\left(\sqrt{z}\, c + g\right) dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos\left(b\sqrt{z}\right) + b\sqrt{z}\,\sin\left(b\sqrt{z}\right)\right)}{b^2} + 2^{1-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(c(\nu-2s)-b)^2}\left(\cos\left(g(\nu-2s) + (c(\nu-2s)-b)\sqrt{z}\right) + (c(\nu-2s)-b)\sqrt{z}\,\sin\left(g(\nu-2s) + (c(\nu-2s)-b)\sqrt{z}\right)\right) + \frac{1}{(-b-c(\nu-2s))^2}\left(\cos\left(g(\nu-2s) - (-b-c(\nu-2s))\sqrt{z}\right) - (-b-c(\nu-2s))\sqrt{z}\,\sin\left(g(\nu-2s) - (-b-c(\nu-2s))\sqrt{z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(a z^r + e)\cos^\nu(c z^r + g)$

01.07.21.1154.01

$$\int \cos(b z^r + e)\cos^\nu(c z^r + g)\,dz = -\frac{1}{r}\left(2^{-\nu-1} z \binom{\nu}{\frac{\nu}{2}}\left(e^{i e}\,\Gamma\!\left(\frac{1}{r}, -i b z^r\right)(-i b z^r)^{-1/r} + e^{-i e}(i b z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, i b z^r\right)\right)(1-\nu \bmod 2)\right) - \frac{2^{-\nu-1} z}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{i e+2 i g s-i g \nu}\,\Gamma\!\left(\frac{1}{r}, (-i b-2 i c s+i c \nu) z^r\right)((-i b-2 i c s+i c \nu) z^r)^{-1/r} + e^{-i e+2 i g s-i g \nu}((i b-2 i c s+i c \nu) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, (i b-2 i c s+i c \nu) z^r\right) + e^{i e-2 i g s+i g \nu}((-i b+2 i c s-i c \nu) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, (-i b+2 i c s-i c \nu) z^r\right) + e^{-i e-2 i g s+i g \nu}((i b+2 i c s-i c \nu) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, (i b+2 i c s-i c \nu) z^r\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1155.01

$$\int \cos(b z^2 + e)\cos^\nu(c z^2 + g)\,dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{\sqrt{b}}\left(\cos(e)\, C\!\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\, z\right) - S\!\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\, z\right)\sin(e)\right) + 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2 c s+c \nu}}\left(\cos(e+g(2 s-\nu))\, C\!\left(\sqrt{\frac{2}{\pi}}\sqrt{-b-2 c s+c \nu}\, z\right) + S\!\left(\sqrt{\frac{2}{\pi}}\sqrt{-b-2 c s+c \nu}\, z\right)\sin(e+g(2 s-\nu))\right) + \frac{1}{\sqrt{-b+2 c s-c \nu}}\left(\cos(e-g(2 s-\nu))\, C\!\left(\sqrt{\frac{2}{\pi}}\sqrt{-b+2 c s-c \nu}\, z\right) + S\!\left(\sqrt{\frac{2}{\pi}}\sqrt{-b+2 c s-c \nu}\, z\right)\sin(e-g(2 s-\nu))\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1156.01

$$\int \cos(\sqrt{z}\, b + e)\cos^\nu(\sqrt{z}\, c + g)\,dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos(\sqrt{z}\, b+e) + b\sqrt{z}\sin(\sqrt{z}\, b+e)\right)}{b^2} + 2^{1-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(c(\nu-2 s)-b)^2}\left(\cos\!\left(e-g(\nu-2 s)-(c(\nu-2 s)-b)\sqrt{z}\right) - (c(\nu-2 s)-b)\sqrt{z}\sin\!\left(e-g(\nu-2 s)-(c(\nu-2 s)-b)\sqrt{z}\right)\right) + \frac{1}{(-b-c(\nu-2 s))^2}\left(\cos\!\left(e+g(\nu-2 s)-(-b-c(\nu-2 s))\sqrt{z}\right) - (-b-c(\nu-2 s))\sqrt{z}\sin\!\left(e+g(\nu-2 s)-(-b-c(\nu-2 s))\sqrt{z}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos(b z^r + d z)\cos^\nu(c z^r + g)$

01.07.21.1157.01

$$\int \cos(b z^2 + d z) \cos^\nu(c z^2 + g)\, dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{\sqrt{b}} \left(\cos\left(\frac{d^2}{4 b}\right) C\left(\frac{d + 2 b z}{\sqrt{b}\, \sqrt{2\pi}}\right) + S\left(\frac{d + 2 b z}{\sqrt{b}\, \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4 b}\right)\right) + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 c s + c \nu}} \left(\cos\left(\frac{d^2}{4(-b - 2 c s + c \nu)} + 2 g s - g \nu\right) C\left(\frac{2(-b - 2 c s + c \nu) z - d}{\sqrt{2\pi}\, \sqrt{-b - 2 c s + c \nu}}\right) + S\left(\frac{2(-b - 2 c s + c \nu) z - d}{\sqrt{2\pi}\, \sqrt{-b - 2 c s + c \nu}}\right) \sin\left(\frac{d^2}{4(-b - 2 c s + c \nu)} + 2 g s - g \nu\right)\right) + \frac{1}{\sqrt{-b + 2 c s - c \nu}} \left(\cos\left(\frac{d^2}{4(-b + 2 c s - c \nu)} - 2 g s + g \nu\right) C\left(\frac{2(-b + 2 c s - c \nu) z - d}{\sqrt{2\pi}\, \sqrt{-b + 2 c s - c \nu}}\right) + S\left(\frac{2(-b + 2 c s - c \nu) z - d}{\sqrt{2\pi}\, \sqrt{-b + 2 c s - c \nu}}\right) \sin\left(\frac{d^2}{4(-b + 2 c s - c \nu)} - 2 g s + g \nu\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1158.01

$$\int \cos(\sqrt{z}\, b + d z) \cos^\nu(\sqrt{z}\, c + g)\, dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b \sqrt{2\pi} \cos\left(\frac{b^2}{4 d}\right) C\left(\frac{b + 2 d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) - b \sqrt{2\pi}\, S\left(\frac{b + 2 d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4 d}\right) + 2 \sqrt{d} \sin(\sqrt{z}\, b + d z)\right)\right) + 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{2(-d)^{3/2}} \left(\sqrt{2\pi}\, (b + 2 c s - c \nu) \cos\left(-\frac{(-b - 2 c s + c \nu)^2}{4 d} + 2 g s - g \nu\right) C\left(\frac{-b - 2 c s + c \nu - 2 d \sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) - \sqrt{2\pi}\, (-b - 2 c s + c \nu) S\left(\frac{-b - 2 c s + c \nu - 2 d \sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(-b - 2 c s + c \nu)^2}{4 d} + 2 g s - g \nu\right) - 2 \sqrt{-d} \sin\left(2 g s - g \nu + d z - (-b - 2 c s + c \nu) \sqrt{z}\right)\right) + \frac{1}{2(-d)^{3/2}} \left(\sqrt{2\pi}\, (b - 2 c s + c \nu) \cos\left(-\frac{(-b + 2 c s - c \nu)^2}{4 d} - 2 g s + g \nu\right) C\left(\frac{-b + 2 c s - c \nu - 2 d \sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) - \sqrt{2\pi}\, (-b + 2 c s - c \nu) S\left(\frac{-b + 2 c s - c \nu - 2 d \sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(-b + 2 c s - c \nu)^2}{4 d} - 2 g s + g \nu\right) - 2 \sqrt{-d} \sin\left(-2 g s + g \nu + d z - (-b + 2 c s - c \nu) \sqrt{z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(b z^r + d z + e) \cos^\nu(c z^r + g)$

01.07.21.1159.01

$$\int \cos\left(b z^2 + d z + e\right) \cos^\nu\left(c z^2 + g\right) dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{\sqrt{b}} \left(\cos\left(\frac{d^2}{4b} - e\right) C\left(\frac{d + 2bz}{\sqrt{b}\sqrt{2\pi}}\right) + S\left(\frac{d + 2bz}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4b} - e\right)\right) + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2cs + c\nu}} \left(\cos\left(\frac{d^2}{4(-b - 2cs + c\nu)} + e + 2gs - g\nu\right) C\left(\frac{2(-b - 2cs + c\nu)z - d}{\sqrt{2\pi}\sqrt{-b - 2cs + c\nu}}\right) + S\left(\frac{2(-b - 2cs + c\nu)z - d}{\sqrt{2\pi}\sqrt{-b - 2cs + c\nu}}\right) \sin\left(\frac{d^2}{4(-b - 2cs + c\nu)} + e + 2gs - g\nu\right)\right) + \frac{1}{\sqrt{-b + 2cs - c\nu}} \left(\cos\left(\frac{d^2}{4(-b + 2cs - c\nu)} + e - 2gs + g\nu\right) C\left(\frac{2(-b + 2cs - c\nu)z - d}{\sqrt{2\pi}\sqrt{-b + 2cs - c\nu}}\right) + S\left(\frac{2(-b + 2cs - c\nu)z - d}{\sqrt{2\pi}\sqrt{-b + 2cs - c\nu}}\right) \sin\left(\frac{d^2}{4(-b + 2cs - c\nu)} + e - 2gs + g\nu\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1160.01

$$\int \cos\left(\sqrt{z}\, b + d z + e\right) \cos^\nu\left(\sqrt{z}\, c + g\right) dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b\sqrt{2\pi} \cos\left(\frac{b^2}{4d} - e\right) C\left(\frac{b + 2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) - b\sqrt{2\pi}\, S\left(\frac{b + 2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d} - e\right) + 2\sqrt{d} \sin\left(\sqrt{z}\, b + e + d z\right)\right)\right) + 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{2(-d)^{3/2}} \left(\sqrt{2\pi}\, (b + 2cs - c\nu) \cos\left(-\frac{(-b - 2cs + c\nu)^2}{4d} + e + 2gs - g\nu\right) C\left(\frac{-b - 2cs + c\nu - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) - \sqrt{2\pi}\, (-b - 2cs + c\nu) S\left(\frac{-b - 2cs + c\nu - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(-\frac{(-b - 2cs + c\nu)^2}{4d} + e + 2gs - g\nu\right) - 2\sqrt{-d} \sin\left(e + 2gs - g\nu + dz - (-b - 2cs + c\nu)\sqrt{z}\right)\right) + \frac{1}{2(-d)^{3/2}} \left(\sqrt{2\pi}\, (b - 2cs + c\nu) \cos\left(-\frac{(-b + 2cs - c\nu)^2}{4d} + e - 2gs + g\nu\right) C\left(\frac{-b + 2cs - c\nu - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) - \sqrt{2\pi}\, (-b + 2cs - c\nu) S\left(\frac{-b + 2cs - c\nu - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(-\frac{(-b + 2cs - c\nu)^2}{4d} + e - 2gs + g\nu\right) - 2\sqrt{-d} \sin\left(e - 2gs + g\nu + dz - (-b + 2cs - c\nu)\sqrt{z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(d\, z) \cos^\nu\left(c\, z^r + f\, z\right)$

01.07.21.1161.01

$$\int \cos(d\,z)\cos^{\nu}\left(c\,z^2+f\,z\right)dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(d\,z)}{d} + 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\,\nu-2\,c\,s}}\left(\cos\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}\right)C\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)+ S\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)\sin\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}\right)\right)+ \frac{1}{\sqrt{2\,c\,s-c\,\nu}}\left(\cos\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}\right)C\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)+ S\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)\sin\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1162.01

$$\int \cos(d\,z)\cos^{\nu}\left(\sqrt{z}\;c+f\,z\right)dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(d\,z)}{d} + 2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(\sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\cos\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}\right)C\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)- \sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)\sin\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}\right)+ 2\sqrt{-d-2\,f\,s+f\,\nu}\,\sin\left((-d-2\,f\,s+f\,\nu)\,z+(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)\Big/\left(2\,(-d-2\,f\,s+f\,\nu)^{3/2}\right)+ \left(\sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\cos\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}\right)C\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)- \sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}\right)+ 2\sqrt{-d+2\,f\,s-f\,\nu}\,\sin\left((-d+2\,f\,s-f\,\nu)\,z+(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\Big/\left(2\,(-d+2\,f\,s-f\,\nu)^{3/2}\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos(d\,z+e)\cos^{\nu}\left(c\,z^r+f\,z\right)$

01.07.21.1163.01

$$\int \cos(d z + e) \cos^{\nu}\left(c z^2 + f z\right) dz = \frac{2^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sin(e + d z)}{d} + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{c \nu - 2 c s}} \left(\cos\left(\frac{(-d - 2 f s + f \nu)^2}{4 (c \nu - 2 c s)} + e \right) C\left(\frac{-d - 2 f s + f \nu + 2 (c \nu - 2 c s) z}{\sqrt{2 \pi} \sqrt{c \nu - 2 c s}} \right) + S\left(\frac{-d - 2 f s + f \nu + 2 (c \nu - 2 c s) z}{\sqrt{2 \pi} \sqrt{c \nu - 2 c s}} \right) \sin\left(\frac{(-d - 2 f s + f \nu)^2}{4 (c \nu - 2 c s)} + e \right) \right) + \frac{1}{\sqrt{2 c s - c \nu}} \left(\cos\left(\frac{(-d + 2 f s - f \nu)^2}{4 (2 c s - c \nu)} + e \right) C\left(\frac{-d + 2 f s - f \nu + 2 (2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{2 c s - c \nu}} \right) + S\left(\frac{-d + 2 f s - f \nu + 2 (2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{2 c s - c \nu}} \right) \sin\left(\frac{(-d + 2 f s - f \nu)^2}{4 (2 c s - c \nu)} + e \right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.07.21.1164.01

$$\int \cos(d z + e) \cos^{\nu}\left(\sqrt{z}\, c + f z\right) dz = \frac{2^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sin(e + d z)}{d} + 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\sqrt{2 \pi} (2 c s - c \nu) \cos\left(\frac{(c \nu - 2 c s)^2}{4 (-d - 2 f s + f \nu)} + e \right) C\left(\frac{-2 c s + c \nu + 2 (-d - 2 f s + f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-d - 2 f s + f \nu}} \right) - \sqrt{2 \pi} (c \nu - 2 c s) S\left(\frac{-2 c s + c \nu + 2 (-d - 2 f s + f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-d - 2 f s + f \nu}} \right) \sin\left(\frac{(c \nu - 2 c s)^2}{4 (-d - 2 f s + f \nu)} + e \right) - 2 \sqrt{-d - 2 f s + f \nu} \sin\left(e - (-d - 2 f s + f \nu) z - (c \nu - 2 c s) \sqrt{z} \right) \right) \Big/ \left(2 (-d - 2 f s + f \nu)^{3/2} \right) + \left(\sqrt{2 \pi} (c \nu - 2 c s) \cos\left(\frac{(2 c s - c \nu)^2}{4 (-d + 2 f s - f \nu)} + e \right) C\left(\frac{2 c s - c \nu + 2 (-d + 2 f s - f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-d + 2 f s - f \nu}} \right) - \sqrt{2 \pi} (2 c s - c \nu) S\left(\frac{2 c s - c \nu + 2 (-d + 2 f s - f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-d + 2 f s - f \nu}} \right) \sin\left(\frac{(2 c s - c \nu)^2}{4 (-d + 2 f s - f \nu)} + e \right) - 2 \sqrt{-d + 2 f s - f \nu} \sin\left(e - (-d + 2 f s - f \nu) z - (2 c s - c \nu) \sqrt{z} \right) \right) \Big/ \left(2 (-d + 2 f s - f \nu)^{3/2} \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $\cos\left(b z^r\right) \cos^{\nu}\left(c z^r + f z\right)$

01.07.21.1165.01

$$\int \cos\left(b z^2\right) \cos^{\nu}\left(c z^2 + f z\right) dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{\sqrt{b}} C\left(\sqrt{b} \sqrt{\frac{2}{\pi}} z\right) + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b-2cs+c\nu}} \left(\cos\left(\frac{(f\nu - 2fs)^2}{4(-b-2cs+c\nu)}\right) C\left(\frac{-2fs + f\nu + 2(-b-2cs+c\nu)z}{\sqrt{2\pi} \sqrt{-b-2cs+c\nu}}\right) + S\left(\frac{-2fs + f\nu + 2(-b-2cs+c\nu)z}{\sqrt{2\pi} \sqrt{-b-2cs+c\nu}}\right) \sin\left(\frac{(f\nu-2fs)^2}{4(-b-2cs+c\nu)}\right) \right) + \frac{1}{\sqrt{-b+2cs-c\nu}} \left(\cos\left(\frac{(2fs - f\nu)^2}{4(-b+2cs-c\nu)}\right) C\left(\frac{2fs - f\nu + 2(-b+2cs-c\nu)z}{\sqrt{2\pi} \sqrt{-b+2cs-c\nu}}\right) + S\left(\frac{2fs - f\nu + 2(-b+2cs-c\nu)z}{\sqrt{2\pi} \sqrt{-b+2cs-c\nu}}\right) \sin\left(\frac{(2fs-f\nu)^2}{4(-b+2cs-c\nu)}\right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1166.01

$$\int \cos\left(\sqrt{z}\, b\right) \cos^{\nu}\left(\sqrt{z}\, c + f z\right) dz = \frac{2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\sqrt{z}\, b\right) + b \sqrt{z} \sin\left(\sqrt{z}\, b\right)\right)}{b^2} + 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{2(f\nu - 2fs)^{3/2}} \left(\sqrt{2\pi}\, (b + 2cs - c\nu) \cos\left(\frac{(-b-2cs+c\nu)^2}{4(f\nu - 2fs)}\right) C\left(\frac{-b-2cs+c\nu + 2(f\nu-2fs)\sqrt{z}}{\sqrt{2\pi} \sqrt{f\nu - 2fs}}\right) - \sqrt{2\pi}\, (-b-2cs+c\nu) S\left(\frac{-b-2cs+c\nu + 2(f\nu-2fs)\sqrt{z}}{\sqrt{2\pi} \sqrt{f\nu - 2fs}}\right) \sin\left(\frac{(-b-2cs+c\nu)^2}{4(f\nu-2fs)}\right) + 2\sqrt{f\nu - 2fs} \sin\left((f\nu - 2fs)z + (-b-2cs+c\nu)\sqrt{z}\right) \right) + \frac{1}{2(2fs - f\nu)^{3/2}} \left(\sqrt{2\pi}\, (b - 2cs + c\nu) \cos\left(\frac{(-b+2cs-c\nu)^2}{4(2fs - f\nu)}\right) C\left(\frac{-b+2cs-c\nu + 2(2fs - f\nu)\sqrt{z}}{\sqrt{2\pi} \sqrt{2fs - f\nu}}\right) - \sqrt{2\pi}\, (-b+2cs-c\nu) S\left(\frac{-b+2cs-c\nu + 2(2fs-f\nu)\sqrt{z}}{\sqrt{2\pi} \sqrt{2fs - f\nu}}\right) \sin\left(\frac{(-b+2cs-c\nu)^2}{4(2fs - f\nu)}\right) + 2\sqrt{2fs - f\nu} \sin\left((2fs - f\nu)z + (-b+2cs-c\nu)\sqrt{z}\right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos\left(b z^r + e\right) \cos^{\nu}\left(c z^r + f z\right)$

01.07.21.1167.01

$$\int \cos(b z^2+e)\cos^\nu(c z^2+f z)\,dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{\sqrt{b}}\left(\cos(e)\, C\!\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\, z\right)-S\!\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\, z\right)\sin(e)\right)+ 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2cs+c\nu}}\left(\cos\!\left(\frac{(f\nu-2fs)^2}{4(-b-2cs+c\nu)}+e\right)C\!\left(\frac{-2fs+f\nu+2(-b-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right)+ S\!\left(\frac{-2fs+f\nu+2(-b-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right)\sin\!\left(\frac{(f\nu-2fs)^2}{4(-b-2cs+c\nu)}+e\right)\right)+ \frac{1}{\sqrt{-b+2cs-c\nu}}\left(\cos\!\left(\frac{(2fs-f\nu)^2}{4(-b+2cs-c\nu)}+e\right)C\!\left(\frac{2fs-f\nu+2(-b+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right)+ S\!\left(\frac{2fs-f\nu+2(-b+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right)\sin\!\left(\frac{(2fs-f\nu)^2}{4(-b+2cs-c\nu)}+e\right)\right)\right)\; /;\; \nu\in\mathbb{N}^+$$

01.07.21.1168.01

$$\int \cos(\sqrt{z}\, b+e)\cos^\nu(\sqrt{z}\, c+f z)\,dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos(\sqrt{z}\, b+e)+b\sqrt{z}\sin(\sqrt{z}\, b+e)\right)}{b^2}+2^{-\nu} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{2(f\nu-2fs)^{3/2}}\left(\sqrt{2\pi}\,(b+2cs-c\nu)\cos\!\left(\frac{(-b-2cs+c\nu)^2}{4(f\nu-2fs)}+e\right)C\!\left(\frac{-b-2cs+c\nu+2(f\nu-2fs)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\nu-2fs}}\right)- \sqrt{2\pi}\,(-b-2cs+c\nu)\,S\!\left(\frac{-b-2cs+c\nu+2(f\nu-2fs)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\nu-2fs}}\right)\sin\!\left(\frac{(-b-2cs+c\nu)^2}{4(f\nu-2fs)}+e\right)- 2\sqrt{f\nu-2fs}\,\sin\!\left(e-(f\nu-2fs)z-(-b-2cs+c\nu)\sqrt{z}\right)\right)+\frac{1}{2(2fs-f\nu)^{3/2}} \left(\sqrt{2\pi}\,(b-2cs+c\nu)\cos\!\left(\frac{(-b+2cs-c\nu)^2}{4(2fs-f\nu)}+e\right)C\!\left(\frac{-b+2cs-c\nu+2(2fs-f\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2fs-f\nu}}\right)- \sqrt{2\pi}\,(-b+2cs-c\nu)\,S\!\left(\frac{-b+2cs-c\nu+2(2fs-f\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2fs-f\nu}}\right)\sin\!\left(\frac{(-b+2cs-c\nu)^2}{4(2fs-f\nu)}+e\right)- 2\sqrt{2fs-f\nu}\,\sin\!\left(e-(2fs-f\nu)z-(-b+2cs-c\nu)\sqrt{z}\right)\right)\right)\; /;\; \nu\in\mathbb{N}^+$$

Involving $\cos(b z^r+d z)\cos^\nu(c z^r+f z)$

01.07.21.1169.01

$$\int \cos\left(b z^2 + d z\right) \cos^{\nu}\left(c z^2 + f z\right) dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4 b}\right) C\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) + S\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) \sin\left(\frac{d^2}{4 b}\right)\right) +$$
$$2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 c s + c \nu}} \left(\cos\left(\frac{(-d - 2 f s + f \nu)^2}{4 (-b - 2 c s + c \nu)}\right) C\left(\frac{-d - 2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 c s + c \nu}}\right) +\right.\right.$$
$$S\left(\frac{-d - 2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 c s + c \nu}}\right) \sin\left(\frac{(-d - 2 f s + f \nu)^2}{4 (-b - 2 c s + c \nu)}\right)\bigg) +$$
$$\frac{1}{\sqrt{-b + 2 c s - c \nu}} \left(\cos\left(\frac{(-d + 2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)}\right) C\left(\frac{-d + 2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 c s - c \nu}}\right) +\right.$$
$$\left.\left. S\left(\frac{-d + 2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 c s - c \nu}}\right) \sin\left(\frac{(-d + 2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1170.01

$$\int \cos\left(\sqrt{z}\, b + d z\right) \cos^{\nu}\left(\sqrt{z}\, c + f z\right) dz =$$
$$\frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b \sqrt{2 \pi} \cos\left(\frac{b^2}{4 d}\right) C\left(\frac{b + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2 \pi}}\right) - b \sqrt{2 \pi}\, S\left(\frac{b + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2 \pi}}\right) \sin\left(\frac{b^2}{4 d}\right) +\right.\right.$$
$$\left.\left. 2 \sqrt{d} \sin\left(\sqrt{z}\, b + d z\right)\right)\right) + 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{2 (-d - 2 f s + f \nu)^{3/2}}\right.$$
$$\left(\sqrt{2 \pi} (b + 2 c s - c \nu) \cos\left(\frac{(-b - 2 c s + c \nu)^2}{4 (-d - 2 f s + f \nu)}\right) C\left(\frac{-b - 2 c s + c \nu + 2 (-d - 2 f s + f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-d - 2 f s + f \nu}}\right) -\right.$$
$$\sqrt{2 \pi} (-b - 2 c s + c \nu)\, S\left(\frac{-b - 2 c s + c \nu + 2 (-d - 2 f s + f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-d - 2 f s + f \nu}}\right) \sin\left(\frac{(-b - 2 c s + c \nu)^2}{4 (-d - 2 f s + f \nu)}\right) +$$
$$\left. 2 \sqrt{-d - 2 f s + f \nu} \sin\left((-d - 2 f s + f \nu) z + (-b - 2 c s + c \nu) \sqrt{z}\right)\right) + \frac{1}{2 (-d + 2 f s - f \nu)^{3/2}}$$
$$\left(\sqrt{2 \pi} (b - 2 c s + c \nu) \cos\left(\frac{(-b + 2 c s - c \nu)^2}{4 (-d + 2 f s - f \nu)}\right) C\left(\frac{-b + 2 c s - c \nu + 2 (-d + 2 f s - f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-d + 2 f s - f \nu}}\right) -\right.$$
$$\sqrt{2 \pi} (-b + 2 c s - c \nu)\, S\left(\frac{-b + 2 c s - c \nu + 2 (-d + 2 f s - f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-d + 2 f s - f \nu}}\right) \sin\left(\frac{(-b + 2 c s - c \nu)^2}{4 (-d + 2 f s - f \nu)}\right) +$$
$$\left.\left. 2 \sqrt{-d + 2 f s - f \nu} \sin\left((-d + 2 f s - f \nu) z + (-b + 2 c s - c \nu) \sqrt{z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(b z^r + d z + e) \cos^\nu(c z^r + f z)$

01.07.21.1171.01

$$\int \cos(b z^2 + d z + e) \cos^\nu(c z^2 + f z)\, dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4b} - e\right) C\left(\frac{d + 2 b z}{\sqrt{b}\,\sqrt{2\pi}}\right) + S\left(\frac{d + 2 b z}{\sqrt{b}\,\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4b} - e\right)\right) +$$

$$2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 c s + c \nu}} \left(\cos\left(\frac{(-d - 2 f s + f \nu)^2}{4(-b - 2 c s + c \nu)} + e\right) C\left(\frac{-d - 2 f s + f \nu + 2(-b - 2 c s + c \nu) z}{\sqrt{2\pi}\,\sqrt{-b - 2 c s + c \nu}}\right) + \right.\right.$$

$$S\left(\frac{-d - 2 f s + f \nu + 2(-b - 2 c s + c \nu) z}{\sqrt{2\pi}\,\sqrt{-b - 2 c s + c \nu}}\right) \sin\left(\frac{(-d - 2 f s + f \nu)^2}{4(-b - 2 c s + c \nu)} + e\right)\right) +$$

$$\frac{1}{\sqrt{-b + 2 c s - c \nu}} \left(\cos\left(\frac{(-d + 2 f s - f \nu)^2}{4(-b + 2 c s - c \nu)} + e\right) C\left(\frac{-d + 2 f s - f \nu + 2(-b + 2 c s - c \nu) z}{\sqrt{2\pi}\,\sqrt{-b + 2 c s - c \nu}}\right) + \right.$$

$$\left.\left. S\left(\frac{-d + 2 f s - f \nu + 2(-b + 2 c s - c \nu) z}{\sqrt{2\pi}\,\sqrt{-b + 2 c s - c \nu}}\right) \sin\left(\frac{(-d + 2 f s - f \nu)^2}{4(-b + 2 c s - c \nu)} + e\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1172.01

$$\int \cos\left(\sqrt{z}\, b + d\, z + e\right) \cos^{\nu}\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4d} - e\right) C\left(\frac{b + 2d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) - b\sqrt{2\pi}\, S\left(\frac{b + 2d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d} - e\right) + 2\sqrt{d}\, \sin\left(\sqrt{z}\, b + e + d\, z\right)\right)\right) + 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{2(-d - 2fs + f\nu)^{3/2}} \left(\sqrt{2\pi}\, (b + 2cs - c\nu) \cos\left(\frac{(-b - 2cs + c\nu)^2}{4(-d - 2fs + f\nu)} + e\right) C\left(\frac{-b - 2cs + c\nu + 2(-d - 2fs + f\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2fs + f\nu}}\right) - \sqrt{2\pi}\, (-b - 2cs + c\nu) S\left(\frac{-b - 2cs + c\nu + 2(-d - 2fs + f\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2fs + f\nu}}\right) \sin\left(\frac{(-b - 2cs + c\nu)^2}{4(-d - 2fs + f\nu)} + e\right) - 2\sqrt{-d - 2fs + f\nu}\, \sin\left(e - (-d - 2fs + f\nu) z - (-b - 2cs + c\nu)\sqrt{z}\right)\right) + \frac{1}{2(-d + 2fs - f\nu)^{3/2}} \left(\sqrt{2\pi}\, (b - 2cs + c\nu) \cos\left(\frac{(-b + 2cs - c\nu)^2}{4(-d + 2fs - f\nu)} + e\right) C\left(\frac{-b + 2cs - c\nu + 2(-d + 2fs - f\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2fs - f\nu}}\right) - \sqrt{2\pi}\, (-b + 2cs - c\nu) S\left(\frac{-b + 2cs - c\nu + 2(-d + 2fs - f\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2fs - f\nu}}\right) \sin\left(\frac{(-b + 2cs - c\nu)^2}{4(-d + 2fs - f\nu)} + e\right) - 2\sqrt{-d + 2fs - f\nu}\, \sin\left(e - (-d + 2fs - f\nu) z - (-b + 2cs - c\nu)\sqrt{z}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos(d\, z) \cos^{\nu}\left(c\, z^r + f\, z + g\right)$

01.07.21.1173.01

$$\int \cos(d\,z)\cos^{\nu}\left(c\,z^2+f\,z+g\right)dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(d\,z)}{d} + 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\,\nu-2\,c\,s}}\left(\cos\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+2\,g\,s-g\,\nu\right)C\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)+ S\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)\sin\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+2\,g\,s-g\,\nu\right)\right)+ \frac{1}{\sqrt{2\,c\,s-c\,\nu}}\left(\cos\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}-2\,g\,s+g\,\nu\right)C\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)+ S\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)\sin\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}-2\,g\,s+g\,\nu\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.07.21.1174.01

$$\int \cos(d\,z)\cos^{\nu}\left(\sqrt{z}\,c+f\,z+g\right)dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(d\,z)}{d} + 2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\cos\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+2\,g\,s-g\,\nu\right)C\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)- \sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)\sin\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+2\,g\,s-g\,\nu\right)- 2\sqrt{-d-2\,f\,s+f\,\nu}\,\sin\left(2\,g\,s-g\,\nu-(-d-2\,f\,s+f\,\nu)\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)\Big/\left(2\,(-d-2\,f\,s+f\,\nu)^{3/2}\right)+ \left(\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cos\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}-2\,g\,s+g\,\nu\right)C\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)- \sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}-2\,g\,s+g\,\nu\right)- 2\sqrt{-d+2\,f\,s-f\,\nu}\,\sin\left(-2\,g\,s+g\,\nu-(-d+2\,f\,s-f\,\nu)\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\Big/\left(2\,(-d+2\,f\,s-f\,\nu)^{3/2}\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\cos(d\,z+e)\cos^{\nu}\left(c\,z^r+f\,z+g\right)$

01.07.21.1175.01

$$\int \cos(d\,z+e)\cos^{\nu}\left(c\,z^2+f\,z+g\right)dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(e+d\,z)}{d} + 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\,\nu-2\,c\,s}}\left(\cos\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+e+2\,g\,s-g\,\nu\right)C\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)+S\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)\sin\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+e+2\,g\,s-g\,\nu\right)\right)+\frac{1}{\sqrt{2\,c\,s-c\,\nu}}\left(\cos\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}+e-2\,g\,s+g\,\nu\right)C\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)+S\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)\sin\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}+e-2\,g\,s+g\,\nu\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.07.21.1176.01

$$\int \cos(d\,z+e)\cos^{\nu}\left(\sqrt{z}\,c+f\,z+g\right)dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(e+d\,z)}{d} + 2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(\sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\cos\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+e+2\,g\,s-g\,\nu\right)C\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)-\sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)\sin\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+e+2\,g\,s-g\,\nu\right)-2\sqrt{-d-2\,f\,s+f\,\nu}\,\sin\left(e+2\,g\,s-g\,\nu-(-d-2\,f\,s+f\,\nu)\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)\Big/\left(2\,(-d-2\,f\,s+f\,\nu)^{3/2}\right)+\left(\sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\cos\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}+e-2\,g\,s+g\,\nu\right)C\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)-\sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}+e-2\,g\,s+g\,\nu\right)-2\sqrt{-d+2\,f\,s-f\,\nu}\,\sin\left(e-2\,g\,s+g\,\nu-(-d+2\,f\,s-f\,\nu)\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\Big/\left(2\,(-d+2\,f\,s-f\,\nu)^{3/2}\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $\cos\left(b\,z^r\right)\cos^{\nu}\left(c\,z^r+f\,z+g\right)$

01.07.21.1177.01

$$\int \cos(b z^2) \cos^\nu(c z^2 + f z + g)\, dz == \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} C\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) (1 - \nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 c s + c \nu}} \left(\cos\left(\frac{(f \nu - 2 f s)^2}{4 (-b - 2 c s + c \nu)} + 2 g s - g \nu \right) C\left(\frac{-2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 c s + c \nu}} \right) + S\left(\frac{-2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 c s + c \nu}} \right) \sin\left(\frac{(f \nu - 2 f s)^2}{4 (-b - 2 c s + c \nu)} + 2 g s - g \nu \right) \right) + \frac{1}{\sqrt{-b + 2 c s - c \nu}} \left(\cos\left(\frac{(2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} - 2 g s + g \nu \right) C\left(\frac{2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 c s - c \nu}} \right) + S\left(\frac{2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 c s - c \nu}} \right) \sin\left(\frac{(2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} - 2 g s + g \nu \right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.07.21.1178.01

$$\int \cos(\sqrt{z}\, b) \cos^\nu(\sqrt{z}\, c + f z + g)\, dz == \frac{2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos(\sqrt{z}\, b) + b \sqrt{z} \sin(\sqrt{z}\, b) \right)}{b^2} + 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{2 (f \nu - 2 f s)^{3/2}} \left(\sqrt{2 \pi} (b + 2 c s - c \nu) \cos\left(\frac{(-b - 2 c s + c \nu)^2}{4 (f \nu - 2 f s)} + 2 g s - g \nu \right) C\left(\frac{-b - 2 c s + c \nu + 2 (f \nu - 2 f s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{f \nu - 2 f s}} \right) - \sqrt{2 \pi} (-b - 2 c s + c \nu) S\left(\frac{-b - 2 c s + c \nu + 2 (f \nu - 2 f s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{f \nu - 2 f s}} \right) \sin\left(\frac{(-b - 2 c s + c \nu)^2}{4 (f \nu - 2 f s)} + 2 g s - g \nu \right) - 2 \sqrt{f \nu - 2 f s} \sin\left(2 g s - g \nu - (f \nu - 2 f s) z - (-b - 2 c s + c \nu) \sqrt{z} \right) \right) + \frac{1}{2 (2 f s - f \nu)^{3/2}} \left(\sqrt{2 \pi} (b - 2 c s + c \nu) \cos\left(\frac{(-b + 2 c s - c \nu)^2}{4 (2 f s - f \nu)} - 2 g s + g \nu \right) C\left(\frac{-b + 2 c s - c \nu + 2 (2 f s - f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 f s - f \nu}} \right) - \sqrt{2 \pi} (-b + 2 c s - c \nu) S\left(\frac{-b + 2 c s - c \nu + 2 (2 f s - f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 f s - f \nu}} \right) \sin\left(\frac{(-b + 2 c s - c \nu)^2}{4 (2 f s - f \nu)} - 2 g s + g \nu \right) - 2 \sqrt{2 f s - f \nu} \sin\left(-2 g s + g \nu - (2 f s - f \nu) z - (-b + 2 c s - c \nu) \sqrt{z} \right) \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(b z^r + e) \cos^\nu(c z^r + f z + g)$

01.07.21.1179.01

$$\int \cos(b z^2 + e) \cos^v(c z^2 + f z + g)\, dz = \frac{2^{-v-\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)}{\sqrt{b}} \left(\cos(e)\, C\!\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) - S\!\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) \sin(e)\right) + 2^{-v-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{\sqrt{-b - 2 c s + c v}} \left(\cos\!\left(\frac{(f v - 2 f s)^2}{4(-b - 2 c s + c v)} + e + 2 g s - g v \right) C\!\left(\frac{-2 f s + f v + 2(-b - 2 c s + c v) z}{\sqrt{2\pi} \sqrt{-b - 2 c s + c v}} \right) + S\!\left(\frac{-2 f s + f v + 2(-b - 2 c s + c v) z}{\sqrt{2\pi} \sqrt{-b - 2 c s + c v}} \right) \sin\!\left(\frac{(f v - 2 f s)^2}{4(-b - 2 c s + c v)} + e + 2 g s - g v \right) \right) + \frac{1}{\sqrt{-b + 2 c s - c v}} \left(\cos\!\left(\frac{(2 f s - f v)^2}{4(-b + 2 c s - c v)} + e - 2 g s + g v \right) C\!\left(\frac{2 f s - f v + 2(-b + 2 c s - c v) z}{\sqrt{2\pi} \sqrt{-b + 2 c s - c v}} \right) + S\!\left(\frac{2 f s - f v + 2(-b + 2 c s - c v) z}{\sqrt{2\pi} \sqrt{-b + 2 c s - c v}} \right) \sin\!\left(\frac{(2 f s - f v)^2}{4(-b + 2 c s - c v)} + e - 2 g s + g v \right) \right) \right) /;\ v \in \mathbb{N}^+$$

01.07.21.1180.01

$$\int \cos(\sqrt{z}\, b + e) \cos^v(\sqrt{z}\, c + f z + g)\, dz = \frac{2^{1-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\cos(\sqrt{z}\, b + e) + b \sqrt{z} \sin(\sqrt{z}\, b + e)\right)}{b^2} + 2^{-v} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{2 (f v - 2 f s)^{3/2}} \left(\sqrt{2\pi}\, (b + 2 c s - c v) \cos\!\left(\frac{(-b - 2 c s + c v)^2}{4 (f v - 2 f s)} + e + 2 g s - g v \right) C\!\left(\frac{-b - 2 c s + c v + 2 (f v - 2 f s) \sqrt{z}}{\sqrt{2\pi} \sqrt{f v - 2 f s}} \right) - \sqrt{2\pi}\, (-b - 2 c s + c v)\, S\!\left(\frac{-b - 2 c s + c v + 2 (f v - 2 f s) \sqrt{z}}{\sqrt{2\pi} \sqrt{f v - 2 f s}} \right) \sin\!\left(\frac{(-b - 2 c s + c v)^2}{4 (f v - 2 f s)} + e + 2 g s - g v \right) - 2 \sqrt{f v - 2 f s}\, \sin\!\left(e + 2 g s - g v - (f v - 2 f s) z - (-b - 2 c s + c v) \sqrt{z}\right) \right) + \frac{1}{2 (2 f s - f v)^{3/2}} \left(\sqrt{2\pi}\, (b - 2 c s + c v) \cos\!\left(\frac{(-b + 2 c s - c v)^2}{4 (2 f s - f v)} + e - 2 g s + g v \right) C\!\left(\frac{-b + 2 c s - c v + 2 (2 f s - f v) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 f s - f v}} \right) - \sqrt{2\pi}\, (-b + 2 c s - c v)\, S\!\left(\frac{-b + 2 c s - c v + 2 (2 f s - f v) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 f s - f v}} \right) \sin\!\left(\frac{(-b + 2 c s - c v)^2}{4 (2 f s - f v)} + e - 2 g s + g v \right) - 2 \sqrt{2 f s - f v}\, \sin\!\left(e - 2 g s + g v - (2 f s - f v) z - (-b + 2 c s - c v) \sqrt{z}\right) \right) \right) /;\ v \in \mathbb{N}^+$$

Involving $\cos(b z^r + d z) \cos^v(c z^r + f z + g)$

01.07.21.1181.01

$$\int \cos\left(b z^2 + d z\right) \cos^{\nu}\left(c z^2 + f z + g\right) dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4 b}\right) C\left(\frac{d + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right) + S\left(\frac{d + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4 b}\right)\right) + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 c s + c \nu}} \left(\cos\left(\frac{(-d - 2 f s + f \nu)^2}{4(-b - 2 c s + c \nu)} + 2 g s - g \nu\right) C\left(\frac{-d - 2 f s + f \nu + 2(-b - 2 c s + c \nu) z}{\sqrt{2\pi}\sqrt{-b - 2 c s + c \nu}}\right) + S\left(\frac{-d - 2 f s + f \nu + 2(-b - 2 c s + c \nu) z}{\sqrt{2\pi}\sqrt{-b - 2 c s + c \nu}}\right) \sin\left(\frac{(-d - 2 f s + f \nu)^2}{4(-b - 2 c s + c \nu)} + 2 g s - g \nu\right)\right) + \frac{1}{\sqrt{-b + 2 c s - c \nu}} \left(\cos\left(\frac{(-d + 2 f s - f \nu)^2}{4(-b + 2 c s - c \nu)} - 2 g s + g \nu\right) C\left(\frac{-d + 2 f s - f \nu + 2(-b + 2 c s - c \nu) z}{\sqrt{2\pi}\sqrt{-b + 2 c s - c \nu}}\right) + S\left(\frac{-d + 2 f s - f \nu + 2(-b + 2 c s - c \nu) z}{\sqrt{2\pi}\sqrt{-b + 2 c s - c \nu}}\right) \sin\left(\frac{(-d + 2 f s - f \nu)^2}{4(-b + 2 c s - c \nu)} - 2 g s + g \nu\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1182.01

$$\int \cos\left(\sqrt{z}\, b + d\, z\right) \cos^{\nu}\left(\sqrt{z}\, c + f\, z + g\right) dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\,d}\right) C\left(\frac{b + 2\,d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) - b\sqrt{2\pi}\, S\left(\frac{b+2\,d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\,d}\right) + 2\sqrt{d}\, \sin\left(\sqrt{z}\, b + d\, z\right)\right)\right) +$$

$$2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{2\,(-d - 2\,f\,s + f\,\nu)^{3/2}} \left(\sqrt{2\pi}\, (b + 2\,c\,s - c\,\nu) \cos\left(\frac{(-b - 2\,c\,s + c\,\nu)^2}{4\,(-d - 2\,f\,s + f\,\nu)} + 2\,g\,s - g\,\nu\right) C\left(\frac{-b - 2\,c\,s + c\,\nu + 2\,(-d - 2\,f\,s + f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2\,f\,s + f\,\nu}}\right) - \sqrt{2\pi}\, (-b - 2\,c\,s + c\,\nu) S\left(\frac{-b - 2\,c\,s + c\,\nu + 2\,(-d - 2\,f\,s + f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2\,f\,s + f\,\nu}}\right) \sin\left(\frac{(-b - 2\,c\,s + c\,\nu)^2}{4\,(-d - 2\,f\,s + f\,\nu)} + 2\,g\,s - g\,\nu\right) - 2\sqrt{-d - 2\,f\,s + f\,\nu}\, \sin\left(2\,g\,s - g\,\nu - (-d - 2\,f\,s + f\,\nu)\,z - (-b - 2\,c\,s + c\,\nu)\sqrt{z}\right)\right) + \frac{1}{2\,(-d + 2\,f\,s - f\,\nu)^{3/2}} \left(\sqrt{2\pi}\, (b - 2\,c\,s + c\,\nu) \cos\left(\frac{(-b + 2\,c\,s - c\,\nu)^2}{4\,(-d + 2\,f\,s - f\,\nu)} - 2\,g\,s + g\,\nu\right) C\left(\frac{-b + 2\,c\,s - c\,\nu + 2\,(-d + 2\,f\,s - f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2\,f\,s - f\,\nu}}\right) - \sqrt{2\pi}\, (-b + 2\,c\,s - c\,\nu) S\left(\frac{-b + 2\,c\,s - c\,\nu + 2\,(-d + 2\,f\,s - f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2\,f\,s - f\,\nu}}\right) \sin\left(\frac{(-b + 2\,c\,s - c\,\nu)^2}{4\,(-d + 2\,f\,s - f\,\nu)} - 2\,g\,s + g\,\nu\right) - 2\sqrt{-d + 2\,f\,s - f\,\nu}\, \sin\left(-2\,g\,s + g\,\nu - (-d + 2\,f\,s - f\,\nu)\,z - (-b + 2\,c\,s - c\,\nu)\sqrt{z}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos\left(b\, z^r + d\, z + e\right) \cos^{\nu}\left(c\, z^r + f\, z + g\right)$

01.07.21.1183.01

$$\int \cos\left(b z^2 + d z + e\right) \cos^{\nu}\left(c z^2 + f z + g\right) dz ==$$

$$\frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4 b} - e\right) C\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) + S\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) \sin\left(\frac{d^2}{4 b} - e\right)\right) + 2^{-\nu-\frac{1}{2}} \sqrt{\pi}$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 c s + c \nu}} \left(\cos\left(\frac{(-d - 2 f s + f \nu)^2}{4 (-b - 2 c s + c \nu)} + e + 2 g s - g \nu\right) C\left(\frac{-d - 2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 c s + c \nu}}\right) + \right.\right.$$

$$S\left(\frac{-d - 2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 c s + c \nu}}\right) \sin\left(\frac{(-d - 2 f s + f \nu)^2}{4 (-b - 2 c s + c \nu)} + e + 2 g s - g \nu\right)\Bigg) +$$

$$\frac{1}{\sqrt{-b + 2 c s - c \nu}} \left(\cos\left(\frac{(-d + 2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} + e - 2 g s + g \nu\right) C\left(\frac{-d + 2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 c s - c \nu}}\right) + \right.$$

$$\left.\left.S\left(\frac{-d + 2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 c s - c \nu}}\right) \sin\left(\frac{(-d + 2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} + e - 2 g s + g \nu\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1184.01

$$\int \cos\left(\sqrt{z}\, b + d\, z + e\right) \cos^{\nu}\left(\sqrt{z}\, c + f\, z + g\right) dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, d} - e\right) C\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) - b\sqrt{2\pi}\, S\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d} - e\right) + 2\sqrt{d}\, \sin\left(\sqrt{z}\, b + e + d\, z\right)\right)\right) +$$

$$2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{2\,(-d - 2\, f\, s + f\, \nu)^{3/2}} \left(\sqrt{2\pi}\, (b + 2\, c\, s - c\, \nu) \cos\left(\frac{(-b - 2\, c\, s + c\, \nu)^2}{4\,(-d - 2\, f\, s + f\, \nu)} + e + 2\, g\, s - g\, \nu\right) C\left(\frac{-b - 2\, c\, s + c\, \nu + 2\,(-d - 2\, f\, s + f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2\, f\, s + f\, \nu}}\right) - \sqrt{2\pi}\, (-b - 2\, c\, s + c\, \nu)\, S\left(\frac{-b - 2\, c\, s + c\, \nu + 2\,(-d - 2\, f\, s + f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2\, f\, s + f\, \nu}}\right) \sin\left(\frac{(-b - 2\, c\, s + c\, \nu)^2}{4\,(-d - 2\, f\, s + f\, \nu)} + e + 2\, g\, s - g\, \nu\right) - 2\sqrt{-d - 2\, f\, s + f\, \nu}\, \sin\left(e + 2\, g\, s - g\, \nu - (-d - 2\, f\, s + f\, \nu)\, z - (-b - 2\, c\, s + c\, \nu)\sqrt{z}\right)\right) + \frac{1}{2\,(-d + 2\, f\, s - f\, \nu)^{3/2}} \left(\sqrt{2\pi}\, (b - 2\, c\, s + c\, \nu) \cos\left(\frac{(-b + 2\, c\, s - c\, \nu)^2}{4\,(-d + 2\, f\, s - f\, \nu)} + e - 2\, g\, s + g\, \nu\right) C\left(\frac{-b + 2\, c\, s - c\, \nu + 2\,(-d + 2\, f\, s - f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2\, f\, s - f\, \nu}}\right) - \sqrt{2\pi}\, (-b + 2\, c\, s - c\, \nu)\, S\left(\frac{-b + 2\, c\, s - c\, \nu + 2\,(-d + 2\, f\, s - f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2\, f\, s - f\, \nu}}\right) \sin\left(\frac{(-b + 2\, c\, s - c\, \nu)^2}{4\,(-d + 2\, f\, s - f\, \nu)} + e - 2\, g\, s + g\, \nu\right) - 2\sqrt{-d + 2\, f\, s - f\, \nu}\, \sin\left(e - 2\, g\, s + g\, \nu - (-d + 2\, f\, s - f\, \nu)\, z - (-b + 2\, c\, s - c\, \nu)\sqrt{z}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving product of powers of two direct functions

Involving $\cos^{\mu}(c\, z) \cos^{\nu}(a\, z)$

01.07.21.1185.01

$$\int \cos^{\mu}(c z) \cos^{\nu}(a z) \, dz = 2^{-\nu} \left(\frac{(\nu \bmod 2 - 1) \sin(c z)}{c (\mu + 1) \sqrt{\sin^2(c z)}} \binom{\nu}{\frac{\nu}{2}} \cos^{\mu+1}(c z) \, {}_2F_1\!\left(\frac{\mu+1}{2}, \frac{1}{2}; \frac{\mu+3}{2}; \cos^2(c z)\right) - i \cos^{\mu}(c z) \left(1 + e^{2 i c z}\right)^{-\mu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(e^{-i a (2 s - \nu) z} \binom{\nu}{s} \left((a (\nu - 2 s) + c \mu) \, {}_2F_1\!\left(-\frac{2 a s - a \nu + c \mu}{2 c}, -\mu; \frac{1}{2} \left(\frac{a (\nu - 2 s)}{c} - \mu + 2\right); -e^{2 i c z}\right) + e^{2 i a (2 s - \nu) z} (2 a s - a \nu + c \mu) \, {}_2F_1\!\left(-\frac{a (\nu - 2 s) + c \mu}{2 c}, -\mu; -\frac{a (\nu - 2 s) + c (\mu - 2)}{2 c}; -e^{2 i c z}\right) \right) \right) \Big/ ((2 a s - a \nu - c \mu) (2 a s - a \nu + c \mu)) \right) /; \nu \in \mathbb{N}^+$$

01.07.21.1186.01

$$\int \cos^{m}(c z) \cos^{\nu}(a z) \, dz = 2^{-m-\nu} \left(z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (m \bmod 2 - 1) (\nu \bmod 2 - 1) - \frac{2}{c} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \frac{\sin(c (m - 2 s) z)}{m - 2 s} - \frac{2}{a} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \frac{\sin(a (2 s - \nu) z)}{2 s - \nu} - 2 \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\binom{\nu}{s} ((2 c k - c m + 2 a s - a \nu) \sin(c (m - 2 k) z + a (2 s - \nu) z) + (2 c k - c m - 2 a s + a \nu) \sin(c (m - 2 k) z + a (\nu - 2 s) z)) \right) \Big/ ((2 c k - c m + 2 a s - a \nu) (2 c k - c m - 2 a s + a \nu)) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.1187.01

$$\int \cos^2(c z) \cos^{\frac{1}{2}}(a z) \, dz = \frac{1}{4 \left(a^3 - 16 a c^2\right) \sqrt{1 + e^{2 i a z}}} \left(4 \left(a^2 - 16 c^2\right) \sqrt{1 + e^{2 i a z}} \, E\!\left(\frac{a z}{2} \,\middle|\, 2\right) + \sqrt{2} \, a \, e^{-2 i c z} \sqrt{e^{-i a z} + e^{i a z}} \, i \left((a + 4 c) e^{4 i c z} \, {}_2F_1\!\left(\frac{c}{a} - \frac{1}{4}, -\frac{1}{2}; \frac{c}{a} + \frac{3}{4}; -e^{2 i a z}\right) + (a - 4 c) \, {}_2F_1\!\left(-\frac{c}{a} - \frac{1}{4}, -\frac{1}{2}; \frac{3}{4} - \frac{c}{a}; -e^{2 i a z}\right) \right) \right)$$

01.07.21.1188.01

$$\int \cos^2(c z) \cos^{\frac{1}{2}}(2 c z) \, dz = \frac{3 E(c z \mid 2) + F(c z \mid 2) + \cos^{\frac{1}{2}}(2 c z) \sin(2 c z)}{6 c}$$

01.07.21.1189.01

$$\int \frac{\cos^2(c z)}{\cos^{\frac{1}{2}}(a z)} \, dz = \left(e^{-\frac{1}{2} i a z} \left(2 \left(a^2 - 16 c^2\right) e^{\frac{i a z}{2}} \sqrt{e^{-i a z} + e^{i a z}} \, F\!\left(\frac{a z}{2} \,\middle|\, 2\right) - i \sqrt{2} \, a \sqrt{1 + e^{2 i a z}} \left((a - 4 c) e^{\frac{1}{2} i (a + 4 c) z} \, {}_2F_1\!\left(\frac{c}{a} + \frac{1}{4}, \frac{1}{2}; \frac{c}{a} + \frac{5}{4}; -e^{2 i a z}\right) + (a + 4 c) e^{\frac{1}{2} i (a - 4 c) z} \, {}_2F_1\!\left(\frac{1}{4} - \frac{c}{a}, \frac{1}{2}; \frac{5}{4} - \frac{c}{a}; -e^{2 i a z}\right) \right) \right) \right) \Big/ \left(2 \left(a^3 - 16 a c^2\right) \sqrt{e^{-i a z} + e^{i a z}} \right)$$

01.07.21.1190.01

$$\int \frac{\cos^2(c\,z)}{\cos^{\frac{1}{2}}(2\,c\,z)}\,dz = \frac{E(c\,z \mid 2) + F(c\,z \mid 2)}{2\,c}$$

01.07.21.1191.01

$$\int \frac{\cos^7(c\,z)}{\sqrt{\cos^7(2\,c\,z)}}\,dz = \frac{\cos(2\,c\,z)\left(30\sqrt{2}\,\sin^{-1}\!\left(\sqrt{2}\,\sin(c\,z)\right)\cos^{\frac{5}{2}}(2\,c\,z) + 140\sin(c\,z) - 45\sin(3\,c\,z) + 83\sin(5\,c\,z)\right)}{480\,c\sqrt{\cos^7(2\,c\,z)}}$$

Involving $\cos^{\mu}(c\,z)\cos^{\nu}(a\,z+b)$

01.07.21.1192.01

$$\int \cos^{\mu}(c\,z)\cos^{\nu}(b+a\,z)\,dz = -i\,2^{-\nu}\cos^{\mu}(c\,z)\left(\frac{\nu \bmod 2 - 1}{c\,\mu}\left(1+e^{2\,i\,c\,z}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\!\left(-\frac{\mu}{2}, -\mu; 1-\frac{\mu}{2}; -e^{2\,i\,c\,z}\right) - \left(1+e^{-2\,i\,c\,z}\right)^{-\mu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i\,b\,(\nu-2\,s)}\binom{\nu}{s}\left(\frac{e^{i\,(\nu-2\,s)\,(2\,b+a\,z)}}{2\,a\,s-a\,\nu-c\,\mu}\,{}_2F_1\!\left(-\frac{a\,(\nu-2\,s)+c\,\mu}{2\,c}, -\mu; -\frac{a\,(\nu-2\,s)+c\,(\mu-2)}{2\,c}; -e^{-2\,i\,c\,z}\right) - \frac{e^{i\,a\,(2\,s-\nu)\,z}}{2\,a\,s-a\,\nu+c\,\mu}\,{}_2F_1\!\left(-\frac{2\,a\,s-a\,\nu+c\,\mu}{2\,c}, -\mu; \frac{1}{2}\left(\frac{a\,(\nu-2\,s)}{c}-\mu+2\right); -e^{-2\,i\,c\,z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1193.01

$$\int \cos^{m}(c\,z)\cos^{\nu}(b+a\,z)\,dz = 2^{-m-\nu}\left(z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2 - 1)(\nu \bmod 2 - 1) - \frac{2}{c}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2 - 1)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\frac{\sin((m-2\,s)\,c\,z)}{m-2\,s} - \frac{2}{a}\binom{m}{\frac{m}{2}}(m \bmod 2 - 1)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\frac{\sin((2\,s-\nu)\,(b+a\,z))}{2\,s-\nu} - 2\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(\binom{\nu}{s}((2\,c\,k-c\,m-2\,a\,s+a\,\nu)\sin(c\,z\,(m-2\,k)+b\,(\nu-2\,s)+a\,(\nu-2\,s)\,z) + (2\,c\,k-c\,m+2\,a\,s-a\,\nu)\sin(b\,(2\,s-\nu)+(-2\,c\,k+c\,m+2\,a\,s-a\,\nu)\,z))\right)\Big/ ((2\,c\,k-c\,m+2\,a\,s-a\,\nu)\,(2\,c\,k-c\,m-2\,a\,s+a\,\nu))\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\cos^{\mu}(c\,z+d)\cos^{\nu}(a\,z+b)$

01.07.21.1194.01

$$\int \cos^{\mu}(d+c\,z)\cos^{\nu}(b+a\,z)\,dz = -i\,2^{-\nu}\cos^{\mu}(d+c\,z)\left(\frac{\nu \bmod 2-1}{c\,\mu}\left(1+e^{2\,i\,(d+c\,z)}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\left(-\frac{\mu}{2},-\mu;1-\frac{\mu}{2};-e^{2\,i\,(d+c\,z)}\right)-\left(1+e^{-2\,i\,(d+c\,z)}\right)^{-\mu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i\,b\,(\nu-2\,s)}\binom{\nu}{s}\left(\frac{e^{i\,(\nu-2\,s)\,(2\,b+a\,z)}}{2\,a\,s-a\,\nu-c\,\mu}\,{}_2F_1\left(-\frac{a\,(\nu-2\,s)+c\,\mu}{2\,c},-\mu;-\frac{a\,(\nu-2\,s)+c\,(\mu-2)}{2\,c};-e^{-2\,i\,(d+c\,z)}\right)-\frac{e^{i\,a\,(2\,s-\nu)\,z}}{2\,a\,s-a\,\nu+c\,\mu}\,{}_2F_1\left(-\frac{2\,a\,s-a\,\nu+c\,\mu}{2\,c},-\mu;\frac{1}{2}\left(\frac{a\,(\nu-2\,s)}{c}-\mu+2\right);-e^{-2\,i\,(d+c\,z)}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1195.01

$$\int \cos^{m}(d+c\,z)\cos^{\nu}(b+a\,z)\,dz = 2^{-m-\nu}\left(z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2-1)(\nu \bmod 2-1)-\frac{2}{c}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\frac{\sin((m-2\,s)\,(d+c\,z))}{m-2\,s}-\frac{2}{a}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\frac{\sin((2\,s-\nu)\,(b+a\,z))}{2\,s-\nu}-2\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(\binom{\nu}{s}((2\,c\,k-c\,m-2\,a\,s+a\,\nu)\sin(d\,(m-2\,k)+c\,z\,(m-2\,k)+b\,(\nu-2\,s)+a\,(\nu-2\,s)\,z)+(2\,c\,k-c\,m+2\,a\,s-a\,\nu)\sin(d\,(m-2\,k)+b\,(2\,s-\nu)+(-2\,c\,k+c\,m+2\,a\,s-a\,\nu)\,z))\right)\Big/((2\,c\,k-c\,m+2\,a\,s-a\,\nu)\,(2\,c\,k-c\,m-2\,a\,s+a\,\nu))\right)\;/;\;m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\cos^{m}(d\,z)\cos^{\nu}\left(c\,z^{r}\right)$

01.07.21.1196.01

$$\int \cos^m(d\,z)\cos^\nu(c\,z^2)\,dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + \frac{2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{d}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin((m-2k)\,d\,z)}{m-2k} + 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{c(\nu-2s)}}\binom{\nu}{s} C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2s)\,z}{\sqrt{c(\nu-2s)}}\right) + 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\,\nu-2\,c\,s}}\left(\cos\left(\frac{(2\,d\,k-d\,m)^2}{4(c\,\nu-2\,c\,s)}\right)C\left(\frac{2\,d\,k-d\,m+2(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\sqrt{c\,\nu-2\,c\,s}}\right)+S\left(\frac{2\,d\,k-d\,m+2(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\sqrt{c\,\nu-2\,c\,s}}\right)\sin\left(\frac{(2\,d\,k-d\,m)^2}{4(c\,\nu-2\,c\,s)}\right)\right)+\frac{1}{\sqrt{2\,c\,s-c\,\nu}}\left(\cos\left(\frac{(2\,d\,k-d\,m)^2}{4(2\,c\,s-c\,\nu)}\right)C\left(\frac{2\,d\,k-d\,m+2(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\sqrt{2\,c\,s-c\,\nu}}\right)+S\left(\frac{2\,d\,k-d\,m+2(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\sqrt{2\,c\,s-c\,\nu}}\right)\sin\left(\frac{(2\,d\,k-d\,m)^2}{4(2\,c\,s-c\,\nu)}\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.1197.01

$$\int \cos^m(d\,z)\cos^\nu(\sqrt{z}\,c)\,dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + \frac{2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{d}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(d\,z\,(m-2k))}{m-2k} + \frac{2^{-m-\nu+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{k}\left(\cos\left((2k-\nu)\sqrt{z}\,c\right)+c\,(2k-\nu)\sqrt{z}\,\sin\left((2k-\nu)\sqrt{z}\,c\right)\right)}{(\nu-2k)^2} + 2^{-m-\nu+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{2(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\cos\left(\frac{(c\,\nu-2\,c\,s)^2}{4(2\,d\,k-d\,m)}\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,d\,k-d\,m}\sqrt{2\pi}}\right)-\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,d\,k-d\,m}\sqrt{2\pi}}\right)\sin\left(\frac{(c\,\nu-2\,c\,s)^2}{4(2\,d\,k-d\,m)}\right)+2\sqrt{2\,d\,k-d\,m}\,\sin\left((2\,d\,k-d\,m)\,z+(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)+\frac{1}{2(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cos\left(\frac{(2\,c\,s-c\,\nu)^2}{4(2\,d\,k-d\,m)}\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,d\,k-d\,m}\sqrt{2\pi}}\right)-\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,d\,k-d\,m}\sqrt{2\pi}}\right)\sin\left(\frac{(2\,c\,s-c\,\nu)^2}{4(2\,d\,k-d\,m)}\right)+2\sqrt{2\,d\,k-d\,m}\,\sin\left((2\,d\,k-d\,m)\,z+(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\cos^m(d\,z+e)\cos^v(c\,z^r)$

01.07.21.1198.01

$$\int \cos^m(d\,z+e)\cos^v(c\,z^2)\,dz = 2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)+\frac{2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)}{d}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin((m-2k)(e+d\,z))}{m-2k}+$$

$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{c\,(v-2s)}}\binom{v}{s}\,C\!\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2s)\,z}{\sqrt{c\,(v-2s)}}\right)+$$

$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\frac{1}{\sqrt{c\,v-2\,c\,s}}\Bigg(\cos\!\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,v-2\,c\,s)}+2\,e\,k-e\,m\right)C\!\left(\frac{2\,d\,k-d\,m+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,v-2\,c\,s}}\right)-$$

$$S\!\left(\frac{2\,d\,k-d\,m+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,v-2\,c\,s}}\right)\sin\!\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,v-2\,c\,s)}+2\,e\,k-e\,m\right)\Bigg)+$$

$$\frac{1}{\sqrt{2\,c\,s-c\,v}}\Bigg(\cos\!\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,v)}+2\,e\,k-e\,m\right)C\!\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,v}}\right)-$$

$$S\!\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,v}}\right)\sin\!\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,v)}+2\,e\,k-e\,m\right)\Bigg)\Bigg)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.07.21.1199.01

$$\int \cos^m(d\,z+e)\cos^\nu\left(\sqrt{z}\;c\right)dz = 2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + \frac{2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{d}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(e\,(m-2\,k)+d\,z\,(m-2\,k))}{m-2\,k} +$$

$$\frac{2^{-m-\nu+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{k}\left(\cos\left((2\,k-\nu)\sqrt{z}\;c\right)+c\,(2\,k-\nu)\sqrt{z}\,\sin\left((2\,k-\nu)\sqrt{z}\;c\right)\right)}{(\nu-2\,k)^2} +$$

$$2^{-m-\nu+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{2\,(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\cos\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\right.\right.$$

$$(c\,\nu-2\,c\,s)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m\right)+$$

$$\left.2\sqrt{2\,d\,k-d\,m}\,\sin\left(2\,e\,k-e\,m+(2\,d\,k-d\,m)\,z+(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)+\frac{1}{2\,(2\,d\,k-d\,m)^{3/2}}$$

$$\left(\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cos\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+\right.$$

$$\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m\right)+$$

$$\left.\left.2\sqrt{2\,d\,k-d\,m}\,\sin\left(2\,e\,k-e\,m+(2\,d\,k-d\,m)\,z+(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\cos^m(a\,z^r)\cos^\nu(c\,z^r)$

01.07.21.1200.01

$$\int \cos^m(b\,z^r)\cos^v(c\,z^r)\,dz = 2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)-\frac{2^{-m-v}\,z}{r}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma\left(\frac{1}{r},(i\,b\,m-2\,i\,b\,k)\,z^r\right)((i\,b\,m-2\,i\,b\,k)\,z^r)^{-1/r}+((2\,i\,b\,k-i\,b\,m)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2\,i\,b\,k-i\,b\,m)\,z^r\right)\right)-\frac{2^{-m-v}\,z}{r}$$
$$\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(\Gamma\left(\frac{1}{r},(i\,c\,v-2\,i\,c\,k)\,z^r\right)((i\,c\,v-2\,i\,c\,k)\,z^r)^{-1/r}+((2\,i\,c\,k-i\,c\,v)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2\,i\,c\,k-i\,c\,v)\,z^r\right)\right)-$$
$$\frac{2^{-m-v}\,z}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma\left(\frac{1}{r},(-2\,b\,i\,k+i\,b\,m-2\,i\,c\,s+i\,c\,v)\,z^r\right)((-2\,b\,i\,k+i\,b\,m-2\,i\,c\,s+i\,c\,v)\,z^r)^{-1/r}+\right.$$
$$((2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,v)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,v)\,z^r\right)+$$
$$((-2\,b\,i\,k+i\,b\,m+2\,i\,c\,s-i\,c\,v)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-2\,b\,i\,k+i\,b\,m+2\,i\,c\,s-i\,c\,v)\,z^r\right)+$$
$$\left.((2\,i\,b\,k-i\,b\,m+2\,i\,c\,s-i\,c\,v)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2\,i\,b\,k-i\,b\,m+2\,i\,c\,s-i\,c\,v)\,z^r\right)\right)/;\,m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.07.21.1201.01

$$\int \cos^m\left(b\,z^2\right)\cos^v\left(c\,z^2\right)dz =$$
$$2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)+2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}}{\sqrt{b\,(m-2\,k)}}\,C\left(\frac{b\,(m-2\,k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b\,(m-2\,k)}}\right)+$$
$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{\binom{v}{k}}{\sqrt{c\,(v-2\,k)}}\,C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2\,k)\,z}{\sqrt{c\,(v-2\,k)}}\right)+2^{-m-v+\frac{1}{2}}\sqrt{\pi}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{C\left(\sqrt{\frac{2}{\pi}}\,\sqrt{2\,b\,k-b\,m-2\,c\,s+c\,v}\,z\right)}{\sqrt{2\,b\,k-b\,m-2\,c\,s+c\,v}}+\frac{C\left(\sqrt{\frac{2}{\pi}}\,\sqrt{2\,b\,k-b\,m+2\,c\,s-c\,v}\,z\right)}{\sqrt{2\,b\,k-b\,m+2\,c\,s-c\,v}}\right)/;\,m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.07.21.1202.01

$$\int \cos^m\left(\sqrt{z}\; b\right) \cos^v\left(\sqrt{z}\; c\right) dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + \frac{1}{b^2} 2^{-m-v+2} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(2k-m)^2} \binom{m}{k} \left(\cos\left(b\sqrt{z}\,(2k-m)\right) + b(2k-m)\sqrt{z}\,\sin\left(b\sqrt{z}\,(2k-m)\right)\right) + \frac{1}{c^2} 2^{-m-v+2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{(2k-v)^2} \left(\binom{v}{k}\left(\cos\left(c\sqrt{z}\,(2k-v)\right) + c(2k-v)\sqrt{z}\,\sin\left(c\sqrt{z}\,(2k-v)\right)\right)\right) + 2^{-m-v+2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{(b(2k-m)+c(v-2s))^2} \left(\cos\left((b(2k-m)+c(v-2s))\sqrt{z}\right) + (b(2k-m)+c(v-2s))\sqrt{z}\,\sin\left((b(2k-m)+c(v-2s))\sqrt{z}\right)\right) + \frac{1}{(b(2k-m)-c(v-2s))^2}\left(\cos\left((b(2k-m)-c(v-2s))\sqrt{z}\right) + (b(2k-m)-c(v-2s))\sqrt{z}\,\sin\left((b(2k-m)-c(v-2s))\sqrt{z}\right)\right)\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\cos^m(d\,z)\cos^v\left(c\,z^r + g\right)$

01.07.21.1203.01

$$\int \cos^m(d\,z)\cos^v\left(c\,z^2 + g\right) dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + \frac{2^{-m-v+1}\binom{v}{\frac{v}{2}}(1 - v \bmod 2)}{d} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k}\sin((m-2k)\,d\,z)}{m-2k} + 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{\sqrt{c(v-2s)}} \binom{v}{s} \left(\cos(g(v-2s))\,C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2s)\,z}{\sqrt{c(v-2s)}}\right) - S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2s)\,z}{\sqrt{c(v-2s)}}\right)\sin(g(v-2s))\right) + 2^{-m-v+\frac{1}{2}}\sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{\sqrt{c\,v - 2\,c\,s}}\left(\cos\left(-\frac{(2\,d\,k - d\,m)^2}{4(c\,v - 2\,c\,s)} - 2\,g\,s + g\,v\right) C\left(\frac{2\,d\,k - d\,m + 2(c\,v - 2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,v - 2\,c\,s}}\right) - S\left(\frac{2\,d\,k - d\,m + 2(c\,v - 2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,v - 2\,c\,s}}\right) \sin\left(-\frac{(2\,d\,k - d\,m)^2}{4(c\,v - 2\,c\,s)} - 2\,g\,s + g\,v\right)\right) + \frac{1}{\sqrt{2\,c\,s - c\,v}}\left(\cos\left(-\frac{(2\,d\,k - d\,m)^2}{4(2\,c\,s - c\,v)} + 2\,g\,s - g\,v\right) C\left(\frac{2\,d\,k - d\,m + 2(2\,c\,s - c\,v)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s - c\,v}}\right) - S\left(\frac{2\,d\,k - d\,m + 2(2\,c\,s - c\,v)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s - c\,v}}\right) \sin\left(-\frac{(2\,d\,k - d\,m)^2}{4(2\,c\,s - c\,v)} + 2\,g\,s - g\,v\right)\right)\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1204.01

$$\int \cos^m(d\,z)\cos^v\left(\sqrt{z}\;c+g\right)dz =$$

$$2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)+\frac{2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)}{d}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(d\,z\,(m-2\,k))}{m-2\,k}+$$

$$\frac{2^{-m-v+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{\binom{v}{k}\left(\cos\left((2\,k-v)\left(\sqrt{z}\;c+g\right)\right)+c\,(2\,k-v)\sqrt{z}\,\sin\left((2\,k-v)\left(\sqrt{z}\;c+g\right)\right)\right)}{(v-2\,k)^2}+$$

$$2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{2\,(2\,d\,k-d\,m)^{3/2}}\right.$$

$$\left(\sqrt{2\pi}\,(2\,c\,s-c\,v)\cos\left(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}-2\,g\,s+g\,v\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\right.$$

$$(c\,v-2\,c\,s)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}-2\,g\,s+g\,v\right)+$$

$$\left.2\sqrt{2\,d\,k-d\,m}\,\sin\left(-2\,g\,s+g\,v+(2\,d\,k-d\,m)\,z+(c\,v-2\,c\,s)\sqrt{z}\right)\right)+$$

$$\frac{1}{2\,(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\,(c\,v-2\,c\,s)\cos\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m)}+2\,g\,s-g\,v\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+\right.$$

$$\sqrt{2\pi}\,(2\,c\,s-c\,v)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m)}+2\,g\,s-g\,v\right)+$$

$$\left.\left.2\sqrt{2\,d\,k-d\,m}\,\sin\left(2\,g\,s-g\,v+(2\,d\,k-d\,m)\,z+(2\,c\,s-c\,v)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m(d\,z+e)\cos^v\left(c\,z^r+g\right)$

01.07.21.1205.01

$$\int \cos^m(d\,z+e)\cos^\nu\left(c\,z^2+g\right)dz = 2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+ \frac{2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{d}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin((m-2k)(e+d\,z))}{m-2k}+2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{c(\nu-2s)}}\binom{\nu}{s}\left(\cos(g(\nu-2s))\,C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2s)\,z}{\sqrt{c(\nu-2s)}}\right)-S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2s)\,z}{\sqrt{c(\nu-2s)}}\right)\sin(g(\nu-2s))\right)+2^{-m-\nu+\frac{1}{2}}\sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\,\nu-2\,c\,s}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,\nu-2\,c\,s)}+2\,e\,k-e\,m-2\,g\,s+g\,\nu\right)C\left(\frac{2\,d\,k-d\,m+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)- S\left(\frac{2\,d\,k-d\,m+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,\nu-2\,c\,s)}+2\,e\,k-e\,m-2\,g\,s+g\,\nu\right)\right)+ \frac{1}{\sqrt{2\,c\,s-c\,\nu}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,\nu)}+2\,e\,k-e\,m+2\,g\,s-g\,\nu\right)C\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)- S\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,\nu)}+2\,e\,k-e\,m+2\,g\,s-g\,\nu\right)\right)\right)\ /;\ m\in\mathbb{N}^+\bigwedge \nu\in\mathbb{N}^+$$

01.07.21.1206.01

$$\int \cos^m(d\,z+e)\cos^v\left(\sqrt{z}\,c+g\right)dz = 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2) + \frac{2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)}{d}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(e\,(m-2k)+d\,z\,(m-2k))}{m-2k} + \frac{2^{-m-v+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{\binom{v}{k}\left(\cos\left((2k-v)\left(\sqrt{z}\,c+g\right)\right)+c\,(2k-v)\sqrt{z}\,\sin\left((2k-v)\left(\sqrt{z}\,c+g\right)\right)\right)}{(v-2k)^2} + 2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{2\,(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\,(2\,c\,s-c\,v)\cos\left(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m-2\,g\,s+g\,v\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(c\,v-2\,c\,s)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m-2\,g\,s+g\,v\right)+2\sqrt{2\,d\,k-d\,m}\,\sin\left(2\,e\,k-e\,m-2\,g\,s+g\,v+(2\,d\,k-d\,m)\,z+(c\,v-2\,c\,s)\sqrt{z}\right)\right)+\frac{1}{2\,(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\,(c\,v-2\,c\,s)\cos\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m+2\,g\,s-g\,v\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(2\,c\,s-c\,v)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m+2\,g\,s-g\,v\right)+2\sqrt{2\,d\,k-d\,m}\,\sin\left(2\,e\,k-e\,m+2\,g\,s-g\,v+(2\,d\,k-d\,m)\,z+(2\,c\,s-c\,v)\sqrt{z}\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m(a\,z^r)\cos^v(c\,z^r+g)$

01.07.21.1207.01

$$\int \cos^m(b z^r)\cos^v(c z^r+g)\,dz = 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2) - \frac{2^{-m-v} z}{r}\binom{v}{\frac{v}{2}}(1-v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma\left(\frac{1}{r}, (i b m-2 i b k) z^r\right)((i b m-2 i b k) z^r)^{-1/r} + ((2 i b k-i b m) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (2 i b k-i b m) z^r\right)\right) - \frac{2^{-m-v} z}{r}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k} \left(e^{2 i g k-i g v}\,\Gamma\left(\frac{1}{r}, (i c v-2 i c k) z^r\right)((i c v-2 i c k) z^r)^{-1/r} + e^{i g v-2 i g k}((2 i c k-i c v) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (2 i c k-i c v) z^r\right)\right) - \frac{2^{-m-v} z}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Big(e^{2 i g s-i g v}\,\Gamma\left(\frac{1}{r}, (-2 b i k+i b m-2 i c s+i c v) z^r\right)((-2 b i k+i b m-2 i c s+i c v) z^r)^{-1/r} + e^{2 i g s-i g v}((2 i b k-i b m-2 i c s+i c v) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (2 i b k-i b m-2 i c s+i c v) z^r\right) + e^{-2 i g s+i g v}((-2 b i k+i b m+2 i c s-i c v) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (-2 b i k+i b m+2 i c s-i c v) z^r\right) + e^{-2 i g s+i g v}((2 i b k-i b m+2 i c s-i c v) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (2 i b k-i b m+2 i c s-i c v) z^r\right)\Big) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1208.01

$$\int \cos^m\left(b z^2\right)\cos^v\left(c z^2+g\right)dz = 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2) + 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{b(m-2k)}}\binom{m}{k} C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\ z}{\sqrt{b(m-2k)}}\right) + 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{c(v-2k)}}\binom{v}{k}\left(\cos(g(v-2k))\, C\left(\frac{c\sqrt{\frac{2}{\pi}}\ (v-2k) z}{\sqrt{c(v-2k)}}\right) - S\left(\frac{c\sqrt{\frac{2}{\pi}}\ (v-2k) z}{\sqrt{c(v-2k)}}\right)\sin(g(v-2k))\right) + 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s} \left(\left(\cos(g(2s-v))\, C\left(\sqrt{\frac{2}{\pi}}\ \sqrt{2bk-bm+2cs-cv}\ z\right) - S\left(\sqrt{\frac{2}{\pi}}\ \sqrt{2bk-bm+2cs-cv}\ z\right)\sin(g(2s-v))\right)\Big/\left(\sqrt{2bk-bm+2cs-cv}\right) + \left(\cos(g(2s-v))\, C\left(\sqrt{\frac{2}{\pi}}\ \sqrt{2bk-bm-2cs+cv}\ z\right) + S\left(\sqrt{\frac{2}{\pi}}\ \sqrt{2bk-bm-2cs+cv}\ z\right)\sin(g(2s-v))\right)\Big/\left(\sqrt{2bk-bm-2cs+cv}\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1209.01

$$\int \cos^m\left(\sqrt{z}\; b\right)\cos^\nu\left(\sqrt{z}\; c+g\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+\frac{1}{b^2}2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(2k-m)^2}\binom{m}{k}\left(\cos\left(b\sqrt{z}\;(2k-m)\right)+b(2k-m)\sqrt{z}\;\sin\left(b\sqrt{z}\;(2k-m)\right)\right)+\frac{1}{c^2}2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(2k-\nu)^2}\left(\binom{\nu}{k}\left(\cos\left(c\sqrt{z}\;(2k-\nu)-g(\nu-2k)\right)+c(2k-\nu)\sqrt{z}\;\sin\left(c\sqrt{z}\;(2k-\nu)-g(\nu-2k)\right)\right)\right)+$$
$$2^{-m-\nu+2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(b(2k-m)+c(\nu-2s))^2}\left(\cos\left(g(\nu-2s)+(b(2k-m)+c(\nu-2s))\sqrt{z}\right)+\right.\right.$$
$$\left.(b(2k-m)+c(\nu-2s))\sqrt{z}\;\sin\left(g(\nu-2s)+(b(2k-m)+c(\nu-2s))\sqrt{z}\right)\right)+$$
$$\frac{1}{(b(2k-m)-c(\nu-2s))^2}\left(\cos\left(g(\nu-2s)-(b(2k-m)-c(\nu-2s))\sqrt{z}\right)-\right.$$
$$\left.\left.(b(2k-m)-c(\nu-2s))\sqrt{z}\;\sin\left(g(\nu-2s)-(b(2k-m)-c(\nu-2s))\sqrt{z}\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\cos^m(a z^r+e)\cos^\nu(c z^r+g)$

01.07.21.1210.01

$$\int \cos^m(b z^r+e)\cos^\nu(c z^r+g)\,dz = 2^{-m-\nu} z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)-$$
$$\frac{2^{-m-\nu}z}{r}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{2iek-iem}\,\Gamma\left(\frac{1}{r},(ibm-2ibk)z^r\right)((ibm-2ibk)z^r)^{-1/r}+\right.$$
$$\left.e^{iem-2iek}((2ibk-ibm)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2ibk-ibm)z^r\right)\right)-$$
$$\frac{2^{-m-\nu}z}{r}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{2igk-ig\nu}\,\Gamma\left(\frac{1}{r},(ic\nu-2ick)z^r\right)((ic\nu-2ick)z^r)^{-1/r}+\right.$$
$$\left.e^{ig\nu-2igk}((2ick-ic\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2ick-ic\nu)z^r\right)\right)-\frac{2^{-m-\nu}z}{r}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{2iek-iem+2igs-ig\nu}\,\Gamma\left(\frac{1}{r},(-2bik+ibm-2ics+ic\nu)z^r\right)((-2bik+ibm-2ics+ic\nu)z^r)^{-1/r}+\right.$$
$$e^{-2eik+iem+2igs-ig\nu}((2ibk-ibm-2ics+ic\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2ibk-ibm-2ics+ic\nu)z^r\right)+$$
$$e^{2iek-iem-2igs+ig\nu}((-2bik+ibm+2ics-ic\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-2bik+ibm+2ics-ic\nu)z^r\right)+$$
$$e^{-2eik+iem-2igs+ig\nu}((2ibk-ibm+2ics-ic\nu)z^r)^{-1/r}$$
$$\left.\Gamma\left(\frac{1}{r},(2ibk-ibm+2ics-ic\nu)z^r\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.1211.01

$$\int \cos^m\left(b z^2+e\right) \cos^v\left(c z^2+g\right) dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \binom{m}{k} \left(\cos(e(m-2k))\, C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin(e(m-2k))\right) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{\sqrt{c(v-2k)}} \binom{v}{k} \left(\cos(g(v-2k))\, C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2k) z}{\sqrt{c(v-2k)}}\right) - S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2k) z}{\sqrt{c(v-2k)}}\right) \sin(g(v-2k))\right) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\left(\cos(e(2k-m)+g(2s-v))\, C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm+2cs-cv}\, z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm+2cs-cv}\, z\right) \sin(e(2k-m)+g(2s-v))\right) \Big/ \left(\sqrt{2bk-bm+2cs-cv}\right) + \left(\cos(e(2k-m)-g(2s-v))\, C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm-2cs+cv}\, z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm-2cs+cv}\, z\right) \sin(e(2k-m)-g(2s-v))\right) \Big/ \left(\sqrt{2bk-bm-2cs+cv}\right)\right) /;\ m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.07.21.1212.01

$$\int \cos^m\left(\sqrt{z}\, b+e\right) \cos^v\left(\sqrt{z}\, c+g\right) dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2) + \frac{1}{b^2} 2^{-m-v+2} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(2k-m)^2} \binom{m}{k} \left(\cos\left(-b\sqrt{z}\,(2k-m)+e(m-2k)\right) - b(2k-m)\sqrt{z}\, \sin\left(-b\sqrt{z}\,(2k-m)+e(m-2k)\right)\right) + \frac{1}{c^2} 2^{-m-v+2} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{(2k-v)^2} \left(\binom{v}{k} \left(\cos\left(c\sqrt{z}\,(2k-v)-g(v-2k)\right) + c(2k-v)\sqrt{z}\, \sin\left(c\sqrt{z}\,(2k-v)-g(v-2k)\right)\right)\right) + 2^{-m-v+2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{(b(2k-m)+c(v-2s))^2} \left(\cos\left(e(m-2k)-g(v-2s)-(b(2k-m)+c(v-2s))\sqrt{z}\right) - (b(2k-m)+c(v-2s))\sqrt{z}\, \sin\left(e(m-2k)-g(v-2s)-(b(2k-m)+c(v-2s))\sqrt{z}\right)\right) + \frac{1}{(b(2k-m)-c(v-2s))^2} \left(\cos\left(e(m-2k)+g(v-2s)-(b(2k-m)-c(v-2s))\sqrt{z}\right) - (b(2k-m)-c(v-2s))\sqrt{z}\, \sin\left(e(m-2k)+g(v-2s)-(b(2k-m)-c(v-2s))\sqrt{z}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\cos^m(d\, z) \cos^v\left(c\, z^r + f\, z\right)$

01.07.21.1213.01

$$\int \cos^m(d\, z) \cos^v\left(c\, z^2+f\, z\right) dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2) + \frac{2^{-m-v+1} \binom{v}{\frac{v}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\sin((m-2k)\, d\, z) \binom{m}{k}}{m-2k}\right) (1-v \bmod 2)}{d} + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{\binom{v}{s} \left(\cos\left(\frac{f^2 (v-2s)}{4c}\right) C\left(\frac{f(v-2s)+2c\, z(v-2s)}{\sqrt{2\pi}\, \sqrt{c(v-2s)}}\right) + S\left(\frac{f(v-2s)+2c\, z(v-2s)}{\sqrt{2\pi}\, \sqrt{c(v-2s)}}\right) \sin\left(\frac{f^2 (v-2s)}{4c}\right)\right)}{\sqrt{c(v-2s)}} + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{\sqrt{c\, v-2c\, s}} \left(\cos\left(\frac{(2d\, k-d\, m-2f\, s+f\, v)^2}{4(c\, v-2c\, s)}\right) C\left(\frac{2d\, k-d\, m-2f\, s+f\, v+2(c\, v-2c\, s)\, z}{\sqrt{2\pi}\, \sqrt{c\, v-2c\, s}}\right) + S\left(\frac{2d\, k-d\, m-2f\, s+f\, v+2(c\, v-2c\, s)\, z}{\sqrt{2\pi}\, \sqrt{c\, v-2c\, s}}\right) \sin\left(\frac{(2d\, k-d\, m-2f\, s+f\, v)^2}{4(c\, v-2c\, s)}\right)\right) + \frac{1}{\sqrt{2c\, s-c\, v}} \left(\cos\left(\frac{(2d\, k-d\, m+2f\, s-f\, v)^2}{4(2c\, s-c\, v)}\right) C\left(\frac{2d\, k-d\, m+2f\, s-f\, v+2(2c\, s-c\, v)\, z}{\sqrt{2\pi}\, \sqrt{2c\, s-c\, v}}\right) + S\left(\frac{2d\, k-d\, m+2f\, s-f\, v+2(2c\, s-c\, v)\, z}{\sqrt{2\pi}\, \sqrt{2c\, s-c\, v}}\right) \sin\left(\frac{(2d\, k-d\, m+2f\, s-f\, v)^2}{4(2c\, s-c\, v)}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1214.01

$$\int \cos^m(d\,z)\cos^\nu\left(\sqrt{z}\;c + f\,z\right)dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1-\nu \bmod 2) + \frac{2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(d\,(m-2\,k)\,z)}{m-2\,k}\right)(1-\nu \bmod 2)}{d} + 2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{2\,(f\,(\nu-2\,s))^{3/2}}\left(\binom{\nu}{s}\left(-c\sqrt{2\pi}\,(\nu-2\,s)\cos\left(\frac{c^2\,(\nu-2\,s)}{4\,f}\right) C\left(\frac{c\,(\nu-2\,s)+2\,f\sqrt{z}\,(\nu-2\,s)}{\sqrt{2\pi}\sqrt{f\,(\nu-2\,s)}}\right) - c\sqrt{2\pi}\,(\nu-2\,s)\,S\left(\frac{c\,(\nu-2\,s)+2\,f\sqrt{z}\,(\nu-2\,s)}{\sqrt{2\pi}\sqrt{f\,(\nu-2\,s)}}\right)\sin\left(\frac{c^2\,(\nu-2\,s)}{4\,f}\right) + 2\sqrt{f\,(\nu-2\,s)}\,\sin\left(f\,z\,(\nu-2\,s)+c\sqrt{z}\,(\nu-2\,s)\right)\right)\right) + 2^{-m-\nu+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\cos\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)}\right) C\left(\frac{-2\,c\,s+c\,\nu+2\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,\nu}}\right) - \sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{-2\,c\,s+c\,\nu+2\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,\nu}}\right)\sin\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)}\right) + 2\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,\nu}\,\sin\left(\sqrt{z}\,(c\,\nu-2\,c\,s)+(2\,d\,k-d\,m-2\,f\,s+f\,\nu)\,z\right)\right)\Big/\left(2\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)^{3/2}\right) + \left(\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cos\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)}\right) C\left(\frac{2\,c\,s-c\,\nu+2\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,\nu}}\right) - \sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{2\,c\,s-c\,\nu+2\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)}\right) + 2\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,\nu}\,\sin\left(\sqrt{z}\,(2\,c\,s-c\,\nu)+(2\,d\,k-d\,m+2\,f\,s-f\,\nu)\,z\right)\right)\Big/\left(2\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)^{3/2}\right)\right) \;/;\; m\in\mathbb{N}^+ \land \nu\in\mathbb{N}^+$$

Involving $\cos^m(d\,z+e)\cos^\nu\left(c\,z^r+f\,z\right)$

01.07.21.1215.01

$$\int \cos^m(e+d\,z)\cos^\nu\left(c\,z^2+f\,z\right)dz = 2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+$$

$$\frac{2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\sin((m-2k)(e+d\,z))\binom{m}{k}}{m-2k}\right)(1-\nu \bmod 2)}{d}+2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\left(\cos\left(\frac{f^2(\nu-2s)}{4c}\right)C\left(\frac{f(\nu-2s)+2c\,z(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)+S\left(\frac{f(\nu-2s)+2c\,z(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)\sin\left(\frac{f^2(\nu-2s)}{4c}\right)\right)}{\sqrt{c(\nu-2s)}}+2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}$$

$$\left(\frac{1}{\sqrt{c\,\nu-2c\,s}}\left(\cos\left(-\frac{(2d\,k-d\,m-2f\,s+f\,\nu)^2}{4(c\,\nu-2c\,s)}+2e\,k-e\,m\right)C\left(\frac{2d\,k-d\,m-2f\,s+f\,\nu+2(c\,\nu-2c\,s)z}{\sqrt{2\pi}\sqrt{c\,\nu-2c\,s}}\right)-\right.\right.$$

$$\left.S\left(\frac{2d\,k-d\,m-2f\,s+f\,\nu+2(c\,\nu-2c\,s)z}{\sqrt{2\pi}\sqrt{c\,\nu-2c\,s}}\right)\sin\left(-\frac{(2d\,k-d\,m-2f\,s+f\,\nu)^2}{4(c\,\nu-2c\,s)}+2e\,k-e\,m\right)\right)+$$

$$\frac{1}{\sqrt{2c\,s-c\,\nu}}\left(\cos\left(-\frac{(2d\,k-d\,m+2f\,s-f\,\nu)^2}{4(2c\,s-c\,\nu)}+2e\,k-e\,m\right)C\left(\frac{2d\,k-d\,m+2f\,s-f\,\nu+2(2c\,s-c\,\nu)z}{\sqrt{2\pi}\sqrt{2c\,s-c\,\nu}}\right)-\right.$$

$$S\left(\frac{2d\,k-d\,m+2f\,s-f\,\nu+2(2c\,s-c\,\nu)z}{\sqrt{2\pi}\sqrt{2c\,s-c\,\nu}}\right)$$

$$\left.\left.\sin\left(-\frac{(2d\,k-d\,m+2f\,s-f\,\nu)^2}{4(2c\,s-c\,\nu)}+2e\,k-e\,m\right)\right)\right)\;/;\;m\in\mathbb{N}^+\bigwedge\nu\in\mathbb{N}^+$$

01.07.21.1216.01

$$\int \cos^m(e+d\,z)\cos^v\left(\sqrt{z}\;c+f\,z\right)dz = 2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)+$$

$$\frac{2^{-m-v+1}\binom{v}{\frac{v}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(e\,(m-2\,k)+d\,z\,(m-2\,k))}{m-2\,k}\right)(1-v \bmod 2)}{d}+2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{2\,(f\,(v-2\,s))^{3/2}}\left(\binom{v}{s}\left(-c\sqrt{2\pi}\;(v-2\,s)\cos\left(\frac{c^2\,(v-2\,s)}{4\,f}\right)C\left(\frac{c\,(v-2\,s)+2\,f\sqrt{z}\;(v-2\,s)}{\sqrt{2\pi}\;\sqrt{f\,(v-2\,s)}}\right)-c\sqrt{2\pi}\;(v-2\,s)\right.\right.$$

$$\left.\left.S\left(\frac{c\,(v-2\,s)+2\,f\sqrt{z}\;(v-2\,s)}{\sqrt{2\pi}\;\sqrt{f\,(v-2\,s)}}\right)\sin\left(\frac{c^2\,(v-2\,s)}{4\,f}\right)+2\sqrt{f\,(v-2\,s)}\;\sin\left(f\,z\,(v-2\,s)+c\sqrt{z}\;(v-2\,s)\right)\right)\right)+$$

$$2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left(\sqrt{2\pi}\;(2\,c\,s-c\,v)\cos\left(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}+2\,e\,k-e\,m\right)\right.\right.$$

$$C\left(\frac{-2\,c\,s+c\,v+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)+\sqrt{2\pi}\;(c\,v-2\,c\,s)$$

$$S\left(\frac{-2\,c\,s+c\,v+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)\sin\left(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}+2\,e\,k-e\,m\right)+$$

$$\left.2\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}\;\sin\left(2\,e\,k-e\,m+(2\,d\,k-d\,m-2\,f\,s+f\,v)\,z+(c\,v-2\,c\,s)\sqrt{z}\right)\right)\Big/$$

$$\left(2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)^{3/2}\right)+\left(\sqrt{2\pi}\;(c\,v-2\,c\,s)\cos\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,e\,k-e\,m\right)\right.$$

$$C\left(\frac{2\,c\,s-c\,v+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)+\sqrt{2\pi}\;(2\,c\,s-c\,v)$$

$$S\left(\frac{2\,c\,s-c\,v+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)\sin\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,e\,k-e\,m\right)+$$

$$\left.2\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}\;\sin\left(2\,e\,k-e\,m+(2\,d\,k-d\,m+2\,f\,s-f\,v)\,z+(2\,c\,s-c\,v)\sqrt{z}\right)\right)\Big/$$

$$\left.\left(2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)^{3/2}\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m(b z^r) \cos^v(c z^r + f z)$

01.07.21.1217.01

$$\int \cos^m(b z^2) \cos^v(c z^2 + f z)\, dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) +$$

$$2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k} C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}} \right)}{\sqrt{b(m-2k)}} \right) (1 - v \bmod 2) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{\binom{v}{s} \left(\cos\left(\frac{f^2 (v-2s)}{4c} \right) C\left(\frac{f(v-2s)+2cz(v-2s)}{\sqrt{2\pi}\sqrt{c(v-2s)}} \right) + S\left(\frac{f(v-2s)+2cz(v-2s)}{\sqrt{2\pi}\sqrt{c(v-2s)}} \right) \sin\left(\frac{f^2(v-2s)}{4c} \right) \right)}{\sqrt{c(v-2s)}} + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s}$$

$$\left(\frac{1}{\sqrt{2bk - bm - 2cs + cv}} \left(\cos\left(\frac{(fv - 2fs)^2}{4(2bk - bm - 2cs + cv)} \right) C\left(\frac{-2fs + fv + 2(2bk - bm - 2cs + cv)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2cs + cv}} \right) + \right.\right.$$

$$\left. S\left(\frac{-2fs + fv + 2(2bk - bm - 2cs + cv)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2cs + cv}} \right) \sin\left(\frac{(fv - 2fs)^2}{4(2bk - bm - 2cs + cv)} \right) \right) +$$

$$\frac{1}{\sqrt{2bk - bm + 2cs - cv}} \left(\cos\left(\frac{(2fs - fv)^2}{4(2bk - bm + 2cs - cv)} \right) C\left(\frac{2fs - fv + 2(2bk - bm + 2cs - cv)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2cs - cv}} \right) + \right.$$

$$\left.\left. S\left(\frac{2fs - fv + 2(2bk - bm + 2cs - cv)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2cs - cv}} \right) \sin\left(\frac{(2fs - fv)^2}{4(2bk - bm + 2cs - cv)} \right) \right) \right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1218.01

$$\int \cos^m\left(b\sqrt{z}\right)\cos^v\left(\sqrt{z}\,c+f\,z\right)dz = 2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)+2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$
$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{2\,(f\,(v-2\,s))^{3/2}}\left(\binom{v}{s}\left(-c\sqrt{2\pi}\,(v-2\,s)\cos\left(\frac{c^2\,(v-2\,s)}{4\,f}\right)C\left(\frac{c\,(v-2\,s)+2\,f\sqrt{z}\,(v-2\,s)}{\sqrt{2\pi}\sqrt{f\,(v-2\,s)}}\right)-c\sqrt{2\pi}\,(v-2\,s)\right.\right.$$
$$\left.\left.S\left(\frac{c\,(v-2\,s)+2\,f\sqrt{z}\,(v-2\,s)}{\sqrt{2\pi}\sqrt{f\,(v-2\,s)}}\right)\sin\left(\frac{c^2\,(v-2\,s)}{4\,f}\right)+2\sqrt{f\,(v-2\,s)}\,\sin\left(f\,z\,(v-2\,s)+c\sqrt{z}\,(v-2\,s)\right)\right)\right)+$$
$$\frac{2^{-m-v+2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\left(\cos\left((2\,k-m)\,b\sqrt{z}\right)+b\,(2\,k-m)\sqrt{z}\,\sin\left((2\,k-m)\,b\sqrt{z}\right)\right)}{(m-2\,k)^2}}{b^2}+$$
$$2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{2\,(f\,v-2\,f\,s)^{3/2}}\left(\sqrt{2\pi}\,(-2\,b\,k+b\,m+2\,c\,s-c\,v)\cos\left(\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,(f\,v-2\,f\,s)}\right)\right.\right.$$
$$C\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,v+2\,(f\,v-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\,v-2\,f\,s}}\right)-\sqrt{2\pi}\,(2\,b\,k-b\,m-2\,c\,s+c\,v)$$
$$S\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,v+2\,(f\,v-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\,v-2\,f\,s}}\right)\sin\left(\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,(f\,v-2\,f\,s)}\right)+$$
$$\left.2\sqrt{f\,v-2\,f\,s}\,\sin\left(\sqrt{z}\,(2\,b\,k-b\,m-2\,c\,s+c\,v)+(f\,v-2\,f\,s)\,z\right)\right)+$$
$$\frac{1}{2\,(2\,f\,s-f\,v)^{3/2}}\left(\sqrt{2\pi}\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\cos\left(\frac{(2\,b\,k-b\,m+2\,c\,s-c\,v)^2}{4\,(2\,f\,s-f\,v)}\right)\right.$$
$$C\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,v+2\,(2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,f\,s-f\,v}}\right)-\sqrt{2\pi}\,(2\,b\,k-b\,m+2\,c\,s-c\,v)$$
$$S\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,v+2\,(2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,f\,s-f\,v}}\right)\sin\left(\frac{(2\,b\,k-b\,m+2\,c\,s-c\,v)^2}{4\,(2\,f\,s-f\,v)}\right)+$$
$$\left.\left.2\sqrt{2\,f\,s-f\,v}\,\sin\left(\sqrt{z}\,(2\,b\,k-b\,m+2\,c\,s-c\,v)+(2\,f\,s-f\,v)\,z\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m\left(b\,z^r+e\right)\cos^v\left(c\,z^r+f\,z\right)$

01.07.21.1219.01

$$\int \cos^m\left(b z^2+e\right)\cos^\nu\left(c z^2+f z\right)dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+$$
$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\left(\cos(e(m-2k))\,C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)-S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)\sin(e(m-2k))\right)}{\sqrt{b(m-2k)}}\right)(1-\nu \bmod 2)+$$
$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\left(\cos\left(\frac{f^2(\nu-2s)}{4c}\right)C\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)+S\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)\sin\left(\frac{f^2(\nu-2s)}{4c}\right)\right)}{\sqrt{c(\nu-2s)}}+$$
$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{2bk-bm-2cs+c\nu}}\right.$$
$$\left(\cos\left(-\frac{(f\nu-2fs)^2}{4(2bk-bm-2cs+c\nu)}+2ek-em\right)C\left(\frac{-2fs+f\nu+2(2bk-bm-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+c\nu}}\right)-\right.$$
$$\left.S\left(\frac{-2fs+f\nu+2(2bk-bm-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+c\nu}}\right)\sin\left(-\frac{(f\nu-2fs)^2}{4(2bk-bm-2cs+c\nu)}+2ek-em\right)\right)+$$
$$\frac{1}{\sqrt{2bk-bm+2cs-c\nu}}\left(\cos\left(-\frac{(2fs-f\nu)^2}{4(2bk-bm+2cs-c\nu)}+2ek-em\right)\right.$$
$$C\left(\frac{2fs-f\nu+2(2bk-bm+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-c\nu}}\right)-S\left(\frac{2fs-f\nu+2(2bk-bm+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-c\nu}}\right)$$
$$\left.\left.\sin\left(-\frac{(2fs-f\nu)^2}{4(2bk-bm+2cs-c\nu)}+2ek-em\right)\right)\right)\Big/;\ m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.1220.01

$$\int \cos^m\left(\sqrt{z}\, b+e\right)\cos^v\left(\sqrt{z}\, c+f\,z\right)dz = 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)+2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{2\,(f\,(v-2\,s))^{3/2}}\left(\binom{v}{s}\left(-c\sqrt{2\pi}\,(v-2\,s)\cos\left(\frac{c^2\,(v-2\,s)}{4\,f}\right)C\left(\frac{c\,(v-2\,s)+2\,f\sqrt{z}\,(v-2\,s)}{\sqrt{2\pi}\sqrt{f\,(v-2\,s)}}\right)-c\sqrt{2\pi}\,(v-2\,s)\right.\right.$$

$$\left.\left.S\left(\frac{c\,(v-2\,s)+2\,f\sqrt{z}\,(v-2\,s)}{\sqrt{2\pi}\sqrt{f\,(v-2\,s)}}\right)\sin\left(\frac{c^2\,(v-2\,s)}{4\,f}\right)+2\sqrt{f\,(v-2\,s)}\,\sin\left(f\,z\,(v-2\,s)+c\sqrt{z}\,(v-2\,s)\right)\right)\right)+$$

$$\frac{1}{b^2}\left(2^{-m-v+2}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\left(\cos\left((2\,k-m)\left(\sqrt{z}\,b+e\right)\right)+b\,(2\,k-m)\sqrt{z}\,\sin\left((2\,k-m)\left(\sqrt{z}\,b+e\right)\right)\right)}{(m-2\,k)^2}\right)+$$

$$2^{-m-v+1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{2\,(f\,v-2\,f\,s)^{3/2}}\left(\sqrt{2\pi}\,(-2\,b\,k+b\,m+2\,c\,s-c\,v)\cos\left(-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,(f\,v-2\,f\,s)}+2\,e\,k-e\,m\right)\right.\right.$$

$$C\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,v+2\,(f\,v-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\,v-2\,f\,s}}\right)+\sqrt{2\pi}\,(2\,b\,k-b\,m-2\,c\,s+c\,v)$$

$$S\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,v+2\,(f\,v-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\,v-2\,f\,s}}\right)\sin\left(-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,(f\,v-2\,f\,s)}+2\,e\,k-e\,m\right)+$$

$$\left.2\sqrt{f\,v-2\,f\,s}\,\sin\left(2\,e\,k-e\,m+(f\,v-2\,f\,s)\,z+(2\,b\,k-b\,m-2\,c\,s+c\,v)\sqrt{z}\right)\right)+$$

$$\frac{1}{2\,(2\,f\,s-f\,v)^{3/2}}\left(\sqrt{2\pi}\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\cos\left(-\frac{(2\,b\,k-b\,m+2\,c\,s-c\,v)^2}{4\,(2\,f\,s-f\,v)}+2\,e\,k-e\,m\right)\right.$$

$$C\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,v+2\,(2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,f\,s-f\,v}}\right)+\sqrt{2\pi}\,(2\,b\,k-b\,m+2\,c\,s-c\,v)$$

$$S\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,v+2\,(2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,f\,s-f\,v}}\right)\sin\left(-\frac{(2\,b\,k-b\,m+2\,c\,s-c\,v)^2}{4\,(2\,f\,s-f\,v)}+2\,e\,k-e\,m\right)+$$

$$\left.\left.2\sqrt{2\,f\,s-f\,v}\,\sin\left(2\,e\,k-e\,m+(2\,f\,s-f\,v)\,z+(2\,b\,k-b\,m+2\,c\,s-c\,v)\sqrt{z}\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m\left(b\,z^r+d\,z+e\right)\cos^v\left(c\,z^r+f\,z\right)$

01.07.21.1221.01

$$\int \cos^m\left(b z^2 + d z\right) \cos^\nu\left(c z^2 + f z\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) +$$
$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left(\binom{m}{k} \left(\cos\left(\frac{(m-2k) d^2}{4b}\right) C\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) + \right.\right.\right.$$
$$\left.\left.\left. S\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) \sin\left(\frac{(m-2k) d^2}{4b}\right)\right)\right)\right)(1 - \nu \bmod 2) +$$
$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{\binom{\nu}{s} \left(\cos\left(\frac{f^2(\nu-2s)}{4c}\right) C\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right) + S\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right) \sin\left(\frac{f^2(\nu-2s)}{4c}\right)\right)}{\sqrt{c(\nu-2s)}} +$$
$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{2bk - bm - 2cs + c\nu}} \right.$$
$$\left(\cos\left(\frac{(2dk - md - 2fs + f\nu)^2}{4(2bk - bm - 2cs + c\nu)}\right) C\left(\frac{2dk - md - 2fs + f\nu + 2(2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + c\nu}}\right) + \right.$$
$$S\left(\frac{2dk - md - 2fs + f\nu + 2(2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + c\nu}}\right)$$
$$\left.\sin\left(\frac{(2dk - md - 2fs + f\nu)^2}{4(2bk - bm - 2cs + c\nu)}\right)\right) + \frac{1}{\sqrt{2bk - bm + 2cs - c\nu}}$$
$$\left(\cos\left(\frac{(2dk - md + 2fs - f\nu)^2}{4(2bk - bm + 2cs - c\nu)}\right) C\left(\frac{2dk - md + 2fs - f\nu + 2(2bk - bm + 2cs - c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - c\nu}}\right) + \right.$$
$$S\left(\frac{2dk - md + 2fs - f\nu + 2(2bk - bm + 2cs - c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - c\nu}}\right)$$
$$\left.\left.\sin\left(\frac{(2dk - md + 2fs - f\nu)^2}{4(2bk - bm + 2cs - c\nu)}\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.1222.01

$$\int \cos^m\left(\sqrt{z}\, b + d z\right) \cos^\nu\left(\sqrt{z}\, c + f z\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) +$$
$$2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{2((m-2k) d)^{3/2}} \left(\binom{m}{k} \left(-b(m-2k) \sqrt{2\pi} \cos\left(\frac{b^2(m-2k)}{4d}\right) C\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{(m-2k) d} \sqrt{2\pi}}\right) - \right.\right.\right.$$
$$b(m-2k) \sqrt{2\pi}\, S\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{(m-2k) d} \sqrt{2\pi}}\right) \sin\left(\frac{b^2(m-2k)}{4d}\right) +$$
$$\left.\left.\left. 2\sqrt{(m-2k) d}\, \sin\left(dz(m-2k) + b\sqrt{z}\,(m-2k)\right)\right)\right)\right)(1 - \nu \bmod 2) + 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{2\,(f\,(v-2\,s))^{3/2}}\left(\binom{v}{s}\left(-c\,\sqrt{2\,\pi}\,(v-2\,s)\cos\left(\frac{c^2\,(v-2\,s)}{4\,f}\right)C\left(\frac{c\,(v-2\,s)+2\,f\,\sqrt{z}\,(v-2\,s)}{\sqrt{2\,\pi}\,\sqrt{f\,(v-2\,s)}}\right)-c\,\sqrt{2\,\pi}\,(v-2\,s)\right.\right.$$

$$\left.\left.S\left(\frac{c\,(v-2\,s)+2\,f\,\sqrt{z}\,(v-2\,s)}{\sqrt{2\,\pi}\,\sqrt{f\,(v-2\,s)}}\right)\sin\left(\frac{c^2\,(v-2\,s)}{4\,f}\right)+2\,\sqrt{f\,(v-2\,s)}\,\sin\left(f\,z\,(v-2\,s)+c\,\sqrt{z}\,(v-2\,s)\right)\right)\right)+$$

$$2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left(\sqrt{2\,\pi}\,(-2\,b\,k+b\,m+2\,c\,s-c\,v)\cos\left(\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,(2\,d\,k-m\,d-2\,f\,s+f\,v)}\right)\right.\right.$$

$$C\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,v+2\,(2\,d\,k-m\,d-2\,f\,s+f\,v)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-m\,d-2\,f\,s+f\,v}}\right)-\sqrt{2\,\pi}\,(2\,b\,k-b\,m-2\,c\,s+c\,v)$$

$$S\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,v+2\,(2\,d\,k-m\,d-2\,f\,s+f\,v)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-m\,d-2\,f\,s+f\,v}}\right)\sin\left(\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,(2\,d\,k-m\,d-2\,f\,s+f\,v)}\right)+$$

$$\left.2\,\sqrt{2\,d\,k-m\,d-2\,f\,s+f\,v}\,\sin\left(\sqrt{z}\,(2\,b\,k-b\,m-2\,c\,s+c\,v)+(2\,d\,k-m\,d-2\,f\,s+f\,v)\,z\right)\right)\Big/$$

$$\left(2\,(2\,d\,k-m\,d-2\,f\,s+f\,v)^{3/2}\right)+\left(\sqrt{2\,\pi}\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\cos\left(\frac{(2\,b\,k-b\,m+2\,c\,s-c\,v)^2}{4\,(2\,d\,k-m\,d+2\,f\,s-f\,v)}\right)\right.$$

$$C\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,v+2\,(2\,d\,k-m\,d+2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-m\,d+2\,f\,s-f\,v}}\right)-\sqrt{2\,\pi}\,(2\,b\,k-b\,m+2\,c\,s-c\,v)$$

$$S\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,v+2\,(2\,d\,k-m\,d+2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-m\,d+2\,f\,s-f\,v}}\right)\sin\left(\frac{(2\,b\,k-b\,m+2\,c\,s-c\,v)^2}{4\,(2\,d\,k-m\,d+2\,f\,s-f\,v)}\right)+$$

$$\left.2\,\sqrt{2\,d\,k-m\,d+2\,f\,s-f\,v}\,\sin\left(\sqrt{z}\,(2\,b\,k-b\,m+2\,c\,s-c\,v)+(2\,d\,k-m\,d+2\,f\,s-f\,v)\,z\right)\right)\Big/$$

$$\left.\left(2\,(2\,d\,k-m\,d+2\,f\,s-f\,v)^{3/2}\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m(d\,z)\cos^v\left(c\,z^r+f\,z+g\right)$

01.07.21.1223.01

$$\int \cos^m(d z)\cos^\nu\left(c z^2+f z+g\right)dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+\frac{2^{-m-\nu+1}(1-\nu \bmod 2)}{d}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\sin((m-2k)dz)\binom{m}{k}}{m-2k}\right)+ 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{c(\nu-2s)}}\left(\binom{\nu}{s}\left(\cos\left(\frac{f^2(\nu-2s)}{4c}-g(\nu-2s)\right)C\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)+ S\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)\sin\left(\frac{f^2(\nu-2s)}{4c}-g(\nu-2s)\right)\right)\right)+2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s} \left(\frac{1}{\sqrt{c\nu-2cs}}\left(\cos\left(-\frac{(2dk-dm-2fs+f\nu)^2}{4(c\nu-2cs)}-2gs+g\nu\right)C\left(\frac{2dk-dm-2fs+f\nu+2(c\nu-2cs)z}{\sqrt{2\pi}\sqrt{c\nu-2cs}}\right)- S\left(\frac{2dk-dm-2fs+f\nu+2(c\nu-2cs)z}{\sqrt{2\pi}\sqrt{c\nu-2cs}}\right)\sin\left(-\frac{(2dk-dm-2fs+f\nu)^2}{4(c\nu-2cs)}-2gs+g\nu\right)\right)+ \frac{1}{\sqrt{2cs-c\nu}}\left(\cos\left(-\frac{(2dk-dm+2fs-f\nu)^2}{4(2cs-c\nu)}+2gs-g\nu\right)C\left(\frac{2dk-dm+2fs-f\nu+2(2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2cs-c\nu}}\right)- S\left(\frac{2dk-dm+2fs-f\nu+2(2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2cs-c\nu}}\right) \sin\left(-\frac{(2dk-dm+2fs-f\nu)^2}{4(2cs-c\nu)}+2gs-g\nu\right)\right)\right) /; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.1224.01

$$\int \cos^m(d z)\cos^\nu\left(\sqrt{z}\,c+f z+g\right)dz = 2^{-m-\nu} z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+ \frac{2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{d}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(dz(m-2k))}{m-2k}+2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{2(f(\nu-2s))^{3/2}}\left(\binom{\nu}{s}\left(-c\sqrt{2\pi}(\nu-2s)\cos\left(\frac{c^2(\nu-2s)}{4f}-g(\nu-2s)\right)C\left(\frac{c(\nu-2s)+2f\sqrt{z}(\nu-2s)}{\sqrt{2\pi}\sqrt{f(\nu-2s)}}\right)- c\sqrt{2\pi}(\nu-2s)S\left(\frac{c(\nu-2s)+2f\sqrt{z}(\nu-2s)}{\sqrt{2\pi}\sqrt{f(\nu-2s)}}\right)\sin\left(\frac{c^2(\nu-2s)}{4f}-g(\nu-2s)\right)+ 2\sqrt{f(\nu-2s)}\sin\left(g(\nu-2s)+fz(\nu-2s)+c\sqrt{z}(\nu-2s)\right)\right)\right)+$$

$$\begin{aligned}
&2^{-m-v+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \Bigg(\Bigg(\sqrt{2\pi}\, (2\, c\, s - c\, v) \cos\!\left(-\frac{(c\, v - 2\, c\, s)^2}{4\, (2\, d\, k - d\, m - 2\, f\, s + f\, v)} - 2\, g\, s + g\, v\right) \\
&\quad C\!\left(\frac{-2\, c\, s + c\, v + 2\, (2\, d\, k - d\, m - 2\, f\, s + f\, v) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{2\, d\, k - d\, m - 2\, f\, s + f\, v}}\right) + \sqrt{2\pi}\, (c\, v - 2\, c\, s) \\
&\quad S\!\left(\frac{-2\, c\, s + c\, v + 2\, (2\, d\, k - d\, m - 2\, f\, s + f\, v) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{2\, d\, k - d\, m - 2\, f\, s + f\, v}}\right) \sin\!\left(-\frac{(c\, v - 2\, c\, s)^2}{4\, (2\, d\, k - d\, m - 2\, f\, s + f\, v)} - 2\, g\, s + g\, v\right) + \\
&\quad 2\, \sqrt{2\, d\, k - d\, m - 2\, f\, s + f\, v}\, \sin\!\left(-2\, g\, s + g\, v + (2\, d\, k - d\, m - 2\, f\, s + f\, v)\, z + (c\, v - 2\, c\, s) \sqrt{z}\right) \Bigg) \Bigg/ \\
&\quad \left(2\, (2\, d\, k - d\, m - 2\, f\, s + f\, v)^{3/2}\right) + \Bigg(\sqrt{2\pi}\, (c\, v - 2\, c\, s) \cos\!\left(-\frac{(2\, c\, s - c\, v)^2}{4\, (2\, d\, k - d\, m + 2\, f\, s - f\, v)} + 2\, g\, s - g\, v\right) \\
&\quad C\!\left(\frac{2\, c\, s - c\, v + 2\, (2\, d\, k - d\, m + 2\, f\, s - f\, v) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{2\, d\, k - d\, m + 2\, f\, s - f\, v}}\right) + \sqrt{2\pi}\, (2\, c\, s - c\, v) \\
&\quad S\!\left(\frac{2\, c\, s - c\, v + 2\, (2\, d\, k - d\, m + 2\, f\, s - f\, v) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{2\, d\, k - d\, m + 2\, f\, s - f\, v}}\right) \sin\!\left(-\frac{(2\, c\, s - c\, v)^2}{4\, (2\, d\, k - d\, m + 2\, f\, s - f\, v)} + 2\, g\, s - g\, v\right) + \\
&\quad 2\, \sqrt{2\, d\, k - d\, m + 2\, f\, s - f\, v}\, \sin\!\left(2\, g\, s - g\, v + (2\, d\, k - d\, m + 2\, f\, s - f\, v)\, z + (2\, c\, s - c\, v) \sqrt{z}\right) \Bigg) \Bigg/ \\
&\quad \left(2\, (2\, d\, k - d\, m + 2\, f\, s - f\, v)^{3/2}\right) \Bigg) \,/;\, m \in \mathbb{N}^+ \land v \in \mathbb{N}^+
\end{aligned}$$

Involving $\cos^m(d\, z + e) \cos^v\left(c\, z^r + f\, z + g\right)$

01.07.21.1225.01

$$\int \cos^m(d\,z+e)\cos^\nu\left(c\,z^2+f\,z+g\right)dz = 2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+\frac{2^{-m-\nu+1}(1-\nu \bmod 2)}{d}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\sin((m-2k)(e+d\,z))\binom{m}{k}}{m-2k}\right)+$$

$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{c(\nu-2s)}}\left(\binom{\nu}{s}\left(\cos\left(\frac{f^2(\nu-2s)}{4c}-g(\nu-2s)\right)C\left(\frac{f(\nu-2s)+2c\,z(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)+S\left(\frac{f(\nu-2s)+2c\,z(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)\sin\left(\frac{f^2(\nu-2s)}{4c}-g(\nu-2s)\right)\right)\right)+$$

$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\nu-2cs}}\left(\cos\left(-\frac{(2dk-dm-2fs+f\nu)^2}{4(c\nu-2cs)}+2ek-em-2gs+g\nu\right)C\left(\frac{2dk-dm-2fs+f\nu+2(c\nu-2cs)z}{\sqrt{2\pi}\sqrt{c\nu-2cs}}\right)-S\left(\frac{2dk-dm-2fs+f\nu+2(c\nu-2cs)z}{\sqrt{2\pi}\sqrt{c\nu-2cs}}\right)\sin\left(-\frac{(2dk-dm-2fs+f\nu)^2}{4(c\nu-2cs)}+2ek-em-2gs+g\nu\right)\right)+\frac{1}{\sqrt{2cs-c\nu}}\left(\cos\left(-\frac{(2dk-dm+2fs-f\nu)^2}{4(2cs-c\nu)}+2ek-em+2gs-g\nu\right)C\left(\frac{2dk-dm+2fs-f\nu+2(2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2cs-c\nu}}\right)-S\left(\frac{2dk-dm+2fs-f\nu+2(2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2cs-c\nu}}\right)\sin\left(-\frac{(2dk-dm+2fs-f\nu)^2}{4(2cs-c\nu)}+2ek-em+2gs-g\nu\right)\right)\right)\ /;\ m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.07.21.1226.01

$$\int \cos^m(d\,z+e)\cos^\nu\left(\sqrt{z}\,c+f\,z+g\right)dz = 2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+$$

$$\frac{2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{d}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(e(m-2k)+d\,z(m-2k))}{m-2k}+2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{2(f(\nu-2s))^{3/2}}\left(\binom{\nu}{s}\left(-c\sqrt{2\pi}(\nu-2s)\cos\left(\frac{c^2(\nu-2s)}{4f}-g(\nu-2s)\right)C\left(\frac{c(\nu-2s)+2f\sqrt{z}(\nu-2s)}{\sqrt{2\pi}\sqrt{f(\nu-2s)}}\right)-c\sqrt{2\pi}(\nu-2s)S\left(\frac{c(\nu-2s)+2f\sqrt{z}(\nu-2s)}{\sqrt{2\pi}\sqrt{f(\nu-2s)}}\right)\sin\left(\frac{c^2(\nu-2s)}{4f}-g(\nu-2s)\right)+\right.\right.$$

$$2\sqrt{f(v-2s)}\,\sin\Big(g(v-2s)+f\,z(v-2s)+c\sqrt{z}\,(v-2s)\Big)\Bigg)\Bigg)+$$

$$2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\Bigg(\sqrt{2\pi}\,(2cs-cv)\cos\!\left(-\frac{(cv-2cs)^2}{4(2dk-dm-2fs+fv)}+2ek-em-2gs+gv\right)$$

$$C\!\left(\frac{-2cs+cv+2(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm-2fs+fv}}\right)+$$

$$\sqrt{2\pi}\,(cv-2cs)\,S\!\left(\frac{-2cs+cv+2(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm-2fs+fv}}\right)$$

$$\sin\!\left(-\frac{(cv-2cs)^2}{4(2dk-dm-2fs+fv)}+2ek-em-2gs+gv\right)+2\sqrt{2dk-dm-2fs+fv}$$

$$\sin\Big(2ek-em-2gs+gv+(2dk-dm-2fs+fv)z+(cv-2cs)\sqrt{z}\Big)\Bigg)\Big/$$

$$\Big(2(2dk-dm-2fs+fv)^{3/2}\Big)+\Bigg(\sqrt{2\pi}\,(cv-2cs)\cos\!\left(-\frac{(2cs-cv)^2}{4(2dk-dm+2fs-fv)}+\right.$$

$$\left.2ek-em+2gs-gv\right)C\!\left(\frac{2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm+2fs-fv}}\right)+\sqrt{2\pi}\,(2cs-cv)$$

$$S\!\left(\frac{2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm+2fs-fv}}\right)\sin\!\left(-\frac{(2cs-cv)^2}{4(2dk-dm+2fs-fv)}+2ek-em+\right.$$

$$\left.2gs-gv\right)+2\sqrt{2dk-dm+2fs-fv}\,\sin\Big(2ek-em+2gs-gv+(2dk-dm+2fs-fv)$$

$$z+(2cs-cv)\sqrt{z}\Big)\Bigg)\Big/\Big(2(2dk-dm+2fs-fv)^{3/2}\Big)\Bigg)\,/;\,m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m(b\,z^r)\cos^v(c\,z^r+f\,z+g)$

01.07.21.1227.01

$$\int \cos^m(b z^2)\cos^v(c z^2+f z+g)\,dz = 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)+ 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{b(m-2k)}}\binom{m}{k} C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)+ 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{c(v-2s)}}\left(\binom{v}{s}\left(\cos\left(\frac{f^2(v-2s)}{4c}-g(v-2s)\right)C\left(\frac{f(v-2s)+2cz(v-2s)}{\sqrt{2\pi}\sqrt{c(v-2s)}}\right)+ S\left(\frac{f(v-2s)+2cz(v-2s)}{\sqrt{2\pi}\sqrt{c(v-2s)}}\right)\sin\left(\frac{f^2(v-2s)}{4c}-g(v-2s)\right)\right)\right)+2^{-m-v+\frac{1}{2}}\sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left(\cos\left(-\frac{(fv-2fs)^2}{4(2bk-bm-2cs+cv)}-2gs+gv\right)C\left(\frac{-2fs+fv+2(2bk-bm-2cs+cv)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+cv}}\right)- S\left(\frac{-2fs+fv+2(2bk-bm-2cs+cv)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+cv}}\right)\sin\left(-\frac{(fv-2fs)^2}{4(2bk-bm-2cs+cv)}-2gs+gv\right)\right)\Big/ \left(\sqrt{2bk-bm-2cs+cv}\right)+\left(\cos\left(-\frac{(2fs-fv)^2}{4(2bk-bm+2cs-cv)}+2gs-gv\right) C\left(\frac{2fs-fv+2(2bk-bm+2cs-cv)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-cv}}\right)-S\left(\frac{2fs-fv+2(2bk-bm+2cs-cv)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-cv}}\right) \sin\left(-\frac{(2fs-fv)^2}{4(2bk-bm+2cs-cv)}+2gs-gv\right)\right)\Big/\left(\sqrt{2bk-bm+2cs-cv}\right)\right)\ /;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.07.21.1228.01

$$\int \cos^m\left(\sqrt{z}\, b\right) \cos^v\left(\sqrt{z}\, c + f z + g\right) dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + 2^{-m-v+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \frac{1}{2\,(f\,(v-2s))^{3/2}} \left(\binom{v}{s}\left(-c\sqrt{2\pi}\,(v-2s)\cos\left(\frac{c^2\,(v-2s)}{4f} - g\,(v-2s)\right) C\left(\frac{c\,(v-2s) + 2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\sqrt{f\,(v-2s)}}\right) - \right.\right.$$

$$c\sqrt{2\pi}\,(v-2s)\, S\left(\frac{c\,(v-2s) + 2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\sqrt{f\,(v-2s)}}\right) \sin\left(\frac{c^2\,(v-2s)}{4f} - g\,(v-2s)\right) +$$

$$\left.\left. 2\sqrt{f\,(v-2s)}\, \sin\left(g\,(v-2s) + f z\,(v-2s) + c\sqrt{z}\,(v-2s)\right)\right)\right) +$$

$$\frac{2^{-m-v+2}}{b^2} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{\binom{m}{k}\left(\cos\left((2k-m)\sqrt{z}\, b\right) + b\,(2k-m)\sqrt{z}\, \sin\left((2k-m)\sqrt{z}\, b\right)\right)}{(m-2k)^2} +$$

$$2^{-m-v+1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} \left(\frac{1}{2\,(f v - 2 f s)^{3/2}} \left(\sqrt{2\pi}\,(-2bk + bm + 2cs - cv)\cos\left(-\frac{(2bk - bm - 2cs + cv)^2}{4\,(f v - 2 f s)} - 2 g s + g v\right)\right.\right.$$

$$C\left(\frac{2bk - bm - 2cs + cv + 2\,(f v - 2 f s)\sqrt{z}}{\sqrt{2\pi}\sqrt{f v - 2 f s}}\right) + \sqrt{2\pi}\,(2bk - bm - 2cs + cv)$$

$$S\left(\frac{2bk - bm - 2cs + cv + 2\,(f v - 2 f s)\sqrt{z}}{\sqrt{2\pi}\sqrt{f v - 2 f s}}\right) \sin\left(-\frac{(2bk - bm - 2cs + cv)^2}{4\,(f v - 2 f s)} - 2 g s + g v\right) +$$

$$\left. 2\sqrt{f v - 2 f s}\, \sin\left(-2 g s + g v + (f v - 2 f s) z + (2bk - bm - 2cs + cv)\sqrt{z}\right)\right) +$$

$$\frac{1}{2\,(2 f s - f v)^{3/2}} \left(\sqrt{2\pi}\,(-2bk + bm - 2cs + cv)\cos\left(-\frac{(2bk - bm + 2cs - cv)^2}{4\,(2 f s - f v)} + 2 g s - g v\right)\right.$$

$$C\left(\frac{2bk - bm + 2cs - cv + 2\,(2 f s - f v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 f s - f v}}\right) + \sqrt{2\pi}\,(2bk - bm + 2cs - cv)$$

$$S\left(\frac{2bk - bm + 2cs - cv + 2\,(2 f s - f v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 f s - f v}}\right) \sin\left(-\frac{(2bk - bm + 2cs - cv)^2}{4\,(2 f s - f v)} + 2 g s - g v\right) +$$

$$\left.\left. 2\sqrt{2 f s - f v}\, \sin\left(2 g s - g v + (2 f s - f v) z + (2bk - bm + 2cs - cv)\sqrt{z}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\cos^m(b z^r + e)\cos^\nu(c z^r + f z + g)$

01.07.21.1229.01

$$\int \cos^m(b z^2 + e)\cos^\nu(c z^2 + f z + g)\,dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{b(m-2k)}}\binom{m}{k}\left(\cos(e(m-2k))\,C\!\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right) - S\!\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)\sin(e(m-2k))\right) + 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{c(\nu-2s)}}\left(\binom{\nu}{s}\left(\cos\!\left(\frac{f^2(\nu-2s)}{4c} - g(\nu-2s)\right)C\!\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right) + S\!\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)\sin\!\left(\frac{f^2(\nu-2s)}{4c} - g(\nu-2s)\right)\right)\right) + 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(\cos\!\left(-\frac{(f\nu-2fs)^2}{4(2bk-bm-2cs+c\nu)} + 2ek - em - 2gs + g\nu\right) C\!\left(\frac{-2fs+f\nu+2(2bk-bm-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+c\nu}}\right) - S\!\left(\frac{-2fs+f\nu+2(2bk-bm-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+c\nu}}\right) \sin\!\left(-\frac{(f\nu-2fs)^2}{4(2bk-bm-2cs+c\nu)} + 2ek - em - 2gs + g\nu\right)\right)\Big/\left(\sqrt{2bk-bm-2cs+c\nu}\right) + \left(\cos\!\left(-\frac{(2fs-f\nu)^2}{4(2bk-bm+2cs-c\nu)} + 2ek - em + 2gs - g\nu\right) C\!\left(\frac{2fs-f\nu+2(2bk-bm+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-c\nu}}\right) - S\!\left(\frac{2fs-f\nu+2(2bk-bm+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-c\nu}}\right)\sin\!\left(-\frac{(2fs-f\nu)^2}{4(2bk-bm+2cs-c\nu)} + 2ek - em + 2gs - g\nu\right)\right)\Big/\left(\sqrt{2bk-bm+2cs-c\nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.1230.01

$$\int \cos^m(\sqrt{z}\,b + e)\cos^\nu(\sqrt{z}\,c + f z + g)\,dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1 - m \bmod 2) \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{2(f(\nu-2s))^{3/2}}\left(\binom{\nu}{s}\left(-c\sqrt{2\pi}\,(\nu-2s)\cos\!\left(\frac{c^2(\nu-2s)}{4f} - g(\nu-2s)\right)C\!\left(\frac{c(\nu-2s)+2f\sqrt{z}\,(\nu-2s)}{\sqrt{2\pi}\sqrt{f(\nu-2s)}}\right) - c\sqrt{2\pi}\,(\nu-2s)\,S\!\left(\frac{c(\nu-2s)+2f\sqrt{z}\,(\nu-2s)}{\sqrt{2\pi}\sqrt{f(\nu-2s)}}\right)\sin\!\left(\frac{c^2(\nu-2s)}{4f} - g(\nu-2s)\right) + \right.\right.$$

$$2\sqrt{f(v-2s)}\,\sin\!\left(g(v-2s)+fz(v-2s)+c\sqrt{z}\,(v-2s)\right)\Bigg)\Bigg)+$$

$$\frac{2^{-m-v+2}}{b^2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\left(\cos\!\left((2k-m)\left(\sqrt{z}\,b+e\right)\right)+b(2k-m)\sqrt{z}\,\sin\!\left((2k-m)\left(\sqrt{z}\,b+e\right)\right)\right)}{(m-2k)^2}+$$

$$2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{2(fv-2fs)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm+2cs-cv)\cos\!\left(-\frac{(2bk-bm-2cs+cv)^2}{4(fv-2fs)}+\right.\right.\right.$$

$$\left.2ek-em-2gs+gv\right)C\!\left(\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{fv-2fs}}\right)+$$

$$\sqrt{2\pi}\,(2bk-bm-2cs+cv)\,S\!\left(\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{fv-2fs}}\right)$$

$$\sin\!\left(-\frac{(2bk-bm-2cs+cv)^2}{4(fv-2fs)}+2ek-em-2gs+gv\right)+$$

$$\left.2\sqrt{fv-2fs}\,\sin\!\left(2ek-em-2gs+gv+(fv-2fs)z+(2bk-bm-2cs+cv)\sqrt{z}\right)\right)+$$

$$\frac{1}{2(2fs-fv)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm-2cs+cv)\cos\!\left(-\frac{(2bk-bm+2cs-cv)^2}{4(2fs-fv)}+\right.\right.$$

$$\left.2ek-em+2gs-gv\right)C\!\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2fs-fv}}\right)+$$

$$\sqrt{2\pi}\,(2bk-bm+2cs-cv)\,S\!\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2fs-fv}}\right)$$

$$\sin\!\left(-\frac{(2bk-bm+2cs-cv)^2}{4(2fs-fv)}+2ek-em+2gs-gv\right)+2\sqrt{2fs-fv}$$

$$\left.\left.\sin\!\left(2ek-em+2gs-gv+(2fs-fv)z+(2bk-bm+2cs-cv)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m\!\left(b\,z^r+d\,z+e\right)\cos^v\!\left(c\,z^r+f\,z+g\right)$

01.07.21.1231.01

$$\int \cos^m\left(b z^2 + d z\right) \cos^\nu\left(c z^2 + f z + g\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b (m-2k)}} \left(\binom{m}{k} \left(\cos\left(\frac{(m-2k) d^2}{4b}\right) C\left(\frac{d (m-2k) + 2 b z (m-2k)}{\sqrt{b (m-2k)} \sqrt{2\pi}}\right) + S\left(\frac{d (m-2k) + 2 b z (m-2k)}{\sqrt{b (m-2k)} \sqrt{2\pi}}\right) \sin\left(\frac{(m-2k) d^2}{4b}\right)\right)\right)\right) (1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{c (\nu - 2s)}} \left(\binom{\nu}{s} \left(\cos\left(\frac{f^2 (\nu - 2s)}{4c} - g (\nu - 2s)\right) C\left(\frac{f (\nu - 2s) + 2 c z (\nu - 2s)}{\sqrt{2\pi} \sqrt{c (\nu - 2s)}}\right) + S\left(\frac{f (\nu - 2s) + 2 c z (\nu - 2s)}{\sqrt{2\pi} \sqrt{c (\nu - 2s)}}\right) \sin\left(\frac{f^2 (\nu - 2s)}{4c} - g (\nu - 2s)\right)\right)\right) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{2bk - bm - 2cs + c\nu}} \left(\cos\left(-\frac{(2dk - md - 2fs + f\nu)^2}{4 (2bk - bm - 2cs + c\nu)} - 2gs + g\nu\right) C\left(\frac{2dk - md - 2fs + f\nu + 2 (2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + c\nu}}\right) - S\left(\frac{2dk - md - 2fs + f\nu + 2 (2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + c\nu}}\right) \sin\left(-\frac{(2dk - md - 2fs + f\nu)^2}{4 (2bk - bm - 2cs + c\nu)} - 2gs + g\nu\right)\right) + \frac{1}{\sqrt{2bk - bm + 2cs - c\nu}} \left(\cos\left(-\frac{(2dk - md + 2fs - f\nu)^2}{4 (2bk - bm + 2cs - c\nu)} + 2gs - g\nu\right) C\left(\frac{2dk - md + 2fs - f\nu + 2 (2bk - bm + 2cs - c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - c\nu}}\right) - S\left(\frac{2dk - md + 2fs - f\nu + 2 (2bk - bm + 2cs - c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - c\nu}}\right) \sin\left(-\frac{(2dk - md + 2fs - f\nu)^2}{4 (2bk - bm + 2cs - c\nu)} + 2gs - g\nu\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.1232.01

$$\int \cos^m\left(\sqrt{z}\, b + d z\right) \cos^\nu\left(\sqrt{z}\, c + g + f z\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{2 ((m-2k) d)^{3/2}} \left(\binom{m}{k} \left(-b (m-2k) \sqrt{2\pi} \cos\left(\frac{b^2 (m-2k)}{4d}\right) C\left(\frac{b (m-2k) + 2 d \sqrt{z} (m-2k)}{\sqrt{(m-2k) d} \sqrt{2\pi}}\right) - b (m-2k) \sqrt{2\pi}\, S\left(\frac{b (m-2k) + 2 d \sqrt{z} (m-2k)}{\sqrt{(m-2k) d} \sqrt{2\pi}}\right) \sin\left(\frac{b^2 (m-2k)}{4d}\right) + \right.\right.\right.$$

$$2\sqrt{(m-2k)\,d}\,\sin\Bigl(d\,z\,(m-2k)+b\sqrt{z}\,(m-2k)\Bigr)\Bigr)\Bigr)\Bigr)\Bigr)(1-v \bmod 2)+2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{2\,(f\,(v-2s))^{3/2}}\left(\binom{v}{s}\left(-c\sqrt{2\pi}\,(v-2s)\cos\left(\frac{c^2\,(v-2s)}{4f}-g\,(v-2s)\right)C\left(\frac{c\,(v-2s)+2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\,\sqrt{f\,(v-2s)}}\right)-\right.\right.$$

$$c\sqrt{2\pi}\,(v-2s)\,S\left(\frac{c\,(v-2s)+2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\,\sqrt{f\,(v-2s)}}\right)\sin\left(\frac{c^2\,(v-2s)}{4f}-g\,(v-2s)\right)+$$

$$\left.\left.2\sqrt{f\,(v-2s)}\,\sin\Bigl(g\,(v-2s)+f\,z\,(v-2s)+c\sqrt{z}\,(v-2s)\Bigr)\right)\right)+$$

$$2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left(\left(\sqrt{2\pi}\,(-2bk+bm+2cs-cv)\cos\left(-\frac{(2bk-bm-2cs+cv)^2}{4\,(2dk-md-2fs+fv)}-2gs+gv\right)\right.\right.\right.$$

$$C\left(\frac{2bk-bm-2cs+cv+2\,(2dk-md-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-md-2fs+fv}}\right)+$$

$$\sqrt{2\pi}\,(2bk-bm-2cs+cv)\,S\left(\frac{2bk-bm-2cs+cv+2\,(2dk-md-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-md-2fs+fv}}\right)$$

$$\sin\left(-\frac{(2bk-bm-2cs+cv)^2}{4\,(2dk-md-2fs+fv)}-2gs+gv\right)+2\sqrt{2dk-md-2fs+fv}\,\sin\Bigl(-2gs+gv+$$

$$\left.\left.(2dk-md-2fs+fv)\,z+(2bk-bm-2cs+cv)\sqrt{z}\Bigr)\right)\right/\left(2\,(2dk-md-2fs+fv)^{3/2}\right)+$$

$$\left(\sqrt{2\pi}\,(-2bk+bm-2cs+cv)\cos\left(-\frac{(2bk-bm+2cs-cv)^2}{4\,(2dk-md+2fs-fv)}+2gs-gv\right)\right.$$

$$C\left(\frac{2bk-bm+2cs-cv+2\,(2dk-md+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-md+2fs-fv}}\right)+\sqrt{2\pi}\,(2bk-bm+2cs-cv)$$

$$S\left(\frac{2bk-bm+2cs-cv+2\,(2dk-md+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-md+2fs-fv}}\right)\sin\left(-\frac{(2bk-bm+2cs-cv)^2}{4\,(2dk-md+2fs-fv)}+\right.$$

$$\left.2gs-gv\right)+2\sqrt{2dk-md+2fs-fv}\,\sin\Bigl(2gs-gv+(2dk-md+2fs-fv)\,z+$$

$$\left.\left.(2bk-bm+2cs-cv)\sqrt{z}\Bigr)\right)\right/\left(2\,(2dk-md+2fs-fv)^{3/2}\right)\Bigr)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m(b z^r + d z + e) \cos^v(c z^r + f z + g)$

01.07.21.1233.01

$$\int \cos^m(b z^2 + d z + e) \cos^v(c z^2 + f z + g)\, dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left(\binom{m}{k} \left(\cos\left(\frac{(m-2k) d^2}{4b} - (m-2k) e \right) C\left(\frac{d(m-2k) + 2 b z (m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) + S\left(\frac{d(m-2k) + 2 b z (m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) \sin\left(\frac{(m-2k) d^2}{4b} - (m-2k) e \right) \right) \right) \right) (1 - v \bmod 2) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{\sqrt{c(v-2s)}} \left(\binom{v}{s} \left(\cos\left(\frac{f^2 (v-2s)}{4c} - g(v-2s) \right) C\left(\frac{f(v-2s) + 2 c z (v-2s)}{\sqrt{2\pi} \sqrt{c(v-2s)}} \right) + S\left(\frac{f(v-2s) + 2 c z (v-2s)}{\sqrt{2\pi} \sqrt{c(v-2s)}} \right) \sin\left(\frac{f^2 (v-2s)}{4c} - g(v-2s) \right) \right) \right) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\left(\cos\left(-\frac{(2dk - md - 2fs + fv)^2}{4(2bk - bm - 2cs + cv)} - me + 2ek - 2gs + gv \right) C\left(\frac{2dk - md - 2fs + fv + 2(2bk - bm - 2cs + cv) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + cv}} \right) - S\left(\frac{2dk - md - 2fs + fv + 2(2bk - bm - 2cs + cv) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + cv}} \right) \sin\left(-\frac{(2dk - md - 2fs + fv)^2}{4(2bk - bm - 2cs + cv)} - me + 2ek - 2gs + gv \right) \right) \Big/ \left(\sqrt{2bk - bm - 2cs + cv} \right) + \left(\cos\left(-\frac{(2dk - md + 2fs - fv)^2}{4(2bk - bm + 2cs - cv)} - me + 2ek + 2gs - gv \right) C\left(\frac{2dk - md + 2fs - fv + 2(2bk - bm + 2cs - cv) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - cv}} \right) - S\left(\frac{2dk - md + 2fs - fv + 2(2bk - bm + 2cs - cv) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - cv}} \right) \sin\left(-\frac{(2dk - md + 2fs - fv)^2}{4(2bk - bm + 2cs - cv)} - me + 2ek + 2gs - gv \right) \right) \Big/ \left(\sqrt{2bk - bm + 2cs - cv} \right) \right) /;\, m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1234.01

$$\int \cos^m(\sqrt{z}\, b + d z + e) \cos^v(\sqrt{z}\, c + f z + g)\, dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + 2^{-m-v+1} \binom{v}{\frac{v}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{2((m-2k) d)^{3/2}} \left(\binom{m}{k} \left(-b(m-2k) \sqrt{2\pi} \cos\left(\frac{b^2 (m-2k)}{4d} - (m-2k) e \right) C\left(\frac{b(m-2k) + 2 d \sqrt{z}\, (m-2k)}{\sqrt{(m-2k) d} \sqrt{2\pi}} \right) - \right. \right. \right.$$

$$b\,(m-2k)\sqrt{2\pi}\; S\!\left(\frac{b\,(m-2k)+2d\sqrt{z}\,(m-2k)}{\sqrt{(m-2k)\,d}\,\sqrt{2\pi}}\right)\sin\!\left(\frac{b^2\,(m-2k)}{4d}-(m-2k)\,e\right)+$$

$$\left.\left.\left.2\sqrt{(m-2k)\,d}\;\sin\!\left(e\,(m-2k)+d\,z\,(m-2k)+b\sqrt{z}\,(m-2k)\right)\right)\right)\right)(1-v \bmod 2)+$$

$$2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{2\,(f\,(v-2s))^{3/2}}\left(\binom{v}{s}\left(-c\sqrt{2\pi}\,(v-2s)\cos\!\left(\frac{c^2\,(v-2s)}{4f}-g\,(v-2s)\right)\right.\right.$$

$$C\!\left(\frac{c\,(v-2s)+2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\,\sqrt{f\,(v-2s)}}\right)-c\sqrt{2\pi}\,(v-2s)\,S\!\left(\frac{c\,(v-2s)+2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\,\sqrt{f\,(v-2s)}}\right)$$

$$\left.\left.\sin\!\left(\frac{c^2\,(v-2s)}{4f}-g\,(v-2s)\right)+2\sqrt{f\,(v-2s)}\;\sin\!\left(g\,(v-2s)+f\,z\,(v-2s)+c\sqrt{z}\,(v-2s)\right)\right)\right)+$$

$$2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left(\left(\sqrt{2\pi}\,(-2bk+bm+2cs-cv)\cos\!\left(-\frac{(2bk-bm-2cs+cv)^2}{4\,(2dk-md-2fs+fv)}-me+\right.\right.\right.\right.$$

$$\left.2ek-2gs+gv\right)C\!\left(\frac{2bk-bm-2cs+cv+2\,(2dk-md-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-md-2fs+fv}}\right)+$$

$$\sqrt{2\pi}\,(2bk-bm-2cs+cv)\,S\!\left(\frac{2bk-bm-2cs+cv+2\,(2dk-md-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-md-2fs+fv}}\right)$$

$$\sin\!\left(-\frac{(2bk-bm-2cs+cv)^2}{4\,(2dk-md-2fs+fv)}-me+2ek-2gs+gv\right)+2\sqrt{2dk-md-2fs+fv}$$

$$\left.\sin\!\left(2ek-me-2gs+gv+(2dk-md-2fs+fv)\,z+(2bk-bm-2cs+cv)\sqrt{z}\right)\right)\Big/$$

$$\left(2\,(2dk-md-2fs+fv)^{3/2}\right)+\left(\sqrt{2\pi}\,(-2bk+bm-2cs+cv)\cos\!\left(-\frac{(2bk-bm+2cs-cv)^2}{4\,(2dk-md+2fs-fv)}-\right.\right.$$

$$\left.me+2ek+2gs-gv\right)C\!\left(\frac{2bk-bm+2cs-cv+2\,(2dk-md+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-md+2fs-fv}}\right)+$$

$$\sqrt{2\pi}\,(2bk-bm+2cs-cv)\,S\!\left(\frac{2bk-bm+2cs-cv+2\,(2dk-md+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-md+2fs-fv}}\right)$$

$$\sin\left(-\frac{(2bk-bm+2cs-cv)^2}{4(2dk-md+2fs-fv)}-me+2ek+2gs-gv\right)+2\sqrt{2dk-md+2fs-fv}$$
$$\sin\left(2ek-me+2gs-gv+(2dk-md+2fs-fv)z+(2bk-bm+2cs-cv)\sqrt{z}\right)\Bigg)\Bigg/$$
$$\left(2(2dk-md+2fs-fv)^{3/2}\right)\Bigg)\,/;\, m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving rational functions of the direct function

Involving $\frac{1}{a+b\cos(cz)}$

01.07.21.1235.01

$$\int\frac{1}{a+b\cos(cz)}\,dz = -\left(2\tanh^{-1}\left(\left((a-b)\tan\left(\frac{cz}{2}\right)\right)\Big/\left(\sqrt{b^2-a^2}\right)\right)\right)\Big/\left(\sqrt{b^2-a^2}\;c\right)$$

01.07.21.1236.01

$$\int\frac{1}{\cos(cz)+1}\,dz = \frac{\tan\left(\frac{cz}{2}\right)}{c}$$

01.07.21.1237.01

$$\int\frac{1}{1-\cos(cz)}\,dz = -\frac{\cot\left(\frac{cz}{2}\right)}{c}$$

Involving $(a+b\cos(cz))^{-n}$

01.07.21.1238.01

$$\int\frac{1}{(a+b\cos(cz))^2}\,dz = -\frac{-2a\tanh^{-1}\left(\frac{(a-b)\tan\left(\frac{cz}{2}\right)}{\sqrt{b^2-a^2}}\right)(a+b\cos(cz))-b\sqrt{b^2-a^2}\,\sin(cz)}{\left(b^2-a^2\right)^{3/2}c\,(a+b\cos(cz))}$$

01.07.21.1239.01

$$\int\frac{1}{(\cos(cz)+1)^2}\,dz = \frac{(\cos(cz)+2)\sin(cz)}{3c(\cos(cz)+1)^2}$$

01.07.21.1240.01

$$\int\frac{1}{(1-\cos(cz))^2}\,dz = \frac{\sin(2cz)-4\sin(cz)}{6c(\cos(cz)-1)^2}$$

01.07.21.1241.01

$$\int\frac{1}{(a+b\cos(cz))^3}\,dz = \frac{1}{2c}\left(\frac{b\left(-4a^2-3b\cos(cz)a+b^2\right)\sin(cz)}{\left(a^2-b^2\right)^2(a+b\cos(cz))^2}-\frac{2\left(2a^2+b^2\right)}{\left(b^2-a^2\right)^{5/2}}\tanh^{-1}\left(\frac{(a-b)}{\sqrt{b^2-a^2}}\tan\left(\frac{cz}{2}\right)\right)\right)$$

01.07.21.1242.01

$$\int \frac{1}{(a+b\cos(c z))^4}\,dz = \frac{1}{6c}\left(\frac{6a\left(2a^2+3b^2\right)}{\left(b^2-a^2\right)^{7/2}}\tanh^{-1}\left(\frac{(a-b)}{\sqrt{b^2-a^2}}\tan\left(\frac{c z}{2}\right)\right)+\frac{b\left(36a^4+b^2a^2+6b\left(9a^2+b^2\right)\cos(c z)\,a+8b^4+b^2\left(11a^2+4b^2\right)\cos(2cz)\right)\sin(c z)}{2\left(b^2-a^2\right)^3(a+b\cos(c z))^3}\right)$$

Involving $\frac{1}{a+b\cos^n(c z)}$

01.07.21.1243.01

$$\int \frac{1}{a+b\cos^2(c z)}\,dz = \frac{\tan^{-1}\left(\frac{\sqrt{a}\,\tan(c z)}{\sqrt{a+b}}\right)}{\sqrt{a}\,\sqrt{a+b}\,c}$$

01.07.21.1244.01

$$\int \frac{1}{\cos^2(c z)+1}\,dz = \frac{\tan^{-1}\left(\frac{\tan(c z)}{\sqrt{2}}\right)}{\sqrt{2}\,c}$$

01.07.21.1245.01

$$\int \frac{1}{1-\cos^2(c z)}\,dz = -\frac{\cot(c z)}{c}$$

01.07.21.1246.01

$$\int \frac{1}{1+\cos^3(c z)}\,dz = \frac{1}{3c\left(\cos^3(c z)+1\right)}\left(\cos\left(\frac{c z}{2}\right)(-2\cos(c z)+\cos(2cz)+3)\left(\frac{\left(i+\sqrt{3}\right)\tan^{-1}\left(\frac{\left(3i+\sqrt{3}\right)\tan\left(\frac{cz}{2}\right)}{\sqrt{6+2i\sqrt{3}}}\right)\cos\left(\frac{cz}{2}\right)}{\sqrt{\frac{1}{2}\left(3+i\sqrt{3}\right)}}+\frac{\left(-i+\sqrt{3}\right)\tan^{-1}\left(\frac{\left(-3i+\sqrt{3}\right)\tan\left(\frac{cz}{2}\right)}{\sqrt{6-2i\sqrt{3}}}\right)\cos\left(\frac{cz}{2}\right)}{\sqrt{\frac{1}{2}\left(3-i\sqrt{3}\right)}}+\sin\left(\frac{c z}{2}\right)\right)\right)$$

01.07.21.1247.01

$$\int \frac{1}{a+b\cos^4(c z)}\,dz = \frac{1}{2\sqrt{a}\,c}\left(\frac{1}{\sqrt{a+i\sqrt{b}\sqrt{a}}}\tan^{-1}\left(\frac{\sqrt{a}\,\tan(c z)}{\sqrt{a+i\sqrt{b}\sqrt{a}}}\right)+\frac{1}{\sqrt{a-i\sqrt{a}\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{a}\,\tan(c z)}{\sqrt{a-i\sqrt{a}\sqrt{b}}}\right)\right)$$

01.07.21.1248.01

$$\int \frac{1}{1-\cos^4(c z)}\,dz = \frac{\sqrt{2}\,\tan^{-1}\left(\frac{\tan(c z)}{\sqrt{2}}\right)-2\cot(c z)}{4c}$$

Involving $\left(a + b\cos^2(c\,z)\right)^{-n}$

01.07.21.1249.01

$$\int \frac{1}{\left(a + b\cos^2(c\,z)\right)^2}\,dz = \frac{1}{2\,a^{3/2}\,c}\left(\frac{2\,a+b}{(a+b)^{3/2}}\tan^{-1}\left(\frac{\sqrt{a}\,\tan(c\,z)}{\sqrt{a+b}}\right) - \frac{\sqrt{a}\,b\sin(2\,c\,z)}{(a+b)\,(2\,a+b+b\cos(2\,c\,z))}\right)$$

01.07.21.1250.01

$$\int \frac{1}{\left(a + b\cos^2(c\,z)\right)^3}\,dz = \frac{1}{8\,a^{5/2}\,c}\left(\frac{\left(8\,a^2 + 8\,b\,a + 3\,b^2\right)\tan^{-1}\left(\frac{\sqrt{a}\,\tan(c\,z)}{\sqrt{a+b}}\right)}{(a+b)^{5/2}} - \frac{\sqrt{a}\,b\left(16\,a^2 + 16\,b\,a + 3\,b^2 + 3\,b\,(2\,a+b)\cos(2\,c\,z)\right)\sin(2\,c\,z)}{(a+b)^2\,(2\,a+b+b\cos(2\,c\,z))^2}\right)$$

Involving $\frac{\cos(d\,z)}{a+b\cos(c\,z)}$

01.07.21.1251.01

$$\int \frac{\cos(d\,z)}{a+b\cos(c\,z)}\,dz = \frac{1}{2\,b\sqrt{a^2-b^2}}\,e^{(i\,c-i\,d)\,z}\left(\frac{1}{i\,c+i\,d}\left(e^{2\,i\,d\,z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d)}{c}, 1; \frac{d}{c}+2; \frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right) + \left(\sqrt{a^2-b^2}-a\right)\right.\right.\right.$$
$$\left.\left.\left.{}_2F_1\left(-\frac{i\,(i\,c+i\,d)}{c}, 1; \frac{d}{c}+2; -\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right) - \frac{1}{-i\,c+i\,d}\right.$$
$$\left.\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(1-\frac{d}{c}, 1; 2-\frac{d}{c}; \frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right) + \left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(1-\frac{d}{c}, 1; 2-\frac{d}{c}; -\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)$$

01.07.21.1252.01

$$\int \frac{\cos(c\,z)}{a+b\cos(c\,z)}\,dz = \frac{1}{b}\left(z + \frac{2\,a}{\sqrt{b^2-a^2}\,c}\tanh^{-1}\left(\frac{(a-b)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right)\right)$$

01.07.21.1253.01

$$\int \frac{\cos(c\,z)}{\cos(c\,z)+1}\,dz = z - \frac{\tan\left(\frac{c\,z}{2}\right)}{c}$$

01.07.21.1254.01

$$\int \frac{\cos(c\,z)}{1-\cos(c\,z)}\,dz = -\frac{c\,z + \cot\left(\frac{c\,z}{2}\right)}{c}$$

01.07.21.1255.01

$$\int \frac{A+B\cos(c\,z)}{a+b\cos(c\,z)}\,dz = \frac{1}{b}\left(B\,z + \frac{2\,(a\,B-A\,b)}{\sqrt{b^2-a^2}\;c}\tanh^{-1}\left(\frac{(a-b)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right)\right)$$

01.07.21.1256.01

$$\int \frac{\cos(2\,c\,z)}{a+b\cos(c\,z)}\,dz = \frac{2}{b^2}\left(-a\,z + \frac{b\sin(c\,z)}{c} - \frac{\left(2\,a^2-b^2\right)}{\sqrt{b^2-a^2}\;c}\tanh^{-1}\left(\frac{(a-b)}{\sqrt{b^2-a^2}}\tan\left(\frac{c\,z}{2}\right)\right)\right)$$

01.07.21.1257.01

$$\int \frac{\cos(c\,z)}{a+b\cos(2\,c\,z)}\,dz = \frac{1}{\sqrt{2}\;\sqrt{-b}\;\sqrt{a+b}\;c}\tan^{-1}\left(\frac{\sqrt{2}\;\sqrt{-b}\;\sin(c\,z)}{\sqrt{a+b}}\right)$$

Involving $\cos(d\,z)\,(a+b\cos(c\,z))^{-n}$

01.07.21.1258.01

$$\int \frac{\cos(d\,z)}{(a+b\cos(c\,z))^2}\,dz =$$

$$\frac{1}{2}\left(\frac{1}{b\left(a^2-b^2\right)^{3/2}\,(i\,c-i\,d)}\left(e^{(i\,c-i\,d)\,z}\left(\left(-a^2-\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\left(1-\frac{d}{c},2;2-\frac{d}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}\;-a}\right)-\right.\right.\right.$$

$$\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\left(1-\frac{d}{c},2;2-\frac{d}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c-i\,d)}{c},\right.$$

$$\left.\left.\left.1;2-\frac{d}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}\;-a}\right)+a\left(\sqrt{a^2-b^2}\;-a\right){}_2F_1\left(-\frac{i\,(i\,c-i\,d)}{c},1;2-\frac{d}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)+$$

$$\frac{1}{b\left(a^2-b^2\right)^{3/2}\,(i\,c+i\,d)}\left(e^{(i\,c+i\,d)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d)}{c},1;\frac{d}{c}+2;\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}\;-a}\right)+\right.\right.$$

$$a\left(\sqrt{a^2-b^2}\;-a\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d)}{c},1;\frac{d}{c}+2;-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(-a^2-\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d)}{c},2;\frac{d}{c}+2;\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}\;-a}\right)-$$

$$\left.\left.\left.\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d)}{c},2;\frac{d}{c}+2;-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)$$

01.07.21.1259.01

$$\int \frac{A+B\cos(c\,z)}{(a+b\cos(c\,z))^2}\,dz = -\frac{\sqrt{b^2-a^2}\;(a\,B-A\,b)\sin(c\,z)-2\,(a\,A-b\,B)\tanh^{-1}\left(\frac{(a-b)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right)(a+b\cos(c\,z))}{\left(b^2-a^2\right)^{3/2}\,c\,(a+b\cos(c\,z))}$$

01.07.21.1260.01

$$\int \frac{A+B\cos(c\,z)}{(\cos(c\,z)+1)^2}\,dz = \frac{(2\,A+B+(A+2\,B)\cos(c\,z))\sin(c\,z)}{3\,c\,(\cos(c\,z)+1)^2}$$

01.07.21.1261.01

$$\int \frac{A+B\cos(c\,z)}{(1-\cos(c\,z))^2}\,dz = \frac{(-2\,A+B+(A-2\,B)\cos(c\,z))\sin(c\,z)}{3\,c\,(\cos(c\,z)-1)^2}$$

01.07.21.1262.01

$$\int \frac{A+B\cos(c\,z)}{(a+b\cos(c\,z))^3}\,dz = \frac{1}{2\left(a^2-b^2\right)^2 c}\left(-\frac{2\left(2\,A\,a^2-3\,b\,B\,a+A\,b^2\right)\tanh^{-1}\left(\frac{(a-b)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right)}{\sqrt{b^2-a^2}}+\frac{\left(B\,a^2-3\,A\,b\,a+2\,b^2\,B\right)\sin(c\,z)}{a+b\cos(c\,z)}+\frac{\left(a^2-b^2\right)(a\,B-A\,b)\sin(c\,z)}{(a+b\cos(c\,z))^2}\right)$$

01.07.21.1263.01

$$\int \frac{A+B\cos(c\,z)}{(\cos(c\,z)+1)^3}\,dz = \frac{(16\,A+9\,B+6\,(2\,A+3\,B)\cos(c\,z)+(2\,A+3\,B)\cos(2\,c\,z))\sin(c\,z)}{30\,c\,(\cos(c\,z)+1)^3}$$

01.07.21.1264.01

$$\int \frac{A+B\cos(c\,z)}{(1-\cos(c\,z))^3}\,dz = \frac{(16\,A-9\,B-6\,(2\,A-3\,B)\cos(c\,z)+(2\,A-3\,B)\cos(2\,c\,z))\sin(c\,z)}{30\,c\,(\cos(c\,z)-1)^3}$$

01.07.21.1265.01

$$\int \frac{A+B\cos(c\,z)+C\cos^2(c\,z)}{(a+b\cos(c\,z))^3}\,dz = \frac{1}{2\,c}\left(-\frac{2\left((2\,A+C)\,a^2-3\,b\,B\,a+b^2\,(A+2\,C)\right)\tanh^{-1}\left(\frac{(a-b)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right)}{\left(b^2-a^2\right)^{5/2}}+\frac{\left(C\,a^3+b\,B\,a^2-b^2\,(3\,A+4\,C)\,a+2\,b^3\,B\right)\sin(c\,z)}{b\left(a^2-b^2\right)^2(a+b\cos(c\,z))}+\frac{\left(A\,b^2+a\,(a\,C-b\,B)\right)\sin(c\,z)}{\left(b^3-a^2\,b\right)(a+b\cos(c\,z))^2}\right)$$

Involving $\frac{\cos(d\,z)}{a+b\cos^2(c\,z)}$

01.07.21.1266.01

$$\int \frac{\cos(d\,z)}{a+b\cos^2(c\,z)}\,dz = \frac{1}{2\sqrt{a}\,b\sqrt{a+b}}\left(-\frac{1}{2\,i\,c+i\,d}\left(e^{(2\,i\,c+i\,d)\,z}\left(\left(2\,a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{d}{2\,c}+1,1;\frac{d}{2\,c}+2;-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\left(-2\,a-2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{d}{2\,c}+1,1;\frac{d}{2\,c}+2;-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)-\frac{1}{2\,i\,c-i\,d}\left(e^{(2\,i\,c-i\,d)\,z}\left(\left(2\,a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(1-\frac{d}{2\,c},1;2-\frac{d}{2\,c};-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\left(-2\,a-2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(1-\frac{d}{2\,c},1;2-\frac{d}{2\,c};-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)$$

01.07.21.1267.01

$$\int \frac{\cos(c\,z)}{a+b\cos^2(c\,z)}\,dz = \frac{1}{\sqrt{-b}\,\sqrt{a+b}\,c}\tan^{-1}\left(\frac{\sqrt{-b}\,\sin(c\,z)}{\sqrt{a+b}}\right)$$

01.07.21.1268.01

$$\int \frac{\cos(2\,c\,z)}{a+b\cos^2(c\,z)}\,dz = \frac{1}{b}\left(2\,z-\frac{(2\,a+b)}{\sqrt{a}\,\sqrt{a+b}\,c}\tan^{-1}\left(\frac{\sqrt{a}\,\tan(c\,z)}{\sqrt{a+b}}\right)\right)$$

Involving $\frac{\cos^m(c\,z)}{a+b\cos^n(c\,z)}$

01.07.21.1269.01

$$\int \frac{\cos^m(c\,z)}{a+b\cos^2(c\,z)}\,dz = \frac{\cos^{m-1}(c\,z)\cos^2(c\,z)^{\frac{1}{2}-\frac{m}{2}}\sin(c\,z)}{a\,c+b\,c}\,F_1\left(\frac{1}{2};\frac{1}{2}-\frac{m}{2},1;\frac{3}{2};\sin^2(c\,z),\frac{b\sin^2(c\,z)}{a+b}\right)$$

01.07.21.1270.01

$$\int \frac{\cos^2(c\,z)}{a+b\cos^2(c\,z)}\,dz = \frac{1}{b}\left(z-\frac{\sqrt{a}}{\sqrt{a+b}\,c}\tan^{-1}\left(\frac{\sqrt{a}\,\tan(c\,z)}{\sqrt{a+b}}\right)\right)$$

01.07.21.1271.01

$$\int \frac{\cos^2(c\,z)}{a+b\cos^4(c\,z)}\,dz = -\frac{i}{2\sqrt{b}\,c}\left(\frac{1}{\sqrt{a-i\sqrt{a}\,\sqrt{b}}}\tan^{-1}\left(\frac{\sqrt{a}\,\tan(c\,z)}{\sqrt{a-i\sqrt{a}\,\sqrt{b}}}\right)-\frac{1}{\sqrt{a+i\sqrt{b}\,\sqrt{a}}}\tan^{-1}\left(\frac{\sqrt{a}\,\tan(c\,z)}{\sqrt{a+i\sqrt{b}\,\sqrt{a}}}\right)\right)$$

Involving $\cos(d\,z)\left(a+b\cos^2(c\,z)\right)^{-n}$

01.07.21.1272.01

$$\int \frac{\cos(d\,z)}{\left(a+b\cos^2(c\,z)\right)^2}\,dz = \frac{1}{4\,a^{3/2}\,b\,(a+b)^{3/2}}$$

$$\left(-\frac{1}{2\,i\,c+i\,d}\left(e^{(2\,i\,c+i\,d)\,z}\left(-(2\,a+b)\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{d}{2\,c}+1,\,1;\,\frac{d}{2\,c}+2;\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\right.\right.\right.$$

$$(-2\,a-b)\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{d}{2\,c}+1,\,1;\,\frac{d}{2\,c}+2;\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(-2\,a^{3/2}+2\sqrt{a+b}\,a-2\,b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(\frac{d}{2\,c}+1,\,2;\,\frac{d}{2\,c}+2;\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\right.$$

$$\left.\left.\left.\left(2\,a^{3/2}+2\sqrt{a+b}\,a+2\,b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(\frac{d}{2\,c}+1,\,2;\,\frac{d}{2\,c}+2;\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)-$$

$$\frac{1}{2\,i\,c-i\,d}\left(e^{(2\,i\,c-i\,d)\,z}\left(-(2\,a+b)\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(1-\frac{d}{2\,c},\,1;\,2-\frac{d}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\right.\right.$$

$$(-2\,a-b)\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(1-\frac{d}{2\,c},\,1;\,2-\frac{d}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(-2\,a^{3/2}+2\sqrt{a+b}\,a-2\,b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(1-\frac{d}{2\,c},\,2;\,2-\frac{d}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\right.$$

$$\left.\left.\left.\left.\left(2\,a^{3/2}+2\sqrt{a+b}\,a+2\,b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(1-\frac{d}{2\,c},\,2;\,2-\frac{d}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)\right)$$

Involving $\cos^m(c\,z)\left(a+b\cos^2(c\,z)\right)^{-n}$

01.07.21.1273.01

$$\int \frac{\cos^m(c\,z)}{\left(a+b\cos^2(c\,z)\right)^n}\,dz = \frac{\cos^{m-1}(c\,z)\cos^2(c\,z)^{\frac{1-m}{2}}\,(a+b)^{-n}\sin(c\,z)}{c}\,F_1\left(\frac{1}{2};\,\frac{1}{2}-\frac{m}{2},\,n;\,\frac{3}{2};\,\sin^2(c\,z),\,\frac{b\sin^2(c\,z)}{a+b}\right)\,/;\,v\in\mathbb{N}^+$$

01.07.21.1274.01

$$\int \frac{\cos^2(c\,z)}{\left(a+b\cos^2(c\,z)\right)^2}\,dz = \frac{1}{2\,c}\left(\frac{1}{\sqrt{a}\,(a+b)^{3/2}}\tan^{-1}\left(\frac{\sqrt{a}\,\tan(c\,z)}{\sqrt{a+b}}\right)+\frac{\sin(2\,c\,z)}{(a+b)\,(2\,a+b+b\cos(2\,c\,z))}\right)$$

Involving $\frac{\cos(e\,z)\cos(d\,z)}{a+b\cos(c\,z)}$

01.07.21.1275.01

$$\int \frac{\cos(e\,z)\cos(d\,z)}{a+b\cos(c\,z)}\,dz = -\frac{1}{4\,b\sqrt{a^2-b^2}}\left(i\left(\frac{1}{c+d-e}\left(e^{i(c+d-e)z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d-e}{c},1;\frac{2c+d-e}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d-e}{c},1;\frac{2c+d-e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)+\frac{1}{c-d+e}\left(e^{i(c-d+e)z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c-d+e}{c},1;\frac{2c-d+e}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c-d+e}{c},1;\frac{2c-d+e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)+\frac{1}{c+d+e}\left(e^{i(c+d+e)z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d+e}{c},1;\frac{2c+d+e}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d+e}{c},1;\frac{2c+d+e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)+\frac{1}{c-d-e}\left(e^{i(c-d-e)z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{-c+d+e}{c},1;-\frac{-2c+d+e}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{-c+d+e}{c},1;-\frac{-2c+d+e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)$$

Involving $\cos(e\,z)\cos(d\,z)\,(a+b\cos(c\,z))^{-n}$

01.07.21.1276.01

$$\int \frac{\cos(e\,z)\cos(d\,z)}{(a+b\cos(c\,z))^2}\,dz = -\frac{1}{4\,b\left(a^2-b^2\right)^{3/2}}\left(i\left(\frac{1}{c+d-e}\left(e^{i(c+d-e)z}\left(-{}_2F_1\left(\frac{c+d-e}{c},2;\frac{2c+d-e}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)a^2+{}_2F_1\left(\frac{c+d-e}{c},2;\frac{2c+d-e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)a^2+\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d-e}{c},1;\frac{2c+d-e}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)a+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d-e}{c},1;\frac{2c+d-e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)a-\sqrt{a^2-b^2}\;{}_2F_1\left(\frac{c+d-e}{c},\right.\right.\right.\right.\right.$$

$$2;\ \frac{2c+d-e}{c};\ \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\Bigg)a-\sqrt{a^2-b^2}\ {}_2F_1\Bigg(\frac{c+d-e}{c},2;\ \frac{2c+d-e}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\Bigg)a+$$

$$b^2\,{}_2F_1\Bigg(\frac{c+d-e}{c},2;\ \frac{2c+d-e}{c};\ \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\Bigg)-b^2\,{}_2F_1\Bigg(\frac{c+d-e}{c},2;\ \frac{2c+d-e}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{c-d+e}\Bigg(e^{i(c-d+e)z}\Bigg(-{}_2F_1\Bigg(\frac{c-d+e}{c},2;\ \frac{2c-d+e}{c};\ \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\Bigg)a^2+{}_2F_1\Bigg(\frac{c-d+e}{c},2;\ \frac{2c-d+e}{c};$$

$$-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\Bigg)a^2+\left(a+\sqrt{a^2-b^2}\right){}_2F_1\Bigg(\frac{c-d+e}{c},1;\ \frac{2c-d+e}{c};\ \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\Bigg)a+$$

$$\left(\sqrt{a^2-b^2}-a\right){}_2F_1\Bigg(\frac{c-d+e}{c},1;\ \frac{2c-d+e}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\Bigg)a-\sqrt{a^2-b^2}\ {}_2F_1\Bigg(\frac{c-d+e}{c},$$

$$2;\ \frac{2c-d+e}{c};\ \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\Bigg)a-\sqrt{a^2-b^2}\ {}_2F_1\Bigg(\frac{c-d+e}{c},2;\ \frac{2c-d+e}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\Bigg)a+$$

$$b^2\,{}_2F_1\Bigg(\frac{c-d+e}{c},2;\ \frac{2c-d+e}{c};\ \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\Bigg)-b^2\,{}_2F_1\Bigg(\frac{c-d+e}{c},2;\ \frac{2c-d+e}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{c+d+e}\Bigg(e^{i(c+d+e)z}\Bigg(-{}_2F_1\Bigg(\frac{c+d+e}{c},2;\ \frac{2c+d+e}{c};\ \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\Bigg)a^2+{}_2F_1\Bigg(\frac{c+d+e}{c},2;\ \frac{2c+d+e}{c};$$

$$-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\Bigg)a^2+\left(a+\sqrt{a^2-b^2}\right){}_2F_1\Bigg(\frac{c+d+e}{c},1;\ \frac{2c+d+e}{c};\ \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\Bigg)a+$$

$$\left(\sqrt{a^2-b^2}-a\right){}_2F_1\Bigg(\frac{c+d+e}{c},1;\ \frac{2c+d+e}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\Bigg)a-$$

$$\sqrt{a^2-b^2}\ {}_2F_1\Bigg(\frac{c+d+e}{c},2;\ \frac{2c+d+e}{c};\ \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\Bigg)a-$$

$$\sqrt{a^2-b^2}\ {}_2F_1\Bigg(\frac{c+d+e}{c},2;\ \frac{2c+d+e}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\Bigg)a+$$

$$b^2\,{}_2F_1\Bigg(\frac{c+d+e}{c},2;\ \frac{2c+d+e}{c};\ \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\Bigg)-b^2\,{}_2F_1\Bigg(\frac{c+d+e}{c},2;\ \frac{2c+d+e}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{c-d-e}\left(e^{i(c-d-e)z}\left(-{}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)a^2 + \right.\right.$$
$$ {}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a^2 + $$
$$ \left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{-c+d+e}{c}, 1; -\frac{-2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)a + $$
$$ \left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{-c+d+e}{c}, 1; -\frac{-2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a - $$
$$ \sqrt{a^2-b^2}\,{}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)a - $$
$$ \sqrt{a^2-b^2}\,{}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a + $$
$$ b^2\,{}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right) - $$
$$ \left.\left. b^2\,{}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)\right)\right) $$

Involving $\frac{\cos(e\,z)\cos(d\,z)}{a+b\cos^2(c\,z)}$

01.07.21.1277.01

$$\int \frac{\cos(e\,z)\cos(d\,z)}{a+b\cos^2(c\,z)}\,dz = \frac{1}{4\sqrt{a}\,b\sqrt{a+b}}$$
$$\Bigg(i\Bigg(\frac{1}{2c+d-e}\Bigg(e^{i(2c+d-e)z}\Bigg(\Big(2a-2\sqrt{a+b}\,\sqrt{a}+b\Big)\,{}_2F_1\Big(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\Big)-$$
$$\Big(2a+2\sqrt{a+b}\,\sqrt{a}+b\Big)\,{}_2F_1\Big(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\Big)\Bigg)\Bigg)+$$
$$\frac{1}{2c-d+e}\Bigg(e^{i(2c-d+e)z}\Bigg(\Big(2a-2\sqrt{a+b}\,\sqrt{a}+b\Big)\,{}_2F_1\Big(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\Big)-$$
$$\Big(2a+2\sqrt{a+b}\,\sqrt{a}+b\Big)\,{}_2F_1\Big(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\Big)\Bigg)\Bigg)+$$
$$\frac{1}{2c+d+e}\Bigg(e^{i(2c+d+e)z}\Bigg(\Big(2a-2\sqrt{a+b}\,\sqrt{a}+b\Big)\,{}_2F_1\Big(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\Big)-$$
$$\Big(2a+2\sqrt{a+b}\,\sqrt{a}+b\Big)\,{}_2F_1\Big(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\Big)\Bigg)\Bigg)-\frac{1}{-2c+d+e}$$
$$\Bigg(e^{i(2c-d-e)z}\Bigg(\Big(2a-2\sqrt{a+b}\,\sqrt{a}+b\Big)\,{}_2F_1\Big(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\Big)-$$
$$\Big(2a+2\sqrt{a+b}\,\sqrt{a}+b\Big)\,{}_2F_1\Big(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\Big)\Bigg)\Bigg)\Bigg)\Bigg)$$

Involving $\cos(e\,z)\cos(d\,z)\left(a+b\cos^2(c\,z)\right)^{-n}$

01.07.21.1278.01

$$\int \frac{\cos(e\,z)\cos(d\,z)}{\left(b\cos^2(c\,z)+a\right)^2}\,dz = \frac{1}{8\,a^{3/2}\,b\,(a+b)^{3/2}}\Bigg(i\Bigg(\frac{1}{2c+d-e}$$
$$\Bigg(e^{i(2c+d-e)z}\Bigg(-(2a+b)\Big(-2a+2\sqrt{a+b}\,\sqrt{a}-b\Big)\,{}_2F_1\Big(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\Big)-$$
$$(2a+b)\Big(2a+2\sqrt{a+b}\,\sqrt{a}+b\Big)\,{}_2F_1\Big(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\Big)+$$
$$2\sqrt{a}\Bigg(\Big(-2a^{3/2}+2\sqrt{a+b}\,a-2b\sqrt{a}+b\sqrt{a+b}\Big)\,{}_2F_1\Big(\frac{2c+d-e}{2c},2;\frac{4c+d-e}{2c};$$
$$-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\Big)+\Big(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\Big)\,{}_2F_1$$
$$\Big(\frac{2c+d-e}{2c},2;\frac{4c+d-e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\Big)\Bigg)\Bigg)\Bigg)+\frac{1}{2c-d+e}$$
$$\Bigg(e^{i(2c-d+e)z}\Bigg(-(2a+b)\Big(-2a+2\sqrt{a+b}\,\sqrt{a}-b\Big)\,{}_2F_1\Big(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\Big)-$$

$$(2a+b)\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(-2a^{3/2}+2\sqrt{a+b}\,a-2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(\frac{2c-d+e}{2c},2;\frac{4c-d+e}{2c};\right.\right.$$
$$\left.-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1$$
$$\left.\left.\left.\left.\left(\frac{2c-d+e}{2c},2;\frac{4c-d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right)+\frac{1}{2c+d+e}$$
$$\left(e^{i(2c+d+e)z}\left(-(2a+b)\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\right.\right.$$
$$(2a+b)\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(-2a^{3/2}+2\sqrt{a+b}\,a-2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(\frac{2c+d+e}{2c},2;\frac{4c+d+e}{2c};\right.\right.$$
$$\left.-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1$$
$$\left.\left.\left.\left.\left(\frac{2c+d+e}{2c},2;\frac{4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right)-\frac{1}{-2c+d+e}\left(e^{i(2c-d-e)z}\right.$$
$$\left(-(2a+b)\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\right.$$
$$(2a+b)\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(-2a^{3/2}+2\sqrt{a+b}\,a-2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(-\frac{-2c+d+e}{2c},2;-\frac{-4c+d+e}{2c};\right.\right.$$
$$\left.-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1$$
$$\left.\left.\left.\left.\left.\left.\left(-\frac{-2c+d+e}{2c},2;-\frac{-4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right)\right)\right)$$

Involving algebraic functions of the direct function

Involving $(a+b\cos(c\,z))^{\beta}$

01.07.21.1279.01

$$\int (a+b\cos(c\,z))^{\beta}\,dz = -\frac{1}{b\,c\,(\beta+1)} \left(F_1\left(\beta+1;\frac{1}{2},\frac{1}{2};\beta+2;\frac{a+b\cos(c\,z)}{a-b},\frac{a+b\cos(c\,z)}{a+b}\right)\sqrt{\frac{b\,(\cos(c\,z)+1)}{b-a}}\,\sqrt{\frac{b-b\cos(c\,z)}{a+b}}\,(a+b\cos(c\,z))^{\beta+1}\csc(c\,z)\right)$$

01.07.21.1280.01

$$\int (a+a\cos(c\,z))^{\beta}\,dz = -\frac{(a\,(\cos(c\,z)+1))^{\beta}\sin(c\,z)}{(2\,\beta\,c+c)\sqrt{\sin^2\left(\frac{c\,z}{2}\right)}}\,{}_2F_1\left(\beta+\frac{1}{2},\frac{1}{2};\beta+\frac{3}{2};\cos^2\left(\frac{c\,z}{2}\right)\right)$$

01.07.21.1281.01

$$\int (a-a\cos(c\,z))^{\beta}\,dz = -\frac{(a-a\cos(c\,z))^{\beta}\sin^2\left(\frac{c\,z}{2}\right)^{-\beta-\frac{1}{2}}\sin(c\,z)}{c}\,{}_2F_1\left(\frac{1}{2},\frac{1}{2}-\beta;\frac{3}{2};\cos^2\left(\frac{c\,z}{2}\right)\right)$$

01.07.21.1282.01

$$\int (a+b\cos(c\,z))^{5/2}\,dz = \frac{1}{30\,c\sqrt{a+b\cos(c\,z)}}\left(4\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\left(23\,a^3+23\,b\,a^2+9\,b^2\,a+9\,b^3\right)E\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)-32\,a\left(a^2-b^2\right)\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,F\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)+2\,b\left(22\,a^2+28\,b\cos(c\,z)\,a+3\,b^2+3\,b^2\cos(2\,c\,z)\right)\sin(c\,z)\right)$$

01.07.21.1283.01

$$\int (a+b\cos(c\,z))^{3/2}\,dz = \frac{1}{3\,c\sqrt{a+b\cos(c\,z)}}\left(8\,a\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,(a+b)\,E\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)-2\left(a^2-b^2\right)\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,F\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)+2\,b\,(a+b\cos(c\,z))\sin(c\,z)\right)$$

01.07.21.1284.01

$$\int \sqrt{a+b\cos(c\,z)}\,dz = \frac{2\sqrt{a+b\cos(c\,z)}\,E\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)}{c\sqrt{\frac{a+b\cos(c\,z)}{a+b}}}$$

01.07.21.1285.01

$$\int \sqrt{a+\cos(c\,z)\,a}\,dz = \frac{2\sqrt{a\,(\cos(c\,z)+1)}\,\tan\left(\frac{c\,z}{2}\right)}{c}$$

01.07.21.1286.01

$$\int \sqrt{a-a\cos(c\,z)}\,dz = -\frac{2\sqrt{a-a\cos(c\,z)}\,\cot\left(\frac{c\,z}{2}\right)}{c}$$

01.07.21.1287.01

$$\int \frac{1}{\sqrt{a+b\cos(c z)}}\,dz = \frac{2}{c\sqrt{a+b\cos(c z)}}\sqrt{\frac{a+b\cos(c z)}{a+b}}\;F\!\left(\frac{c z}{2}\,\middle|\,\frac{2b}{a+b}\right)$$

01.07.21.1288.01

$$\int \frac{1}{\sqrt{a+a\cos(c z)}}\,dz = \frac{2\cos\left(\frac{c z}{2}\right)\left(\log\left(\cos\left(\frac{c z}{4}\right)+\sin\left(\frac{c z}{4}\right)\right)-\log\left(\cos\left(\frac{c z}{4}\right)-\sin\left(\frac{c z}{4}\right)\right)\right)}{c\sqrt{a\,(\cos(c z)+1)}}$$

01.07.21.1289.01

$$\int \frac{1}{\sqrt{a-a\cos(c z)}}\,dz = \frac{2\left(\log\left(\sin\left(\frac{c z}{4}\right)\right)-\log\left(\cos\left(\frac{c z}{4}\right)\right)\right)\sin\left(\frac{c z}{2}\right)}{c\sqrt{a-a\cos(c z)}}$$

01.07.21.1290.01

$$\int \frac{1}{(a+b\cos(c z))^{3/2}}\,dz = \frac{2}{(a-b)\,(a+b)\,c\sqrt{a+b\cos(c z)}}\left((a+b)\sqrt{\frac{a+b\cos(c z)}{a+b}}\;E\!\left(\frac{c z}{2}\,\middle|\,\frac{2b}{a+b}\right)-b\sin(c z)\right)$$

01.07.21.1291.01

$$\int \frac{1}{(a+a\cos(c z))^{3/2}}\,dz = \frac{\left(\log\left(\cos\left(\frac{c z}{4}\right)+\sin\left(\frac{c z}{4}\right)\right)-\log\left(\cos\left(\frac{c z}{4}\right)-\sin\left(\frac{c z}{4}\right)\right)\right)\cos^3\left(\frac{c z}{2}\right)+\frac{1}{2}\sin(c z)}{c\,(a\,(\cos(c z)+1))^{3/2}}$$

01.07.21.1292.01

$$\int \frac{1}{(a-a\cos(c z))^{3/2}}\,dz = \frac{\sin\left(\frac{c z}{2}\right)\left(\left(\log\left(\cos\left(\frac{c z}{4}\right)\right)-\log\left(\sin\left(\frac{c z}{4}\right)\right)\right)\sin^2\left(\frac{c z}{2}\right)+\cos\left(\frac{c z}{2}\right)\right)}{a\,c\,(\cos(c z)-1)\sqrt{a-a\cos(c z)}}$$

01.07.21.1293.01

$$\int \frac{1}{(a+b\cos(c z))^{5/2}}\,dz = \left(2\left(4\,a\,(a+b)^2\,E\!\left(\frac{c z}{2}\,\middle|\,\frac{2b}{a+b}\right)\left(\frac{a+b\cos(c z)}{a+b}\right)^{3/2}-(a-b)\,(a+b)^2\,F\!\left(\frac{c z}{2}\,\middle|\,\frac{2b}{a+b}\right)\left(\frac{a+b\cos(c z)}{a+b}\right)^{3/2}+b\left(-5a^2-4\,b\cos(c z)\,a+b^2\right)\sin(c z)\right)\right)\Big/\left(3\,(a-b)^2\,(a+b)^2\,c\,(a+b\cos(c z))^{3/2}\right)$$

Involving $((a+b\cos(c z))^{\nu})^{\beta}$

01.07.21.1294.01

$$\int ((a+b\cos(c z))^{\nu})^{\beta}\,dz = -\frac{(a+b\cos(c z))\left((a+b\cos(c z))^{\nu}\right)^{\beta}\csc(c z)}{b\,c\,(\beta\nu+1)}\sqrt{\frac{b\,(\cos(c z)+1)}{b-a}}\sqrt{\frac{b-b\cos(c z)}{a+b}}\;F_1\!\left(\beta\nu+1;\,\frac{1}{2},\,\frac{1}{2};\,\beta\nu+2;\,\frac{a+b\cos(c z)}{a+b},\,\frac{a+b\cos(c z)}{a-b}\right)$$

01.07.21.1295.01

$$\int \sqrt{(a+b\cos(c z))^5}\, dz = \frac{1}{30\, c\, (a+b\cos(c z))^3}\left(\sqrt{(a+b\cos(c z))^5}\left(4\sqrt{\frac{a+b\cos(c z)}{a+b}}\left(23 a^3+23 b a^2+9 b^2 a+9 b^3\right) E\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)-32 a\left(a^2-b^2\right)\sqrt{\frac{a+b\cos(c z)}{a+b}}\, F\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)+2 b\left(22 a^2+28 b\cos(c z)\, a+3 b^2+3 b^2\cos(2 c z)\right)\sin(c z)\right)\right)$$

01.07.21.1296.01

$$\int \sqrt{(a+b\cos(c z))^3}\, dz = \frac{1}{3\, c\, (a+b\cos(c z))^2}\left(\sqrt{(a+b\cos(c z))^3}\left(8 a\sqrt{\frac{a+b\cos(c z)}{a+b}}\,(a+b)\, E\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)-2\left(a^2-b^2\right)\sqrt{\frac{a+b\cos(c z)}{a+b}}\, F\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)+2 b\,(a+b\cos(c z))\sin(c z)\right)\right)$$

01.07.21.1297.01

$$\int \frac{1}{\sqrt{(a+b\cos(c z))^3}}\, dz = \frac{2\,(a+b\cos(c z))}{(a-b)\,(a+b)\, c\sqrt{(a+b\cos(c z))^3}}\left((a+b)\sqrt{\frac{a+b\cos(c z)}{a+b}}\, E\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)-b\sin(c z)\right)$$

01.07.21.1298.01

$$\int \frac{1}{\sqrt{(a+b\cos(c z))^5}}\, dz = \frac{1}{3\, c\sqrt{(a+b\cos(c z))^5}}\left(\frac{2\,(a+b)\left(\frac{a+b\cos(c z)}{a+b}\right)^{5/2}\left(4 a\, E\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)+(b-a)\, F\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)\right)}{(a-b)^2}+\frac{2 b\,(a+b\cos(c z))\left(-5 a^2-4 b\cos(c z)\, a+b^2\right)\sin(c z)}{\left(a^2-b^2\right)^2}\right)$$

Involving $(a+b\cos(c z))^\beta \cos(c z)$

01.07.21.1299.01

$$\int (a+b\cos(c z))^\beta \cos(d z)\, dz = -\frac{1}{2\,(d-c\beta)\,(d+c\beta)}\left(i\, e^{-i d z}\left(\frac{e^{i c z}\, b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(\frac{e^{i c z}\, b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2}\, b\, e^{-i c z}\left(1+e^{2 i c z}\right)\right)^\beta\left((c\beta-d)\, F_1\left(-\frac{d+c\beta}{c}; -\beta, -\beta; -\frac{d}{c}-\beta+1; -\frac{b\, e^{i c z}}{a+\sqrt{a^2-b^2}}, \frac{b\, e^{i c z}}{\sqrt{a^2-b^2}-a}\right)+e^{2 i d z}\,(d+c\beta)\, F_1\left(\frac{d}{c}-\beta; -\beta, -\beta; \frac{d}{c}-\beta+1; -\frac{b\, e^{i c z}}{a+\sqrt{a^2-b^2}}, \frac{b\, e^{i c z}}{\sqrt{a^2-b^2}-a}\right)\right)\right)$$

01.07.21.1300.01

$$\int (a+b\cos(c\,z))^{\beta}\cos(c\,z)\,dz = -\frac{1}{b^2\,c\,(\beta+1)\,(\beta+2)} \left(\sqrt{2}\,\sqrt{\frac{b\cos^2\left(\frac{c\,z}{2}\right)}{b-a}}\,\sqrt{\frac{b-b\cos(c\,z)}{a+b}}\,(a+b\cos(c\,z))^{\beta+1}\left((\beta+1)\,F_1\left(\beta+2;\frac{1}{2},\frac{1}{2};\beta+3;\frac{a+b\cos(c\,z)}{a-b},\frac{a+b\cos(c\,z)}{a+b}\right)(a+b\cos(c\,z))-a\,(\beta+2)\,F_1\left(\beta+1;\frac{1}{2},\frac{1}{2};\beta+2;\frac{a+b\cos(c\,z)}{a-b},\frac{a+b\cos(c\,z)}{a+b}\right)\right)\csc(c\,z)\right)$$

01.07.21.1301.01

$$\int (a+a\cos(c\,z))^{\beta}\cos(c\,z)\,dz = \frac{1}{c\,(\beta-1)\,(\beta+1)}\left(i\,2^{-2\beta-1}\,e^{-i\,c\,z}\left(1+e^{i\,c\,z}\right)^{-2\beta}\left(e^{-\frac{1}{2}i\,c\,z}\left(1+e^{i\,c\,z}\right)\right)^{2\beta}\cos^{-2\beta}\left(\frac{c\,z}{2}\right)(a\,(\cos(c\,z)+1))^{\beta}\left((\beta-1)\,{}_2F_1\left(-\beta-1,-2\beta;-\beta;-e^{i\,c\,z}\right)+e^{2\,i\,c\,z}\,(\beta+1)\,{}_2F_1\left(1-\beta,-2\beta;2-\beta;-e^{i\,c\,z}\right)\right)\right)$$

01.07.21.1302.01

$$\int (a-a\cos(c\,z))^{\beta}\cos(c\,z)\,dz = \frac{1}{c\,(\beta-1)\,(\beta+1)}\left(i\,2^{-2\beta-1}\,e^{-i\,c\,z}\left(1-e^{i\,c\,z}\right)^{-2\beta}\left(-i\,e^{-\frac{1}{2}i\,c\,z}\left(-1+e^{i\,c\,z}\right)\right)^{2\beta}(a-a\cos(c\,z))^{\beta}\left((\beta-1)\,{}_2F_1\left(-\beta-1,-2\beta;-\beta;e^{i\,c\,z}\right)+e^{2\,i\,c\,z}\,(\beta+1)\,{}_2F_1\left(1-\beta,-2\beta;2-\beta;e^{i\,c\,z}\right)\right)\sin^{-2\beta}\left(\frac{c\,z}{2}\right)\right)$$

01.07.21.1303.01

$$\int \sqrt{a+b\cos(c\,z)}\,\cos(c\,z)\,dz = \frac{1}{3\,b\,c\,\sqrt{a+b\cos(c\,z)}}\left(2\,a\,\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,(a+b)\,E\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)-2\left(a^2-b^2\right)\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,F\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)+2\,b\,(a+b\cos(c\,z))\sin(c\,z)\right)$$

01.07.21.1304.01

$$\int \sqrt{a+a\cos(c\,z)}\,\cos(c\,z)\,dz = \frac{\sqrt{a\,(\cos(c\,z)+1)}\,\sec\left(\frac{c\,z}{2}\right)\left(3\sin\left(\frac{c\,z}{2}\right)+\sin\left(\frac{3\,c\,z}{2}\right)\right)}{3\,c}$$

01.07.21.1305.01

$$\int \sqrt{a-a\cos(c\,z)}\,\cos(c\,z)\,dz = -\frac{\sqrt{a-a\cos(c\,z)}\left(\cos\left(\frac{3\,c\,z}{2}\right)-3\cos\left(\frac{c\,z}{2}\right)\right)\csc\left(\frac{c\,z}{2}\right)}{3\,c}$$

01.07.21.1306.01

$$\int \frac{\cos(c\,z)}{\sqrt{a+b\cos(c\,z)}}\,dz = \frac{2}{b\,c\,\sqrt{a+b\cos(c\,z)}}\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\left((a+b)\,E\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)-a\,F\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)\right)$$

01.07.21.1307.01

$$\int \frac{\cos(c\,z)}{\sqrt{a+a\cos(c\,z)}}\,dz = \frac{2\cos\left(\frac{c\,z}{2}\right)\left(\log\left(\cos\left(\frac{c\,z}{4}\right)-\sin\left(\frac{c\,z}{4}\right)\right)-\log\left(\cos\left(\frac{c\,z}{4}\right)+\sin\left(\frac{c\,z}{4}\right)\right)+2\sin\left(\frac{c\,z}{2}\right)\right)}{c\,\sqrt{a\,(\cos(c\,z)+1)}}$$

01.07.21.1308.01

$$\int \frac{\cos(c\,z)}{\sqrt{a-a\cos(c\,z)}}\,dz = \frac{2\left(2\cos\left(\frac{c\,z}{2}\right)-\log\left(\cos\left(\frac{c\,z}{4}\right)\right)+\log\left(\sin\left(\frac{c\,z}{4}\right)\right)\right)\sin\left(\frac{c\,z}{2}\right)}{c\sqrt{a-a\cos(c\,z)}}$$

01.07.21.1309.01

$$\int \frac{\cos(c\,z)}{(a+b\cos(c\,z))^{3/2}}\,dz = -\left(2\left(a\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,(a+b)\,E\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)-\left(a^2-b^2\right)\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,F\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)-a\,b\sin(c\,z)\right)\right)\Big/\left((a-b)\,b\,(a+b)\,c\sqrt{a+b\cos(c\,z)}\right)$$

01.07.21.1310.01

$$\int \frac{\cos(c\,z)}{(a+b\cos(c\,z))^{5/2}}\,dz = \frac{2}{3\,c\,(a+b\cos(c\,z))^{3/2}}\left(\frac{\left(2\,a\left(a^2+b^2\right)+b\left(a^2+3\,b^2\right)\cos(c\,z)\right)\sin(c\,z)}{\left(a^2-b^2\right)^2}-\frac{\left(\frac{a+b\cos(c\,z)}{a+b}\right)^{3/2}\left(\left(a^2+3\,b^2\right)E\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)+a\,(b-a)\,F\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)\right)}{(a-b)^2\,b}\right)$$

Involving $((a+b\cos(c\,z))^{\nu})^{\beta}\cos(d\,z)$

01.07.21.1311.01

$$\int \left((a+b\cos(c\,z))^{\nu}\right)^{\beta}\cos(d\,z)\,dz = -\frac{1}{2\,(d-c\,\beta\,\nu)\,(d+c\,\beta\,\nu)}\left(i\,e^{-i\,d\,z}\left(\frac{e^{i\,c\,z}\,b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta\,\nu}\left(\frac{e^{i\,c\,z}\,b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta\,\nu}\left(a+\frac{1}{2}\,b\,e^{-i\,c\,z}\left(1+e^{2\,i\,c\,z}\right)\right)^{\beta\,\nu}\right.$$
$$\left(\left(c\,\beta\,\nu-d\right)F_1\left(-\frac{d+c\,\beta\,\nu}{c};-\beta\,\nu,-\beta\,\nu;-\frac{d}{c}-\beta\,\nu+1;-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+e^{2\,i\,d\,z}\,(d+c\,\beta\,\nu)\right.$$
$$\left.\left.F_1\left(\frac{d}{c}-\beta\,\nu;-\beta\,\nu,-\beta\,\nu;\frac{d}{c}-\beta\,\nu+1;-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)\right)(a+b\cos(c\,z))^{-\beta\,\nu}\left((a+b\cos(c\,z))^{\nu}\right)^{\beta}\right)$$

01.07.21.1312.01

$$\int \sqrt{(a+b\cos(c z))^5}\,\cos(c z)\,dz = \frac{1}{84\,b\,c\,(a+b\cos(c z))^3}\left(\sqrt{(a+b\cos(c z))^5}\left(8\,a\sqrt{\frac{a+b\cos(c z)}{a+b}}\left(3\,a^3+3\,b\,a^2+29\,b^2\,a+29\,b^3\right)E\!\left(\frac{c z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)- 8\left(3\,a^4+2\,b^2\,a^2-5\,b^4\right)\sqrt{\frac{a+b\cos(c z)}{a+b}}\,F\!\left(\frac{c z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)+ 2\,b\left(36\,a^3+44\,b^2\,a+24\,b^2\cos(2\,c z)\,a+b\left(72\,a^2+29\,b^2\right)\cos(c z)+3\,b^3\cos(3\,c z)\right)\sin(c z)\right)\right)$$

01.07.21.1313.01

$$\int \sqrt{(a+b\cos(c z))^3}\,\cos(c z)\,dz = \frac{1}{10\,b\,c\,(a+b\cos(c z))^2}\left(\sqrt{(a+b\cos(c z))^3}\left(4\sqrt{\frac{a+b\cos(c z)}{a+b}}\left(a^3+b\,a^2+3\,b^2\,a+3\,b^3\right)E\!\left(\frac{c z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)- 4\,a\left(a^2-b^2\right)\sqrt{\frac{a+b\cos(c z)}{a+b}}\,F\!\left(\frac{c z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)+2\,b\left(4\,a^2+6\,b\cos(c z)\,a+b^2+b^2\cos(2\,c z)\right)\sin(c z)\right)\right)$$

01.07.21.1314.01

$$\int \frac{\cos(c z)}{\sqrt{(a+b\cos(c z))^3}}\,dz = -\left(2\,(a+b\cos(c z))\left(a\sqrt{\frac{a+b\cos(c z)}{a+b}}\,(a+b)\,E\!\left(\frac{c z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)-\left(a^2-b^2\right)\sqrt{\frac{a+b\cos(c z)}{a+b}}\,F\!\left(\frac{c z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)-a\,b\sin(c z)\right)\right)\Big/ \left(b\left(a^2-b^2\right)c\sqrt{(a+b\cos(c z))^3}\right)$$

01.07.21.1315.01

$$\int \frac{\cos(c z)}{\sqrt{(a+a\cos(c z))^3}}\,dz = -\frac{\cos\left(\frac{c z}{2}\right)\left(3\left(\log\left(\cos\left(\frac{c z}{4}\right)-\sin\left(\frac{c z}{4}\right)\right)-\log\left(\cos\left(\frac{c z}{4}\right)+\sin\left(\frac{c z}{4}\right)\right)\right)\cos^2\left(\frac{c z}{2}\right)+\sin\left(\frac{c z}{2}\right)\right)}{c\sqrt{(\cos(c z)\,a+a)^3}}$$

01.07.21.1316.01

$$\int \frac{\cos(c z)}{\sqrt{(a-a\cos(c z))^3}}\,dz = -\frac{\sin\left(\frac{c z}{2}\right)\left(3\left(\log\left(\sin\left(\frac{c z}{4}\right)\right)-\log\left(\cos\left(\frac{c z}{4}\right)\right)\right)\sin^2\left(\frac{c z}{2}\right)+\cos\left(\frac{c z}{2}\right)\right)}{c\sqrt{(a-a\cos(c z))^3}}$$

01.07.21.1317.01

$$\int \frac{\cos(c z)}{\sqrt{(a+b\cos(c z))^5}}\,dz = \frac{1}{3 c \sqrt{(a+b\cos(c z))^5}} \left(\frac{2 (a+b\cos(c z)) \left(2 a \left(a^2+b^2\right)+b \left(a^2+3 b^2\right)\cos(c z)\right)\sin(c z)}{\left(a^2-b^2\right)^2} - \frac{2 (a+b) \left(\frac{a+b\cos(c z)}{a+b}\right)^{5/2} \left(\left(a^2+3 b^2\right) E\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)+a (b-a) F\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)\right)}{(a-b)^2 b} \right)$$

Involving $(a+b\cos(c z))^\beta \cos^\nu(c z)$

01.07.21.1318.01

$$\int \frac{\cos^2(c z)}{\sqrt{a+b\cos(c z)}}\,dz = \frac{1}{3 b^2 c \sqrt{a+b\cos(c z)}} \left(-4 a \sqrt{\frac{a+b\cos(c z)}{a+b}} (a+b) E\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right) + 2 \sqrt{\frac{a+b\cos(c z)}{a+b}} \left(2 a^2+b^2\right) F\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right) + 2 b (a+b\cos(c z))\sin(c z)\right)$$

01.07.21.1319.01

$$\int \frac{\cos^2(c z)}{\sqrt{a-a\cos(c z)}}\,dz = \frac{2\left(3\cos\left(\frac{c z}{2}\right)+\cos\left(\frac{3 c z}{2}\right)-3\log\left(\cos\left(\frac{c z}{4}\right)\right)+3\log\left(\sin\left(\frac{c z}{4}\right)\right)\right)\sin\left(\frac{c z}{2}\right)}{3 c \sqrt{a-a\cos(c z)}}$$

01.07.21.1320.01

$$\int \frac{\cos^{\frac{1}{2}}(c z)}{a+b\cos(c z)}\,dz = \frac{1}{b c}\left(2 F\left(\frac{c z}{2} \,\middle|\, 2\right) - \frac{2 a \,\Pi\left(\frac{2 b}{a+b}; \frac{c z}{2} \,\middle|\, 2\right)}{a+b}\right)$$

Involving $(a+b\cos(c z))^\beta$and rational function of $\cos(c z)$

01.07.21.1321.01

$$\int \frac{\sqrt{a+b\cos(c z)}}{d+e\cos(c z)}\,dz = \frac{2\sqrt{\frac{a+b\cos(c z)}{a+b}} \left(b (d+e) F\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)+(a e-b d)\,\Pi\left(\frac{2 e}{d+e}; \frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)\right)}{c e (d+e)\sqrt{a+b\cos(c z)}}$$

01.07.21.1322.01

$$\int \frac{\sqrt{a+b\cos(c z)}}{\cos(c z)+1}\,dz = \left(\cos\left(\frac{c z}{2}\right)\left(-2\sqrt{\frac{a+b\cos(c z)}{a+b}} (a+b)\cos\left(\frac{c z}{2}\right) E\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right) + 2\sqrt{\frac{a+b\cos(c z)}{a+b}} (a+b)\cos\left(\frac{c z}{2}\right) F\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right) + 2 (a+b\cos(c z))\sin\left(\frac{c z}{2}\right)\right)\right) \Big/ \left(c (\cos(c z)+1)\sqrt{a+b\cos(c z)}\right)$$

01.07.21.1323.01

$$\int \frac{\sqrt{a+b\cos(c z)}}{\cos(c z)-1}\,dz = \frac{1}{c\sqrt{a+b\cos(c z)}}\left((a+b\cos(c z))\cot\left(\frac{c z}{2}\right)+\sqrt{\frac{a+b\cos(c z)}{a+b}}\,(a+b)\,E\left(\frac{c z}{2}\,\middle|\,\frac{2b}{a+b}\right)-(a-b)\sqrt{\frac{a+b\cos(c z)}{a+b}}\,F\left(\frac{c z}{2}\,\middle|\,\frac{2b}{a+b}\right)\right)$$

01.07.21.1324.01

$$\int \frac{\sqrt{a+b\cos(c z)}}{(d+e\cos(c z))^2}\,dz = \frac{1}{b\,c\left(d^2-e^2\right)}\left(i\sqrt{-\frac{1}{a+b}}\left(a^2-b^2\right)\sqrt{\frac{b(\cos(c z)+1)}{b-a}}\sqrt{\frac{b-b\cos(c z)}{a+b}}\csc(c z)\,E\left(i\sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\sqrt{a+b\cos(c z)}\right)\,\middle|\,\frac{a+b}{a-b}\right)+\right.$$

$$\frac{i\sqrt{\frac{-\cos(c z)\,b-b}{a-b}}\sqrt{\frac{b-b\cos(c z)}{a+b}}\csc(c z)\,F\left(i\sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\sqrt{a+b\cos(c z)}\right)\,\middle|\,\frac{a+b}{a-b}\right)}{\sqrt{-\frac{1}{a+b}}\,c\,e\,(d+e)}+$$

$$\frac{\sqrt{\frac{a+b\cos(c z)}{a+b}}\,(4\,a\,d-b\,e)\,\Pi\left(\frac{2e}{d+e};\frac{c z}{2}\,\middle|\,\frac{2b}{a+b}\right)}{2\,c\,(d-e)\,(d+e)^2\sqrt{a+b\cos(c z)}}+$$

$$\left(i\,b\left(2\,d^2+e^2\right)\sqrt{\frac{b(\cos(c z)+1)}{b-a}}\sqrt{\frac{b-b\cos(c z)}{a+b}}\csc(c z)\,\Pi\left(\frac{(a+b)\,e}{a\,e-b\,d};i\sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\sqrt{a+b\cos(c z)}\right)\,\middle|\,\frac{a+b}{a-b}\right)\right)\Big/$$

$$\left(2\sqrt{-\frac{1}{a+b}}\,c\,e\,(b\,d-a\,e)\left(e^2-d^2\right)\right)-\frac{e\sqrt{a+b\cos(c z)}\,\sin(c z)}{c\,(d-e)\,(d+e)\,(d+e\cos(c z))}$$

01.07.21.1325.01

$$\int \frac{A+B\cos(c z)}{\sqrt{a+b\cos(c z)}}\,dz = \frac{2}{b\,c\sqrt{a+b\cos(c z)}}\sqrt{\frac{a+b\cos(c z)}{a+b}}\left((a+b)\,B\,E\left(\frac{c z}{2}\,\middle|\,\frac{2b}{a+b}\right)+(A\,b-a\,B)\,F\left(\frac{c z}{2}\,\middle|\,\frac{2b}{a+b}\right)\right)$$

01.07.21.1326.01

$$\int \frac{1}{(d+e\cos(c z))\sqrt{a+b\cos(c z)}}\,dz = \frac{2}{c\,(d+e)\sqrt{a+b\cos(c z)}}\sqrt{\frac{a+b\cos(c z)}{a+b}}\,\Pi\left(\frac{2e}{d+e};\frac{c z}{2}\,\middle|\,\frac{2b}{a+b}\right)$$

01.07.21.1327.01

$$\int \frac{1}{(\cos(c\,z)+1)\sqrt{a+b\cos(c\,z)}}\,dz = \left(\cos\left(\frac{c\,z}{2}\right)\left(-2\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,(a+b)\cos\left(\frac{c\,z}{2}\right)E\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)+2\,(a-b)\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,\cos\left(\frac{c\,z}{2}\right)F\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)+2\,(a+b\cos(c\,z))\sin\left(\frac{c\,z}{2}\right)\right)\right)\Big/\left((a-b)\,c\,(\cos(c\,z)+1)\sqrt{a+b\cos(c\,z)}\right)$$

01.07.21.1328.01

$$\int \frac{1}{(\cos(c\,z)-1)\sqrt{a+b\cos(c\,z)}}\,dz = \left((a+b\cos(c\,z))\cot\left(\frac{c\,z}{2}\right)+\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,(a+b)\,E\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)-(a+b)\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,F\left(\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)\right)\Big/\left((a+b)\,c\sqrt{a+b\cos(c\,z)}\right)$$

01.07.21.1329.01

$$\int \frac{1}{(d+e\cos(c\,z))^2\sqrt{a+b\cos(c\,z)}}\,dz = \frac{\sqrt{a+b\cos(c\,z)}\,\sin(c\,z)\,e^2}{c\,(d-e)\,(d+e)\,(b\,d-a\,e)\,(d+e\cos(c\,z))}+\frac{1}{b\,c\,(b\,d-a\,e)\left(d^2-e^2\right)}\left(i\sqrt{-\frac{1}{a+b}}\left(b^2-a^2\right)e\sqrt{\frac{b\,(\cos(c\,z)+1)}{b-a}}\sqrt{\frac{b-b\cos(c\,z)}{a+b}}\,\csc(c\,z)\,E\left(i\sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\sqrt{a+b\cos(c\,z)}\right)\middle|\,\frac{a+b}{a-b}\right)\right)+\frac{i\sqrt{\frac{b\,(\cos(c\,z)+1)}{b-a}}\sqrt{\frac{b-b\cos(c\,z)}{a+b}}\,\csc(c\,z)\,F\left(i\sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\sqrt{a+b\cos(c\,z)}\right)\middle|\,\frac{a+b}{a-b}\right)}{\sqrt{-\frac{1}{a+b}}\,c\,(d+e)\,(a\,e-b\,d)}+\frac{\left(-4\,b\,d^2+4\,a\,e\,d+3\,b\,e^2\right)\sqrt{\frac{a+b\cos(c\,z)}{a+b}}\,\Pi\left(\frac{2\,e}{d+e};\frac{c\,z}{2}\,\middle|\,\frac{2\,b}{a+b}\right)}{2\,c\,(d-e)\,(d+e)^2\,(a\,e-b\,d)\sqrt{a+b\cos(c\,z)}}+\left(i\,b\left(2\,d^2+e^2\right)\sqrt{\frac{b\,(\cos(c\,z)+1)}{b-a}}\sqrt{\frac{b-b\cos(c\,z)}{a+b}}\,\csc(c\,z)\,\Pi\left(\frac{(a+b)\,e}{a\,e-b\,d};i\sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\sqrt{a+b\cos(c\,z)}\right)\middle|\,\frac{a+b}{a-b}\right)\right)\Big/\left(2\sqrt{-\frac{1}{a+b}}\,c\,(b\,d-a\,e)^2\left(d^2-e^2\right)\right)$$

01.07.21.1330.01

$$\int \frac{1}{(\cos(c z)+1)^2 \sqrt{a+b\cos(c z)}} \, dz = \left(\cos\left(\frac{c z}{2}\right)\left(-4\sqrt{\frac{a+b\cos(c z)}{a+b}}\left(a^2-2 b a-3 b^2\right) E\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)\cos^3\left(\frac{c z}{2}\right)+4\sqrt{\frac{a+b\cos(c z)}{a+b}}\left(a^2-3 b a+2 b^2\right) F\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)\cos^3\left(\frac{c z}{2}\right)+\left(4 a^2-7 b a-3 b^2+2\left(a^2-b a-4 b^2\right)\cos(c z)+b(a-3 b)\cos(2 c z)\right)\sin\left(\frac{c z}{2}\right)\right)\right) \Big/ \left(3 (a-b)^2 c (\cos(c z)+1)^2 \sqrt{a+b\cos(c z)}\right)$$

01.07.21.1331.01

$$\int \frac{1}{(\cos(c z)-1)^2 \sqrt{a+b\cos(c z)}} \, dz = \left(\frac{1}{2}\left(-4 a^2-7 b a+3 b^2+2\left(a^2+b a-4 b^2\right)\cos(c z)+b(a+3 b)\cos(2 c z)\right)\cot\left(\frac{c z}{2}\right)\csc^2\left(\frac{c z}{2}\right)-2\left(a^2+4 b a+3 b^2\right)\sqrt{\frac{a+b\cos(c z)}{a+b}}\, E\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)+2\sqrt{\frac{a+b\cos(c z)}{a+b}}\left(a^2+3 b a+2 b^2\right) F\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)\right) \Big/ \left(6 (a+b)^2 c \sqrt{a+b\cos(c z)}\right)$$

01.07.21.1332.01

$$\int \frac{\cos(c z)}{(d+e\cos(c z))\sqrt{a+b\cos(c z)}} \, dz = -\frac{1}{b\sqrt{-\frac{1}{a+b}}\, c e (b d-a e)} \left(2 i \sqrt{\frac{b(\cos(c z)+1)}{b-a}}\sqrt{\frac{b-b\cos(c z)}{a+b}}\csc(c z)\left((a e-b d) F\left(i \sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\sqrt{a+b\cos(c z)}\right) \,\middle|\, \frac{a+b}{a-b}\right)+b d\, \Pi\left(\frac{(a+b) e}{a e-b d}; i \sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\sqrt{a+b\cos(c z)}\right) \,\middle|\, \frac{a+b}{a-b}\right)\right)\right)$$

01.07.21.1333.01

$$\int \frac{\cos(c z)+1}{(a+b\cos(c z))^{3/2}} \, dz = \frac{2\left(\sqrt{\frac{a+b\cos(c z)}{a+b}}\,(-(a+b)) E\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)+\sqrt{\frac{a+b\cos(c z)}{a+b}}\,(a+b) F\left(\frac{c z}{2} \,\middle|\, \frac{2 b}{a+b}\right)+b\sin(c z)\right)}{b(a+b) c\sqrt{a+b\cos(c z)}}$$

01.07.21.1334.01

$$\int \frac{\cos(c\,z)}{(d+e\cos(2\,c\,z))\sqrt{a+b\cos(2\,c\,z)}}\,dz = \frac{1}{\sqrt{2}\,c\sqrt{d+e}\,\sqrt{b\,d-a\,e}}\tan^{-1}\left(\frac{\sqrt{2\,b\,d-2\,a\,e}\,\sin(c\,z)}{\sqrt{d+e}\,\sqrt{a+b\cos(2\,c\,z)}}\right)$$

Involving $(a+b\cos(2\,c\,z))^{\beta}\cos(c\,z)$

01.07.21.1335.01

$$\int (a+b\cos(2\,c\,z))^{5/2}\cos(c\,z)\,dz = \frac{1}{32\,c}\left(\frac{5\sqrt{2}\,(a+b)^3}{\sqrt{b}}\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\right)+\frac{2}{3}\sqrt{a+b\cos(2\,c\,z)}\,\left(33\,a^2+40\,b\,a+19\,b^2+2\,b\,(13\,a+5\,b)\cos(2\,c\,z)+4\,b^2\cos(4\,c\,z)\right)\sin(c\,z)\right)$$

01.07.21.1336.01

$$\int (a+b\cos(2\,c\,z))^{3/2}\cos(c\,z)\,dz = \frac{1}{16\,c}\left(\frac{3\sqrt{2}\,(a+b)^2}{\sqrt{b}}\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\right)+2\sqrt{a+b\cos(2\,c\,z)}\,(5\,a+3\,b+2\,b\cos(2\,c\,z))\sin(c\,z)\right)$$

01.07.21.1337.01

$$\int \sqrt{a+b\cos(2\,c\,z)}\,\cos(c\,z)\,dz = \frac{\sqrt{2}\,(a+b)\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\right)+2\sqrt{b}\,\sqrt{a+b\cos(2\,c\,z)}\,\sin(c\,z)}{4\sqrt{b}\,c}$$

01.07.21.1338.01

$$\int \frac{\cos(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\,dz = \frac{\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\right)}{\sqrt{2}\,\sqrt{b}\,c}$$

01.07.21.1339.01

$$\int \frac{\cos(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = \frac{\sin(c\,z)}{(a+b)\,c\sqrt{a+b\cos(2\,c\,z)}}$$

01.07.21.1340.01

$$\int \frac{\cos(c\,z)}{(a+b\cos(2\,c\,z))^{5/2}}\,dz = \frac{(3\,a+b+2\,b\cos(2\,c\,z))\sin(c\,z)}{3\,(a+b)^2\,c\,(a+b\cos(2\,c\,z))^{3/2}}$$

Involving $((a+b\cos(2\,c\,z))^{m})^{\pm\frac{1}{2}}\cos(c\,z)$

01.07.21.1341.01

$$\int \sqrt{(a+b\cos(2cz))^5}\,\cos(cz)\,dz = \frac{1}{32c}\left(\sqrt{(a+b\cos(2cz))^5}\left(\frac{5\sqrt{2}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(cz)}{\sqrt{a+b\cos(2cz)}}\right)(a+b)^3}{\sqrt{b}\,(a+b\cos(2cz))^{5/2}} + \frac{2\left(33a^2+40ba+19b^2+2b(13a+5b)\cos(2cz)+4b^2\cos(4cz)\right)\sin(cz)}{3(a+b\cos(2cz))^2}\right)\right)$$

01.07.21.1342.01

$$\int \sqrt{(a+b\cos(2cz))^3}\,\cos(cz)\,dz = \left(\sqrt{(a+b\cos(2cz))^3}\left(3\sqrt{2}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(cz)}{\sqrt{a+b\cos(2cz)}}\right)(a+b)^2 + 2\sqrt{b}\sqrt{a+b\cos(2cz)}\,(5a+3b+2b\cos(2cz))\sin(cz)\right)\right)\Big/\left(16\sqrt{b}\,c\,(a+b\cos(2cz))^{3/2}\right)$$

01.07.21.1343.01

$$\int \frac{\cos(cz)}{\sqrt{(a+b\cos(2cz))^3}}\,dz = \frac{(a+b\cos(2cz))\sin(cz)}{(a+b)\,c\sqrt{(a+b\cos(2cz))^3}}$$

01.07.21.1344.01

$$\int \frac{\cos(cz)}{\sqrt{(a+b\cos(2cz))^5}}\,dz = \frac{(a+b\cos(2cz))(3a+b+2b\cos(2cz))\sin(cz)}{3(a+b)^2\,c\sqrt{(a+b\cos(2cz))^5}}$$

Involving $(a+b\cos(2cz))^\beta \cos^\nu(cz)$

01.07.21.1345.01

$$\int (a+b\cos(2cz))^{3/2}\cos^2(cz)\,dz = \frac{1}{60bc\sqrt{a+b\cos(2cz)}}\left(2\sqrt{\frac{a+b\cos(2cz)}{a+b}}\left(3a^3+23ba^2+29b^2a+9b^3\right)E\left(cz\,\middle|\,\frac{2b}{a+b}\right) - 2\left(3a^3+5ba^2-3b^2a-5b^3\right)\sqrt{\frac{a+b\cos(2cz)}{a+b}}\,F\left(cz\,\middle|\,\frac{2b}{a+b}\right) + b\left(12a^2+10ba+3b^2+2b(9a+5b)\cos(2cz)+3b^2\cos(4cz)\right)\sin(2cz)\right)$$

01.07.21.1346.01

$$\int (a+b\cos(2cz))^{3/2}\cos^3(cz)\,dz = \frac{1}{64c}\left(\frac{\sqrt{2}\,(11b-a)\,(a+b)^2}{b^{3/2}}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(cz)}{\sqrt{a+b\cos(2cz)}}\right) + \frac{1}{3b}\left(2\sqrt{a+b\cos(2cz)}\left(3a^2+52ba+37b^2+2b(7a+11b)\cos(2cz)+4b^2\cos(4cz)\right)\sin(cz)\right)\right)$$

01.07.21.1347.01

$$\int (a+b\cos(2cz))^{3/2}\cos^4(cz)\,dz = \left(-8\sqrt{\frac{a+b\cos(2cz)}{a+b}}\left(a^4-6ba^3-44b^2a^2-58b^3a-21b^4\right)E\left(cz\,\middle|\,\frac{2b}{a+b}\right)+ 8\sqrt{\frac{a+b\cos(2cz)}{a+b}}\left(a^4-7ba^3-11b^2a^2+7b^3a+10b^4\right)F\left(cz\,\middle|\,\frac{2b}{a+b}\right)+ b\left(4a^3+112ba^2+106b^2a+28b^3+b\left(36a^2+168ba+95b^2\right)\cos(2cz)+2b^2(13a+14b)\cos(4cz)+5b^3\cos(6cz)\right)\sin(2cz)\right)\Big/\left(560b^2c\sqrt{a+b\cos(2cz)}\right)$$

01.07.21.1348.01

$$\int \sqrt{a+b\cos(2cz)}\,\cos^2(cz)\,dz = \frac{1}{6bc\sqrt{a+b\cos(2cz)}}\left(\sqrt{\frac{a+b\cos(2cz)}{a+b}}\left(a^2+4ba+3b^2\right)E\left(cz\,\middle|\,\frac{2b}{a+b}\right)- \left(a^2-b^2\right)\sqrt{\frac{a+b\cos(2cz)}{a+b}}\,F\left(cz\,\middle|\,\frac{2b}{a+b}\right)+b(a+b\cos(2cz))\sin(2cz)\right)$$

01.07.21.1349.01

$$\int \sqrt{a+b\cos(2cz)}\,\cos^3(cz)\,dz = \frac{1}{32b^{3/2}c}\left(2\sqrt{b}\sqrt{a+b\cos(2cz)}\,(a+7b+2b\cos(2cz))\sin(cz)-\sqrt{2}\left(a^2-6ba-7b^2\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(cz)}{\sqrt{a+b\cos(2cz)}}\right)\right)$$

01.07.21.1350.01

$$\int \sqrt{a+b\cos(2cz)}\,\cos^4(cz)\,dz = \left(-8\sqrt{\frac{a+b\cos(2cz)}{a+b}}\left(a^3-4ba^2-17b^2a-12b^3\right)E\left(cz\,\middle|\,\frac{2b}{a+b}\right)+ 8\sqrt{\frac{a+b\cos(2cz)}{a+b}}\left(a^3-5ba^2-b^2a+5b^3\right)F\left(cz\,\middle|\,\frac{2b}{a+b}\right)+ 2b\left(2a^2+20ba+3b^2+4b(2a+5b)\cos(2cz)+3b^2\cos(4cz)\right)\sin(2cz)\right)\Big/\left(240b^2c\sqrt{a+b\cos(2cz)}\right)$$

01.07.21.1351.01

$$\int \frac{\cos^2(cz)}{\sqrt{a+b\cos(2cz)}}\,dz = \frac{\sqrt{\frac{a+b\cos(2cz)}{a+b}}\left((a+b)E\left(cz\,\middle|\,\frac{2b}{a+b}\right)+(b-a)F\left(cz\,\middle|\,\frac{2b}{a+b}\right)\right)}{2bc\sqrt{a+b\cos(2cz)}}$$

01.07.21.1352.01

$$\int \frac{\cos^3(cz)}{\sqrt{a+b\cos(2cz)}}\,dz = \frac{2\sqrt{b}\sqrt{a+b\cos(2cz)}\,\sin(cz)-\sqrt{2}\,(a-3b)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(cz)}{\sqrt{a+b\cos(2cz)}}\right)}{8b^{3/2}c}$$

01.07.21.1353.01

$$\int \frac{\cos^4(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\,dz = \frac{1}{12\,b^2\,c\,\sqrt{a+b\cos(2\,c\,z)}}\left(-2\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,\left(a^2-2\,b\,a-3\,b^2\right)E\!\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)+2\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,\left(a^2-3\,b\,a+2\,b^2\right)F\!\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)+b\,(a+b\cos(2\,c\,z))\sin(2\,c\,z)\right)$$

01.07.21.1354.01

$$\int \frac{\cos^2(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = \frac{\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,(-(a+b))\,E\!\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)+\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,(a+b)\,F\!\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)+b\sin(2\,c\,z)}{2\,b\,(a+b)\,c\,\sqrt{a+b\cos(2\,c\,z)}}$$

01.07.21.1355.01

$$\int \frac{\cos^3(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = \frac{\sqrt{2}\,\tan^{-1}\!\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\right)+\frac{2\,\sqrt{b}\,(b-a)\sin(c\,z)}{(a+b)\,\sqrt{a+b\cos(2\,c\,z)}}}{4\,b^{3/2}\,c}$$

01.07.21.1356.01

$$\int \frac{\cos^4(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = \left(2\,a\,(a+b)\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,E\!\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)-(a-b)\left(2\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,(a+b)\,F\!\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)+b\sin(2\,c\,z)\right)\right)\Big/\left(4\,b^2\,(a+b)\,c\,\sqrt{a+b\cos(2\,c\,z)}\right)$$

Involving $\cos(e\,z)\cos(d\,z)\,(a+b\cos(c\,z))^{\beta}$

01.07.21.1357.01

$$\int \cos(e\,z)\cos(d\,z)\,(a+b\cos(c\,z))^{\beta}\,dz = -\frac{1}{4}\,i\left(\frac{e^{i\,c\,z}\,b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(\frac{e^{i\,c\,z}\,b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta}$$
$$\left(a+\frac{1}{2}\,b\,e^{-i\,c\,z}\left(1+e^{2\,i\,c\,z}\right)\right)^{\beta}\left(\frac{e^{i\,(d-e)\,z}\,F_1\!\left(\frac{d-e-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c+d-e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)}{d-e-c\,\beta}+\right.$$
$$\frac{e^{i\,(d+e)\,z}\,F_1\!\left(\frac{d+e-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c+d+e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)}{d+e-c\,\beta}-$$
$$\frac{e^{-i\,(d-e)\,z}\,F_1\!\left(-\frac{d-e+c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c-d+e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)}{d-e+c\,\beta}-$$
$$\left.\frac{e^{-i\,(d+e)\,z}\,F_1\!\left(-\frac{d+e+c\,\beta}{c};-\beta,-\beta;-\frac{d+e+c\,(\beta-1)}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)}{d+e+c\,\beta}\right)$$

Involving $\left(a+b\cos^2(c\,z)\right)^{\beta}$

01.07.21.1358.01

$$\int \left(a+b\cos^2(c\,z)\right)^{\beta}\,dz ==$$
$$-\frac{1}{b\,c\,(\beta+1)}\left(2^{-\beta-1}\,F_1\!\left(\beta+1;\frac{1}{2},\frac{1}{2};\beta+2;\frac{2\,a+b+b\cos(2\,c\,z)}{2\,a},\frac{2\,a+b+b\cos(2\,c\,z)}{2\,(a+b)}\right)\sqrt{-\frac{b\cos^2(c\,z)}{a}}\right.$$
$$\left.(2\,a+b+b\cos(2\,c\,z))^{\beta+1}\csc(2\,c\,z)\sqrt{\frac{b\sin^2(c\,z)}{a+b}}\right)$$

01.07.21.1359.01

$$\int \left(a+b\cos^2(c z)\right)^{5/2} dz = \frac{1}{240 c \sqrt{2a+b+b\cos(2cz)}} \left(16 \sqrt{\frac{2a+b+b\cos(2cz)}{a+b}} \left(23a^3+46ba^2+31b^2a+8b^3\right) E\left(cz \middle| \frac{b}{a+b}\right) - 64a\left(2a^2+3ba+b^2\right)\sqrt{\frac{2a+b+b\cos(2cz)}{a+b}}\, F\left(cz \middle| \frac{b}{a+b}\right) + \sqrt{2}\, b\left(88a^2+88ba+25b^2+28b(2a+b)\cos(2cz)+3b^2\cos(4cz)\right)\sin(2cz)\right)$$

01.07.21.1360.01

$$\int \left(a+b\cos^2(c z)\right)^{3/2} dz = \frac{1}{12 c \sqrt{2a+b+b\cos(2cz)}} \left(8 \sqrt{\frac{2a+b+b\cos(2cz)}{a+b}} \left(2a^2+3ba+b^2\right) E\left(cz \middle| \frac{b}{a+b}\right) - 4a(a+b)\sqrt{\frac{2a+b+b\cos(2cz)}{a+b}}\, F\left(cz \middle| \frac{b}{a+b}\right) + \sqrt{2}\, b\,(2a+b+b\cos(2cz))\sin(2cz)\right)$$

01.07.21.1361.01

$$\int \sqrt{a+b\cos^2(cz)}\, dz = \frac{\sqrt{2a+b+b\cos(2cz)}\, E\left(cz \middle| \frac{b}{a+b}\right)}{c\sqrt{\frac{2a+b+b\cos(2cz)}{a+b}}}$$

01.07.21.1362.01

$$\int \frac{1}{\sqrt{a+b\cos^2(cz)}}\, dz = \frac{1}{c\sqrt{2a+b+b\cos(2cz)}} \sqrt{\frac{2a+b+b\cos(2cz)}{a+b}}\, F\left(cz \middle| \frac{b}{a+b}\right)$$

01.07.21.1363.01

$$\int \frac{1}{\left(a+b\cos^2(cz)\right)^{3/2}}\, dz = \frac{1}{2a(a+b)c\sqrt{2a+b+b\cos(2cz)}} \left(2(a+b)\sqrt{\frac{2a+b+b\cos(2cz)}{a+b}}\, E\left(cz \middle| \frac{b}{a+b}\right) - \sqrt{2}\, b\sin(2cz)\right)$$

01.07.21.1364.01

$$\int \frac{1}{\left(a+b\cos^2(c\,z)\right)^{5/2}}\,dz = \left(2\,(a+b)^2\,(2\,a+b)\,E\!\left(c\,z \,\middle|\, \frac{b}{a+b}\right)\left(\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}\right)^{3/2} - a\,(a+b)^2\,F\!\left(c\,z \,\middle|\, \frac{b}{a+b}\right)\left(\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}\right)^{3/2} - \sqrt{2}\,b\left(5\,a^2+5\,b\,a+b^2+b\,(2\,a+b)\cos(2\,c\,z)\right)\sin(2\,c\,z)\right) \Big/ \left(3\,a^2\,(a+b)^2\,c\,(2\,a+b+b\cos(2\,c\,z))^{3/2}\right)$$

Involving $\left(a+b\cos^2(c\,z)\right)^\beta\cos(d\,z)$

01.07.21.1365.01

$$\int \left(a+b\cos^2(c\,z)\right)^\beta\cos(d\,z)\,dz = -\frac{1}{\left(1+e^{2\,i\,d\,z}\right)\left(d^2-4\,c^2\,\beta^2\right)}\left(i\left(\frac{e^{2\,i\,c\,z}\,b}{2\,a+b-2\,\sqrt{a\,(a+b)}}+1\right)^{-\beta}\left(\frac{e^{2\,i\,c\,z}\,b}{2\,a+b+2\,\sqrt{a\,(a+b)}}+1\right)^{-\beta}\left(\frac{1}{4}\,b\,e^{-2\,i\,c\,z}\left(1+e^{2\,i\,c\,z}\right)^2+a\right)^\beta \left(e^{2\,i\,d\,z}\,(d+2\,c\,\beta)\,F_1\!\left(\frac{d}{2\,c}-\beta;-\beta,-\beta;\frac{d}{2\,c}-\beta+1;-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b+2\,\sqrt{a\,(a+b)}},-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b-2\,\sqrt{a\,(a+b)}}\right) - (d-2\,c\,\beta)\,F_1\!\left(-\frac{d+2\,c\,\beta}{2\,c};-\beta,-\beta;-\frac{d}{2\,c}-\beta+1;-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b+2\,\sqrt{a\,(a+b)}},-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b-2\,\sqrt{a\,(a+b)}}\right)\right)\cos(d\,z)\right)$$

01.07.21.1366.01

$$\int \left(a+b\cos^2(c\,z)\right)^\beta\cos(c\,z)\,dz = -\frac{\left(b\cos^2(c\,z)+a\right)^{\beta+1}\csc(c\,z)\,{}_2F_1\!\left(\beta+1,\frac{1}{2};\beta+2;\frac{b\cos^2(c\,z)+a}{a+b}\right)\sqrt{\frac{b\sin^2(c\,z)}{a+b}}}{2\,b\,c\,(\beta+1)}$$

01.07.21.1367.01

$$\int \left(a-a\cos^2(c\,z)\right)^\beta\cos(d\,z)\,dz = -\frac{1}{d^2-4\,c^2\,\beta^2}\left(i\,2^{-2\,\beta-1}\,e^{-i\,d\,z}\left(1-e^{2\,i\,c\,z}\right)^{-2\,\beta}\left(-i\,e^{-i\,c\,z}\left(-1+e^{2\,i\,c\,z}\right)\right)^{2\,\beta}\left(e^{2\,i\,d\,z}\,(d+2\,c\,\beta)\,{}_2F_1\!\left(\frac{d}{2\,c}-\beta,-2\,\beta;\frac{d}{2\,c}-\beta+1;e^{2\,i\,c\,z}\right) - (d-2\,c\,\beta)\,{}_2F_1\!\left(-\frac{d+2\,c\,\beta}{2\,c},-2\,\beta;-\frac{d}{2\,c}-\beta+1;e^{2\,i\,c\,z}\right)\right)\sin^{-2\,\beta}(c\,z)\left(a\sin^2(c\,z)\right)^\beta\right)$$

01.07.21.1368.01

$$\int \left(a+a\cos^2(c\,z)\right)^\beta\cos(c\,z)\,dz = -\frac{\left(a\left(\cos^2(c\,z)+1\right)\right)^{\beta+1}\csc(c\,z)\sqrt{\sin^2(c\,z)}}{2\,\sqrt{2}\,a\,c\,(\beta+1)}\,{}_2F_1\!\left(\beta+1,\frac{1}{2};\beta+2;\frac{1}{4}\,(\cos(2\,c\,z)+3)\right)$$

01.07.21.1369.01

$$\int \left(a-a\cos^2(c\,z)\right)^\beta\cos(c\,z)\,dz = \frac{\sin(c\,z)\left(a\sin^2(c\,z)\right)^\beta}{2\,\beta\,c+c}$$

01.07.21.1370.01

$$\int \left(a+b\cos^2(c\,z)\right)^{3/2}\cos(c\,z)\,dz = \frac{1}{32\sqrt{b}\,c}\left(12\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)(a+b)^2+2\sqrt{2}\sqrt{b}\sqrt{2\,a+b+b\cos(2\,c\,z)}\,(5\,a+4\,b+b\cos(2\,c\,z))\sin(c\,z)\right)$$

01.07.21.1371.01

$$\int \sqrt{a+b\cos^2(c\,z)}\cos(c\,z)\,dz = \frac{2\,(a+b)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)+\sqrt{2}\sqrt{b}\sqrt{2\,a+b+b\cos(2\,c\,z)}\sin(c\,z)}{4\sqrt{b}\,c}$$

01.07.21.1372.01

$$\int \sqrt{a+a\cos^2(c\,z)}\cos(c\,z)\,dz = \frac{\sqrt{a\left(\cos^2(c\,z)+1\right)}\left(2\sqrt{2}\tan^{-1}\left(\frac{\sqrt{2}\sin(c\,z)}{\sqrt{\cos(2\,c\,z)+3}}\right)+\sqrt{\cos(2\,c\,z)+3}\sin(c\,z)\right)}{2\,c\sqrt{\cos(2\,c\,z)+3}}$$

01.07.21.1373.01

$$\int \sqrt{a-a\cos^2(c\,z)}\cos(c\,z)\,dz = -\frac{\cos(c\,z)\cot(c\,z)\sqrt{a\sin^2(c\,z)}}{2\,c}$$

01.07.21.1374.01

$$\int \frac{\cos(c\,z)}{\sqrt{a+b\cos^2(c\,z)}}\,dz = \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)}{\sqrt{b}\,c}$$

01.07.21.1375.01

$$\int \frac{\cos(c\,z)}{\sqrt{a+a\cos^2(c\,z)}}\,dz = \frac{\tan^{-1}\left(\frac{\sqrt{2}\sin(c\,z)}{\sqrt{\cos(2\,c\,z)+3}}\right)\sqrt{\cos(2\,c\,z)+3}}{c\sqrt{a\,(\cos(2\,c\,z)+3)}}$$

01.07.21.1376.01

$$\int \frac{\cos(c\,z)}{\sqrt{a-a\cos^2(c\,z)}}\,dz = \frac{\log(\sin(c\,z))\sin(c\,z)}{c\sqrt{a\sin^2(c\,z)}}$$

01.07.21.1377.01

$$\int \frac{\cos(c\,z)}{\left(a+b\cos^2(c\,z)\right)^{3/2}}\,dz = \frac{\sqrt{2}\sin(c\,z)}{(a+b)\,c\sqrt{2\,a+b+b\cos(2\,c\,z)}}$$

01.07.21.1378.01

$$\int \frac{\cos(c\,z)}{\left(a+b\cos^2(c\,z)\right)^{5/2}}\,dz = \frac{2\sqrt{2}\,(3\,a+2\,b+b\cos(2\,c\,z))\sin(c\,z)}{3\,(a+b)^2\,c\,(2\,a+b+b\cos(2\,c\,z))^{3/2}}$$

01.07.21.1379.01

$$\int \frac{\cos(c\,z)}{\left(a+b\cos^2(c\,z)\right)^{7/2}}\,dz = \frac{4\sqrt{2}\left(15\,a^2+20\,b\,a+8\,b^2+2\,b\,(5\,a+3\,b)\cos(2\,c\,z)+b^2\cos(4\,c\,z)\right)\sin(c\,z)}{15\,(a+b)^3\,c\,(2\,a+b+b\cos(2\,c\,z))^{5/2}}$$

01.07.21.1380.01

$$\int \left(a+b\cos^2(c\,z)\right)^{\beta}\cos(2\,c\,z)\,dz = -\frac{1}{b^2\,c\,(\beta+1)\,(\beta+2)}\left(2^{-\beta-1}\sqrt{-\frac{b\cos^2(c\,z)}{a}}\;(2\,a+b+b\cos(2\,c\,z))^{\beta+1}\right.$$
$$\left((\beta+1)\,F_1\!\left(\beta+2;\frac{1}{2},\frac{1}{2};\beta+3;\frac{2\,a+b+b\cos(2\,c\,z)}{2\,a},\frac{2\,a+b+b\cos(2\,c\,z)}{2\,(a+b)}\right)(2\,a+b+b\cos(2\,c\,z))-\right.$$
$$\left.\left.(2\,a+b)\,(\beta+2)\,F_1\!\left(\beta+1;\frac{1}{2},\frac{1}{2};\beta+2;\frac{2\,a+b+b\cos(2\,c\,z)}{2\,a},\frac{2\,a+b+b\cos(2\,c\,z)}{2\,(a+b)}\right)\right)\csc(2\,c\,z)\sqrt{\frac{b\sin^2(c\,z)}{a+b}}\right)$$

Involving $\left(\left(a+b\cos^2(c\,z)\right)^{\nu}\right)^{\beta}$

01.07.21.1381.01

$$\int \left(\left(a+b\cos^2(c\,z)\right)^{\nu}\right)^{\beta}dz =$$
$$-\frac{1}{b\,c\,(\beta\,\nu+1)}\left(2^{-\beta\,\nu-1}\,F_1\!\left(\beta\,\nu+1;\frac{1}{2},\frac{1}{2};\beta\,\nu+2;\frac{2\,a+b+b\cos(2\,c\,z)}{2\,a},\frac{2\,a+b+b\cos(2\,c\,z)}{2\,(a+b)}\right)\sqrt{-\frac{b\cos^2(c\,z)}{a}}\right.$$
$$\left.\left(b\cos^2(c\,z)+a\right)^{-\beta\,\nu}\left(\left(b\cos^2(c\,z)+a\right)^{\nu}\right)^{\beta}(2\,a+b+b\cos(2\,c\,z))^{\beta\,\nu+1}\csc(2\,c\,z)\sqrt{\frac{b\sin^2(c\,z)}{a+b}}\right)$$

01.07.21.1382.01

$$\int \sqrt{\left(a+b\cos^2(c\,z)\right)^5}\;dz =$$
$$\left(\sqrt{(2\,a+b+b\cos(2\,c\,z))^5}\left(32\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\;\left(23\,a^3+46\,b\,a^2+31\,b^2\,a+8\,b^3\right)E\!\left(c\,z\,\middle|\,\frac{b}{a+b}\right)-\right.\right.$$
$$128\,a\left(2\,a^2+3\,b\,a+b^2\right)\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\;F\!\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+$$
$$\left.\left.2\sqrt{2}\;b\left(88\,a^2+88\,b\,a+25\,b^2+28\,b\,(2\,a+b)\cos(2\,c\,z)+3\,b^2\cos(4\,c\,z)\right)\sin(2\,c\,z)\right)\right)\Big/\left(480\,c\,(2\,a+b+b\cos(2\,c\,z))^3\right)$$

01.07.21.1383.01

$$\int \sqrt{\left(a+b\cos^2(c\,z)\right)^3}\,dz = \left(\sqrt{\left(b\cos^2(c\,z)+a\right)^3}\left(8\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\left(2\,a^2+3\,b\,a+b^2\right)E\!\left(c\,z\,\middle|\,\frac{b}{a+b}\right)-4\,a\,(a+b)\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\,F\!\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+\sqrt{2}\,b\,(2\,a+b+b\cos(2\,c\,z))\sin(2\,c\,z)\right)\right)\Big/\left(3\sqrt{2}\,c\,(2\,a+b+b\cos(2\,c\,z))^2\right)$$

01.07.21.1384.01

$$\int \frac{1}{\sqrt{\left(a+b\cos^2(c\,z)\right)^3}}\,dz = \frac{(2\,a+b+b\cos(2\,c\,z))\left(2\,(a+b)\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\,E\!\left(c\,z\,\middle|\,\frac{b}{a+b}\right)-\sqrt{2}\,b\sin(2\,c\,z)\right)}{2\,a\,(a+b)\,c\sqrt{(2\,a+b+b\cos(2\,c\,z))^3}}$$

01.07.21.1385.01

$$\int \frac{1}{\sqrt{\left(a+b\cos^2(c\,z)\right)^5}}\,dz = -\left(\left(b\cos^2(c\,z)+a\right)^{5/2}\left(-2\,(a+b)^2\,(2\,a+b)\,E\!\left(c\,z\,\middle|\,\frac{b}{a+b}\right)\left(\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}\right)^{3/2}+a\,(a+b)^2\,F\!\left(c\,z\,\middle|\,\frac{b}{a+b}\right)\left(\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}\right)^{3/2}+\sqrt{2}\,b\left(5\,a^2+5\,b\,a+b^2+b\,(2\,a+b)\cos(2\,c\,z)\right)\sin(2\,c\,z)\right)\right)\Big/\left(3\,a^2\,(a+b)^2\,c\sqrt{\left(b\cos^2(c\,z)+a\right)^5}\,(2\,a+b+b\cos(2\,c\,z))^{3/2}\right)$$

Involving $\left(\left(a+b\cos^2(c\;z)\right)^{\nu}\right)^{\beta}\cos(d\,z)$

01.07.21.1386.01

$$\int\left(\left(a+b\cos^2(c\,z)\right)^{\nu}\right)^{\beta}\cos(d\,z)\,dz = -\frac{1}{\left(1+e^{2\,i\,d\,z}\right)\left(d^2-4\,c^2\,\beta^2\,\nu^2\right)}$$
$$\left(i\,2^{\beta\,\nu}\left(\frac{e^{2\,i\,c\,z}\,b}{2\,a+b-2\,\sqrt{a\,(a+b)}}+1\right)^{-\beta\,\nu}\left(\frac{e^{2\,i\,c\,z}\,b}{2\,a+b+2\,\sqrt{a\,(a+b)}}+1\right)^{-\beta\,\nu}\left(\frac{1}{4}\,b\,e^{-2\,i\,c\,z}\left(1+e^{2\,i\,c\,z}\right)^2+a\right)^{\beta\,\nu}\right.$$
$$\left(e^{2\,i\,d\,z}\,(d+2\,c\,\beta\,\nu)\,F_1\!\left(\frac{d}{2\,c}-\beta\,\nu;\,-\beta\,\nu,\,-\beta\,\nu;\,\frac{d}{2\,c}-\beta\,\nu+1;\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b+2\,\sqrt{a\,(a+b)}},\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b-2\,\sqrt{a\,(a+b)}}\right)-\right.$$
$$\left.(d-2\,c\,\beta\,\nu)\,F_1\!\left(-\frac{d+2\,c\,\beta\,\nu}{2\,c};\,-\beta\,\nu,\,-\beta\,\nu;\,-\frac{d}{2\,c}-\beta\,\nu+1;\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b+2\,\sqrt{a\,(a+b)}},\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b-2\,\sqrt{a\,(a+b)}}\right)\right)$$
$$\left.(2\,a+b+b\cos(2\,c\,z))^{-\beta\,\nu}\left(2^{-\nu}\,(2\,a+b+b\cos(2\,c\,z))^{\nu}\right)^{\beta}\cos(d\,z)\right)$$

01.07.21.1387.01

$$\int\left(\left(a+b\cos^2(c\,z)\right)^{\nu}\right)^{\beta}\cos(c\,z)\,dz =$$
$$-\frac{1}{2\,b\,c\,(\beta\,\nu+1)}\left(\left(b\cos^2(c\,z)+a\right)\left(\left(b\cos^2(c\,z)+a\right)^{\nu}\right)^{\beta}\csc(c\,z)\,{}_2F_1\!\left(\beta\,\nu+1,\,\frac{1}{2};\,\beta\,\nu+2;\,\frac{b\cos^2(c\,z)+a}{a+b}\right)\sqrt{\frac{b\sin^2(c\,z)}{a+b}}\right)$$

01.07.21.1388.01

$$\int\sqrt{\left(a+b\cos^2(c\,z)\right)^5}\,\cos(c\,z)\,dz =$$
$$\frac{1}{16\,c\left(b\cos^2(c\,z)+a\right)^{5/2}}\left(\sqrt{\left(b\cos^2(c\,z)+a\right)^5}\left(\frac{5\,(a+b)^3}{\sqrt{b}}\tan^{-1}\!\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)+\right.\right.$$
$$\left.\left.\frac{1}{3\,\sqrt{2}}\left(\sqrt{2\,a+b+b\cos(2\,c\,z)}\,\left(33\,a^2+53\,b\,a+23\,b^2+b\,(13\,a+9\,b)\cos(2\,c\,z)+b^2\cos(4\,c\,z)\right)\sin(c\,z)\right)\right)\right)$$

01.07.21.1389.01

$$\int\sqrt{\left(a+b\cos^2(c\,z)\right)^3}\,\cos(c\,z)\,dz =$$
$$\left(\sqrt{\left(b\cos^2(c\,z)+a\right)^3}\left(6\tan^{-1}\!\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)(a+b)^2+\sqrt{2}\,\sqrt{b}\,\sqrt{2\,a+b+b\cos(2\,c\,z)}\right.\right.$$
$$\left.\left.(5\,a+4\,b+b\cos(2\,c\,z))\sin(c\,z)\right)\right)\Big/\left(16\,\sqrt{b}\,c\left(b\cos^2(c\,z)+a\right)^{3/2}\right)$$

01.07.21.1390.01

$$\int\frac{\cos(c\,z)}{\sqrt{\left(a+b\cos^2(c\,z)\right)^3}}\,dz = \frac{(2\,a+b+b\cos(2\,c\,z))\sin(c\,z)}{2\,(a+b)\,c\,\sqrt{\left(b\cos^2(c\,z)+a\right)^3}}$$

01.07.21.1391.01

$$\int \frac{\cos(c\,z)}{\sqrt{\left(a+b\cos^2(c\,z)\right)^5}}\,dz = \frac{(2\,a+b+b\cos(2\,c\,z))\,(3\,a+2\,b+b\cos(2\,c\,z))\sin(c\,z)}{6\,(a+b)^2\,c\,\sqrt{\left(b\cos^2(c\,z)+a\right)^5}}$$

01.07.21.1392.01

$$\int \left(\left(a+b\cos^2(c\,z)\right)^{\nu}\right)^{\beta}\cos(2\,c\,z)\,dz = -\frac{1}{b^2\,c\,(\beta\,\nu+1)\,(\beta\,\nu+2)}\left(2^{-\beta\,\nu-1}\sqrt{-\frac{b\cos^2(c\,z)}{a}}\,\left(b\cos^2(c\,z)+a\right)^{-\beta\,\nu}\left(\left(b\cos^2(c\,z)+a\right)^{\nu}\right)^{\beta}(2\,a+b+b\cos(2\,c\,z))^{\beta\,\nu+1}\right.$$
$$\left((\beta\,\nu+1)\,F_1\!\left(\beta\,\nu+2;\,\frac{1}{2},\,\frac{1}{2};\,\beta\,\nu+3;\,\frac{2\,a+b+b\cos(2\,c\,z)}{2\,a},\,\frac{2\,a+b+b\cos(2\,c\,z)}{2\,(a+b)}\right)(2\,a+b+b\cos(2\,c\,z))-\right.$$
$$\left.\left.(2\,a+b)\,(\beta\,\nu+2)\,F_1\!\left(\beta\,\nu+1;\,\frac{1}{2},\,\frac{1}{2};\,\beta\,\nu+2;\,\frac{2\,a+b+b\cos(2\,c\,z)}{2\,a},\,\frac{2\,a+b+b\cos(2\,c\,z)}{2\,(a+b)}\right)\right)\csc(2\,c\,z)\sqrt{\frac{b\sin^2(c\,z)}{a+b}}\right)$$

Involving $\left(a+b\cos^2(c\,z)\right)^{\beta}\cos^{\nu}(c\,z)$

01.07.21.1393.01

$$\int \left(a+b\cos^2(c\,z)\right)^{\beta}\cos^{\nu}(c\,z)\,dz = \frac{1}{c}\left(F_1\!\left(\frac{1}{2};\,\frac{1}{2}-\frac{\nu}{2},\,-\beta;\,\frac{3}{2};\,\sin^2(c\,z),\,\frac{b\sin^2(c\,z)}{a+b}\right)\right.$$
$$\left.\cos^{\nu-1}(c\,z)\cos^2(c\,z)^{\frac{1-\nu}{2}}\,(2\,a+b+b\cos(2\,c\,z))^{\beta}\left(\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}\right)^{-\beta}\sin(c\,z)\right)$$

01.07.21.1394.01

$$\int \left(a+b\cos^2(c\,z)\right)^{3/2}\cos^2(c\,z)\,dz = \left(16\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\,\left(3\,a^3+16\,b\,a^2+21\,b^2\,a+8\,b^3\right)E\!\left(c\,z\;\middle|\;\frac{b}{a+b}\right)-\right.$$
$$16\,a\left(3\,a^2+7\,b\,a+4\,b^2\right)\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\;F\!\left(c\,z\;\middle|\;\frac{b}{a+b}\right)+$$
$$\left.\sqrt{2}\;b\left(48\,a^2+68\,b\,a+25\,b^2+4\,b\,(9\,a+7\,b)\cos(2\,c\,z)+3\,b^2\cos(4\,c\,z)\right)\sin(2\,c\,z)\right)\Big/\left(240\,b\,c\sqrt{2\,a+b+b\cos(2\,c\,z)}\right)$$

01.07.21.1395.01

$$\int \left(a+b\cos^2(c\,z)\right)^{3/2}\cos^3(c\,z)\,dz = \frac{1}{96\,b^{3/2}\,c}\left(\sqrt{2}\,\sqrt{b}\,\sqrt{2\,a+b+b\cos(2\,c\,z)}\,\left(3\,a^2+29\,b\,a+23\,b^2+b\,(7\,a+9\,b)\cos(2\,c\,z)+b^2\cos(4\,c\,z)\right)\sin(c\,z)-\right.$$
$$\left.6\,(a-5\,b)\,(a+b)^2\tan^{-1}\!\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)\right)$$

01.07.21.1396.01

$$\int \left(a+b\cos^2(c\,z)\right)^{3/2}\cos^4(c\,z)\,dz = \left(-128\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\left(a^4-b\,a^3-14\,b^2\,a^2-20\,b^3\,a-8\,b^4\right)E\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+64\,a\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\left(2\,a^3-3\,b\,a^2-13\,b^2\,a-8\,b^3\right)F\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+\sqrt{2}\,b\left(32\,a^3+496\,b\,a^2+684\,b^2\,a+250\,b^3+b\left(144\,a^2+480\,b\,a+299\,b^2\right)\cos(2\,c\,z)+2\,b^2\,(26\,a+27\,b)\cos(4\,c\,z)+5\,b^3\cos(6\,c\,z)\right)\sin(2\,c\,z)\right)\Big/\left(2240\,b^2\,c\sqrt{2\,a+b+b\cos(2\,c\,z)}\right)$$

01.07.21.1397.01

$$\int \sqrt{a+b\cos^2(c\,z)}\,\cos^2(c\,z)\,dz = \left(4\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\left(a^2+3\,b\,a+2\,b^2\right)E\left(c\,z\,\middle|\,\frac{b}{a+b}\right)-4\,a\,(a+b)\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\,F\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+\sqrt{2}\,b\,(2\,a+b+b\cos(2\,c\,z))\sin(2\,c\,z)\right)\Big/\left(12\,b\,c\sqrt{2\,a+b+b\cos(2\,c\,z)}\right)$$

01.07.21.1398.01

$$\int \sqrt{a+b\cos^2(c\,z)}\,\cos^3(c\,z)\,dz = \frac{1}{32\,b^{3/2}\,c}\left(2\sqrt{2}\sqrt{b}\sqrt{2\,a+b+b\cos(2\,c\,z)}\,(a+4\,b+b\cos(2\,c\,z))\sin(c\,z)-4\left(a^2-2\,b\,a-3\,b^2\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)\right)$$

01.07.21.1399.01

$$\int \sqrt{a+b\cos^2(c\,z)}\,\cos^4(c\,z)\,dz = \left(-16\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\left(2\,a^3-b\,a^2-11\,b^2\,a-8\,b^3\right)E\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+32\,a\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\left(a^2-b\,a-2\,b^2\right)F\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+\sqrt{2}\,b\left(8\,a^2+48\,b\,a+25\,b^2+4\,b\,(4\,a+7\,b)\cos(2\,c\,z)+3\,b^2\cos(4\,c\,z)\right)\sin(2\,c\,z)\right)\Big/\left(240\,b^2\,c\sqrt{2\,a+b+b\cos(2\,c\,z)}\right)$$

01.07.21.1400.01

$$\int \sqrt{a+b\cos^2(c\,z)}\,\cos^5(c\,z)\,dz = \frac{1}{16\,c}\left(\frac{(a+b)\left(a^2-2\,b\,a+5\,b^2\right)\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)}{b^{5/2}} + \frac{1}{3\sqrt{2}\,b^2}\left(\sqrt{2\,a+b+b\cos(2\,c\,z)}\,\left(-3\,a^2+5\,b\,a+23\,b^2+b\,(a+9\,b)\cos(2\,c\,z)+b^2\cos(4\,c\,z)\right)\sin(c\,z)\right)\right)$$

01.07.21.1401.01

$$\int \frac{\cos^\nu(c\,z)}{\sqrt{a+b\cos^2(c\,z)}}\,dz = \left(F_1\left(\frac{1}{2};\frac{1}{2}-\frac{\nu}{2},\frac{1}{2};\frac{3}{2};\sin^2(c\,z),\frac{b\sin^2(c\,z)}{a+b}\right)\cos^{\nu-1}(c\,z)\cos^2(c\,z)^{\frac{1-\nu}{2}}\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\,\sin(c\,z)\right)\Big/\left(c\sqrt{2\,a+b+b\cos(2\,c\,z)}\right)$$

01.07.21.1402.01

$$\int \frac{\cos^2(c\,z)}{\sqrt{a+b\cos^2(c\,z)}}\,dz = \frac{1}{b\,c\sqrt{2\,a+b+b\cos(2\,c\,z)}}\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\left((a+b)\,E\left(c\,z\,\middle|\,\frac{b}{a+b}\right)-a\,F\left(c\,z\,\middle|\,\frac{b}{a+b}\right)\right)$$

01.07.21.1403.01

$$\int \frac{\cos^3(c\,z)}{\sqrt{a+b\cos^2(c\,z)}}\,dz = \frac{\sqrt{2}\,\sqrt{b}\,\sqrt{2\,a+b+b\cos(2\,c\,z)}\,\sin(c\,z)-2\,(a-b)\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)}{4\,b^{3/2}\,c}$$

01.07.21.1404.01

$$\int \frac{\cos^4(c\,z)}{\sqrt{a+b\cos^2(c\,z)}}\,dz = \left(-8\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\left(a^2-b^2\right)E\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+4\,a\,(2\,a-b)\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\,F\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+\sqrt{2}\,b\,(2\,a+b+b\cos(2\,c\,z))\sin(2\,c\,z)\right)\Big/\left(12\,b^2\,c\sqrt{2\,a+b+b\cos(2\,c\,z)}\right)$$

01.07.21.1405.01

$$\int \frac{\cos^5(c\,z)}{\sqrt{a+b\cos^2(c\,z)}}\,dz = \frac{1}{32\,b^{5/2}\,c}\left(4\left(3\,a^2-2\,b\,a+3\,b^2\right)\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)+\right.$$
$$\left.2\sqrt{2}\,\sqrt{b}\,\sqrt{2\,a+b+b\cos(2\,c\,z)}\,(-3\,a+4\,b+b\cos(2\,c\,z))\sin(c\,z)\right)$$

01.07.21.1406.01

$$\int \frac{\cos^6(c\,z)}{\sqrt{a+b\cos^2(c\,z)}}\,dz = \left(16\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\left(8\,a^3+b\,a^2+b^2\,a+8\,b^3\right)E\left(c\,z\,\middle|\,\frac{b}{a+b}\right)-\right.$$
$$16\,a\left(8\,a^2-3\,b\,a+4\,b^2\right)\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\,F\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+$$
$$\left.\sqrt{2}\,b\left(-32\,a^2+28\,b\,a+25\,b^2-4\,(a-7\,b)\,b\cos(2\,c\,z)+3\,b^2\cos(4\,c\,z)\right)\sin(2\,c\,z)\right)\Big/\left(240\,b^3\,c\,\sqrt{2\,a+b+b\cos(2\,c\,z)}\right)$$

01.07.21.1407.01

$$\int \frac{\cos^7(c\,z)}{\sqrt{a+b\cos^2(c\,z)}}\,dz = \frac{1}{96\,b^{7/2}\,c}\left(6\,(b-a)\left(5\,a^2+2\,b\,a+5\,b^2\right)\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)+\right.$$
$$\left.\sqrt{2}\,\sqrt{b}\,\sqrt{2\,a+b+b\cos(2\,c\,z)}\left(15\,a^2-19\,b\,a+23\,b^2-(5\,a-9\,b)\,b\cos(2\,c\,z)+b^2\cos(4\,c\,z)\right)\sin(c\,z)\right)$$

01.07.21.1408.01

$$\int \frac{\cos^2(c\,z)}{\left(a+b\cos^2(c\,z)\right)^{3/2}}\,dz =$$
$$\left(-2\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\,(a+b)\,E\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+2\sqrt{\frac{2\,a+b+b\cos(2\,c\,z)}{a+b}}\,(a+b)\,F\left(c\,z\,\middle|\,\frac{b}{a+b}\right)+\sqrt{2}\,b\sin(2\,c\,z)\right)\Big/$$
$$\left(2\,b\,(a+b)\,c\,\sqrt{2\,a+b+b\cos(2\,c\,z)}\right)$$

01.07.21.1409.01

$$\int \frac{\cos^3(c\,z)}{\left(a+b\cos^2(c\,z)\right)^{3/2}}\,dz = \frac{\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{2\,a+b+b\cos(2\,c\,z)}}\right)-\frac{\sqrt{2}\,a\,\sqrt{b}\,\sin(c\,z)}{(a+b)\sqrt{2\,a+b+b\cos(2\,c\,z)}}}{b^{3/2}\,c}$$

01.07.21.1410.01

$$\int \frac{\cos^4(c z)}{\left(a+b\cos^2(c z)\right)^{3/2}}\,dz = \left(2\left(2a^2+3ba+b^2\right)\sqrt{\frac{2a+b+b\cos(2cz)}{a+b}}\;E\!\left(c z \,\middle|\, \frac{b}{a+b}\right) - a\left(4\sqrt{\frac{2a+b+b\cos(2cz)}{a+b}}\;(a+b)\,F\!\left(c z \,\middle|\, \frac{b}{a+b}\right) + \sqrt{2}\; b\sin(2cz)\right)\right) \Big/ \left(2b^2(a+b)\,c\sqrt{2a+b+b\cos(2cz)}\right)$$

01.07.21.1411.01

$$\int \frac{\cos^5(c z)}{\left(a+b\cos^2(c z)\right)^{3/2}}\,dz = \frac{1}{2c}\left(\frac{b-3a}{b^{5/2}}\tan^{-1}\!\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(cz)}{\sqrt{2a+b+b\cos(2cz)}}\right) + \frac{\left(6a^2+3ba+b^2+b(a+b)\cos(2cz)\right)\sin(cz)}{\sqrt{2}\;b^2(a+b)\sqrt{2a+b+b\cos(2cz)}}\right)$$

01.07.21.1412.01

$$\int \frac{\cos^2(c z)}{\left(a+b\cos^2(c z)\right)^{5/2}}\,dz = \left(-2(a-b)(a+b)^2 E\!\left(c z \,\middle|\, \frac{b}{a+b}\right)\left(\frac{2a+b+b\cos(2cz)}{a+b}\right)^{3/2} + 2a(a+b)^2 F\!\left(c z \,\middle|\, \frac{b}{a+b}\right)\left(\frac{2a+b+b\cos(2cz)}{a+b}\right)^{3/2} - \sqrt{2}\; b\left(-4a^2-ba+b^2-(a-b)\,b\cos(2cz)\right)\sin(2cz)\right) \Big/ \left(6ab(a+b)^2 c\,(2a+b+b\cos(2cz))^{3/2}\right)$$

01.07.21.1413.01

$$\int \frac{\cos^3(c z)}{\left(a+b\cos^2(c z)\right)^{5/2}}\,dz = \frac{\sqrt{2}\;(5a+3b+(a+3b)\cos(2cz))\sin(cz)}{3(a+b)^2 c\,(2a+b+b\cos(2cz))^{3/2}}$$

01.07.21.1414.01

$$\int \frac{\cos^4(c z)}{\left(a+b\cos^2(c z)\right)^{5/2}}\,dz = \left(\left((2a+3b)\,F\!\left(c z \,\middle|\, \frac{b}{a+b}\right) - 2(a+2b)\,E\!\left(c z \,\middle|\, \frac{b}{a+b}\right)\right)\left(\frac{2a+b+b\cos(2cz)}{a+b}\right)^{3/2} + \frac{\sqrt{2}\; b\left(a^2+4ba+2b^2+b(a+2b)\cos(2cz)\right)\sin(2cz)}{(a+b)^2}\right) \Big/ \left(3b^2 c\,(2a+b+b\cos(2cz))^{3/2}\right)$$

Involving $\left(a+b\sin^2(c z)\right)^{\beta}$ and rational function of $\sin(c z)$

01.07.21.1415.01

$$\int \frac{1}{(d+e\cos(c z))\sqrt{a+b\cos^2(c z)}}\,dz = \left(\sqrt{\frac{2a+b+b\cos(2cz)}{a}}\left(d\tanh^{-1}\left(\frac{\sqrt{\frac{2bd^2}{ae^2}+2}\,\sin(cz)}{\sqrt{1-\frac{d^2}{e^2}}\sqrt{\frac{2a+b+b\cos(2cz)}{a}}}\right)-\sqrt{1-\frac{d^2}{e^2}}\sqrt{\frac{bd^2}{ae^2}+1}\;e\,\Pi\left(\frac{e^2}{d^2};\frac{\pi}{2}-cz\,\middle|\,-\frac{b}{a}\right)\right)\right)\Big/\left(c\,d\sqrt{1-\frac{d^2}{e^2}}\sqrt{\frac{bd^2}{ae^2}+1}\;e\sqrt{2a+b+b\cos(2cz)}\right)$$

01.07.21.1416.01

$$\int \frac{\cos(cz)}{(d+e\cos(c z))\sqrt{a+b\cos^2(c z)}}\,dz = \left(4i\sqrt{2a+b+b\cos(2cz)}\sqrt{\frac{2a+b+b\cos(2cz)}{(\cos(cz)+1)^2}}\left((d+e)F\left(i\sinh^{-1}\left(\sqrt{\frac{\sqrt{a}-i\sqrt{b}}{\sqrt{a}+i\sqrt{b}}}\tan\left(\frac{cz}{2}\right)\right)\middle|\frac{\left(\sqrt{a}+i\sqrt{b}\right)^2}{\left(\sqrt{a}-i\sqrt{b}\right)^2}\right)-2d\,\Pi\left(\frac{\left(\sqrt{a}+i\sqrt{b}\right)^2(d-e)}{(a+b)(d+e)};i\sinh^{-1}\left(\sqrt{\frac{\sqrt{a}-i\sqrt{b}}{\sqrt{a}+i\sqrt{b}}}\tan\left(\frac{cz}{2}\right)\right)\middle|\frac{\left(\sqrt{a}+i\sqrt{b}\right)^2}{\left(\sqrt{a}-i\sqrt{b}\right)^2}\right)\right)\sec^2\left(\frac{cz}{2}\right)\sqrt{\frac{(a+b)\tan^2\left(\frac{cz}{2}\right)}{\left(\sqrt{a}-i\sqrt{b}\right)^2}+1}\sqrt{\frac{(a+b)\tan^2\left(\frac{cz}{2}\right)}{\left(\sqrt{a}+i\sqrt{b}\right)^2}+1}\right)\Big/\left(\sqrt{\frac{\sqrt{a}-i\sqrt{b}}{2\sqrt{a}+2i\sqrt{b}}}\,c\,(d-e)(d+e)\left((2a+b+b\cos(2cz))\sec^4\left(\frac{cz}{2}\right)\right)^{3/2}\right)$$

01.07.21.1417.01

$$\int \frac{\sqrt{a+b\cos^2(cz)}}{d+e\cos^2(cz)}\,dz = \frac{\sqrt{\frac{2a+b+b\cos(2cz)}{a+b}}\left(b(d+e)F\left(cz\,\middle|\,\frac{b}{a+b}\right)+(ae-bd)\,\Pi\left(\frac{e}{d+e};cz\,\middle|\,\frac{b}{a+b}\right)\right)}{c\,e\,(d+e)\sqrt{2a+b+b\cos(2cz)}}$$

01.07.21.1418.01

$$\int \frac{1}{\left(d+e\cos^2(cz)\right)\sqrt{a+b\cos^2(cz)}}\,dz = \frac{1}{c\,(d+e)\sqrt{2a+b+b\cos(2cz)}}\sqrt{\frac{2a+b+b\cos(2cz)}{a+b}}\;\Pi\left(\frac{e}{d+e};cz\,\middle|\,\frac{b}{a+b}\right)$$

01.07.21.1419.01

$$\int \frac{\cos(cz)}{\left(d+e\cos^2(cz)\right)\sqrt{a+b\cos^2(cz)}}\,dz = \frac{1}{c\sqrt{d+e}\sqrt{bd-ae}}\tan^{-1}\left(\frac{\sqrt{2bd-2ae}\,\sin(cz)}{\sqrt{d+e}\sqrt{2a+b+b\cos(2cz)}}\right)$$

01.07.21.1420.01

$$\int \frac{1}{\left(d+e\cos^2(c z)\right)^2 \sqrt{a+b\cos^2(c z)}}\,dz = \left(\sin(c z)\left(\frac{i\,b\sqrt{\frac{b\cos^2(c z)}{a}+1}\;F\!\left(i\sinh^{-1}\!\left(\sqrt{\frac{b}{a}}\,\cos(c z)\right)\middle|-\frac{a}{b}\right)}{a c d e-b c d^2}+\left(i\,(a e(2 d+e)-b d(3 d+2 e))\sqrt{\frac{b\cos^2(c z)}{a}+1}\;\Pi\!\left(\frac{a e}{b d};i\sinh^{-1}\!\left(\sqrt{\frac{b}{a}}\,\cos(c z)\right)\middle|-\frac{a}{b}\right)\right)\Big/\left(c d^2 (d+e)(a e-b d)\right)-\left(e\left(\sqrt{\frac{b}{a}}\;e\cos(c z)\sqrt{\sin^2(c z)}\left(b\cos^2(c z)+a\right)+\sqrt{\frac{b\cos^2(c z)}{a}+1}\;b\,i\left(e\cos^2(c z)+d\right)E\!\left(i\sinh^{-1}\!\left(\sqrt{\frac{b}{a}}\,\cos(c z)\right)\middle|-\frac{a}{b}\right)\right)\right)\Big/\left(c d (d+e)(a e-b d)\left(e\cos^2(c z)+d\right)\right)\right)\right)\Big/\left(2\sqrt{\frac{b}{a}}\,\sqrt{b\cos^2(c z)+a}\,\sqrt{\sin^2(c z)}\right)$$

01.07.21.1421.01

$$\int \frac{\cos(c z)}{\left(e\cos^2(c z)+d\right)^2 \sqrt{a+b\cos^2(c z)}}\,dz = \frac{1}{2 c (d+e)(a e-b d)}\left(\frac{a e-b(2 d+e)}{\sqrt{d+e}\,\sqrt{b d-a e}}\tan^{-1}\!\left(\frac{\sqrt{2 b d-2 a e}\,\sin(c z)}{\sqrt{d+e}\,\sqrt{2 a+b+b\cos(2 c z)}}\right)+\frac{\sqrt{2}\,e\sqrt{2 a+b+b\cos(2 c z)}\,\sin(c z)}{2 d+e+e\cos(2 c z)}\right)$$

Involving $\cos(e z)\cos(d z)\left(a+b\cos^2(c z)\right)^\beta$

01.07.21.1422.01

$$\int \cos(e\,z)\cos(d\,z)\left(a+b\cos^2(c\,z)\right)^{\beta} dz = -\frac{1}{4}\,i\left(\frac{e^{2icz}\,b}{2\,a+b-2\sqrt{a\,(a+b)}}+1\right)^{-\beta}\left(\frac{e^{2icz}\,b}{2\,a+b+2\sqrt{a\,(a+b)}}+1\right)^{-\beta}$$

$$\left(\frac{1}{4}\,b\,e^{-2icz}\left(1+e^{2icz}\right)^2+a\right)^{\beta}\left(\frac{e^{i(d-e)z}\,F_1\!\left(\frac{d-e-2c\beta}{2c};-\beta,-\beta;\frac{-2\beta c+2c+d-e}{2c};-\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)}{d-e-2\,c\,\beta}+\right.$$

$$\frac{e^{i(d+e)z}\,F_1\!\left(\frac{d+e-2c\beta}{2c};-\beta,-\beta;\frac{-2\beta c+2c+d+e}{2c};-\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)}{d+e-2\,c\,\beta}-$$

$$\frac{e^{-i(d-e)z}\,F_1\!\left(-\frac{d-e+2c\beta}{2c};-\beta,-\beta;\frac{-2\beta c+2c-d+e}{2c};-\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)}{d-e+2\,c\,\beta}-\frac{1}{d+e+2\,c\,\beta}$$

$$\left.\left(e^{-i(d+e)z}\,F_1\!\left(-\frac{d+e+2\,c\,\beta}{2\,c};-\beta,-\beta;-\frac{d+e+2\,c\,(\beta-1)}{2\,c};-\frac{b\,e^{2icz}}{2\,a+b+2\sqrt{a\,(a+b)}},-\frac{b\,e^{2icz}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)\right)\right)$$

Involving $\left(a+b\cos^2(c\,z)\right)^{\beta}$ and algebraic function of $\cos(c\,z)$

01.07.21.1423.01

$$\int\left(a+b\cos^2(c\,z)\right)^{\nu}\left(d+e\cos^2(c\,z)\right)^{\beta}\cos(c\,z)\,dz = \frac{1}{c}$$

$$\left(F_1\!\left(\frac{1}{2};-\nu,-\beta;\frac{3}{2};\frac{b\sin^2(c\,z)}{a+b},\frac{e\sin^2(c\,z)}{d+e}\right)\sin(c\,z)\left(b\cos^2(c\,z)+a\right)^{\nu}\left(\frac{b\cos^2(c\,z)+a}{a+b}\right)^{-\nu}\left(e\cos^2(c\,z)+d\right)^{\beta}\left(\frac{e\cos^2(c\,z)+d}{d+e}\right)^{-\beta}\right)$$

01.07.21.1424.01

$$\int\frac{\left(d+e\cos^2(c\,z)\right)^{\beta}\cos(c\,z)}{\sqrt{a+b\cos^2(c\,z)}}\,dz =$$

$$\frac{1}{c\sqrt{b\cos^2(c\,z)+a}}\left(F_1\!\left(\frac{1}{2};\frac{1}{2},-\beta;\frac{3}{2};\frac{b\sin^2(c\,z)}{a+b},\frac{e\sin^2(c\,z)}{d+e}\right)\sin(c\,z)\sqrt{\frac{b\cos^2(c\,z)+a}{a+b}}\left(e\cos^2(c\,z)+d\right)^{\beta}\left(\frac{e\cos^2(c\,z)+d}{d+e}\right)^{-\beta}\right)$$

Other integrals

01.07.21.1425.01

$$\int \sqrt{\frac{a+b\cos(e\,z)}{c+d\cos(e\,z)}}\,dz = \left(2\sqrt{\frac{(c+d)\cot^2\left(\frac{e\,z}{2}\right)}{d-c}}\sqrt{\frac{(c+d)\,(a+b\cos(e\,z))\csc^2\left(\frac{e\,z}{2}\right)}{a\,d-b\,c}}\right.$$

$$\left(b\,(c+d)\,\Pi\left(\frac{a\,d-b\,c}{(a+b)\,d};\sin^{-1}\left(\sqrt{-\frac{(a+b)\,(c+d\cos(e\,z))\csc^2\left(\frac{e\,z}{2}\right)}{2\,a\,d-2\,b\,c}}\right)\middle|\,\frac{2\,(a\,d-b\,c)}{(a+b)\,(d-c)}\right)-\right.$$

$$\left.\left.(a+b)\,d\,F\left(\sin^{-1}\left(\sqrt{-\frac{(a+b)\,(c+d\cos(e\,z))\csc^2\left(\frac{e\,z}{2}\right)}{2\,a\,d-2\,b\,c}}\right)\middle|\,\frac{2\,(a\,d-b\,c)}{(a+b)\,(d-c)}\right)\right)\tan\left(\frac{e\,z}{2}\right)\right)\Big/$$

$$\left(d\,(c+d)\,e\sqrt{\frac{a+b\cos(e\,z)}{c+d\cos(e\,z)}}\sqrt{\frac{(a+b)\,(c+d\cos(e\,z))\csc^2\left(\frac{e\,z}{2}\right)}{b\,c-a\,d}}\right)$$

01.07.21.1426.01

$$\int \frac{\sqrt{a+b\cos(e\,z)}}{\sqrt{c+d\cos(e\,z)}}\,dz = \left(2\sqrt{c+d\cos(e\,z)}\sqrt{\frac{(c+d)\cot^2\left(\frac{e\,z}{2}\right)}{d-c}}\sqrt{\frac{(c+d)\,(a+b\cos(e\,z))\csc^2\left(\frac{e\,z}{2}\right)}{a\,d-b\,c}}\right.$$

$$\left(b\,(c+d)\,\Pi\left(\frac{a\,d-b\,c}{(a+b)\,d};\sin^{-1}\left(\sqrt{-\frac{(a+b)\,(c+d\cos(e\,z))\csc^2\left(\frac{e\,z}{2}\right)}{2\,a\,d-2\,b\,c}}\right)\middle|\,\frac{2\,(a\,d-b\,c)}{(a+b)\,(d-c)}\right)-\right.$$

$$\left.\left.(a+b)\,d\,F\left(\sin^{-1}\left(\sqrt{-\frac{(a+b)\,(c+d\cos(e\,z))\csc^2\left(\frac{e\,z}{2}\right)}{2\,a\,d-2\,b\,c}}\right)\middle|\,\frac{2\,(a\,d-b\,c)}{(a+b)\,(d-c)}\right)\right)\tan\left(\frac{e\,z}{2}\right)\right)\Big/$$

$$\left(d\,(c+d)\,e\sqrt{a+b\cos(e\,z)}\sqrt{\frac{(a+b)\,(c+d\cos(e\,z))\csc^2\left(\frac{e\,z}{2}\right)}{b\,c-a\,d}}\right)$$

Involving functions of the direct function and a power function

Involving powers of the direct function and a power function

Involving powers of sin and power

Involving $z^{\alpha-1}\cos^{\nu}(a\,z)$

01.07.21.1427.01

$$\int z^{\alpha-1}\cos^{\nu}(a z)\,dz = \frac{2^{-\nu}\,(1-\nu \bmod 2)}{\alpha}\, z^{\alpha}\binom{\nu}{\frac{\nu}{2}} - 2^{-\nu} z^{\alpha}\sum_{j=0}^{\left\lfloor \frac{\nu-1}{2}\right\rfloor}\binom{\nu}{j}\left(\Gamma(\alpha,\, i\,a\,(2\,j-\nu)\,z)\,(i\,a\,(2\,j-\nu)\,z)^{-\alpha} + (i\,a\,(\nu-2\,j)\,z)^{-\alpha}\,\Gamma(\alpha,\, i\,a\,(\nu-2\,j)\,z)\right) /;\ \alpha \neq 0 \bigwedge \nu \in \mathbb{N}^{+}$$

01.07.21.1428.01

$$\int \frac{\cos^{\nu}(a z)}{z}\,dz = 2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\log(z)\,(1-\nu \bmod 2) + 2^{1-\nu}\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\operatorname{Ci}(a\,(2\,k-\nu)\,z) /;\ n \in \mathbb{N}^{+}$$

01.07.21.1429.01

$$\int z^{\alpha-1}\cos^{2}(a z)\,dz = \frac{1}{4} z^{\alpha}\left(-2^{-\alpha}\,\Gamma(\alpha,\, -2\,i\,a\,z)\,(-i\,a\,z)^{-\alpha} - 2^{-\alpha}\,(i\,a\,z)^{-\alpha}\,\Gamma(\alpha,\, 2\,i\,a\,z) + \frac{2}{\alpha}\right)$$

01.07.21.1430.01

$$\int z^{\alpha-1}\cos^{3}(a z)\,dz = -\frac{1}{8}\,3^{-\alpha}\,z^{\alpha}\left(a^2 z^2\right)^{-\alpha}\left(3^{\alpha+1}\,\Gamma(\alpha,\, i\,a\,z)\,(-i\,a\,z)^{\alpha} + \Gamma(\alpha,\, 3\,i\,a\,z)\,(-i\,a\,z)^{\alpha} + 3^{\alpha+1}\,(i\,a\,z)^{\alpha}\,\Gamma(\alpha,\, -i\,a\,z) + (i\,a\,z)^{\alpha}\,\Gamma(\alpha,\, -3\,i\,a\,z)\right)$$

01.07.21.1431.01

$$\int z^{n}\cos^{\nu}(a z)\,dz = n!\,\cos^{\nu}(a z)\left(1+e^{2\,i\,a\,z}\right)^{-\nu}\sum_{j=0}^{n}\frac{(-1)^{j}\,z^{n-j}}{(n-j)!\,(-i\,a\,\nu)^{j+1}}\,{}_{j+2}F_{j+1}\!\left(-\frac{\nu}{2},\, \ldots,\, -\frac{\nu}{2},\, -\nu;\, 1-\frac{\nu}{2},\, \ldots,\, 1-\frac{\nu}{2};\, -e^{2\,i\,a\,z}\right) /;\ n \in \mathbb{N}$$

01.07.21.1432.01

$$\int z\cos^{\nu}(a z)\,dz = \frac{1}{2\,a^{2}}\left(\cos^{\nu+1}(a z)\left(-2^{-\nu-1}\sqrt{\pi}\,\cos(a z)\,\Gamma(\nu+1)\,{}_{3}\tilde{F}_{2}\!\left(1,\, \frac{\nu+2}{2},\, \frac{\nu+2}{2};\, \frac{\nu+3}{2},\, \frac{\nu+4}{2};\, \cos^{2}(a z)\right) - \frac{2\,a\,z}{\nu+1}\,{}_{2}F_{1}\!\left(1,\, \frac{\nu+2}{2};\, \frac{\nu+3}{2};\, \cos^{2}(a z)\right)\sin(a z)\right)\right)$$

01.07.21.1433.01

$$\int \frac{\cos^{2}(a z)}{z}\,dz = \frac{1}{2}\left(\operatorname{Ci}(2\,a\,z) + \log(z)\right)$$

01.07.21.1434.01

$$\int \frac{\cos^{3}(a z)}{z}\,dz = \frac{1}{4}\left(3\operatorname{Ci}(a\,z) + \operatorname{Ci}(3\,a\,z)\right)$$

01.07.21.1435.01

$$\int \frac{\cos^{4}(a z)}{z}\,dz = \frac{1}{8}\left(4\operatorname{Ci}(2\,a\,z) + \operatorname{Ci}(4\,a\,z) + 3\log(z)\right)$$

01.07.21.1436.01

$$\int \frac{\cos^{5}(a z)}{z}\,dz = \frac{1}{16}\left(10\operatorname{Ci}(a\,z) + 5\operatorname{Ci}(3\,a\,z) + \operatorname{Ci}(5\,a\,z)\right)$$

01.07.21.1437.01

$$\int z\cos^{2}(a z)\,dz = \frac{\cos(2\,a\,z) + 2\,a\,z\,(a\,z + \sin(2\,a\,z))}{8\,a^{2}}$$

01.07.21.1438.01

$$\int z\cos^3(a z)\,dz = \frac{27\cos(a z)+\cos(3 a z)+3 a z\,(9\sin(a z)+\sin(3 a z))}{36 a^2}$$

01.07.21.1439.01

$$\int z\cos^4(a z)\,dz = \frac{16\cos(2 a z)+\cos(4 a z)+4 a z\,(6 a z+8\sin(2 a z)+\sin(4 a z))}{128 a^2}$$

01.07.21.1440.01

$$\int z\cos^5(a z)\,dz = \frac{1}{3600 a^2}\,(2250\cos(a z)+125\cos(3 a z)+9\cos(5 a z)+2250\, a z\sin(a z)+375\, a z\sin(3 a z)+45\, a z\sin(5 a z))$$

01.07.21.1441.01

$$\int z^2\cos^2(a z)\,dz = \frac{4 a^3 z^3+6 a\cos(2 a z)\, z+\left(6 a^2 z^2-3\right)\sin(2 a z)}{24 a^3}$$

01.07.21.1442.01

$$\int z^2\cos^3(a z)\,dz = \frac{81\, a z\cos(a z)+3\, a z\cos(3 a z)+\left(45 a^2 z^2+\left(9 a^2 z^2-2\right)\cos(2 a z)-82\right)\sin(a z)}{54 a^3}$$

01.07.21.1443.01

$$\int z^2\cos^4(a z)\,dz = \frac{1}{256 a^3}\left(32 a^3 z^3+64 a^2\sin(2 a z)\, z^2+8 a^2\sin(4 a z)\, z^2+64 a\cos(2 a z)\, z+4 a\cos(4 a z)\, z-32\sin(2 a z)-\sin(4 a z)\right)$$

01.07.21.1444.01

$$\int z^2\cos^5(a z)\,dz = \frac{1}{54\,000\, a^3}\left(67\,500\, a z\cos(a z)+3750\, a z\cos(3 a z)+270\, a z\cos(5 a z)+33\,750\left(a^2 z^2-2\right)\sin(a z)+625\left(9 a^2 z^2-2\right)\sin(3 a z)+27\left(25 a^2 z^2-2\right)\sin(5 a z)\right)$$

01.07.21.1445.01

$$\int z^2\cos^6(a z)\,dz = \frac{1}{13\,824\, a^3}\left(1440 a^3 z^3+3240 a^2\sin(2 a z)\, z^2+648 a^2\sin(4 a z)\, z^2+72 a^2\sin(6 a z)\, z^2+3240 a\cos(2 a z)\, z+324 a\cos(4 a z)\, z+24 a\cos(6 a z)\, z-1620\sin(2 a z)-81\sin(4 a z)-4\sin(6 a z)\right)$$

01.07.21.1446.01

$$\int z^3\cos^2(a z)\,dz = \frac{2 a^4 z^4+2 a\left(2 a^2 z^2-3\right)\sin(2 a z)\, z+\left(6 a^2 z^2-3\right)\cos(2 a z)}{16 a^4}$$

01.07.21.1447.01

$$\int z^3\cos^3(a z)\,dz = \frac{1}{108 a^4}\left(243\left(a^2 z^2-2\right)\cos(a z)+\left(9 a^2 z^2-2\right)\cos(3 a z)+6 a z\left(15 a^2 z^2+\left(3 a^2 z^2-2\right)\cos(2 a z)-82\right)\sin(a z)\right)$$

01.07.21.1448.01

$$\int z^3\cos^4(a z)\,dz = \frac{1}{1024 a^4}\left(192\left(2 a^2 z^2-1\right)\cos(2 a z)+3\left(8 a^2 z^2-1\right)\cos(4 a z)+4 a z\left(24 a^3 z^3+32\left(2 a^2 z^2-3\right)\sin(2 a z)+\left(8 a^2 z^2-3\right)\sin(4 a z)\right)\right)$$

01.07.21.1449.01

$$\int z^{n+\frac{1}{2}} \cos^{\nu}(a z)\, dz = \frac{2^{1-\nu} z^{n+\frac{3}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{2n+3} - 2^{-\nu} z^{n+\frac{3}{2}} \sum_{j=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{j} \left(\left(\operatorname{erfc}\left(\sqrt{i a (2j-\nu) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{-i a (2j-\nu) z} \sum_{k=0}^{n} \frac{(i a (2j-\nu) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{-i a (2j-\nu) z} \sum_{k=n+1}^{-1} \frac{(i a (2j-\nu) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) (i a (2j-\nu) z)^{-n-\frac{3}{2}} + (i a (\nu-2j) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{i a (\nu-2j) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{-i a (\nu-2j) z} \sum_{k=0}^{n} \frac{(i a (\nu-2j) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{-i a (\nu-2j) z} \sum_{k=n+1}^{-1} \frac{(i a (\nu-2j) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) \right) /;\, n \in \mathbb{Z} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \cos^{\nu}(a z + b)$

01.07.21.1450.01

$$\int z^{\alpha-1} \cos^{\nu}(b + a z)\, dz = \frac{2^{-\nu} (1 - \nu \bmod 2) z^{\alpha}}{\alpha} \binom{\nu}{\frac{\nu}{2}} - 2^{-\nu} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(a^2 (2k-\nu)^2 z^2\right)^{-\alpha} \left(e^{i b (-2k+\nu)} \Gamma(\alpha, i a (2k-\nu) z) (-i a (2k-\nu) z)^{\alpha} + e^{-i b (-2k+\nu)} (i a (2k-\nu) z)^{\alpha} \Gamma(\alpha, -i a (2k-\nu) z)\right) /;\, \alpha \neq 0 \land n \in \mathbb{N}^+$$

01.07.21.1451.01

$$\int \frac{\cos^{\nu}(b + a z)}{z}\, dz = 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \log(z) (1 - \nu \bmod 2) + 2^{1-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} (\cos(b (\nu - 2k)) \operatorname{Ci}(a (2k-\nu) z) + \sin(b (\nu - 2k)) \operatorname{Si}(a (2k-\nu) z)) /;\, n \in \mathbb{N}^+$$

01.07.21.1452.01

$$\int z^{\alpha-1} \cos^2(b + a z)\, dz = \frac{1}{\alpha} 2^{-\alpha-2} z^{\alpha} \left(a^2 z^2\right)^{-\alpha} \left(-\alpha\, \Gamma(\alpha, 2 i a z) (\cos(b) - i \sin(b))^2 (-i a z)^{\alpha} + 2^{\alpha+1} \left(a^2 z^2\right)^{\alpha} - (i a z)^{\alpha} \alpha\, \Gamma(\alpha, -2 i a z) (\cos(b) + i \sin(b))^2\right)$$

01.07.21.1453.01

$$\int z^{\alpha-1} \cos^3(a z + b)\, dz = -\frac{1}{8} 3^{-\alpha} e^{-3 i b} z^{\alpha} \left(a^2 z^2\right)^{-\alpha} \left(3^{\alpha+1} e^{2 i b} \Gamma(\alpha, i a z) (-i a z)^{\alpha} + \Gamma(\alpha, 3 i a z) (-i a z)^{\alpha} + 3^{\alpha+1} e^{4 i b} (i a z)^{\alpha} \Gamma(\alpha, -i a z) + e^{6 i b} (i a z)^{\alpha} \Gamma(\alpha, -3 i a z)\right)$$

01.07.21.1454.01

$$\int z^{n} \cos^{\nu}(a z + b)\, dz = n!\, \cos^{\nu}(a z + b) \left(1 + e^{2 i (a z + b)}\right)^{-\nu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (-i a \nu)^{j+1}}\, {}_{j+2}F_{j+1}\left(-\frac{\nu}{2}, \ldots, -\frac{\nu}{2}, -\nu; 1 - \frac{\nu}{2}, \ldots, 1 - \frac{\nu}{2}; -e^{2 i (a z + b)}\right) /;\, n \in \mathbb{N}$$

01.07.21.1455.01

$$\int z\cos^{\nu}(b+a\,z)\,dz = \frac{1}{2\,a^2}\left(\cos^{\nu+1}(b+a\,z)\left((\pi-2\,b)\,{}_2F_1\!\left(\frac{1}{2},\,\frac{1-\nu}{2};\,\frac{3}{2};\,\sin^2(b+a\,z)\right)\sin(b+a\,z)\cos^2(b+a\,z)^{\frac{1}{2}(-\nu-1)} - 2^{-\nu-1}\sqrt{\pi}\,\cos(b+a\,z)\,\Gamma(\nu+1)\,{}_3\tilde{F}_2\!\left(1,\,\frac{\nu+2}{2},\,\frac{\nu+2}{2};\,\frac{\nu+3}{2},\,\frac{\nu+4}{2};\,\cos^2(b+a\,z)\right) + \frac{-2\,b-2\,a\,z+\pi}{\nu+1}\,{}_2F_1\!\left(1,\,\frac{\nu+2}{2};\,\frac{\nu+3}{2};\,\cos^2(b+a\,z)\right)\sin(b+a\,z)\right)\right)$$

01.07.21.1456.01

$$\int \frac{\sin^2(b+a\,z)}{z^2}\,dz = \frac{\cos(2\,(b+a\,z)) + 2\,a\,z\,\mathrm{Ci}(2\,a\,z)\sin(2\,b) + 2\,a\,z\cos(2\,b)\,\mathrm{Si}(2\,a\,z) - 1}{2\,z}$$

01.07.21.1457.01

$$\int \frac{\cos^2(b+a\,z)}{z}\,dz = \frac{\log(z)}{2} + \frac{1}{2}\left(\cos(2\,b)\,\mathrm{Ci}(2\,a\,z) - \sin(2\,b)\,\mathrm{Si}(2\,a\,z)\right)$$

01.07.21.1458.01

$$\int \frac{\cos^3(b+a\,z)}{z}\,dz = \frac{1}{4}\left(3\cos(b)\,\mathrm{Ci}(a\,z) + \cos(3\,b)\,\mathrm{Ci}(3\,a\,z) - 3\sin(b)\,\mathrm{Si}(a\,z) - \sin(3\,b)\,\mathrm{Si}(3\,a\,z)\right)$$

01.07.21.1459.01

$$\int \frac{\cos^4(b+a\,z)}{z}\,dz = \frac{1}{8}\left(4\cos(2\,b)\,\mathrm{Ci}(2\,a\,z) + \cos(4\,b)\,\mathrm{Ci}(4\,a\,z) + 3\log(z) - 4\sin(2\,b)\,\mathrm{Si}(2\,a\,z) - \sin(4\,b)\,\mathrm{Si}(4\,a\,z)\right)$$

01.07.21.1460.01

$$\int \frac{\cos^5(b+a\,z)}{z}\,dz = \frac{1}{16}\left(10\cos(b)\,\mathrm{Ci}(a\,z) + 5\cos(3\,b)\,\mathrm{Ci}(3\,a\,z) + \cos(5\,b)\,\mathrm{Ci}(5\,a\,z) - 10\sin(b)\,\mathrm{Si}(a\,z) - 5\sin(3\,b)\,\mathrm{Si}(3\,a\,z) - \sin(5\,b)\,\mathrm{Si}(5\,a\,z)\right)$$

01.07.21.1461.01

$$\int z\cos^2(b+a\,z)\,dz = \frac{\cos(2\,(b+a\,z)) + 2\,a\,z\,(a\,z+\sin(2\,(b+a\,z)))}{8\,a^2}$$

01.07.21.1462.01

$$\int z\cos^3(b+a\,z)\,dz = \frac{27\cos(b+a\,z) + \cos(3\,(b+a\,z)) + 3\,a\,z\,(9\sin(b+a\,z) + \sin(3\,(b+a\,z)))}{36\,a^2}$$

01.07.21.1463.01

$$\int z\cos^4(b+a\,z)\,dz = \frac{16\cos(2\,(b+a\,z)) + \cos(4\,(b+a\,z)) + 4\,a\,z\,(6\,a\,z + 8\sin(2\,(b+a\,z)) + \sin(4\,(b+a\,z)))}{128\,a^2}$$

01.07.21.1464.01

$$\int z\cos^5(b+a\,z)\,dz = \frac{1}{3600\,a^2}\left(2250\cos(b+a\,z) + 125\cos(3\,(b+a\,z)) + 9\cos(5\,(b+a\,z)) + 2250\,a\,z\sin(b+a\,z) + 375\,a\,z\sin(3\,(b+a\,z)) + 45\,a\,z\sin(5\,(b+a\,z))\right)$$

01.07.21.1465.01

$$\int z^2\cos^2(b+a\,z)\,dz = \frac{4\,a^3\,z^3 + 6\,a\cos(2\,(b+a\,z))\,z + \left(6\,a^2\,z^2-3\right)\sin(2\,(b+a\,z))}{24\,a^3}$$

01.07.21.1466.01

$$\int z^2 \cos^3(b + a\,z)\, dz = \frac{1}{54\,a^3} \left(81\,a\,z \cos(b + a\,z) + 3\,a\,z \cos(3\,(b + a\,z)) + \left(45\,a^2\,z^2 + \left(9\,a^2\,z^2 - 2\right) \cos(2\,(b + a\,z)) - 82\right) \sin(b + a\,z)\right)$$

01.07.21.1467.01

$$\int z^2 \cos^4(b + a\,z)\, dz = \frac{1}{256\,a^3} \left(32\,a^3\,z^3 + 64\,a^2 \sin(2\,(b + a\,z))\,z^2 + 8\,a^2 \sin(4\,(b + a\,z))\,z^2 + 64\,a \cos(2\,(b + a\,z))\,z + 4\,a \cos(4\,(b + a\,z))\,z - 32 \sin(2\,(b + a\,z)) - \sin(4\,(b + a\,z))\right)$$

01.07.21.1468.01

$$\int z^2 \cos^5(b + a\,z)\, dz = \frac{1}{54\,000\,a^3} \left(33\,750\,a^2 \sin(b + a\,z)\,z^2 + 5625\,a^2 \sin(3\,(b + a\,z))\,z^2 + 675\,a^2 \sin(5\,(b + a\,z))\,z^2 + 67\,500\,a \cos(b + a\,z)\,z + 3750\,a \cos(3\,(b + a\,z))\,z + 270\,a \cos(5\,(b + a\,z))\,z - 67\,500 \sin(b + a\,z) - 1250 \sin(3\,(b + a\,z)) - 54 \sin(5\,(b + a\,z))\right)$$

01.07.21.1469.01

$$\int z^2 \cos^6(b + a\,z)\, dz = \frac{1}{13\,824\,a^3} \left(1440\,a^3\,z^3 + 3240\,a^2 \sin(2\,(b + a\,z))\,z^2 + 648\,a^2 \sin(4\,(b + a\,z))\,z^2 + 72\,a^2 \sin(6\,(b + a\,z))\,z^2 + 3240\,a \cos(2\,(b + a\,z))\,z + 324\,a \cos(4\,(b + a\,z))\,z + 24\,a \cos(6\,(b + a\,z))\,z - 1620 \sin(2\,(b + a\,z)) - 81 \sin(4\,(b + a\,z)) - 4 \sin(6\,(b + a\,z))\right)$$

01.07.21.1470.01

$$\int z^3 \cos^2(b + a\,z)\, dz = \frac{2\,a^4\,z^4 + \left(6\,a^2\,z^2 - 3\right) \cos(2\,(b + a\,z)) + \left(4\,a^3\,z^3 - 6\,a\,z\right) \sin(2\,(b + a\,z))}{16\,a^4}$$

01.07.21.1471.01

$$\int z^3 \cos^3(b + a\,z)\, dz = \frac{1}{108\,a^4} \left(243\left(a^2\,z^2 - 2\right) \cos(b + a\,z) + \left(9\,a^2\,z^2 - 2\right) \cos(3\,(b + a\,z)) + 6\,a\,z\left(15\,a^2\,z^2 + \left(3\,a^2\,z^2 - 2\right) \cos(2\,(b + a\,z)) - 82\right) \sin(b + a\,z)\right)$$

01.07.21.1472.01

$$\int z^3 \cos^4(b + a\,z)\, dz = \frac{1}{1024\,a^4} \left(192\left(2\,a^2\,z^2 - 1\right) \cos(2\,(b + a\,z)) + 3\left(8\,a^2\,z^2 - 1\right) \cos(4\,(b + a\,z)) + 4\,a\,z\left(24\,a^3\,z^3 + 32\left(2\,a^2\,z^2 - 3\right) \sin(2\,(b + a\,z)) + \left(8\,a^2\,z^2 - 3\right) \sin(4\,(b + a\,z))\right)\right)$$

01.07.21.1473.01

$$\int z^{n+\frac{1}{2}} \cos^{\nu}(a z+b)\, dz = \frac{2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)\, z^{n+\frac{3}{2}}}{2n+3} - 2^{-\nu} \sqrt{z}\, (-i a)^{-n-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\binom{\nu}{s} \left(\left(e^{-i b (\nu-2s)} \sqrt{i a (2s-\nu) z}\, \text{erfc}\left(\sqrt{-i a (2s-\nu) z}\right) - (-1)^n e^{i b(\nu-2s)} \sqrt{-i a (2s-\nu) z}\, \text{erfc}\left(\sqrt{i a (2s-\nu) z}\right) \right) \Gamma\left(n+\frac{3}{2}\right) + e^{i(-b(\nu-2s)+a(2s-\nu)z)} \sqrt{i a (2s-\nu) z} \left(\sum_{k=0}^{n} \frac{(-i a (2s-\nu) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(-i a (2s-\nu) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) - (-1)^n e^{-i(-b(\nu-2s)+a(2s-\nu)z)} \sqrt{-i a (2s-\nu) z} \left(\sum_{k=0}^{n} \frac{(i a (2s-\nu) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(i a (2s-\nu) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) \right) \right) \Big/ \left((2s-\nu)^{n+1} \sqrt{a^2 (2s-\nu)^2 z^2} \right) /; n \in \mathbb{Z} \land \alpha \neq 0 \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \cos^{\nu}(a z^r)$

01.07.21.1474.01

$$\int z^{\alpha-1} \cos^{\nu}(a z^r)\, dz = \frac{2^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)\, z^{\alpha}}{\alpha} - \frac{2^{-\nu} z^{\alpha}}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\Gamma\left(\frac{\alpha}{r}, -i a (\nu-2k) z^r\right) (-i a (\nu-2k) z^r)^{-\frac{\alpha}{r}} + (i a (\nu-2k) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, i a (\nu-2k) z^r\right) \right) /; \alpha \neq 0 \land \nu \in \mathbb{N}^+$$

01.07.21.1475.01

$$\int \frac{\cos^{\nu}(a z^r)}{z}\, dz = 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \log(z)\, (1-\nu \bmod 2) + \frac{2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\text{Ei}(-i a (\nu-2k) z^r) + \text{Ei}(i a (\nu-2k) z^r) \right)}{r} /; \nu \in \mathbb{N}^+$$

01.07.21.1476.01

$$\int z^n \cos^{\nu}\left(a z^2\right) dz = \frac{2^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{n+1} - 2^{-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\Gamma\left(\frac{n+1}{2}, -i a (\nu-2k) z^2\right) \left(-i a (\nu-2k) z^2\right)^{\frac{1}{2}(-n-1)} + \left(i a (\nu-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i a (\nu-2k) z^2\right) \right) /; n \in \mathbb{Z} \land n \neq -1 \land \nu \in \mathbb{N}^+$$

01.07.21.1477.01

$$\int z^{2n}\cos^{\nu}(a z^2)\,dz = \frac{2^{-\nu} z^{2n+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{2n+1} - 2^{-\nu-1} z^{2n+1}\sum_{j=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{j}\left(\left(\operatorname{erfc}\left(\sqrt{-i a (2j-\nu) z^2}\right)\Gamma\left(n+\frac{1}{2}\right) + e^{i a (2j-\nu) z^2}\sum_{k=0}^{n-1}\frac{\left(-i a (2j-\nu) z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}} - e^{i a (2j-\nu) z^2}\sum_{k=n}^{-1}\frac{\left(-i a (2j-\nu) z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right)\left(-i a (2j-\nu) z^2\right)^{\frac{1}{2}(-2n-1)} + \left(i a (2j-\nu) z^2\right)^{\frac{1}{2}(-2n-1)}\left(\operatorname{erfc}\left(\sqrt{i a (2j-\nu) z^2}\right)\Gamma\left(n+\frac{1}{2}\right) + e^{-i a (2j-\nu) z^2}\sum_{k=0}^{n-1}\frac{\left(i a (2j-\nu) z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}} - e^{-i a (2j-\nu) z^2}\sum_{k=n}^{-1}\frac{\left(i a (2j-\nu) z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right)\right) /;\ n\in\mathbb{Z}\land \nu\in\mathbb{N}^+$$

01.07.21.1478.01

$$\int z^{2n-1}\cos^{\nu}(a z^2)\,dz = \frac{2^{-\nu-1} z^{2n}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{n} - 2^{-\nu-1} z^{2n}\sum_{j=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{j}\left(\left(-i a (2j-\nu) z^2\right)^{-n}\left(\frac{(-1)^{n-1}\operatorname{Ei}\left(i a (2j-\nu) z^2\right)}{(-n)!} + e^{i a (2j-\nu) z^2}\sum_{k=0}^{n-1}\frac{\left(-i a (2j-\nu) z^2\right)^{k}}{(n)_{k-n+1}} - e^{i a (2j-\nu) z^2}\sum_{k=n}^{-1}\frac{\left(-i a (2j-\nu) z^2\right)^{k}}{(n)_{k-n+1}}\right) + \left(i a (2j-\nu) z^2\right)^{-n}\left(\frac{(-1)^{n-1}\operatorname{Ei}\left(-i a (2j-\nu) z^2\right)}{(-n)!} + e^{-i a (2j-\nu) z^2}\sum_{k=0}^{n-1}\frac{\left(i a (2j-\nu) z^2\right)^{k}}{(n)_{k-n+1}} - e^{-i a (2j-\nu) z^2}\sum_{k=n}^{-1}\frac{\left(i a (2j-\nu) z^2\right)^{k}}{(n)_{k-n+1}}\right)\right) /;\ n\in\mathbb{Z}\land n\neq 0\land \nu\in\mathbb{N}^+$$

01.07.21.1479.01

$$\int z^{n}\cos^{\nu}\left(a\sqrt{z}\right)dz = \frac{2^{-\nu} z^{n+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{n+1} - 2^{1-\nu} z^{n+1}\sum_{j=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{j}\left(i a (2j-\nu)\sqrt{z}\right)^{-2(n+1)}\left(-\frac{\operatorname{Ei}\left(-i a (2j-\nu)\sqrt{z}\right)}{(-2(n+1))!} - \frac{\operatorname{Ei}\left(i a (2j-\nu)\sqrt{z}\right)}{(-2(n+1))!} + e^{i a (2j-\nu)\sqrt{z}}\sum_{k=0}^{2(n+1)-1}\frac{\left(-i a (2j-\nu)\sqrt{z}\right)^{k}}{(2(n+1))_{k-2(n+1)+1}} - e^{i a (2j-\nu)\sqrt{z}}\sum_{k=2(n+1)}^{-1}\frac{\left(-i a (2j-\nu)\sqrt{z}\right)^{k}}{(2(n+1))_{k-2(n+1)+1}} + e^{-i a (2j-\nu)\sqrt{z}}\sum_{k=0}^{2(n+1)-1}\frac{\left(i a (2j-\nu)\sqrt{z}\right)^{k}}{(2(n+1))_{k-2(n+1)+1}} - e^{-i a (2j-\nu)\sqrt{z}}\sum_{k=2(n+1)}^{-1}\frac{\left(i a (2j-\nu)\sqrt{z}\right)^{k}}{(2(n+1))_{k-2(n+1)+1}}\right) /;\ n\in\mathbb{Z}\land n\neq 0\land \nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^{\nu}(a z^r + b)$

01.07.21.1480.01

$$\int z^{\alpha-1}\cos^{\nu}(a\,z^r+b)\,dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\,z^{\alpha}}{\alpha} - \frac{2^{-\nu}\,z^{\alpha}}{r}$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{i\,b\,(\nu-2k)}\,\Gamma\!\left(\frac{\alpha}{r},\,-i\,a\,(\nu-2k)\,z^r\right)(-i\,a\,(\nu-2k)\,z^r)^{-\frac{\alpha}{r}} + e^{-i\,b\,(\nu-2k)}\,(i\,a\,(\nu-2k)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,a\,(\nu-2k)\,z^r\right)\right) /;\ \alpha \neq 0 \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.1481.01

$$\int \frac{\cos^{\nu}(a\,z^r+b)}{z}\,dz =$$

$$2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\log(z)\,(1-\nu \bmod 2) + \frac{2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{-i\,b\,(\nu-2k)}\,\mathrm{Ei}(-i\,a\,(\nu-2k)\,z^r) + e^{i\,b\,(\nu-2k)}\,\mathrm{Ei}(i\,a\,(\nu-2k)\,z^r)\right)}{r} /;\ \nu \in \mathbb{N}^+$$

01.07.21.1482.01

$$\int z^n\cos^{\nu}\!\left(a\,z^2+b\right)dz =$$

$$\frac{2^{-\nu}\,z^{n+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{n+1} - 2^{-\nu-1}\,z^{n+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{i\,b\,(\nu-2k)}\,\Gamma\!\left(\frac{n+1}{2},\,-i\,a\,(\nu-2k)\,z^2\right)\left(-i\,a\,(\nu-2k)\,z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$

$$\left. e^{-i\,b\,(\nu-2k)}\left(i\,a\,(\nu-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,i\,a\,(\nu-2k)\,z^2\right)\right) /;\ n \in \mathbb{Z} \bigwedge n \neq -1 \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.1483.01

$$\int z^{2n}\cos^{\nu}\!\left(a\,z^2+b\right)dz = \frac{2^{-\nu}\,z^{2n+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{2n+1} -$$

$$2^{-\nu-1}\,z^{2n+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{i\,b\,(\nu-2k)}\left(\mathrm{erfc}\!\left(\sqrt{-i\,a\,(\nu-2k)\,z^2}\right)\Gamma\!\left(n+\frac{1}{2}\right) + e^{i\,a\,(\nu-2k)\,z^2}\sum_{j=0}^{n-1}\frac{\left(-i\,a\,(\nu-2k)\,z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}} - \right.\right.$$

$$\left. e^{i\,a\,(\nu-2k)\,z^2}\sum_{j=n}^{-1}\frac{\left(-i\,a\,(\nu-2k)\,z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}}\right)\left(-i\,a\,(\nu-2k)\,z^2\right)^{\frac{1}{2}(-2n-1)} +$$

$$e^{-i\,b\,(\nu-2k)}\left(i\,a\,(\nu-2k)\,z^2\right)^{\frac{1}{2}(-2n-1)}\left(\mathrm{erfc}\!\left(\sqrt{i\,a\,(\nu-2k)\,z^2}\right)\Gamma\!\left(n+\frac{1}{2}\right) + e^{-i\,a\,(\nu-2k)\,z^2}\sum_{j=0}^{n-1}\frac{\left(i\,a\,(\nu-2k)\,z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}} - \right.$$

$$\left.\left. e^{-i\,a\,(\nu-2k)\,z^2}\sum_{j=n}^{-1}\frac{\left(i\,a\,(\nu-2k)\,z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}}\right)\right) /;\ n \in \mathbb{Z} \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.1484.01

$$\int z^{2n-1} \cos^{\nu}(a z^2 + b)\, dz = \frac{2^{-\nu-1} z^{2n} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{n} - 2^{-\nu-1} z^{2n} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(e^{i b (\nu-2k)} \left(\frac{(-1)^{n-1} \operatorname{Ei}(i a (\nu - 2k) z^2)}{(-n)!} + e^{i a (\nu-2k) z^2} \sum_{j=0}^{n-1} \frac{(-i a (\nu - 2k) z^2)^j}{(n)_{j-n+1}} - e^{i a (\nu-2k) z^2} \sum_{j=n}^{-1} \frac{(-i a (\nu - 2k) z^2)^j}{(n)_{j-n+1}} \right) (-i a (\nu - 2k) z^2)^{-n} + e^{-i b (\nu-2k)} (i a (\nu - 2k) z^2)^{-n} \left(\frac{(-1)^{n-1} \operatorname{Ei}(-i a (\nu - 2k) z^2)}{(-n)!} + e^{-i a (\nu-2k) z^2} \sum_{j=0}^{n-1} \frac{(i a (\nu - 2k) z^2)^j}{(n)_{j-n+1}} - e^{-i a (\nu-2k) z^2} \sum_{j=n}^{-1} \frac{(i a (\nu - 2k) z^2)^j}{(n)_{j-n+1}} \right) \right) /;\ n \in \mathbb{Z} \land n \neq 0 \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.1485.01

$$\int z^n \cos^{\nu}(\sqrt{z}\, a + b)\, dz = \frac{2^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{n+1} - 2^{1-\nu} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(e^{i b (\nu-2k)} \left(-\frac{\operatorname{Ei}(i a (\nu - 2k) \sqrt{z})}{(-2(n+1))!} + e^{i a (\nu-2k) \sqrt{z}} \sum_{j=0}^{2(n+1)-1} \frac{(-i a (\nu - 2k) \sqrt{z})^j}{(2(n+1))_{j-2(n+1)+1}} - e^{i a (\nu-2k) \sqrt{z}} \sum_{j=2(n+1)}^{-1} \frac{(-i a (\nu - 2k) \sqrt{z})^j}{(2(n+1))_{j-2(n+1)+1}} \right) (-i a (\nu - 2k) \sqrt{z})^{-2(n+1)} + e^{-i b (\nu-2k)} (i a (\nu - 2k) \sqrt{z})^{-2(n+1)} \left(e^{-i a (\nu-2k) \sqrt{z}} \sum_{j=0}^{2(n+1)-1} \frac{(i a (\nu - 2k) \sqrt{z})^j}{(2(n+1))_{j-2(n+1)+1}} - e^{-i a (\nu-2k) \sqrt{z}} \sum_{j=2(n+1)}^{-1} \frac{(i a (\nu - 2k) \sqrt{z})^j}{(2(n+1))_{j-2(n+1)+1}} - \frac{\operatorname{Ei}(-i a (\nu - 2k) \sqrt{z})}{(-2(n+1))!} \right) \right) /;\ n \in \mathbb{Z} \land n \neq -1 \bigwedge \nu \in \mathbb{N}^+$$

Involving $z^n \cos^{\nu}(c z^r + f z)$

01.07.21.1486.01

$$\int z^n \cos^\nu\left(c z^2 + f z\right) dz == 2^{-n-\nu-1} (-f)^n c^{-n-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\nu - 2k} \left(e^{-\frac{i f^2 (2k-\nu)}{4c}} (f (2k-\nu) + 2 c z (2k-\nu)) \binom{\nu}{k} \left(e^{\frac{i f^2 (2k-\nu)}{2c}} \sum_{j=0}^{n} \left(\frac{i (f (2k-\nu) + 2 c z (2k-\nu))^2}{c (2k-\nu)} \right)^{\frac{1}{2}(-j-1)} \left(-\frac{2 f (2k-\nu) + 4 c z (2k-\nu)}{f (2k-\nu)} \right)^j \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f (2k-\nu) + 2 c z (2k-\nu))^2}{4 c (2k-\nu)} \right) + \sum_{j=0}^{n} \left(-\frac{i (f (2k-\nu) + 2 c z (2k-\nu))^2}{c (2k-\nu)} \right)^{\frac{1}{2}(-j-1)} \left(-\frac{2 f (2k-\nu) + 4 c z (2k-\nu)}{f (2k-\nu)} \right)^j \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (f (2k-\nu) + 2 c z (2k-\nu))^2}{4 c (2k-\nu)} \right) \right) \right) + \frac{2^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{n+1} /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1487.01

$$\int z^n \cos^{\nu}\left(\sqrt{z}\, c + f\, z\right) dz = 2^{-\nu-1} f^{-2n-2} c^{2n} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(2k-\nu)^2} \left(4^{-n} e^{-\frac{i(2k-\nu)c^2}{4f}} \binom{\nu}{k} \left(e^{\frac{i c^2 (2k-\nu)}{2f}} \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j \left(-\frac{c(2k-\nu) + 2f\sqrt{z}\,(2k-\nu)}{c(2k-\nu)}\right)^{h+j} \left(\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c(2k-\nu)\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)}\right) + 2 f i (2k-\nu) \sqrt{\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)}\right)\right) + \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j \left(-\frac{c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)}{c(2k-\nu)}\right)^{h+j} \left(-\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c(2k-\nu)\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)}\right) - 2\, i\, f(2k-\nu) \sqrt{-\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)}}\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)}\right)\right)\right)\right) + \frac{2^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n \cos^{\nu}\left(c\, z^r + f\, z + g\right)$

01.07.21.1488.01

$$\int z^n \cos^\nu\left(c z^2 + f z + g\right) dz = 2^{-n-\nu-1} (-f)^n c^{-n-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\nu - 2k} \left(e^{-\frac{i f^2 (2k-\nu)}{4c} + i g (-2k+\nu)} (f (2k-\nu) + 2 c z (2k-\nu)) \binom{\nu}{k} \left(e^{\frac{i f^2 (2k-\nu)}{2c}} \sum_{j=0}^{n} \left(\frac{i (f (2k-\nu) + 2 c z (2k-\nu))^2}{c (2k-\nu)} \right)^{\frac{1}{2}(-j-1)} \left(-\frac{2 f (2k-\nu) + 4 c z (2k-\nu)}{f (2k-\nu)} \right)^j \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f (2k-\nu) + 2 c z (2k-\nu))^2}{4 c (2k-\nu)} \right) + e^{-2 i g (\nu - 2k)} \sum_{j=0}^{n} \left(-\frac{i (f (2k-\nu) + 2 c z (2k-\nu))^2}{c (2k-\nu)} \right)^{\frac{1}{2}(-j-1)} \left(-\frac{2 f (2k-\nu) + 4 c z (2k-\nu)}{f (2k-\nu)} \right)^j \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (f (2k-\nu) + 2 c z (2k-\nu))^2}{4 c (2k-\nu)} \right) \right) \right) + \frac{2^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.1489.01

$$\int z^n \cos^\nu\left(\sqrt{z}\, c + f\, z + g\right) dz = 2^{-\nu-1} f^{-2n-2} c^{2n} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(2k-\nu)^2} \left(4^{-n} e^{-\frac{i c^2 (2k-\nu)}{4f} + i g(-2k+\nu)} \binom{\nu}{k} \left(e^{\frac{i c^2 (2k-\nu)}{2f}} \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j \left(-\frac{c(2k-\nu) + 2f\sqrt{z}\,(2k-\nu)}{c(2k-\nu)}\right)^{h+j} \left(\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(c(2k-\nu)\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)}\right) + 2 f\, i\,(2k-\nu) \sqrt{\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)}\right)\right) + e^{-2 i g(\nu-2k)} \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j \left(-\frac{c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)}{c(2k-\nu)}\right)^{h+j} \left(-\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c(2k-\nu)\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)}\right) - 2 i f (2k-\nu) \sqrt{-\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)}\right)\right)\right)\right) + \frac{2^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving powers of the direct function and algebraic functions

Involving powers of cos and algebraic functions

Involving $(a\,z + b)^\beta$

01.07.21.1490.01

$$\int (a z + b)^{\beta} \cos^{\nu}(c z)\, dz = \frac{2^{-\nu} (b + a z)^{\beta+1} (1 - \nu \bmod 2)}{a (\beta + 1)} \binom{\nu}{\frac{\nu}{2}} - \frac{2^{-\nu} (b + a z)^{\beta+1}}{a} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(e^{\frac{i b c (\nu - 2k)}{a}} \left(\frac{i c (\nu - 2k)(b + a z)}{a} \right)^{-\beta-1} \Gamma\left(\beta + 1, \frac{i c (\nu - 2k)(b + a z)}{a}\right) + e^{-\frac{i b c (\nu-2k)}{a}} \left(-\frac{i c (\nu - 2k)(b + a z)}{a} \right)^{-\beta-1} \Gamma\left(\beta + 1, -\frac{i c (\nu - 2k)(b + a z)}{a}\right) \right) /; \nu \in \mathbb{N}$$

01.07.21.1491.01

$$\int (a z + b)^{\beta} \cos^{2}(c z)\, dz = \frac{1}{a c (\beta + 1)} \left(2^{-\beta-3} (b + a z)^{\beta} \left(\frac{c^2 (b + a z)^2}{a^2} \right)^{-\beta} \left(-i a (\beta + 1) \Gamma\left(\beta + 1, -\frac{2 i c (b + a z)}{a}\right) \left(\cos\left(\frac{2 b c}{a}\right) - i \sin\left(\frac{2 b c}{a}\right) \right) \left(\frac{i c (b + a z)}{a} \right)^{\beta} + 2^{\beta+2} \left(\frac{c^2 (b + a z)^2}{a^2} \right)^{\beta} c (b + a z) + \left(-\frac{i c (b + a z)}{a} \right)^{\beta} a i (\beta + 1) \Gamma\left(\beta + 1, \frac{2 i c (b + a z)}{a}\right) \left(\cos\left(\frac{2 b c}{a}\right) + i \sin\left(\frac{2 b c}{a}\right) \right) \right) \right)$$

01.07.21.1492.01

$$\int \frac{\cos^{\nu}(c z)}{\sqrt{a z + b}}\, dz = \frac{2^{1-\nu} \sqrt{b + a z}\, (1 - \nu \bmod 2)}{a} \binom{\nu}{\frac{\nu}{2}} + \frac{2^{-\nu} \sqrt{\pi}}{a} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{1}{\sqrt{-\frac{i c (\nu-2k)}{a}}} e^{\frac{i b c (\nu-2k)}{a}} \operatorname{erfi}\left(\sqrt{-\frac{i c (\nu - 2k)}{a}} \sqrt{b + a z} \right) + \frac{1}{\sqrt{\frac{i c (\nu-2k)}{a}}} e^{-\frac{i b c (\nu-2k)}{a}} \operatorname{erfi}\left(\sqrt{\frac{i c (\nu - 2k)}{a}} \sqrt{b + a z} \right) \right) /; \nu \in \mathbb{N}$$

01.07.21.1493.01

$$\int \frac{\cos^{2}(c z)}{\sqrt{a z + b}}\, dz = \frac{1}{2 c} \left(\sqrt{\frac{c}{a}} \left(\sqrt{\pi} \cos\left(\frac{2 b c}{a}\right) C\left(\frac{2 \sqrt{\frac{c}{a}} \sqrt{b + a z}}{\sqrt{\pi}} \right) + \sqrt{\pi}\, S\left(\frac{2 \sqrt{\frac{c}{a}} \sqrt{b + a z}}{\sqrt{\pi}} \right) \sin\left(\frac{2 b c}{a}\right) + 2 \sqrt{\frac{c}{a}} \sqrt{b + a z} \right) \right)$$

Involving products of the direct function and a power function

Involving products of two direct functions and a power function

Involving $z^{\alpha-1}\cos(c\,z)\cos(a\,z)$

01.07.21.1494.01

$$\int z^{\alpha-1}\cos(c\,z)\cos(a\,z)\,dz = \frac{1}{4}z^{\alpha}\left(-(-i\,(a-c)\,z)^{-\alpha}\,\Gamma(\alpha,-i\,(a-c)\,z)-(i\,(a-c)\,z)^{-\alpha}\,\Gamma(\alpha,i\,(a-c)\,z)-(-i\,(a+c)\,z)^{-\alpha}\,\Gamma(\alpha,-i\,(a+c)\,z)-(i\,(a+c)\,z)^{-\alpha}\,\Gamma(\alpha,i\,(a+c)\,z)\right)$$

01.07.21.1495.01

$$\int z^{n}\cos(c\,z)\cos(a\,z)\,dz = -\frac{1}{4}n!\left((-i\,(a-c))^{-n-1}\,e^{i\,(a-c)\,z}\sum_{k=0}^{n}\frac{(-i\,(a-c)\,z)^{k}}{k!}+(i\,(a-c))^{-n-1}\,e^{-i\,(a-c)\,z}\sum_{k=0}^{n}\frac{(i\,(a-c)\,z)^{k}}{k!}+(-i\,(a+c))^{-n-1}\,e^{i\,(a+c)\,z}\sum_{k=0}^{n}\frac{(-i\,(a+c)\,z)^{k}}{k!}+(i\,(a+c))^{-n-1}\,e^{-i\,(a+c)\,z}\sum_{k=0}^{n}\frac{(i\,(a+c)\,z)^{k}}{k!}\right)/;\,n\in\mathbb{N}$$

01.07.21.1496.01

$$\int z^{-n}\cos(c\,z)\cos(a\,z)\,dz = \frac{i}{4\left(c^{2}-a^{2}\right)(n-1)!}\left(e^{-i\,(2\,a+c)\,z}\left(-(a+c)\,e^{3\,i\,a\,z}\,(n-1)!\,(-i\,(a-c))^{n}\sum_{k=1}^{n-1}\frac{(-i\,(a-c))^{k-n}\,z^{k-n}}{(1-n)_{k}}+(-1)^{n}\,e^{i\,(2\,a+c)\,z}\left((-i\,(a-c))^{n}\,(a+c)\,\mathrm{Ei}(i\,(a-c)\,z)-(a-c)\,(i\,(a+c))^{n}\,\mathrm{Ei}(-i\,(a+c)\,z)\right)+(a-c)\,(i\,(a+c))^{n}\,e^{i\,a\,z}\,(n-1)!\sum_{k=1}^{n-1}\frac{(i\,(a+c))^{k-n}\,z^{k-n}}{(1-n)_{k}}\right)-e^{-i\,(a-c)\,z}\left(-(a+c)\,(n-1)!\,(i\,(a-c))^{n}\sum_{k=1}^{n-1}\frac{(i\,(a-c))^{k-n}\,z^{k-n}}{(1-n)_{k}}+(-1)^{n}\,e^{i\,(a-c)\,z}\left((i\,(a-c))^{n}\,(a+c)\,\mathrm{Ei}(-i\,(a-c)\,z)-(a-c)\,(-i\,(a+c))^{n}\,\mathrm{Ei}(i\,(a+c)\,z)\right)+(a-c)\,(-i\,(a+c))^{n}\,e^{2\,i\,a\,z}\,(n-1)!\sum_{k=1}^{n-1}\frac{(-i\,(a+c))^{k-n}\,z^{k-n}}{(1-n)_{k}}\right)\right)/;\,n\in\mathbb{N}^{+}$$

01.07.21.1497.01

$$\int\frac{\cos(c\,z)\cos(a\,z)}{z}\,dz = \frac{1}{2}\left(\mathrm{Ci}((a-c)\,z)+\mathrm{Ci}((a+c)\,z)\right)$$

Involving $z^{\alpha-1}\cos(c\,z)\cos(a\,z+b)$

01.07.21.1498.01

$$\int z^{\alpha-1}\cos(c\,z)\cos(b+a\,z)\,dz = -\frac{1}{4}z^{\alpha}\left((a-c)^{2}\,z^{2}\right)^{-\alpha}\left((a+c)^{2}\,z^{2}\right)^{-\alpha}\left(\left(\Gamma(\alpha,i\,(a+c)\,z)\,(\cos(b)-i\sin(b))\,(-i\,(a+c)\,z)^{\alpha}+(i\,(a+c)\,z)^{\alpha}\,\Gamma(\alpha,-i\,(a+c)\,z)\,(\cos(b)+i\sin(b))\right)\left((a-c)^{2}\,z^{2}\right)^{\alpha}+(i\,(a-c)\,z)^{\alpha}\left((a+c)^{2}\,z^{2}\right)^{\alpha}\Gamma(\alpha,i\,(c-a)\,z)\,(\cos(b)+i\sin(b))+(i\,(c-a)\,z)^{\alpha}\left((a+c)^{2}\,z^{2}\right)^{\alpha}\Gamma(\alpha,i\,(a-c)\,z)\,(\cos(b)-i\sin(b))\right)$$

Involving $z^{\alpha-1}\cos(c\,z+d)\cos(a\,z+b)$

01.07.21.1499.01

$$\int z^{\alpha-1}\cos(d+c\,z)\cos(b+a\,z)\,dz = -\frac{1}{4}z^{\alpha}\left((a-c)^{2}\,z^{2}\right)^{-\alpha}\left((a+c)^{2}\,z^{2}\right)^{-\alpha}\left(\left(\Gamma(\alpha,i\,(a+c)\,z)\,(\cos(b+d)-i\sin(b+d))\,(-i\,(a+c)\,z)^{\alpha}+(i\,(a+c)\,z)^{\alpha}\,\Gamma(\alpha,-i\,(a+c)\,z)\,(\cos(b+d)+i\sin(b+d))\right)\left((a-c)^{2}\,z^{2}\right)^{\alpha}+(i\,(a-c)\,z)^{\alpha}\left((a+c)^{2}\,z^{2}\right)^{\alpha}\Gamma(\alpha,i\,(c-a)\,z)\,(\cos(b-d)+i\sin(b-d))+(i\,(c-a)\,z)^{\alpha}\left((a+c)^{2}\,z^{2}\right)^{\alpha}\Gamma(\alpha,i\,(a-c)\,z)\,(\cos(b-d)-i\sin(b-d))\right)$$

Involving $z^n \cos(d\, z) \cos(c\, z^r)$

01.07.21.1500.01

$$\int z^n \cos(d\, z) \cos(c\, z^2)\, dz ==$$

$$\frac{1}{8\, c^2}\left(-\sqrt{i\, c}\, \sqrt{c^2}\, e^{\frac{i\, d^2}{4\, c}} \sum_{q=0}^{n} 2^{q-n} (-i\, c)^{-n-\frac{1}{2}} (i\, d)^{n-q} (-i\, (d + 2\, c\, z))^{q+1} \left(\frac{i\, (d + 2\, c\, z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i\, (d + 2\, c\, z)^2}{4\, c}\right) - \right.$$

$$\sqrt{i\, c}\, \sqrt{c^2}\, e^{\frac{i\, d^2}{4\, c}} \sum_{q=0}^{n} 2^{q-n} (-i\, c)^{-n-\frac{1}{2}} (-i\, d)^{n-q} (i\, (d - 2\, c\, z))^{q+1} \left(\frac{i\, (d - 2\, c\, z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i\, (d - 2\, c\, z)^2}{4\, c}\right) -$$

$$\sqrt{-i\, c}\, \sqrt{c^2}\, e^{-\frac{i\, d^2}{4\, c}} \sum_{q=0}^{n} 2^{q-n} (i\, c)^{-n-\frac{1}{2}} (-i\, d)^{n-q} (i\, (d + 2\, c\, z))^{q+1} \left(-\frac{i\, (d + 2\, c\, z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{i\, (d + 2\, c\, z)^2}{4\, c}\right) -$$

$$\sqrt{-i\, c}\, \sqrt{c^2}\, e^{-\frac{i\, d^2}{4\, c}}$$

$$\left.\sum_{q=0}^{n} 2^{q-n} (i\, c)^{-n-\frac{1}{2}} (i\, d)^{n-q} (-i\, (d - 2\, c\, z))^{q+1} \left(-\frac{i\, (d - 2\, c\, z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{i\, (d - 2\, c\, z)^2}{4\, c}\right)\right) /;\ n \in \mathbb{N}$$

01.07.21.1501.01

$$\int z^n \cos(d\, z) \cos\!\left(c\, \sqrt{z}\right) dz ==$$

$$(-1)^{n-1}\, 2^{-2\, n-3} \left(e^{\frac{i\, c^2}{4\, d}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, c)^{-h-k+2\, n} \left(-i\left(2\, d\, \sqrt{z} - c\right)\right)^{h+k} \left(\frac{i\left(2\, d\, \sqrt{z} - c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h} \binom{n}{k} \left(c\left(2\, d\, \sqrt{z} - c\right) \Gamma\!\left(\frac{1}{2}(h+k+1), \frac{i\left(2\, d\, \sqrt{z} - c\right)^2}{4\, d}\right) - \right.$$

$$\left.\left.2\, i\, d\, \sqrt{\frac{i\left(2\, d\, \sqrt{z} - c\right)^2}{d}}\, \Gamma\!\left(\frac{1}{2}(h+k+2), \frac{i\left(2\, d\, \sqrt{z} - c\right)^2}{4\, d}\right)\right)\right) d^{-2\, n-2} + e^{-\frac{i\, c^2}{4\, d}}$$

$$\left(e^{\frac{i\, c^2}{2\, d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, c)^{-h-k+2\, n} \left(-i\left(c + 2\, d\, \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c + 2\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-c\left(c + 2\, d\, \sqrt{z}\right) \Gamma\!\left(\right.\right.\right.$$

$$\frac{1}{2}(h+k+1),\ \frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\Bigg)-2\,i\,d\sqrt{\frac{i\left(c+2\,d\sqrt{z}\right)^2}{d}}\ \Gamma\!\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(i\left(c+2\,d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(2\,i\,d\sqrt{-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{d}}\ \Gamma\!\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)-$$

$$c\left(c+2\,d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\,d^{-2\,n-2}+$$

$$e^{-\frac{i\,c^2}{4\,d}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\left(i\left(2\,d\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2\,d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(c\left(2\,d\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right)+$$

$$2\sqrt{-\frac{i\left(2\,d\sqrt{z}-c\right)^2}{d}}\ d\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right)\Bigg)\Bigg)\,d^{-2\,n-2}\Bigg)\ /;\ n\in\mathbb{N}$$

Involving $z^n \cos(d\,z+e)\cos\left(c\,z^r\right)$

01.07.21.1502.01

$$\int z^n \cos(e + d\, z) \cos(c\, z^2)\, dz = \frac{1}{8\, c^2} \left(e^{-i\, e} \left(-\sqrt{i\, c}\, \sqrt{c^2}\, e^{\frac{i\, d^2}{4\, c}} \sum_{q=0}^{n} 2^{q-n} (-i\, c)^{-n-\frac{1}{2}} (i\, d)^{n-q} (-i\, (d + 2\, c\, z))^{q+1} \left(\frac{i\, (d + 2\, c\, z)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\, (d + 2\, c\, z)^2}{4\, c} \right) - \sqrt{i\, c}\, \sqrt{c^2}\, e^{\frac{i\left(d^2 + 8\, c\, e\right)}{4\, c}} \sum_{q=0}^{n} 2^{q-n} (-i\, c)^{-n-\frac{1}{2}} (-i\, d)^{n-q} (i\, (d - 2\, c\, z))^{q+1} \left(\frac{i\, (d - 2\, c\, z)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\, (d - 2\, c\, z)^2}{4\, c} \right) - \sqrt{-i\, c}\, \sqrt{c^2}\, e^{-\frac{i\left(d^2 - 8\, c\, e\right)}{4\, c}} \sum_{q=0}^{n} 2^{q-n} (i\, c)^{-n-\frac{1}{2}} (-i\, d)^{n-q} (i\, (d + 2\, c\, z))^{q+1} \left(-\frac{i\, (d + 2\, c\, z)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\, (d + 2\, c\, z)^2}{4\, c} \right) - \sqrt{-i\, c}\, \sqrt{c^2}\, e^{-\frac{i\, d^2}{4\, c}} \sum_{q=0}^{n} 2^{q-n} (i\, c)^{-n-\frac{1}{2}} (i\, d)^{n-q} (-i\, (d - 2\, c\, z))^{q+1} \left(-\frac{i\, (d - 2\, c\, z)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\, (d - 2\, c\, z)^2}{4\, c} \right) \right) \right) /;\, n \in \mathbb{N}$$

01.07.21.1503.01

$$\int z^n \cos(d\, z + e) \cos\left(c\, \sqrt{z}\right) dz = (-1)^{n-1}\, 2^{-2\, n-3}\, e^{-i\, e} \left(e^{\frac{i\, c^2}{4\, d}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, c)^{-h-k+2\, n} \left(-i \left(2\, d\, \sqrt{z} - c \right) \right)^{h+k} \left(\frac{i \left(2\, d\, \sqrt{z} - c \right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c \left(2\, d\, \sqrt{z} - c \right) \Gamma\left(\frac{1}{2}(h + k + 1), \frac{i \left(2\, d\, \sqrt{z} - c \right)^2}{4\, d} \right) - 2\, i\, d\, \sqrt{\frac{i \left(2\, d\, \sqrt{z} - c \right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h + k + 2), \frac{i \left(2\, d\, \sqrt{z} - c \right)^2}{4\, d} \right) \right) \right) d^{-2\, n-2} + e^{-\frac{i\, c^2}{4\, d}} \left(e^{\frac{i\, c^2}{2\, d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, c)^{-h-k+2\, n} \left(-i \left(c + 2\, d\, \sqrt{z} \right) \right)^{h+k} \left(\frac{i \left(c + 2\, d\, \sqrt{z} \right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-c \left(c + 2\, d\, \sqrt{z} \right) \Gamma\left(\frac{1}{2}(h + k + 1), \frac{i \left(c + 2\, d\, \sqrt{z} \right)^2}{4\, d} \right) - 2\, i\, d\, \sqrt{\frac{i \left(c + 2\, d\, \sqrt{z} \right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h + k + 2), \frac{i \left(c + 2\, d\, \sqrt{z} \right)^2}{4\, d} \right) \right) + \right.\right.$$

$$e^{2ie}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(i\left(c+2\,d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,d\sqrt{-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.c\left(c+2\,d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)d^{-2n-2}+$$

$$e^{-\frac{i\left(c^2-8\,d\,e\right)}{4\,d}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(i\left(2\,d\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2\,d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\right.$$

$$\binom{n}{k}\left(c\left(2\,d\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right)+\right.$$

$$\left.\left.\left.2\sqrt{-\frac{i\left(2\,d\sqrt{z}-c\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right)\right)\right)d^{-2n-2}\right)/;\,n\in\mathbb{N}$$

Involving $z^{\alpha-1}\cos(b\,z^r)\cos(c\,z^r)$

01.07.21.1504.01

$$\int z^{\alpha-1}\cos(b\,z^r)\cos(c\,z^r)\,dz = -\frac{1}{4\,r}\,z^{\alpha}\left(\Gamma\!\left(\frac{\alpha}{r},\,(-i\,b+i\,c)\,z^r\right)((-i\,b+i\,c)\,z^r)^{-\frac{\alpha}{r}}+\right.$$

$$\left.((i\,b+i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,b+i\,c)\,z^r\right)+((-i\,b-i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(-i\,b-i\,c)\,z^r\right)+((i\,b-i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,b-i\,c)\,z^r\right)\right)$$

01.07.21.1505.01

$$\int z^n\cos\left(b\,z^2\right)\cos\left(c\,z^2\right)dz =$$

$$-\frac{1}{8}\,z^{n+1}\left(\Gamma\!\left(\frac{n+1}{2},\,(-i\,b+i\,c)\,z^2\right)\left((-i\,b+i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}+\left((i\,b+i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},\,(i\,b+i\,c)\,z^2\right)+\right.$$

$$\left.\left((-i\,b-i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},\,(-i\,b-i\,c)\,z^2\right)+\left((i\,b-i\,c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},\,(i\,b-i\,c)\,z^2\right)\right)/;\,n\in\mathbb{N}$$

01.07.21.1506.01

$$\int z^n \cos\left(\sqrt{z}\, b\right) \cos\left(\sqrt{z}\, c\right) dz = \frac{1}{2} (-1)^n \left(\Gamma\left(2(n+1), (-i\, b + i\, c) \sqrt{z}\right) (b-c)^{-2(n+1)} + \Gamma\left(2(n+1), (i\, b - i\, c)\sqrt{z}\right) (b-c)^{-2(n+1)} + (b+c)^{-2(n+1)} \Gamma\left(2(n+1), (i\, b + i\, c)\sqrt{z}\right) + (b+c)^{-2(n+1)} \Gamma\left(2(n+1), (-i\, b - i\, c)\sqrt{z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \cos(d\, z) \cos(c\, z^r + g)$

01.07.21.1507.01

$$\int z^n \cos(d\, z) \cos(c\, z^2 + g)\, dz = \frac{1}{8 c^2} \left(e^{-i g} \left(-\sqrt{i\, c}\, \sqrt{c^2}\, e^{\frac{i d^2}{4 c}} \sum_{q=0}^{n} 2^{q-n} (-i\, c)^{-n-\frac{1}{2}} (i\, d)^{n-q} (-i (d + 2 c z))^{q+1} \left(\frac{i (d+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d+2 c z)^2}{4 c}\right) - \sqrt{i\, c}\, \sqrt{c^2}\, e^{\frac{i d^2}{4 c}} \sum_{q=0}^{n} 2^{q-n} (-i\, c)^{-n-\frac{1}{2}} (-i\, d)^{n-q} (i (d - 2 c z))^{q+1} \left(\frac{i (d-2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d-2 c z)^2}{4 c}\right) - \sqrt{-i\, c}\, \sqrt{c^2}\, e^{-\frac{i\left(d^2 - 8 c g\right)}{4 c}} \sum_{q=0}^{n} 2^{q-n} (i\, c)^{-n-\frac{1}{2}} (-i\, d)^{n-q} (i (d + 2 c z))^{q+1} \left(-\frac{i (d+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d+2 c z)^2}{4 c}\right) - \sqrt{-i\, c}\, \sqrt{c^2}\, e^{-\frac{i\left(d^2 - 8 c g\right)}{4 c}} \sum_{q=0}^{n} 2^{q-n} (i\, c)^{-n-\frac{1}{2}} (i\, d)^{n-q} (-i (d - 2 c z))^{q+1} \left(-\frac{i (d-2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d-2 c z)^2}{4 c}\right)\right)\right) /; n \in \mathbb{N}$$

01.07.21.1508.01

$$\int z^n \cos(d\, z) \cos\left(\sqrt{z}\, c + g\right) dz = (-1)^{n-1} 2^{-2n-3} d^{-2n-2} e^{-i g} \left(e^{\frac{i\left(c^2 + 8 d g\right)}{4 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i\, c)^{-h-k+2n} \left(-i\left(2 d \sqrt{z} - c\right)\right)^{h+k} \left(\frac{i\left(2 d\sqrt{z} - c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\left(2 d \sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(2 d \sqrt{z} - c\right)^2}{4 d}\right) - 2\, i\, d \sqrt{\frac{i\left(2 d\sqrt{z} - c\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(2 d \sqrt{z} - c\right)^2}{4 d}\right)\right) + e^{-\frac{i c^2}{4 d}} \left(e^{\frac{i c^2}{2 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i\, c)^{-h-k+2n} \left(-i\left(c + 2 d \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(c + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-c\left(c + 2 d \sqrt{z}\right) \right.\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2d\sqrt{z}\right)^2}{4d}\right) - 2\,i\,d\sqrt{\frac{i\left(c+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2d\sqrt{z}\right)^2}{4d}\right)\Bigg) +$$

$$e^{2ig}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(i\left(c+2d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(2\,i\,d\sqrt{-\frac{i\left(c+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2d\sqrt{z}\right)^2}{4d}\right) -$$

$$c\left(c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg) +$$

$$e^{-\frac{i c^2}{4d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(i\left(2d\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(c\left(2d\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(2d\sqrt{z}-c\right)^2}{4d}\right) +$$

$$2\sqrt{-\frac{i\left(2d\sqrt{z}-c\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(2d\sqrt{z}-c\right)^2}{4d}\right)\Bigg)\Bigg) /;\ n\in\mathbb{N}$$

Involving $z^n\cos(d\,z+e)\cos\left(c\,z^r+g\right)$

01.07.21.1509.01

$$\int z^n \cos(d z+e)\cos\left(c z^2+g\right) dz = \frac{1}{8 c^2}\left(e^{-i(e+g)}\left(-\sqrt{i c}\,\sqrt{c^2}\, e^{\frac{i d^2}{4 c}} \sum_{q=0}^n 2^{q-n}(-i c)^{-n-\frac{1}{2}}(i d)^{n-q}(-i(d+2 c z))^{q+1}\left(\frac{i(d+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(d+2 c z)^2}{4 c}\right)-\sqrt{i c}\,\sqrt{c^2}\, e^{\frac{i\left(d^2+8 c e\right)}{4 c}} \sum_{q=0}^n 2^{q-n}(-i c)^{-n-\frac{1}{2}}(-i d)^{n-q}(i(d-2 c z))^{q+1}\left(\frac{i(d-2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(d-2 c z)^2}{4 c}\right)-\sqrt{-i c}\,\sqrt{c^2}\, e^{-\frac{i\left(d^2-8 c e-8 c g\right)}{4 c}} \sum_{q=0}^n 2^{q-n}(i c)^{-n-\frac{1}{2}}(-i d)^{n-q}(i(d+2 c z))^{q+1}\left(-\frac{i(d+2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(d+2 c z)^2}{4 c}\right)-\sqrt{-i c}\,\sqrt{c^2}\, e^{-\frac{i\left(d^2-8 c g\right)}{4 c}} \sum_{q=0}^n 2^{q-n}(i c)^{-n-\frac{1}{2}}(i d)^{n-q}(-i(d-2 c z))^{q+1}\left(-\frac{i(d-2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(d-2 c z)^2}{4 c}\right)\right)\right) /; n\in\mathbb{N}$$

01.07.21.1510.01

$$\int z^n \cos(d z+e)\cos\left(\sqrt{z}\, c+g\right) dz = (-1)^{n-1} 2^{-2n-3} e^{-i(e+g)}\left(e^{\frac{i\left(c^2+8 d g\right)}{4 d}}\left(\sum_{k=0}^n\sum_{h=0}^k(-1)^{k-h} 4^k (i c)^{-h-k+2n}\left(-i\left(2 d\sqrt{z}-c\right)\right)^{h+k}\left(\frac{i\left(2 d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(c\left(2 d\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(2 d\sqrt{z}-c\right)^2}{4 d}\right)-2 i d\sqrt{\frac{i\left(2 d\sqrt{z}-c\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(2 d\sqrt{z}-c\right)^2}{4 d}\right)\right)\right) d^{-2n-2} + e^{-\frac{i c^2}{4 d}}\left(e^{\frac{i c^2}{2 d}}\sum_{k=0}^n\sum_{h=0}^k(-1)^{k-h} 4^k(-i c)^{-h-k+2n}\left(-i\left(c+2 d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2 d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-c\left(c+2 d\sqrt{z}\right)\right.\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2d\sqrt{z}\right)^2}{4d}\right) - 2 i d \sqrt{\frac{i\left(c+2d\sqrt{z}\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2d\sqrt{z}\right)^2}{4d}\right)\Bigg) +$$

$$e^{2i(e+g)} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,c)^{-h-k+2n} \left(i\left(c+2d\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k}\Bigg(2 i d \sqrt{-\frac{i\left(c+2d\sqrt{z}\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2d\sqrt{z}\right)^2}{4d}\right) -$$

$$c\left(c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg) d^{-2n-2} +$$

$$e^{-\frac{i\left(c^2-8de\right)}{4d}} \Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,c)^{-h-k+2n} \left(i\left(2d\sqrt{z}-c\right)\right)^{h+k} \left(-\frac{i\left(2d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k}\Bigg(c\left(2d\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(2d\sqrt{z}-c\right)^2}{4d}\right) +$$

$$2\sqrt{-\frac{i\left(2d\sqrt{z}-c\right)^2}{d}}\ d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(2d\sqrt{z}-c\right)^2}{4d}\right)\Bigg)\Bigg) d^{-2n-2}\Bigg) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1}\cos(b\,z^r)\cos(c\,z^r+g)$

01.07.21.1511.01

$$\int z^{\alpha-1}\cos(b\,z^r)\cos(c\,z^r+g)\,dz =$$

$$-\frac{1}{4r} z^\alpha \left(e^{-ig}\,\Gamma\left(\frac{\alpha}{r}, (-i\,b+i\,c)\,z^r\right)((-i\,b+i\,c)\,z^r)^{-\frac{\alpha}{r}} + e^{-ig}\,((i\,b+i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (i\,b+i\,c)\,z^r\right) +\right.$$

$$\left. e^{ig}\,((-i\,b-i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (-i\,b-i\,c)\,z^r\right) + e^{ig}\,((i\,b-i\,c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (i\,b-i\,c)\,z^r\right)\right)$$

01.07.21.1512.01

$$\int z^n \cos(b z^2) \cos(c z^2 + g) \, dz = -\frac{1}{8} z^{n+1} \left(e^{-i g} \Gamma\left(\frac{n+1}{2}, (-i b + i c) z^2\right) \left((-i b + i c) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i g} \left((i b + i c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b + i c) z^2\right) + e^{i g} \left((-i b - i c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i b - i c) z^2\right) + e^{i g} \left((i b - i c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - i c) z^2\right)\right) /; n \in \mathbb{N}$$

01.07.21.1513.01

$$\int z^n \cos(\sqrt{z}\, b) \cos(\sqrt{z}\, c + g) \, dz = \frac{1}{2} (-1)^n \left(e^{-i g} \Gamma\left(2(n+1), (-i b + i c) \sqrt{z}\right) (b - c)^{-2(n+1)} + e^{i g} \Gamma\left(2(n+1), (i b - i c) \sqrt{z}\right) (b - c)^{-2(n+1)} + (b + c)^{-2(n+1)} e^{-i g} \Gamma\left(2(n+1), (i b + i c) \sqrt{z}\right) + (b + c)^{-2(n+1)} e^{i g} \Gamma\left(2(n+1), (-i b - i c) \sqrt{z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \cos(b z^r + e) \cos(c z^r + g)$

01.07.21.1514.01

$$\int z^{\alpha-1} \cos(b z^r + e) \cos(c z^r + g) \, dz = -\frac{1}{4 r} z^\alpha \left(e^{i e - i g} \Gamma\left(\frac{\alpha}{r}, (-i b + i c) z^r\right) ((-i b + i c) z^r)^{-\frac{\alpha}{r}} + e^{-i e - i g} ((i b + i c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b + i c) z^r\right) + e^{i e + i g} ((-i b - i c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-i b - i c) z^r\right) + e^{-i e + i g} ((i b - i c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b - i c) z^r\right)\right)$$

01.07.21.1515.01

$$\int z^n \cos(b z^2 + e) \cos(c z^2 + g) \, dz = -\frac{1}{8} z^{n+1} \left(e^{i e - i g} \Gamma\left(\frac{n+1}{2}, (-i b + i c) z^2\right) \left((-i b + i c) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e - i g} \left((i b + i c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b + i c) z^2\right) + e^{i e + i g} \left((-i b - i c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i b - i c) z^2\right) + e^{-i e + i g} \left((i b - i c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - i c) z^2\right)\right) /; n \in \mathbb{N}$$

01.07.21.1516.01

$$\int z^n \cos(\sqrt{z}\, b + e) \cos(\sqrt{z}\, c + g) \, dz = \frac{1}{2} (-1)^n \left(e^{i e - i g} \Gamma\left(2(n+1), (-i b + i c) \sqrt{z}\right) (b - c)^{-2(n+1)} + e^{-i e + i g} \Gamma\left(2(n+1), (i b - i c) \sqrt{z}\right) (b - c)^{-2(n+1)} + (b + c)^{-2(n+1)} e^{-i e - i g} \Gamma\left(2(n+1), (i b + i c) \sqrt{z}\right) + (b + c)^{-2(n+1)} e^{i e + i g} \Gamma\left(2(n+1), (-i b - i c) \sqrt{z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \cos(d z) \cos(c z^r + f z)$

01.07.21.1517.01

$$\int z^n \cos(d\,z)\cos\left(c\,z^2+f\,z\right)dz = \frac{1}{8\,c^2}\left(e^{-\frac{i\,d\,f}{c}}\left(-\sqrt{i\,c}\,\sqrt{c^2}\,e^{\frac{i\left(d^2+6\,f\,d+f^2\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(-i\,c)^{-n-\frac{1}{2}}\,(i\,(d+f))^{n-q}\,(-i\,(d+f+2\,c\,z))^{q+1}\left(\frac{i\,(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(d+f+2\,c\,z)^2}{4\,c}\right)-\sqrt{i\,c}\,\sqrt{c^2}\,e^{\frac{i\left(d^2+2\,f\,d+f^2\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(-i\,c)^{-n-\frac{1}{2}}\,(-i\,(d-f))^{n-q}\,(i\,(d-f-2\,c\,z))^{q+1}\left(\frac{i\,(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(d-f-2\,c\,z)^2}{4\,c}\right)-\sqrt{-i\,c}\,\sqrt{c^2}\,e^{-\frac{i\left(d^2-2\,f\,d+f^2\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(i\,c)^{-n-\frac{1}{2}}\,(-i\,(d+f))^{n-q}\,(i\,(d+f+2\,c\,z))^{q+1}\left(-\frac{i\,(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(d+f+2\,c\,z)^2}{4\,c}\right)-\sqrt{-i\,c}\,\sqrt{c^2}\,e^{-\frac{i\left(d^2-6\,f\,d+f^2\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(i\,c)^{-n-\frac{1}{2}}\,(i\,(d-f))^{n-q}\,(-i\,(d-f-2\,c\,z))^{q+1}\left(-\frac{i\,(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(d-f-2\,c\,z)^2}{4\,c}\right)\right)\right)\,/;\,n\in\mathbb{N}$$

01.07.21.1518.01

$$\int z^n \cos(d\,z)\cos\left(\sqrt{z}\,c+f\,z\right)dz = (-1)^{n-1}\,2^{-2\,n-3}\left(e^{\frac{i\,c^2}{4(d-f)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(-i\left(2\,(d-f)\sqrt{z}-c\right)\right)^{h+k}\left(\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\left(2\,(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{4\,(d-f)}\right)-2\,i\,(d-f)\sqrt{\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}}\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{4\,(d-f)}\right)\right)\right)(d-f)^{-2\,n-2}+e^{-\frac{i\,c^2}{4(d-f)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\left(i\left(2\,(d-f)\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c\left(2\,(d-f)\,\sqrt{z}\,-c\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\,(d-f)\,\sqrt{z}\,-c\right)^2}{4\,(d-f)}\right)+\right.$$

$$\left.\left.2\,\sqrt{-\frac{i\left(2\,(d-f)\,\sqrt{z}\,-c\right)^2}{d-f}}\,\,(d-f)\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\,(d-f)\,\sqrt{z}\,-c\right)^2}{4\,(d-f)}\right)\right)\right)(d-f)^{-2\,n-2}+$$

$$e^{-\frac{i\,c^2}{4\,(d+f)}}\,(d+f)^{-2\,n-2}\left(e^{\frac{i\,c^2}{2\,(d+f)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\left(-i\left(c+2\,(d+f)\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2\,(d+f)\,\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}\,(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(-c\left(c+2\,(d+f)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c+2\,(d+f)\,\sqrt{z}\right)^2}{4\,(d+f)}\right)-\right.$$

$$\left.\left.2\,i\,(d+f)\,\sqrt{\frac{i\left(c+2\,(d+f)\,\sqrt{z}\right)^2}{d+f}}\,\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c+2\,(d+f)\,\sqrt{z}\right)^2}{4\,(d+f)}\right)\right)\right)+$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(i\left(c+2\,(d+f)\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2\,(d+f)\,\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(2\,i\,(d+f)\,\sqrt{-\frac{i\left(c+2\,(d+f)\,\sqrt{z}\right)^2}{d+f}}\,\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c+2\,(d+f)\,\sqrt{z}\right)^2}{4\,(d+f)}\right)-\right.$$

$$\left.\left.\left.c\left(c+2\,(d+f)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c+2\,(d+f)\,\sqrt{z}\right)^2}{4\,(d+f)}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n\cos(d\,z+e)\cos\left(c\,z^r+f\,z\right)$

01.07.21.1519.01

$$\int z^n \cos(e+d\,z)\cos\left(c\,z^2+f\,z\right)dz = \frac{1}{8\,c^2}\left(e^{-\frac{i(c\,e+d\,f)}{c}}\left(-\sqrt{i\,c}\,\sqrt{c^2}\,e^{\frac{i\left(d^2+6\,f\,d+f^2\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(-i\,c)^{-n-\frac{1}{2}}\,(i\,(d+f))^{n-q}\,(-i\,(d+f+2\,c\,z))^{q+1}\left(\frac{i\,(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(d+f+2\,c\,z)^2}{4\,c}\right)-\sqrt{i\,c}\,\sqrt{c^2}\,e^{\frac{i\left(d^2+2\,f\,d+f^2+8\,c\,e\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(-i\,c)^{-n-\frac{1}{2}}(-i\,(d-f))^{n-q}\,(i\,(d-f-2\,c\,z))^{q+1}\left(\frac{i\,(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(d-f-2\,c\,z)^2}{4\,c}\right)-\sqrt{-i\,c}\,\sqrt{c^2}\,e^{-\frac{i\left(d^2-2\,f\,d+f^2-8\,c\,e\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(i\,c)^{-n-\frac{1}{2}}\,(-i\,(d+f))^{n-q}\,(i\,(d+f+2\,c\,z))^{q+1}\left(-\frac{i\,(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(d+f+2\,c\,z)^2}{4\,c}\right)-\sqrt{-i\,c}\,\sqrt{c^2}\,e^{-\frac{i\left(d^2-6\,f\,d+f^2\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(i\,c)^{-n-\frac{1}{2}}\,(i\,(d-f))^{n-q}(-i\,(d-f-2\,c\,z))^{q+1}\left(-\frac{i\,(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(d-f-2\,c\,z)^2}{4\,c}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

01.07.21.1520.01

$$\int z^n \cos(d\,z+e)\cos\left(\sqrt{z}\,c+f\,z\right)dz = (-1)^{n-1}\,2^{-2\,n-3}\,e^{-i\,e}\left(e^{\frac{i\,c^2}{4(d-f)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(-i\left(2\,(d-f)\sqrt{z}-c\right)\right)^{h+k}\left(\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\left(2\,(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{4\,(d-f)}\right)-2\,i\,(d-f)\sqrt{\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}}\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{4\,(d-f)}\right)\right)\right)(d-f)^{-2\,n-2}+e^{-\frac{i\left(c^2-8\,d\,e+8\,e\,f\right)}{4\,(d-f)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\left(i\left(2\,(d-f)\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\,(d-f)\,i\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)\right)\right)(d-f)^{-2n-2}+$$

$$e^{-\frac{i c^2}{4(d+f)}}(d+f)^{-2n-2}\left(e^{\frac{i c^2}{2(d+f)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(-i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(-c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.2\,i\,(d+f)\sqrt{\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)+$$

$$e^{2\,i\,e}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+f)\sqrt{-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left.c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)\,/;\, n\in\mathbb{N}$$

Involving $z^n \cos(b\,z^r)\cos(c\,z^r + f\,z)$

01.07.21.1521.01

$$\int z^n \cos\left(b z^2\right) \cos\left(c z^2 + f z\right) dz = \frac{1}{8 \sqrt{(b-c)^2} \sqrt{(b+c)^2}} \left(e^{-\frac{i b f^2}{2 (b-c)(b+c)}} \left(-\sqrt{i (b-c)} \sqrt{(b+c)^2} e^{\frac{i\left(3 b f^2 + c f^2\right)}{4 (b-c)(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i (b-c))^{-n-\frac{1}{2}} (-i f)^{n-q} \right.\right.$$

$$(-i(-f + 2 b z - 2 c z))^{q+1} \left(\frac{i (-f + 2 b z - 2 c z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (-f + 2 b z - 2 c z)^2}{4 (b-c)}\right) -$$

$$\sqrt{-i (b-c)} \sqrt{(b+c)^2} e^{\frac{i f^2}{4 (b+c)}} \sum_{q=0}^{n} 2^{q-n} (i (b-c))^{-n-\frac{1}{2}} (i f)^{n-q} (i (-f + 2 b z - 2 c z))^{q+1}$$

$$\left(-\frac{i (-f + 2 b z - 2 c z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-f + 2 b z - 2 c z)^2}{4 (b-c)}\right) -$$

$$\sqrt{(b-c)^2} \sqrt{i (b+c)} e^{\frac{i\left(3 b f^2 - c f^2\right)}{4 (b-c)(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i (b+c))^{-n-\frac{1}{2}} (i f)^{n-q} (-i (f + 2 (b+c) z))^{q+1}$$

$$\left(\frac{i (f + 2 (b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f + 2 (b+c) z)^2}{4 (b+c)}\right) -$$

$$\sqrt{(b-c)^2} \sqrt{-i (b+c)} e^{\frac{i f^2}{4 (b-c)}} \sum_{q=0}^{n} 2^{q-n} (i (b+c))^{-n-\frac{1}{2}} (-i f)^{n-q} (i (f + 2 (b+c) z))^{q+1}$$

$$\left.\left.\left(-\frac{i (f + 2 (b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f + 2 (b+c) z)^2}{4 (b+c)}\right)\right)\right) /; n \in \mathbb{N}$$

01.07.21.1522.01

$$\int z^n \cos\left(b \sqrt{z}\right) \cos\left(\sqrt{z}\, c + f z\right) dz = (-1)^{n-1} 2^{-2 n-3} f^{-2 n-2}$$

$$\left(e^{-\frac{i (b+c)^2}{4 f}} \left(e^{\frac{i (b+c)^2}{2 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b+c))^{-h-k+2 n} \left(-i \left(b + c + 2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b + c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h} \binom{n}{k} \left((-b-c) \left(b + c + 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), \frac{i \left(b + c + 2 f \sqrt{z}\right)^2}{4 f}\right) -\right.$$

$$\left.\left. 2 i f \sqrt{\frac{i \left(b + c + 2 f \sqrt{z}\right)^2}{f}} \Gamma\left(\frac{1}{2} (h+k+2), \frac{i \left(b + c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right. +$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+c))^{-h-k+2n}\left(i\left(b+c+2f\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((-b-c)\left(b+c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)+$$

$$2\sqrt{-\frac{i\left(b+c+2f\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i(b-c)^2}{4f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-c))^{-h-k+2n}\left(i\left(b-c-2f\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c-b)\left(b-c-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)-$$

$$2\,i\,f\sqrt{\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)+$$

$$e^{-\frac{i(b-c)^2}{4f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b-c))^{-h-k+2n}\left(-i\left(b-c-2f\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c-b)\left(b-c-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)+$$

$$2\sqrt{-\frac{i\left(b-c-2f\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^n\cos\left(b\,z^r+e\right)\cos\left(c\,z^r+f\,z\right)$

01.07.21.1523.01

$$\int z^n \cos\left(b z^2 + e\right) \cos\left(c z^2 + f z\right) dz = \left(e^{-\frac{i\left(2 e b^2 + f^2 b - 2 c^2 e\right)}{2 (b-c) (b+c)}} \left(-\sqrt{i (b-c)} \sqrt{(b+c)^2} e^{\frac{i\left(3 b f^2 + c f^2\right)}{4 (b-c) (b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i (b-c))^{-n-\frac{1}{2}} (-i f)^{n-q} (-i (-f + 2 b z - 2 c z))^{q+1} \left(\frac{i (-f + 2 b z - 2 c z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (-f + 2 b z - 2 c z)^2}{4 (b-c)}\right) - \sqrt{-i (b-c)} \sqrt{(b+c)^2} e^{\frac{i\left(f^2 + 8 b e + 8 c e\right)}{4 (b+c)}} \sum_{q=0}^{n} 2^{q-n} (i (b-c))^{-n-\frac{1}{2}} (i f)^{n-q} (i (-f + 2 b z - 2 c z))^{q+1} \left(-\frac{i (-f + 2 b z - 2 c z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-f + 2 b z - 2 c z)^2}{4 (b-c)}\right) - \sqrt{(b-c)^2} \sqrt{i (b+c)} e^{\frac{i\left(3 b f^2 - c f^2\right)}{4 (b-c) (b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i (b+c))^{-n-\frac{1}{2}} (i f)^{n-q} (-i (f + 2 (b+c) z))^{q+1} \left(\frac{i (f + 2 (b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f + 2 (b+c) z)^2}{4 (b+c)}\right) - \sqrt{(b-c)^2} \sqrt{-i (b+c)} e^{\frac{i\left(f^2 + 8 b e - 8 c e\right)}{4 (b-c)}} \sum_{q=0}^{n} 2^{q-n} (i (b+c))^{-n-\frac{1}{2}} (-i f)^{n-q} (i (f + 2 (b+c) z))^{q+1} \left(-\frac{i (f + 2 (b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f + 2 (b+c) z)^2}{4 (b+c)}\right)\right)\right) \Big/ \left(8 \sqrt{(b-c)^2} \sqrt{(b+c)^2}\right) /; n \in \mathbb{N}$$

01.07.21.1524.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \cos\left(\sqrt{z}\, c + f z\right) dz = (-1)^{n-1} 2^{-2n-3} e^{-i e} f^{-2n-2} \left(e^{-\frac{i (b+c)^2}{4 f}} \left(e^{\frac{i (b+c)^2}{2 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b+c))^{-h-k+2n} \left(-i\left(b + c + 2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((-b-c)\left(b + c + 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{\frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{f}} \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right) + \right.\right.$$

$$e^{2 i e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b+c))^{-h-k+2n} \left(i \left(b+c+2 f \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((-b-c) \left(b+c+2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right) + \right.$$

$$\left.\left. 2 \sqrt{-\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{f}} \, f \, i \, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) +$$

$$e^{\frac{i \left(b^2-2 c b+c^2+8 e f\right)}{4 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b-c))^{-h-k+2n} \left(i \left(b-c-2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((c-b) \left(b-c-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right) - \right.$$

$$\left.\left. 2 \, i \, f \sqrt{\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}} \, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) +$$

$$e^{-\frac{i \left(b^2-2 c b+c^2\right)}{4 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b-c))^{-h-k+2n} \left(-i \left(b-c-2 f \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((c-b) \left(b-c-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right) + \right.$$

$$\left.\left. 2 \sqrt{-\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}} \, f \, i \, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \cos\left(b z^r + d z + e\right) \cos\left(c z^r + f z\right)$

01.07.21.1525.01

$$\int z^n \cos\left(b z^2 + d z\right) \cos\left(c z^2 + f z\right) dz = $$

$$\left(e^{-\frac{i \left(b\left(d^2+f^2\right)-2 c d f\right)}{2 (b-c) (b+c)}} \left(-\sqrt{i (b-c)} \sqrt{(b+c)^2} e^{\frac{i\left(c\left(d^2-6 f d+f^2\right)+b\left(3 d^2-2 f d+3 f^2\right)\right)}{4 (b-c) (b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i (b-c))^{-n-\frac{1}{2}} (i (d-f))^{n-q} \right.\right.$$

$$(-i (d-f+2 b z-2 c z))^{q+1} \left(\frac{i (d-f+2 b z-2 c z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d-f+2 b z-2 c z)^2}{4 (b-c)}\right) -$$

$$\sqrt{-i (b-c)} \sqrt{(b+c)^2} e^{\frac{i (d+f)^2}{4 (b+c)}} \sum_{q=0}^{n} 2^{q-n} (i (b-c))^{-n-\frac{1}{2}} (-i (d-f))^{n-q} (i (d-f+2 b z-2 c z))^{q+1}$$

$$\left(-\frac{i (d-f+2 b z-2 c z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d-f+2 b z-2 c z)^2}{4 (b-c)}\right) -$$

$$\sqrt{(b-c)^2} \sqrt{i (b+c)} e^{\frac{i\left(b\left(3 d^2+2 f d+3 f^2\right)-c\left(d^2+6 f d+f^2\right)\right)}{4 (b-c) (b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i (b+c))^{-n-\frac{1}{2}} (i (d+f))^{n-q} (-i (d+f+2 (b+c) z))^{q+1}$$

$$\left(\frac{i (d+f+2 (b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d+f+2 (b+c) z)^2}{4 (b+c)}\right) - \sqrt{(b-c)^2} \sqrt{-i (b+c)} e^{\frac{i\left(d^2-2 f d+f^2\right)}{4 (b-c)}}$$

$$\sum_{q=0}^{n} 2^{q-n} (i (b+c))^{-n-\frac{1}{2}} (-i (d+f))^{n-q} (i (d+f+2 (b+c) z))^{q+1} \left(-\frac{i (d+f+2 (b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d+f+2 (b+c) z)^2}{4 (b+c)}\right)\right)\right) \Big/ \left(8 \sqrt{(b-c)^2} \sqrt{(b+c)^2}\right) /; n \in \mathbb{N}$$

01.07.21.1526.01

$$\int z^n \cos\left(\sqrt{z} b + d z\right) \cos\left(\sqrt{z} c + f z\right) dz = 2^{-2 n-3} (-1)^{n-1}$$

$$\left(e^{\frac{i\left(b^2-2 c b+c^2\right)}{4 (d-f)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b-c))^{-h-k+2 n} \left(-i \left(b-c+2 (d-f) \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b-c+2 (d-f) \sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \right.\right.$$

$$\binom{k}{h} \binom{n}{k} \left((c-b) \left(b-c+2 (d-f) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), \frac{i \left(b-c+2 (d-f) \sqrt{z}\right)^2}{4 (d-f)}\right) - \right.$$

$$\left.\left. 2 i (d-f) \sqrt{\frac{i \left(b-c+2 (d-f) \sqrt{z}\right)^2}{d-f}} \Gamma\left(\frac{1}{2} (h+k+2), \frac{i \left(b-c+2 (d-f) \sqrt{z}\right)^2}{4 (d-f)}\right)\right)\right) (d-f)^{-2 n-2} +$$

$$e^{-\frac{i\left(b^2-2cb+c^2\right)}{4(d-f)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-c))^{-h-k+2n}\left(i\left(b-c+2\,(d-f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left((c-b)\left(b-c+2\,(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{4\,(d-f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{d-f}}\;(d-f)\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{4\,(d-f)}\right)\right)\right)(d-f)^{-2n-2}+$$

$$e^{-\frac{i(b+c)^2}{4(d+f)}}\,(d+f)^{-2n-2}\left(e^{\frac{i(b+c)^2}{2(d+f)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+c))^{-h-k+2n}\left(-i\left(b+c+2\,(d+f)\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b-c)\left(b+c+2\,(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)-\right.$$

$$\left.2\,i\,(d+f)\sqrt{\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)\right)+$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+c))^{-h-k+2n}\left(i\left(b+c+2\,(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2\,(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{d+f}}\;(d+f)\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)\right)\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^n \cos(d\,z)\cos(c\,z^r+f\,z+g)$

01.07.21.1527.01

$$\int z^n \cos(d\,z)\cos(c\,z^2+f\,z+g)\,dz = \frac{1}{8\,c^2}\Bigg(e^{-\frac{i(d\,f+c\,g)}{c}}\Bigg(-\sqrt{i\,c}\,\sqrt{c^2}\,e^{\frac{i(d^2+6\,f\,d+f^2)}{4\,c}}\sum_{q=0}^{n}2^{q-n}(-i\,c)^{-n-\frac{1}{2}}(i\,(d+f))^{n-q}(-i\,(d+f+2\,c\,z))^{q+1}\left(\frac{i\,(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(d+f+2\,c\,z)^2}{4\,c}\right)-\sqrt{i\,c}\,\sqrt{c^2}\,e^{\frac{i(d^2+2\,f\,d+f^2)}{4\,c}}\sum_{q=0}^{n}2^{q-n}(-i\,c)^{-n-\frac{1}{2}}(-i\,(d-f))^{n-q}(i\,(d-f-2\,c\,z))^{q+1}\left(\frac{i\,(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(d-f-2\,c\,z)^2}{4\,c}\right)-\sqrt{-i\,c}\,\sqrt{c^2}\,e^{-\frac{i(d^2-2\,f\,d+f^2-8\,c\,g)}{4\,c}}\sum_{q=0}^{n}2^{q-n}(i\,c)^{-n-\frac{1}{2}}(-i\,(d+f))^{n-q}(i\,(d+f+2\,c\,z))^{q+1}\left(-\frac{i\,(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(d+f+2\,c\,z)^2}{4\,c}\right)-\sqrt{-i\,c}\,\sqrt{c^2}\,e^{-\frac{i(d^2-6\,f\,d+f^2-8\,c\,g)}{4\,c}}\sum_{q=0}^{n}2^{q-n}(i\,c)^{-n-\frac{1}{2}}(i\,(d-f))^{n-q}(-i\,(d-f-2\,c\,z))^{q+1}\left(-\frac{i\,(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(d-f-2\,c\,z)^2}{4\,c}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}$$

01.07.21.1528.01

$$\int z^n \cos(d\,z)\cos(\sqrt{z}\,c+g+f\,z)\,dz = (-1)^{n-1}\,2^{-2\,n-3}\,e^{-i\,g}\Bigg(e^{\frac{i(c^2+8\,d\,g-8\,f\,g)}{4(d-f)}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(-i\left(2\,(d-f)\sqrt{z}-c\right)\right)^{h+k}\left(\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(c\left(2\,(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{4\,(d-f)}\right)-2\,i\,(d-f)\sqrt{\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}}\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{4\,(d-f)}\right)\Bigg)\Bigg)(d-f)^{-2\,n-2}+e^{-\frac{i\,c^2}{4(d-f)}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\left(i\left(2\,(d-f)\sqrt{z}-c\right)\right)^{h+k}\left(-\frac{i\left(2\,(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\;(d-f)\,i\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)\right)\right)(d-f)^{-2n-2}+$$

$$e^{-\frac{i c^2}{4(d+f)}}(d+f)^{-2n-2}\left(e^{\frac{i c^2}{2(d+f)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2n}\left(-i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(-c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.2\,i\,(d+f)\sqrt{\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)+$$

$$e^{2\,i\,g}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2n}\left(i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+f)\sqrt{-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left.\left.c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \cos(d\,z+e)\cos\left(c\,z^r+f\,z+g\right)$

01.07.21.1529.01

$$\int z^n \cos(e+d\,z)\cos\left(c\,z^2+f\,z+g\right)dz = \frac{1}{8\,c^2}\left(e^{-\frac{i\,(d\,f+c\,(e+g))}{c}}\left(-\sqrt{i\,c}\,\sqrt{c^2}\,e^{\frac{i\left(d^2+6\,f\,d+f^2\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(-i\,c)^{-n-\frac{1}{2}}\,(i\,(d+f))^{n-q}\,(-i\,(d+f+2\,c\,z))^{q+1}\left(\frac{i\,(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(d+f+2\,c\,z)^2}{4\,c}\right)-\sqrt{i\,c}\,\sqrt{c^2}\,e^{\frac{i\left(d^2+2\,f\,d+f^2+8\,c\,e\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(-i\,c)^{-n-\frac{1}{2}}\,(-i\,(d-f))^{n-q}\,(i\,(d-f-2\,c\,z))^{q+1}\left(\frac{i\,(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(d-f-2\,c\,z)^2}{4\,c}\right)-\sqrt{-i\,c}\,\sqrt{c^2}\,e^{-\frac{i\left(d^2-2\,f\,d+f^2-8\,c\,e-8\,c\,g\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(i\,c)^{-n-\frac{1}{2}}\,(-i\,(d+f))^{n-q}\,(i\,(d+f+2\,c\,z))^{q+1}\left(-\frac{i\,(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(d+f+2\,c\,z)^2}{4\,c}\right)-\sqrt{-i\,c}\,\sqrt{c^2}\,e^{-\frac{i\left(d^2-6\,f\,d+f^2-8\,c\,g\right)}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(i\,c)^{-n-\frac{1}{2}}\,(i\,(d-f))^{n-q}\,(-i\,(d-f-2\,c\,z))^{q+1}\left(-\frac{i\,(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(d-f-2\,c\,z)^2}{4\,c}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

01.07.21.1530.01

$$\int z^n \cos(e+d\,z)\cos\left(\sqrt{z}\;c+f\,z+g\right)dz = (-1)^{n-1}\,2^{-2\,n-3}\,e^{-i\,(e+g)}\left(e^{\frac{i\left(c^2+8\,d\,g-8\,f\,g\right)}{4\,(d-f)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c)^{-h-k+2\,n}\left(-i\left(2\,(d-f)\sqrt{z}\;-c\right)\right)^{h+k}\left(\frac{i\left(2\,(d-f)\sqrt{z}\;-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\left(2\,(d-f)\sqrt{z}\;-c\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\frac{i\left(2\,(d-f)\sqrt{z}\;-c\right)^2}{4\,(d-f)}\right)-2\,i\,(d-f)\sqrt{\frac{i\left(2\,(d-f)\sqrt{z}\;-c\right)^2}{d-f}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\frac{i\left(2\,(d-f)\sqrt{z}\;-c\right)^2}{4\,(d-f)}\right)\right)\right)(d-f)^{-2\,n-2}+e^{-\frac{i\left(c^2-8\,d\,e+8\,e\,f\right)}{4\,(d-f)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c)^{-h-k+2\,n}\left(i\left(2\,(d-f)\sqrt{z}\;-c\right)\right)^{h+k}\left(-\frac{i\left(2\,(d-f)\sqrt{z}\;-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\,(d-f)\,i\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)\right)\right)(d-f)^{-2n-2}+$$

$$e^{-\frac{i c^2}{4(d+f)}}(d+f)^{-2n-2}\left(e^{\frac{i c^2}{2(d+f)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i c)^{-h-k+2n}\left(-i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(-c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.2\,i\,(d+f)\sqrt{\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)+$$

$$e^{2i(e+g)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i c)^{-h-k+2n}\left(i\left(c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+f)\sqrt{-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left.c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n\cos\left(b\,z^r\right)\cos\left(c\,z^r+f\,z+g\right)$

01.07.21.1531.01

$$\int z^n \cos(b z^2) \cos(c z^2 + f z + g)\, dz = \left(e^{-\frac{i(2 g b^2 + f^2 b - 2 c^2 g)}{2(b-c)(b+c)}} \left(-\sqrt{i(b-c)} \sqrt{(b+c)^2}\, e^{\frac{i(8 g b^2 + 3 f^2 b + c(f^2 - 8 c g))}{4(b-c)(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i(b-c))^{-n-\frac{1}{2}} (-i f)^{n-q} (-i(-f + 2 b z - 2 c z))^{q+1} \left(\frac{i(-f + 2 b z - 2 c z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-f + 2 b z - 2 c z)^2}{4(b-c)}\right) - \sqrt{-i(b-c)} \sqrt{(b+c)^2}\, e^{\frac{i f^2}{4(b+c)}} \sum_{q=0}^{n} 2^{q-n} (i(b-c))^{-n-\frac{1}{2}} (i f)^{n-q} (i(-f + 2 b z - 2 c z))^{q+1} \left(-\frac{i(-f + 2 b z - 2 c z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-f + 2 b z - 2 c z)^2}{4(b-c)}\right) - \sqrt{(b-c)^2} \sqrt{i(b+c)}\, e^{\frac{i(3 b f^2 - c f^2)}{4(b-c)(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i(b+c))^{-n-\frac{1}{2}} (i f)^{n-q} (-i(f + 2(b+c) z))^{q+1} \left(\frac{i(f + 2(b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(f + 2(b+c) z)^2}{4(b+c)}\right) - \sqrt{(b-c)^2} \sqrt{-i(b+c)}\, e^{\frac{i(f^2 + 8 b g - 8 c g)}{4(b-c)}} \sum_{q=0}^{n} 2^{q-n} (i(b+c))^{-n-\frac{1}{2}} (-i f)^{n-q} (i(f + 2(b+c) z))^{q+1} \left(-\frac{i(f + 2(b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(f + 2(b+c) z)^2}{4(b+c)}\right)\right)\right) \Big/ \left(8 \sqrt{(b-c)^2} \sqrt{(b+c)^2}\right) /; n \in \mathbb{N}$$

01.07.21.1532.01

$$\int z^n \cos(b \sqrt{z}) \cos(\sqrt{z}\, c + f z + g)\, dz = 2^{-2n-3} e^{-i g} f^{-2n-2} (-1)^n \left(e^{-\frac{i(b+c)^2}{4 f}} \left(-e^{\frac{i(b+c)^2}{2 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i(b+c))^{-h-k+2n} \left(-i\left(b + c + 2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((-b-c)\left(b + c + 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{\frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right) - \right.\right.$$

$$e^{2 i g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b+c))^{-h-k+2n} \left(i \left(b+c+2 f \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((-b-c) \left(b+c+2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right) + \right.$$

$$\left.\left. 2 \sqrt{-\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{f}} \; f \, i \, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) -$$

$$e^{\frac{i (b-c)^2}{4 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b-c))^{-h-k+2n} \left(i \left(b-c-2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((c-b) \left(b-c-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right) - \right.$$

$$\left.\left. 2 \, i \, f \sqrt{\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}} \; \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) -$$

$$e^{-\frac{i \left(b^2-2 c b+c^2-8 f g\right)}{4 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b-c))^{-h-k+2n} \left(-i \left(b-c-2 f \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((c-b) \left(b-c-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right) + \right.$$

$$\left.\left. 2 \sqrt{-\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}} \; f \, i \, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \cos(b z^r + e) \cos(c z^r + f z + g)$

01.07.21.1533.01

$$\int z^n \cos(b z^2 + e) \cos(c z^2 + f z + g) \, dz = \left(e^{-\frac{i(2(e+g) b^2 + f^2 b - 2 c^2 (e+g))}{2(b-c)(b+c)}} \left(-\sqrt{i(b-c)} \sqrt{(b+c)^2} \, e^{\frac{i(8 g b^2 + 3 f^2 b + c(f^2 - 8 c g))}{4(b-c)(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i(b-c))^{-n-\frac{1}{2}} (-i f)^{n-q} (-i(-f + 2 b z - 2 c z))^{q+1} \left(\frac{i(-f + 2 b z - 2 c z)^2}{b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-f + 2 b z - 2 c z)^2}{4(b-c)} \right) - \sqrt{-i(b-c)} \sqrt{(b+c)^2} \, e^{\frac{i(f^2 + 8 b e + 8 c e)}{4(b+c)}} \sum_{q=0}^{n} 2^{q-n} (i(b-c))^{-n-\frac{1}{2}} (i f)^{n-q} (i(-f + 2 b z - 2 c z))^{q+1} \left(-\frac{i(-f + 2 b z - 2 c z)^2}{b-c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-f + 2 b z - 2 c z)^2}{4(b-c)} \right) - \sqrt{(b-c)^2} \sqrt{i(b+c)} \, e^{\frac{i(3 b f^2 - c f^2)}{4(b-c)(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i(b+c))^{-n-\frac{1}{2}} (i f)^{n-q} (-i(f + 2(b+c) z))^{q+1} \left(\frac{i(f + 2(b+c) z)^2}{b+c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(f + 2(b+c) z)^2}{4(b+c)} \right) - \sqrt{(b-c)^2} \sqrt{-i(b+c)} \, e^{\frac{i(f^2 - 8 c e - 8 c g + 8 b(e+g))}{4(b-c)}} \sum_{q=0}^{n} 2^{q-n} (i(b+c))^{-n-\frac{1}{2}} (-i f)^{n-q} (i(f + 2(b+c) z))^{q+1} \left(-\frac{i(f + 2(b+c) z)^2}{b+c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(f + 2(b+c) z)^2}{4(b+c)} \right) \right) \right) \Big/ \left(8 \sqrt{(b-c)^2} \sqrt{(b+c)^2} \right) /; n \in \mathbb{N}$$

01.07.21.1534.01

$$\int z^n \cos(\sqrt{z}\, b + e) \cos(\sqrt{z}\, c + f z + g) \, dz = 2^{-2n-3} e^{-i(e+g)} f^{-2n-2} (-1)^n \left(e^{-\frac{i(b+c)^2}{4 f}} \left(-e^{\frac{i(b+c)^2}{2 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i(b+c))^{-h-k+2n} \left(-i\left(b + c + 2 f \sqrt{z}\right) \right)^{h+k} \left(\frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((-b-c)\left(b + c + 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{4 f} \right) - 2 i f \sqrt{\frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{f}} \, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b + c + 2 f \sqrt{z}\right)^2}{4 f} \right) \right) - \right.\right.$$

$$e^{2 i (e+g)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b+c))^{-h-k+2n} \left(i \left(b+c+2 f \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((-b-c) \left(b+c+2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right) + \right.$$

$$\left. 2 \sqrt{-\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{f}} \, f \, i \, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right)\right) -$$

$$e^{\frac{i \left(b^2-2 c b+c^2+8 e f\right)}{4 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b-c))^{-h-k+2n} \left(i \left(b-c-2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((c-b) \left(b-c-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right) - \right.$$

$$\left. 2 \, i \, f \sqrt{\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}} \, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\right) -$$

$$e^{-\frac{i \left(b^2-2 c b+c^2-8 f g\right)}{4 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b-c))^{-h-k+2n} \left(-i \left(b-c-2 f \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((c-b) \left(b-c-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right) + \right.$$

$$\left. \left. 2 \sqrt{-\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{f}} \, f \, i \, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \cos\left(b z^r + d z + e\right) \cos\left(c z^r + f z + g\right)$

01.07.21.1535.01

$$\int z^n \cos\left(b z^2 + d z\right) \cos\left(c z^2 + f z + g\right) dz = \left(e^{-\frac{i\left(2 g b^2 + \left(d^2+f^2\right) b - 2 c (d f + c g)\right)}{2 (b-c)(b+c)}} \left(-\sqrt{i (b-c)} \sqrt{(b+c)^2}\, e^{\frac{i\left(8 g b^2 + \left(3 d^2 - 2 f d + 3 f^2\right) b + c\left(d^2 - 6 f d + f^2 - 8 c g\right)\right)}{4 (b-c)(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i (b-c))^{-n-\frac{1}{2}} (i (d-f))^{n-q} (-i (d - f + 2 b z - 2 c z))^{q+1} \left(\frac{i (d - f + 2 b z - 2 c z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d - f + 2 b z - 2 c z)^2}{4 (b-c)}\right) - \sqrt{-i (b-c)} \sqrt{(b+c)^2}\, e^{\frac{i (d+f)^2}{4 (b+c)}} \sum_{q=0}^{n} 2^{q-n} (i (b-c))^{-n-\frac{1}{2}} (-i (d-f))^{n-q} (i (d - f + 2 b z - 2 c z))^{q+1} \left(-\frac{i (d - f + 2 b z - 2 c z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d - f + 2 b z - 2 c z)^2}{4 (b-c)}\right) - \sqrt{(b-c)^2} \sqrt{i (b+c)}\, e^{\frac{i\left(b\left(3 d^2 + 2 f d + 3 f^2\right) - c\left(d^2 + 6 f d + f^2\right)\right)}{4 (b-c)(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-i (b+c))^{-n-\frac{1}{2}} (i (d+f))^{n-q} (-i (d + f + 2 (b+c) z))^{q+1} \left(\frac{i (d + f + 2 (b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + f + 2 (b+c) z)^2}{4 (b+c)}\right) - \sqrt{(b-c)^2} \sqrt{-i (b+c)}\, e^{\frac{i\left(d^2 - 2 f d + f^2 + 8 b g - 8 c g\right)}{4 (b-c)}} \sum_{q=0}^{n} 2^{q-n} (i (b+c))^{-n-\frac{1}{2}} (-i (d+f))^{n-q} (i (d + f + 2 (b+c) z))^{q+1} \left(-\frac{i (d + f + 2 (b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + f + 2 (b+c) z)^2}{4 (b+c)}\right)\right)\right) \Big/ \left(8 \sqrt{(b-c)^2} \sqrt{(b+c)^2}\right) /;\ n \in \mathbb{N}$$

01.07.21.1536.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \cos\left(\sqrt{z}\, c + f z + g\right) dz = 2^{-2 n - 3} e^{-i g} \left(-\frac{1}{(d-f)^2} \left(e^{\frac{i\left(b^2 - 2 c b + c^2 + 8 d g - 8 f g\right)}{4 (d-f)}} (-i (d-f))^{-2 n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b-c))^{-h-k+2 n} \left(-i\left(b - c + 2 (d-f) \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b - c + 2 (d-f) \sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}\right.\right.$$

$$\left((c-b)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)-\right.$$

$$\left.\left.2\,i\,(d-f)\sqrt{\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right)-$$

$$\frac{1}{(d-f)^2}\left(e^{-\frac{i\left(b^2-2cb+c^2\right)}{4(d-f)}}\,(i\,(d-f))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-c))^{-h-k+2n}\left(i\left(b-c+2(d-f)\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((c-b)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\ (d-f)\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right)+$$

$$e^{-\frac{i(b+c)^2}{4(d+f)}}\left((d+f)^2\right)^{-2n-1}\left(-e^{2ig}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+c))^{-h-k+2n}\left(i\left(b+c+2(d+f)\sqrt{z}\right)\right)^{h+k}\right.\right.$$

$$\left(-\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2(d+f)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+2\sqrt{-\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\ (d+f)$$

$$\left.\left.\left.i\,\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)(-i\,(d+f))^{2n}-e^{\frac{i(b+c)^2}{2(d+f)}}\,(i\,(d+f))^{2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^{k}\,(-i\,(b+c))^{-h-k+2\,n}\left(-i\left(b+c+2\,(d+f)\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^{2}}{d+f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c)\left(b+c+2\,(d+f)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^{2}}{4\,(d+f)}\right)-\right.$$

$$\left.\left.\left.2\,i\,(d+f)\sqrt{\frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^{2}}{d+f}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+c+2\,(d+f)\,\sqrt{z}\right)^{2}}{4\,(d+f)}\right)\right)\right)\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n \cos(b\,z^r + d\,z + e)\cos(c\,z^r + f\,z + g)$

01.07.21.1537.01

$$\int z^n \cos\left(b z^2 + d z + e\right) \cos\left(c z^2 + f z + g\right) dz = \left(e^{-\frac{i\left(2(e+g)b^2+\left(d^2+f^2\right)b-2c(d f+c(e+g))\right)}{2(b-c)(b+c)}} \left(-\sqrt{i(b-c)}\,\sqrt{(b+c)^2}\, e^{\frac{i\left(8 g b^2+\left(3 d^2-2 f d+3 f^2\right)b+c\left(d^2-6 f d+f^2-8 c g\right)\right)}{4(b-c)(b+c)}} \right.\right.$$

$$\sum_{q=0}^n 2^{q-n} (-i(b-c))^{-n-\frac{1}{2}} (i(d-f))^{n-q} (-i(d-f+2bz-2cz))^{q+1} \left(\frac{i(d-f+2bz-2cz)^2}{b-c}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d-f+2bz-2cz)^2}{4(b-c)}\right) - \sqrt{-i(b-c)}\,\sqrt{(b+c)^2}\, e^{\frac{i\left(d^2+2fd+f^2+8be+8ce\right)}{4(b+c)}}$$

$$\sum_{q=0}^n 2^{q-n} (i(b-c))^{-n-\frac{1}{2}} (-i(d-f))^{n-q} (i(d-f+2bz-2cz))^{q+1} \left(-\frac{i(d-f+2bz-2cz)^2}{b-c}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d-f+2bz-2cz)^2}{4(b-c)}\right) - \sqrt{(b-c)^2}\,\sqrt{i(b+c)}\, e^{\frac{i\left(b\left(3d^2+2fd+3f^2\right)-c\left(d^2+6fd+f^2\right)\right)}{4(b-c)(b+c)}}$$

$$\sum_{q=0}^n 2^{q-n} (-i(b+c))^{-n-\frac{1}{2}} (i(d+f))^{n-q} (-i(d+f+2(b+c)z))^{q+1} \left(\frac{i(d+f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+f+2(b+c)z)^2}{4(b+c)}\right) - \sqrt{(b-c)^2}\,\sqrt{-i(b+c)}\, e^{\frac{i\left(d^2-2fd+f^2-8ce-8cg+8b(e+g)\right)}{4(b-c)}}$$

$$\sum_{q=0}^n 2^{q-n} (i(b+c))^{-n-\frac{1}{2}} (-i(d+f))^{n-q} (i(d+f+2(b+c)z))^{q+1} \left(-\frac{i(d+f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+f+2(b+c)z)^2}{4(b+c)}\right)\right)\right) \Big/ \left(8\sqrt{(b-c)^2}\,\sqrt{(b+c)^2}\right) /;\, n \in \mathbb{N}$$

01.07.21.1538.01

$$\int z^n \cos\left(\sqrt{z}\, b + e + d z\right) \cos\left(\sqrt{z}\, c + g + f z\right) dz = 2^{-2n-3} e^{-i(e+g)} \left(-\frac{1}{(d-f)^2} \left(e^{\frac{i\left(b^2-2cb+c^2+8dg-8fg\right)}{4(d-f)}} (-i(d-f))^{-2n} \sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (-i(b-c))^{-h-k+2n} \right.\right.$$

$$\left(-i\left(b-c+2(d-f)\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(-(b-c)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)-\right.$$

$$\left.\left.\left.2\,i\,(d-f)\sqrt{\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right)\right)-$$

$$\frac{1}{(d-f)^2}\left(e^{-\frac{i\left(b^2-2cb+c^2-8de+8ef\right)}{4(d-f)}}\,(i(d-f))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i(b-c))^{-h-k+2n}\left(i\left(b-c+2(d-f)\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,(d-f)\sqrt{-\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)-\right.$$

$$\left.\left.\left.(b-c)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right)\right)+e^{-\frac{i(b+c)^2}{4(d+f)}}\left((d+f)^2\right)^{-2n-1}$$

$$\left(-e^{2i(e+g)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i(b+c))^{-h-k+2n}\left(i\left(b+c+2(d+f)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+f)\sqrt{-\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left.(b+c)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)(-i(d+f))^{2n}-$$

$$e^{\frac{i(b+c)^2}{2(d+f)}}\,(i(d+f))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i(b+c))^{-h-k+2n}\left(-i\left(b+c+2(d+f)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(-(b+c)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)-\right.$$

$$\left.\left.\left. 2\,i\,(d+f)\sqrt{\frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\;\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\right)\right)/;\, n\in\mathbb{N}$$

Involving products of several direct functions and a power function

Involving $z^{\alpha-1}\cos(a\,z)\cos(b\,z)\cos(c\,z)$

01.07.21.1539.01

$$\int z^{\alpha-1}\cos(a\,z)\cos(b\,z)\cos(c\,z)\,dz = \frac{1}{8}z^\alpha\left(-(-i(a-b-c)z)^{-\alpha}\Gamma(\alpha,-i(a-b-c)z)-(i(a-b-c)z)^{-\alpha}\Gamma(\alpha,i(a-b-c)z)-(-i(a+b-c)z)^{-\alpha}\Gamma(\alpha,-i(a+b-c)z)-(i(a+b-c)z)^{-\alpha}\Gamma(\alpha,i(a+b-c)z)-(-i(a-b+c)z)^{-\alpha}\Gamma(\alpha,-i(a-b+c)z)-(i(a-b+c)z)^{-\alpha}\Gamma(\alpha,i(a-b+c)z)-(-i(a+b+c)z)^{-\alpha}\Gamma(\alpha,-i(a+b+c)z)-(i(a+b+c)z)^{-\alpha}\Gamma(\alpha,i(a+b+c)z)\right)$$

01.07.21.1540.01

$$\int\frac{\cos(a\,z)\cos(b\,z)\cos(c\,z)}{z}\,dz = \frac{1}{4}\left(\operatorname{Ci}((a-b-c)z)+\operatorname{Ci}((a+b-c)z)+\operatorname{Ci}((a-b+c)z)+\operatorname{Ci}((a+b+c)z)\right)$$

Involving $z^{\alpha-1}\prod_{k=1}^n\cos(a_k\,z)$

01.07.21.1541.01

$$\int z^{\alpha-1}\prod_{k=1}^n\cos(a_k\,z)\,dz = -2^{-n-1}z^\alpha\sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1}\sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1}\cdots\sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1}\left(\left(\Gamma\left(\alpha, i\,z\sum_{j=1}^n k_j\,a_j\right)\left(i\,a\sum_{j=1}^n k_j\,a_j\right)^{-\alpha}+\Gamma\left(\alpha,-i\,z\sum_{j=1}^n k_j\,a_j\right)\left(-i\,z\sum_{j=1}^n k_j\,a_j\right)^{-\alpha}\right)\right)$$

01.07.21.1542.01

$$\int\frac{1}{z}\prod_{k=1}^n\cos(a_k\,z)\,dz = 2^{-n}\sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1}\sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1}\cdots\sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1}\operatorname{Ci}\left(z\sum_{j=1}^n k_j\,a_j\right)$$

Involving products of powers of the direct function and a power function

Involving product of power of the direct function, the direct function and a power function

Involving $z^{\alpha-1}\cos(c\,z)\cos^{\nu}(a\,z)$

01.07.21.1543.01

$$\int z^{\alpha-1}\cos(c\,z)\cos^{\nu}(a\,z)\,dz = 2^{-\nu-1}z^{\alpha}\left(\binom{\nu}{\frac{\nu}{2}}(E_{1-\alpha}(-i\,c\,z)+E_{1-\alpha}(i\,c\,z))\,(\nu \bmod 2-1)-\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}(E_{1-\alpha}(-i\,(c-2\,a\,s+a\,\nu)\,z)+E_{1-\alpha}(i\,(c-2\,a\,s+a\,\nu)\,z)+E_{1-\alpha}(-i\,(c+2\,a\,s-a\,\nu)\,z)+E_{1-\alpha}(i\,(c+2\,a\,s-a\,\nu)\,z))\right)\,/;\,\nu\in\mathbb{N}^{+}$$

01.07.21.1544.01

$$\int z^{n}\cos(c\,z)\cos^{\nu}(a\,z)\,dz = \frac{1}{2}\left(1+e^{2\,i\,a\,z}\right)^{-\nu}\cos^{\nu}(a\,z)\,n!\left(e^{i\,c\,z}\sum_{p=0}^{n}\frac{(-1)^{p}\,z^{n-p}\,(i\,c-i\,a\,\nu)^{-p-1}}{(n-p)!}\;{}_{p+2}F_{p+1}\!\left(\frac{c-a\,\nu}{2\,a},\,\ldots,\,\frac{c-a\,\nu}{2\,a},\,-\nu;\,\frac{c-a\,\nu}{2\,a}+1,\,\ldots,\,\frac{c-a\,\nu}{2\,a}+1;\,-e^{2\,i\,a\,z}\right)+e^{-i\,c\,z}\sum_{p=0}^{n}\frac{(-1)^{p}\,z^{n-p}\,(-i\,c-i\,a\,\nu)^{-p-1}}{(n-p)!}\;{}_{p+2}F_{p+1}\!\left(-\frac{c+a\,\nu}{2\,a},\,\ldots,\,-\frac{c+a\,\nu}{2\,a},\,-\nu;\,1-\frac{c+a\,\nu}{2\,a},\,\ldots,\,1-\frac{c+a\,\nu}{2\,a};\,-e^{2\,i\,a\,z}\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^{\alpha-1}\cos(c\,z+d)\cos^{\nu}(a\,z)$

01.07.21.1545.01

$$\int z^{\alpha-1}\cos(d+c\,z)\cos^{\nu}(a\,z)\,dz = 2^{-\nu-1}z^{\alpha}\left(e^{-i\,d}\binom{\nu}{\frac{\nu}{2}}\left(e^{2\,i\,d}E_{1-\alpha}(-i\,c\,z)+E_{1-\alpha}(i\,c\,z)\right)(\nu \bmod 2-1)-\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i\,d}\binom{\nu}{s}\left(e^{2\,i\,d}E_{1-\alpha}(-i\,(c-2\,a\,s+a\,\nu)\,z)+E_{1-\alpha}(i\,(c-2\,a\,s+a\,\nu)\,z)+e^{2\,i\,d}E_{1-\alpha}(-i\,(c+2\,a\,s-a\,\nu)\,z)+E_{1-\alpha}(i\,(c+2\,a\,s-a\,\nu)\,z)\right)\right)\,/;\,\nu\in\mathbb{N}^{+}$$

01.07.21.1546.01

$$\int z^{n}\cos(d+c\,z)\cos^{\nu}(a\,z)\,dz = \frac{1}{2}\left(1+e^{2\,i\,a\,z}\right)^{-\nu}\cos^{\nu}(a\,z)\,n!\left(e^{-i\,d-i\,c\,z}\sum_{p=0}^{n}\frac{(-1)^{p}\,z^{n-p}\,(-i\,c-i\,a\,\nu)^{-p-1}}{(n-p)!}\;{}_{p+2}F_{p+1}\!\left(-\frac{c+a\,\nu}{2\,a},\,\ldots,\,-\frac{c+a\,\nu}{2\,a},\,-\nu;\,-\frac{c+a\,\nu}{2\,a}+1,\,\ldots,\,-\frac{c+a\,\nu}{2\,a}+1;\,-e^{2\,i\,a\,z}\right)+e^{i\,d+i\,c\,z}\sum_{p=0}^{n}\frac{(-1)^{p}\,z^{n-p}\,(i\,c-i\,a\,\nu)^{-p-1}}{(n-p)!}\;{}_{p+2}F_{p+1}\!\left(\frac{c-a\,\nu}{2\,a},\,\ldots,\,\frac{c-a\,\nu}{2\,a},\,-\nu;\,\frac{c-a\,\nu}{2\,a}+1,\,\ldots,\,\frac{c-a\,\nu}{2\,a}+1;\,-e^{2\,i\,a\,z}\right)\right)\,/;\,n\in\mathbb{N}^{+}$$

Involving $z^{\alpha-1}\cos(c\,z)\cos^{\nu}(a\,z+b)$

01.07.21.1547.01

$$\int z^{\alpha-1}\cos(c\,z)\cos^{\nu}(b+a\,z)\,dz = 2^{-\nu-1} z^{\alpha}\left(\binom{\nu}{\frac{\nu}{2}}(E_{1-\alpha}(-i\,c\,z)+E_{1-\alpha}(i\,c\,z))(\nu \bmod 2-1)-\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i\,b\,(2\,s+\nu)}\binom{\nu}{s}\left(e^{2\,i\,b\,\nu}E_{1-\alpha}(-i\,(c-2\,a\,s+a\,\nu)\,z)+ e^{4\,i\,b\,s}E_{1-\alpha}(i\,(c-2\,a\,s+a\,\nu)\,z)+e^{4\,i\,b\,s}E_{1-\alpha}(-i\,(c+2\,a\,s-a\,\nu)\,z)+e^{2\,i\,b\,\nu}E_{1-\alpha}(i\,(c+2\,a\,s-a\,\nu)\,z)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1548.01

$$\int z^{n}\cos(c\,z)\cos^{\nu}(a\,z+b)\,dz = \frac{1}{2}\left(1+e^{2\,i\,(a\,z+b)}\right)^{-\nu}\cos^{\nu}(a\,z+b)\,n!\left(e^{-i\,c\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-i\,c-i\,a\,\nu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{c+a\,\nu}{2\,a},\,\ldots,\,-\frac{c+a\,\nu}{2\,a},\,-\nu;\,-\frac{c+a\,\nu}{2\,a}+1,\,\ldots,\,-\frac{c+a\,\nu}{2\,a}+1;\,-e^{2\,i\,(a\,z+b)}\right)+ e^{i\,c\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(i\,c-i\,a\,\nu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(\frac{c-a\,\nu}{2\,a},\,\ldots,\,\frac{c-a\,\nu}{2\,a},\,-\nu;\,\frac{c-a\,\nu}{2\,a}+1,\,\ldots,\,\frac{c-a\,\nu}{2\,a}+1;\,-e^{2\,i\,(a\,z+b)}\right)\right)\;/;\;n\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos(c\,z+d)\cos^{\nu}(a\,z+b)$

01.07.21.1549.01

$$\int z^{\alpha-1}\cos(d+c\,z)\cos^{\nu}(b+a\,z)\,dz = 2^{-\nu-1} z^{\alpha}\left(e^{-i\,d}\binom{\nu}{\frac{\nu}{2}}\left(e^{2\,i\,d}E_{1-\alpha}(-i\,c\,z)+E_{1-\alpha}(i\,c\,z)\right)(\nu \bmod 2-1)-\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i\,(d+b\,(2\,s+\nu))}\binom{\nu}{s}\left(e^{2\,i\,(d+b\,\nu)}E_{1-\alpha}(-i\,(c-2\,a\,s+a\,\nu)\,z)+e^{4\,i\,b\,s}E_{1-\alpha}(i\,(c-2\,a\,s+a\,\nu)\,z)+ e^{2\,i\,(d+2\,b\,s)}E_{1-\alpha}(-i\,(c+2\,a\,s-a\,\nu)\,z)+e^{2\,i\,b\,\nu}E_{1-\alpha}(i\,(c+2\,a\,s-a\,\nu)\,z)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1550.01

$$\int z^{n}\cos(d+c\,z)\cos^{\nu}(a\,z+b)\,dz = \frac{1}{2}\left(1+e^{2\,i\,(a\,z+b)}\right)^{-\nu}\cos^{\nu}(a\,z+b)\,n!\left(e^{-i\,d-i\,c\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-i\,c-i\,a\,\nu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{c+a\,\nu}{2\,a},\,\ldots,\,-\frac{c+a\,\nu}{2\,a},\,-\nu;\,-\frac{c+a\,\nu}{2\,a}+1,\,\ldots,\,-\frac{c+a\,\nu}{2\,a}+1;\,-e^{2\,i\,(a\,z+b)}\right)+e^{i\,d+i\,c\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(i\,c-i\,a\,\nu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(\frac{c-a\,\nu}{2\,a},\,\ldots,\,\frac{c-a\,\nu}{2\,a},\,-\nu;\,\frac{c-a\,\nu}{2\,a}+1,\,\ldots,\,\frac{c-a\,\nu}{2\,a}+1;\,-e^{2\,i\,(a\,z+b)}\right)\right)\;/;\;n\in\mathbb{N}^+$$

Involving $z^n \cos(b z^r) \cos^\nu(c z)$

01.07.21.1551.01

$$\int z^n \cos(b z^2) \cos^\nu(c z)\, dz = -2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{n+1}{2}, -i b z^2\right) \left(-i b z^2\right)^{\frac{1}{2}(-n-1)} + \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2) z^{n+1} - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i c^2 (\nu-2s)^2}{4b}} \left(\sum_{j=0}^{n} 2^{j-n} (i c (\nu-2s))^{n-j} (-i c (\nu-2s) - 2 i b z)^{j+1} \left(-\frac{i (-i c (\nu-2s) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i c (\nu-2s) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + e^{\frac{i c^2 (\nu-2s)^2}{4b}} \left(\sum_{j=0}^{n} 2^{j-n} (-i c (\nu-2s))^{n-j} (i c (\nu-2s) - 2 i b z)^{j+1} \left(-\frac{i (i c (\nu-2s) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (i c (\nu-2s) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{-\frac{i c^2 (\nu-2s)^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (i c (\nu-2s))^{n-j} (2 i b z - i c (\nu-2s))^{j+1} \left(\frac{i (2 i b z - i c (\nu-2s))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b z - i c (\nu-2s))^2}{4b}\right) + (i b)^{-n-1} e^{-\frac{i c^2 (\nu-2s)^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-i c (\nu-2s))^{n-j} (c i (\nu-2s) + 2 i b z)^{j+1} \left(\frac{i (c i (\nu-2s) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c i (\nu-2s) + 2 i b z)^2}{4b}\right)\right) /; n \in \mathbb{N} \wedge \nu \in \mathbb{N}^+$$

01.07.21.1552.01

$$\int z^n \cos(\sqrt{z}\, b) \cos^\nu(c z)\, dz = (-1)^n 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), -i b \sqrt{z}\right) + \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1 - \nu \bmod 2) b^{-2(n+1)} + 2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i b^2}{4 c (\nu-2s)}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-i b - 2 i c (\nu-2s) \sqrt{z}\right)^{h+j} \left(-\frac{i \left(-i b - 2 i c (\nu-2s) \sqrt{z}\right)^2}{c (\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i b \left(-i b - 2 i c (\nu-2s) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(-i b - 2 i c (\nu-2s) \sqrt{z}\right)^2}{4 c (\nu-2s)}\right) - 2 i c \right.\right.\right.$$

$$(v-2\,s)\sqrt{-\frac{i\left(-i\,b-2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\Bigg)$$

$$(-i\,c\,(v-2\,s))^{-2\,(n+1)}+e^{\frac{i\,b^2}{4\,c\,(v-2\,s)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b-2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^{h+j}\right.$$

$$\left(-\frac{i\left(i\,b-2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(i\,b\left(i\,b-2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{i\left(i\,b-2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)-2\,i\,c\,(v-2\,s)\sqrt{-\frac{i\left(i\,b-2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(i\,b-2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)(-i\,c\,(v-2\,s))^{-2\,(n+1)}+e^{-\frac{i\,b^2}{4\,c\,(v-2\,s)}}\,(i\,c\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^{h+j}\left(\frac{i\left(-i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,c\,(v-2\,s)\sqrt{\frac{i\left(-i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(-i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)-\right.$$

$$\left.i\,b\left(-i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(-i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)\right)+$$

$$e^{-\frac{i\,b^2}{4\,c\,(v-2\,s)}}\,(i\,c\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\,\right)^{h+j}$$

$$\left(\frac{i\left(i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\left(i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)+2\,c\,i\,(v-2\,s)\right.$$

$$\left.\left.\sqrt{\frac{i\left(i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)\right)/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r+e\right)\cos^v(c\,z)$

01.07.21.1553.01

$$\int z^n\cos\left(b\,z^2+e\right)\cos^v(c\,z)\,dz ==$$

$$-2^{-v-2}\binom{v}{\frac{v}{2}}\left(e^{i\,e}\,\Gamma\left(\frac{n+1}{2},\,-i\,b\,z^2\right)\left(-i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}+e^{-i\,e}\left(i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,i\,b\,z^2\right)\right)(1-v\bmod 2)\,z^{n+1}-$$

$$2^{-v-2}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{-\frac{1}{4}i\left(4\,e-\frac{c^2(v-2\,s)^2}{b}\right)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,c\,(v-2\,s))^{n-j}\,(-i\,c\,(v-2\,s)-2\,i\,b\,z)^{j+1}\right.\right.$$

$$\left.\left(-\frac{i\,(-i\,c\,(v-2\,s)-2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(-i\,c\,(v-2\,s)-2\,i\,b\,z)^2}{4\,b}\right)\right)(-i\,b)^{-n-1}+$$

$$e^{-\frac{1}{4}i\left(4\,e-\frac{c^2(v-2\,s)^2}{b}\right)}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,c\,(v-2\,s))^{n-j}\,(i\,c\,(v-2\,s)-2\,i\,b\,z)^{j+1}\left(-\frac{i\,(i\,c\,(v-2\,s)-2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(i\,c\,(v-2\,s)-2\,i\,b\,z)^2}{4\,b}\right)\right)(-i\,b)^{-n-1}+(i\,b)^{-n-1}\,e^{\frac{1}{4}i\left(4\,e-\frac{c^2(v-2\,s)^2}{b}\right)}\sum_{j=0}^{n}2^{j-n}\,(i\,c\,(v-2\,s))^{n-j}$$

$$(2\,i\,b\,z-i\,c\,(v-2\,s))^{j+1}\left(\frac{i\,(2\,i\,b\,z-i\,c\,(v-2\,s))^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(2\,i\,b\,z-i\,c\,(v-2\,s))^2}{4\,b}\right)+$$

$$(i\,b)^{-n-1}\,e^{\frac{1}{4}i\left(4\,e-\frac{c^2(v-2\,s)^2}{b}\right)}\sum_{j=0}^{n}2^{j-n}\,(-i\,c\,(v-2\,s))^{n-j}\,(c\,i\,(v-2\,s)+2\,i\,b\,z)^{j+1}$$

$$\left.\left(\frac{i\,(c\,i\,(v-2\,s)+2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(c\,i\,(v-2\,s)+2\,i\,b\,z)^2}{4\,b}\right)\right)/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

01.07.21.1554.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \cos^\nu(c\, z)\, dz ==$$

$$(-1)^n\, 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(2\,(n+1),\, -i\, b\, \sqrt{z}\right) + e^{-i e}\, \Gamma\left(2\,(n+1),\, i\, b\, \sqrt{z}\right)\right) (1 - \nu \bmod 2)\, b^{-2\,(n+1)} + 2^{-2\,n-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s}$$

$$\left(e^{\frac{i\, b^2}{4\, c\, (\nu-2\, s)} - i\, e} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2\, n} \left(-i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^{h+j} \left(-\frac{i\left(-i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^2}{c\, (\nu - 2\, s)}\right)^{\frac{1}{2}(-h-j-1)}\right.\right.$$

$$\binom{j}{h} \binom{n}{j} \left(-i\, b \left(-i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right) \Gamma\left(\frac{1}{2}\,(h+j+1),\, -\frac{i\left(-i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^2}{4\, c\, (\nu - 2\, s)}\right) - 2\, i\, c\right.$$

$$\left.\left.(\nu - 2\, s) \sqrt{-\frac{i\left(-i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^2}{c\, (\nu - 2\, s)}}\; \Gamma\left(\frac{1}{2}\,(h+j+2),\, -\frac{i\left(-i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^2}{4\, c\, (\nu - 2\, s)}\right)\right)\right)$$

$$(-i\, c\, (\nu - 2\, s))^{-2\,(n+1)} + e^{\frac{i\, b^2}{4\, c\, (\nu-2\, s)} + i\, e} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2\, n} \left(i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^2}{c\, (\nu - 2\, s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(i\, b \left(i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right) \Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{i\left(i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^2}{4\, c\, (\nu - 2\, s)}\right) - 2\, i\, c\, (\nu - 2\, s) \sqrt{-\frac{i\left(i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^2}{c\, (\nu - 2\, s)}}\; \Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(i\, b - 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^2}{4\, c\, (\nu - 2\, s)}\right)\right)\right) (-i\, c\, (\nu - 2\, s))^{-2\,(n+1)} + e^{-\frac{i\, b^2}{4\, c\, (\nu-2\, s)} - i\, e}\, (i\, c\, (\nu - 2\, s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2\, n} \left(-i\, b + 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^{h+j} \left(\frac{i\left(-i\, b + 2\, i\, c\, (\nu - 2\, s)\, \sqrt{z}\right)^2}{c\, (\nu - 2\, s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,c\,(v-2\,s)\sqrt{\frac{i\left(-i\,b+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(-i\,b+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)-\right.$$

$$\left.\left.i\,b\left(-i\,b+2\,i\,c\,(v-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(-i\,b+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)+$$

$$e^{-\frac{i\,b^2}{4\,c\,(v-2\,s)}+i\,e}\,(i\,c\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\left(i\,b+2\,i\,c\,(v-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(i\,b+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)+2\,c\,i\,(v-2\,s)\right.$$

$$\left.\left.\sqrt{\frac{i\left(i\,b+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r+d\,z\right)\cos^v(c\,z)$

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$$\int z^n \cos\left(b z^2 + d z\right) \cos^\nu(c z)\, dz == 2^{-\nu-2} \left(\frac{1}{b^{n+1}} e^{-\frac{i d^2}{4 b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) (-i)^{n+1} \right.$$

$$\sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 b z))^{q+1} \left(-\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4 b}\right) + \frac{1}{b^{n+1}} e^{\frac{i d^2}{4 b}} i^{n+1}$$

$$\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^{q+1} \left(\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4 b}\right) -$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i (d+2 c s-c \nu)^2}{4 b}} (-i b)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i (d + 2 c s - c \nu))^{n-q} (-i (d + 2 c s - c \nu + 2 b z))^{q+1} \right.$$

$$\left(\frac{i (d + 2 c s - c \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 c s - c \nu + 2 b z)^2}{4 b}\right) +$$

$$e^{\frac{i (d-2 c s+c \nu)^2}{4 b}} (-i b)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i (d - 2 c s + c \nu))^{n-q} (-i (d + c (\nu - 2 s) + 2 b z))^{q+1}$$

$$\left(\frac{i (d + c (\nu - 2 s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + c (\nu - 2 s) + 2 b z)^2}{4 b}\right) +$$

$$(i b)^{-n-1} e^{-\frac{i (d+2 c s-c \nu)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (-i (d + 2 c s - c \nu))^{n-q} (i (d + 2 c s - c \nu + 2 b z))^{q+1}$$

$$\left(-\frac{i (d + 2 c s - c \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 c s - c \nu + 2 b z)^2}{4 b}\right) +$$

$$(i b)^{-n-1} e^{-\frac{i (d-2 c s+c \nu)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (-i (d - 2 c s + c \nu))^{n-q} (i (d + c (\nu - 2 s) + 2 b z))^{q+1}$$

$$\left.\left.\left(-\frac{i (d + c (\nu - 2 s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + c (\nu - 2 s) + 2 b z)^2}{4 b}\right)\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \cos^\nu(c z)\, dz ==$$

$$-2^{-2 n-\nu-2} d^{-2 (n+1)} e^{-\frac{i b^2}{4 d}} \left(e^{\frac{i b^2}{4 d}} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{i b^2}{4 (d-2 c s+c \nu)}} \left((d - 2 c s + c \nu)^2\right)^{-2 n-1} \left(\left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2 n} \right.\right.\right.\right.\right.$$

$$\left(i\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)^2}{d-2cs+cv}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2i\left(d-2cs+cv\right)\sqrt{-\frac{i\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)^2}{d-2cs+cv}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)^2}{4\left(d-2cs+cv\right)}\right)-b\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)^2}{4\left(d-2cs+cv\right)}\right)\right)\right)\right)\left(-i\left(d-2cs+cv\right)\right)^{2n}+$$

$$e^{\frac{ib^2}{2(d-2cs+cv)}}\left(i\left(d-2cs+cv\right)\right)^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-ib)^{-h-k+2n}\left(-i\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)^2}{d-2cs+cv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-b\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)^2}{4\left(d-2cs+cv\right)}\right)-2i\left(d-2cs+cv\right)$$

$$\left.\left.\left.\sqrt{\frac{i\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)^2}{d-2cs+cv}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(b+2\left(d-2cs+cv\right)\sqrt{z}\right)^2}{4\left(d-2cs+cv\right)}\right)\right)\right)\right)+$$

$$\frac{1}{\left(d+2cs-cv\right)^2}\left(e^{\frac{ib^2}{4(d+2cs-cv)}}\left(i\left(d+2cs-cv\right)\right)^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-ib)^{-h-k+2n}\right.$$

$$\left(-i\left(b+2\left(d+2cs-cv\right)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2\left(d+2cs-cv\right)\sqrt{z}\right)^2}{d+2cs-cv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\left(b+2\left(d+2cs-cv\right)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+2\left(d+2cs-cv\right)\sqrt{z}\right)^2}{4\left(d+2cs-cv\right)}\right)-\right.$$

$$2\,i\,(d+2\,c\,s-c\,v)\sqrt{\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{d+2\,c\,s-c\,v}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(d+2\,c\,s-c\,v)}\right)\right)\right)\right)+\frac{1}{(d+2\,c\,s-c\,v)^2}$$

$$\left(e^{-\frac{i\,b^2}{4\,(d+2\,c\,s-c\,v)}}\,(i\,(d+2\,c\,s-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\left(i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{d+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+2\,c\,s-c\,v)\right.$$

$$\sqrt{-\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{d+2\,c\,s-c\,v}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(d+2\,c\,s-c\,v)}\right)-$$

$$\left.\left.\left.\left.b\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(d+2\,c\,s-c\,v)}\right)\right)\right)\right)\right)$$

$$d^{2\,n+2}+(-1)^n\,e^{\frac{i\,b^2}{2\,d}}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,d\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(b\left(b+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.\left.2\sqrt{\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$(-1)^n \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i \left(b + 2\, d \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b + 2\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(b \left(b + 2\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1), -\frac{i \left(b + 2\, d \sqrt{z}\right)^2}{4\, d}\right) - \right.$$

$$\left. \left. 2\, i\, d \sqrt{-\frac{i \left(b + 2\, d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h + k + 2), -\frac{i \left(b + 2\, d \sqrt{z}\right)^2}{4\, d}\right)\right)\right) /;\, n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

Involving $z^n \cos\left(b\, z^r + d\, z + e\right) \cos^\nu(c\, z)$

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$$\int z^n \cos\left(b z^2 + d z + e\right) \cos^\nu(c z)\, dz = 2^{-\nu-2} \Bigg(\frac{1}{b^{n+1}} e^{i e - \frac{i d^2}{4 b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) (-i)^{n+1}$$

$$\Bigg(\sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 b z))^{q+1} \left(-\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4 b} \right) \Bigg) + \frac{1}{b^{n+1}} \Bigg(e^{\frac{i (d^2 - 4 b e)}{4 b}} i^{n+1}$$

$$\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^{q+1} \left(\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4 b} \right) \Bigg) -$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i e} \binom{\nu}{s} \Bigg(e^{\frac{i (d + 2 c s - c \nu)^2}{4 b}} \Bigg(\sum_{q=0}^{n} 2^{q-n} (i (d + 2 c s - c \nu))^{n-q} (-i (d + 2 c s - c \nu + 2 b z))^{q+1}$$

$$\left(\frac{i (d + 2 c s - c \nu + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 c s - c \nu + 2 b z)^2}{4 b} \right) \Bigg) (-i b)^{-n-1} +$$

$$e^{\frac{i (d - 2 c s + c \nu)^2}{4 b}} \Bigg(\sum_{q=0}^{n} 2^{q-n} (i (d - 2 c s + c \nu))^{n-q} (-i (d + c (\nu - 2 s) + 2 b z))^{q+1} \left(\frac{i (d + c (\nu - 2 s) + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + c (\nu - 2 s) + 2 b z)^2}{4 b} \right) \Bigg) (-i b)^{-n-1} +$$

$$(i b)^{-n-1} e^{\frac{1}{4} i \left(-\frac{(d + 2 c s - c \nu)^2}{b} + 8 e \right)} \sum_{q=0}^{n} 2^{q-n} (-i (d + 2 c s - c \nu))^{n-q} (i (d + 2 c s - c \nu + 2 b z))^{q+1}$$

$$\left(-\frac{i (d + 2 c s - c \nu + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 c s - c \nu + 2 b z)^2}{4 b} \right) +$$

$$(i b)^{-n-1} e^{2 i e - \frac{i (d - 2 c s + c \nu)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (-i (d - 2 c s + c \nu))^{n-q} (i (d + c (\nu - 2 s) + 2 b z))^{q+1}$$

$$\left(-\frac{i (d + c (\nu - 2 s) + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + c (\nu - 2 s) + 2 b z)^2}{4 b} \right) \Bigg) \Bigg) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1558.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z + e\right) \cos^\nu(c z)\, dz =$$

$$-2^{-2 n - \nu - 2} d^{-2 (n+1)} e^{-\frac{i (b^2 + 4 d e)}{4 d}} \Bigg(e^{\frac{i (b^2 + 4 d e)}{4 d}} \Bigg(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i e} \binom{\nu}{s} \Bigg(e^{-\frac{i b^2}{4 (d - 2 c s + c \nu)}} \left((d - 2 c s + c \nu)^2 \right)^{-2 n - 1} \Bigg(e^{2 i e} \Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k$$

$$(i\,b)^{-h-k+2n}\left(i\left(b+2(d-2cs+cv)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2(d-2cs+cv)\sqrt{z}\right)^2}{d-2cs+cv}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d-2cs+cv)\sqrt{-\frac{i\left(b+2(d-2cs+cv)\sqrt{z}\right)^2}{d-2cs+cv}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2(d-2cs+cv)\sqrt{z}\right)^2}{4(d-2cs+cv)}\right)-b\left(b+2(d-2cs+cv)\sqrt{z}\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+2(d-2cs+cv)\sqrt{z}\right)^2}{4(d-2cs+cv)}\right)\right)\right)(-i\,(d-2cs+cv))^{2n}+$$

$$e^{\frac{i\,b^2}{2(d-2cs+cv)}}\,(i\,(d-2cs+cv))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2n}\left(-i\left(b+2(d-2cs+cv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2(d-2cs+cv)\sqrt{z}\right)^2}{d-2cs+cv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-b\left(b+2(d-2cs+cv)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+2(d-2cs+cv)\sqrt{z}\right)^2}{4(d-2cs+cv)}\right)-2\,i\,(d-2cs+cv)$$

$$\left.\left.\sqrt{\frac{i\left(b+2(d-2cs+cv)\sqrt{z}\right)^2}{d-2cs+cv}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+2(d-2cs+cv)\sqrt{z}\right)^2}{4(d-2cs+cv)}\right)\right)\right)+$$

$$\frac{1}{(d+2cs-cv)^2}\left(e^{\frac{i\,b^2}{4(d+2cs-cv)}}\,(i\,(d+2cs-cv))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2n}\right.$$

$$\left(-i\left(b+2(d+2cs-cv)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2(d+2cs-cv)\sqrt{z}\right)^2}{d+2cs-cv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\left(b+2(d+2cs-cv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+2(d+2cs-cv)\sqrt{z}\right)^2}{4(d+2cs-cv)}\right)-\right.$$

$$2\,i\,(d+2\,c\,s-c\,v)\sqrt{\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{d+2\,c\,s-c\,v}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(d+2\,c\,s-c\,v)}\right)\right)\right)\right)+\frac{1}{(d+2\,c\,s-c\,v)^2}$$

$$\left(e^{\frac{1}{4}\,i\left(8\,e-\frac{b^2}{d+2\,c\,s-c\,v}\right)}\,(i\,(d+2\,c\,s-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\left(i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{d+2\,c\,s-c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+2\,c\,s-c\,v)\right.$$

$$\sqrt{-\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{d+2\,c\,s-c\,v}}\ \Gamma\left(\frac{1}{2}\,(h+k+2),\ -\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(d+2\,c\,s-c\,v)}\right)-$$

$$\left.\left.\left.\left.\left.b\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\ -\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(d+2\,c\,s-c\,v)}\right)\right)\right)\right)\right)\right)$$

$$d^{2\,n+2}+(-1)^n\,e^{\frac{i\,b^2}{2\,d}}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,d\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(b\left(b+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.\left.2\sqrt{\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}}\ d\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$(-1)^n\,e^{2\,i\,e}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\left(i\left(b+2\,d\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(b\left(b+2\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\,\sqrt{-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r\right)\cos^v(f\,z+g)$

01.07.21.1559.01

$$\int z^n \cos\left(b z^2\right) \cos^\nu(f z+g)\, dz = -2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{n+1}{2}, -i b z^2\right) \left(-i b z^2\right)^{\frac{1}{2}(-n-1)} + \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1-\nu \bmod 2)\, z^{n+1} - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{b} + 4 g (\nu-2s)\right)} \left(\sum_{j=0}^n 2^{j-n} (i f (\nu-2s))^{n-j} (-i f(\nu-2s) - 2 i b z)^{j+1} \left(-\frac{i(-i f(\nu-2s) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-i f(\nu-2s) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{b} - 4 g (\nu-2s)\right)} \left(\sum_{j=0}^n 2^{j-n} (-i f (\nu-2s))^{n-j} (i f(\nu-2s) - 2 i b z)^{j+1} \left(-\frac{i(i f(\nu-2s) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(i f(\nu-2s) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{b} - 4 g (\nu-2s)\right)} \sum_{j=0}^n 2^{j-n} (i f(\nu-2s))^{n-j} (2 i b z - i f(\nu-2s))^{j+1} \left(\frac{i(2 i b z - i f(\nu-2s))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(2 i b z - i f(\nu-2s))^2}{4b}\right) + (i b)^{-n-1} e^{\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{b} + 4 g (\nu-2s)\right)} \sum_{j=0}^n 2^{j-n} (-i f(\nu-2s))^{n-j} (f i (\nu-2s) + 2 i b z)^{j+1} \left(\frac{i(f i(\nu-2s) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f i(\nu-2s) + 2 i b z)^2}{4b}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1560.01

$$\int z^n \cos\left(\sqrt{z}\, b\right) \cos^\nu(f z+g)\, dz = (-1)^n 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), -i b \sqrt{z}\right) + \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1-\nu \bmod 2)\, b^{-2(n+1)} + 2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i b^2}{4 f (\nu-2s)} - i g (\nu-2s)} \left(\sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-i b - 2 i f(\nu-2s)\sqrt{z}\right)^{h+j} \left(-\frac{i\left(-i b - 2 i f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)}\right.\right.$$

$$\binom{j}{h}\binom{n}{j}\left(-i\,b\left(-i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,i\,f\right.$$

$$\left.(v-2\,s)\sqrt{-\frac{i\left(-i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\Bigg)$$

$$(-i\,f\,(v-2\,s))^{-2\,(n+1)}+e^{\frac{i\,b^2}{4\,f\,(v-2\,s)}-i\,g\,(v-2\,s)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(i\,b\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,i\,f\,(v-2\,s)\right.$$

$$\left.\left.\sqrt{-\frac{i\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)$$

$$(-i\,f\,(v-2\,s))^{-2\,(n+1)}+e^{-\frac{i\,b^2}{4\,f\,(v-2\,s)}+g\,i\,(v-2\,s)}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}$$

$$\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,i\,f\,(v-2\,s)\sqrt{\frac{i\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-\right.$$

$$\left.i\,b\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+$$

$$e^{-\frac{i\,b^2}{4\,f\,(v-2\,s)}+g\,i\,(v-2\,s)}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+2\,f\,i\,(v-2\,s)\right.$$

$$\left.\left.\sqrt{\frac{i\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos(b\,z^r+e)\cos^v(f\,z+g)$

01.07.21.1561.01

$$\int z^n \cos\left(b z^2 + e\right) \cos^\nu(f z + g)\, dz = -2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(\frac{n+1}{2}, -i b z^2\right) \left(-i b z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e} \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2)\, z^{n+1} -$$

$$2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{b} + 4 g (\nu-2s) + 4 e\right)} \left(\sum_{j=0}^{n} 2^{j-n} \left(i f (\nu-2s)\right)^{n-j} \left(-i f (\nu-2s) - 2 i b z\right)^{j+1} \right.\right.$$

$$\left.\left. \left(-\frac{i \left(-i f (\nu-2s) - 2 i b z\right)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i \left(-i f (\nu-2s) - 2 i b z\right)^2}{4 b}\right)\right) (-i b)^{-n-1} + \right.$$

$$e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{b} - 4 g (\nu-2s) + 4 e\right)} \left(\sum_{j=0}^{n} 2^{j-n} \left(-i f (\nu-2s)\right)^{n-j} \left(i f (\nu-2s) - 2 i b z\right)^{j+1} \right.$$

$$\left. \left(-\frac{i \left(i f (\nu-2s) - 2 i b z\right)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i \left(i f (\nu-2s) - 2 i b z\right)^2}{4 b}\right)\right) (-i b)^{-n-1} +$$

$$(i b)^{-n-1} e^{\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{b} - 4 g (\nu-2s) + 4 e\right)} \sum_{j=0}^{n} 2^{j-n} \left(i f (\nu-2s)\right)^{n-j} \left(2 i b z - i f (\nu-2s)\right)^{j+1}$$

$$\left(\frac{i \left(2 i b z - i f (\nu-2s)\right)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i \left(2 i b z - i f (\nu-2s)\right)^2}{4 b}\right) +$$

$$(i b)^{-n-1} e^{\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{b} + 4 g (\nu-2s) + 4 e\right)} \sum_{j=0}^{n} 2^{j-n} \left(-i f (\nu-2s)\right)^{n-j} \left(f i (\nu-2s) + 2 i b z\right)^{j+1}$$

$$\left.\left(\frac{i \left(f i (\nu-2s) + 2 i b z\right)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i \left(f i (\nu-2s) + 2 i b z\right)^2}{4 b}\right)\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1562.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \cos^\nu(f z + g)\, dz = (-1)^n\, 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(2(n+1), -i b \sqrt{z}\right) + e^{-i e}\, \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1 - \nu \bmod 2)\, b^{-2(n+1)} +$$

$$2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i b^2}{4 f (\nu-2s)} - i e - i g (\nu-2s)} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i b)^{-h-j+2n} \left(-i b - 2 i f (\nu-2s) \sqrt{z}\right)^{h+j} \right.\right.$$

$$\left(-\frac{i \left(-i b - 2 i f (\nu-2s) \sqrt{z}\right)^2}{f (\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i b \left(-i b - 2 i f (\nu-2s) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \right.\right.$$

$$-\frac{i\left(-i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)-2\,i\,f\,(v-2\,s)\,\sqrt{-\frac{i\left(-i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg)\Bigg)\Bigg)\,(-i\,f\,(v-2\,s))^{-2\,(n+1)}+e^{\frac{i\,b^2}{4\,f\,(v-2\,s)}+i\,e-i\,g\,(v-2\,s)}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(i\,b\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,i\,f$$

$$(v-2\,s)\,\sqrt{-\frac{i\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(i\,b-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg)\Bigg)$$

$$(-i\,f\,(v-2\,s))^{-2\,(n+1)}+e^{-\frac{i\,b^2}{4\,f\,(v-2\,s)}-i\,e+g\,i\,(v-2\,s)}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}$$

$$\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,i\,f\,(v-2\,s)\,\sqrt{\frac{i\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-$$

$$i\,b\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(-i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg)+$$

$$e^{-\frac{i\,b^2}{4\,f\,(v-2\,s)}+i\,e+g\,i\,(v-2\,s)}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+2\,f\,i\,(v-2\,s)\right.$$

$$\left.\left.\sqrt{\frac{i\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r+d\,z\right)\cos^v(f\,z+g)$

01.07.21.1563.01

$$\int z^n \cos\left(b z^2 + d z\right) \cos^\nu(f z + g)\, dz = 2^{-\nu-2} \left(\frac{1}{b^{n+1}} \left(e^{-\frac{i d^2}{4 b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\sum_{q=0}^{n} 2^{q-n} (-i\, d)^{n-q} (i\, (d + 2 b z))^{q+1} \left(-\frac{i\, (d+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\, (d+2 b z)^2}{4 b}\right)\right) (-i)^{n+1} \right) + \frac{1}{b^{n+1}} \left(e^{\frac{i d^2}{4 b}} i^{n+1} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (i\, d)^{n-q} (-i\, (d + 2 b z))^{q+1} \left(\frac{i\, (d+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\, (d+2 b z)^2}{4 b}\right)\right) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i (2 g s - g \nu)} \binom{\nu}{s} \left(e^{\frac{i (d+2 f s - f \nu)^2}{4 b}} \left(\sum_{q=0}^{n} 2^{q-n} (i\, (d + 2 f s - f \nu))^{n-q} (-i\, (d + 2 f s - f \nu + 2 b z))^{q+1} \left(\frac{i\, (d + 2 f s - f \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\, (d + 2 f s - f \nu + 2 b z)^2}{4 b}\right)\right) (-i\, b)^{-n-1} + e^{\frac{1}{4} i \left(\frac{(d - 2 f s + f \nu)^2}{b} + 8 g (2 s - \nu)\right)} \left(\sum_{q=0}^{n} 2^{q-n} (i\, (d - 2 f s + f \nu))^{n-q} (-i\, (d + f(\nu - 2 s) + 2 b z))^{q+1} \left(\frac{i\, (d + f(\nu - 2 s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\, (d + f(\nu - 2 s) + 2 b z)^2}{4 b}\right)\right) (-i\, b)^{-n-1} + (i\, b)^{-n-1} e^{\frac{1}{4} i \left(8 g (2 s - \nu) - \frac{(d + 2 f s - f \nu)^2}{b}\right)} \sum_{q=0}^{n} 2^{q-n} (-i\, (d + 2 f s - f \nu))^{n-q} (i\, (d + 2 f s - f \nu + 2 b z))^{q+1} \left(-\frac{i\, (d + 2 f s - f \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\, (d + 2 f s - f \nu + 2 b z)^2}{4 b}\right) + (i\, b)^{-n-1} e^{-\frac{i (d - 2 f s + f \nu)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (-i\, (d - 2 f s + f \nu))^{n-q} (i\, (d + f(\nu - 2 s) + 2 b z))^{q+1} \left(-\frac{i\, (d + f(\nu - 2 s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\, (d + f(\nu - 2 s) + 2 b z)^2}{4 b}\right)\right)\right) /;\, n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.1564.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \cos^\nu(f z + g)\, dz ==$$

$$-2^{-2 n - \nu - 2} d^{-2(n+1)} e^{-\frac{i b^2}{4 d}} \left(e^{\frac{i b^2}{4 d}} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i (2 g s - g \nu)} \binom{\nu}{s} \left(e^{-\frac{i b^2}{4 (d - 2 f s + f \nu)}} \left((d - 2 f s + f \nu)^2\right)^{-2 n - 1} \left(\left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i\, b)^{-h-k+2 n}\right.\right.\right.\right.\right.$$

$$\left(i\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)\right)^{h+k}\left(-\frac{i\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{d-2\,f\,s+f\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d-2\,f\,s+f\,v)\,\sqrt{-\frac{i\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{d-2\,f\,s+f\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.\right.$$

$$\left.-\frac{i\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{4\,(d-2\,f\,s+f\,v)}\right)-b\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\right.$$

$$\left.\left.\left.-\frac{i\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{4\,(d-2\,f\,s+f\,v)}\right)\right)\right)(-i\,(d-2\,f\,s+f\,v))^{2\,n}+e^{\frac{1}{2}\,i\left(\frac{b^2}{d-2\,f\,s+f\,v}+8\,g\,s-4\,g\,v\right)}$$

$$(i\,(d-2\,f\,s+f\,v))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{d-2\,f\,s+f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-b\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{4\,(d-2\,f\,s+f\,v)}\right)-2\,i\,(d-2\,f\,s+f\,v)$$

$$\left.\left.\sqrt{\frac{i\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{d-2\,f\,s+f\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{4\,(d-2\,f\,s+f\,v)}\right)\right)\right)+$$

$$\frac{1}{(d+2\,f\,s-f\,v)^2}\left(e^{\frac{i\,b^2}{4\,(d+2\,f\,s-f\,v)}}\,(i\,(d+2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\right.$$

$$\left(-i\left(b+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)\right)^{h+k}\left(\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)^2}{d+2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\left(b+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)^2}{4\,(d+2\,f\,s-f\,v)}\right)-\right.$$

$$2\,i\,(d+2\,f\,s-f\,v)\sqrt{\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,(d+2\,f\,s-f\,v)}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{(d+2\,f\,s-f\,v)^2}\Bigg(e^{\frac{1}{4}\,i\left(8\,g\,(2\,s-v)-\frac{b^2}{d+2\,f\,s-f\,v}\right)}\,(i\,(d+2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}$$

$$\left(i\left(b+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,(d+2\,f\,s-f\,v)\sqrt{-\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,(d+2\,f\,s-f\,v)}\right)-$$

$$b\left(b+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,(d+2\,f\,s-f\,v)}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$d^{2\,n+2}+(-1)^n\,e^{\frac{i\,b^2}{2\,d}}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,d\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(b\left(b+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\sqrt{\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}}\,d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$(-1)^n \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i \left(b + 2\, d\, \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b + 2\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(b \left(b + 2\, d\, \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1),\, -\frac{i \left(b + 2\, d\, \sqrt{z}\right)^2}{4\, d}\right) - \right.$$

$$\left. 2\, i\, d \sqrt{-\frac{i \left(b + 2\, d\, \sqrt{z}\right)^2}{d}}\; \Gamma\!\left(\frac{1}{2}(h+k+2),\, -\frac{i \left(b + 2\, d\, \sqrt{z}\right)^2}{4\, d}\right)\right) \Bigg) \,/;\, n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

Involving $z^n \cos\left(b\, z^r + d\, z + e\right) \cos^\nu(f\, z + g)$

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$$\int z^n \cos\left(b z^2 + d z + e\right) \cos^\nu(f z + g)\, dz = 2^{-\nu-2} \left(\frac{1}{b^{n+1}} \left(e^{i e - \frac{i d^2}{4 b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 b z))^{q+1} \left(-\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4 b} \right) \right) (-i)^{n+1} \right) + \frac{1}{b^{n+1}} \left(e^{\frac{i \left(d^2 - 4 b e\right)}{4 b}} i^{n+1} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^{q+1} \left(\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4 b} \right) \right) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i (e + 2 g s - g \nu)} \binom{\nu}{s} \left(e^{\frac{i (d + 2 f s - f \nu)^2}{4 b}} \left(\sum_{q=0}^{n} 2^{q-n} (i (d + 2 f s - f \nu))^{n-q} (-i (d + 2 f s - f \nu + 2 b z))^{q+1} \left(\frac{i (d + 2 f s - f \nu + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 f s - f \nu + 2 b z)^2}{4 b} \right) \right) (-i b)^{-n-1} + e^{\frac{1}{4} i \left(\frac{(d - 2 f s + f \nu)^2}{b} + 8 g (2 s - \nu) \right)} \left(\sum_{q=0}^{n} 2^{q-n} (i (d - 2 f s + f \nu))^{n-q} (-i (d + f (\nu - 2 s) + 2 b z))^{q+1} \left(\frac{i (d + f (\nu - 2 s) + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + f (\nu - 2 s) + 2 b z)^2}{4 b} \right) \right) (-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{1}{4} i \left(-\frac{(d + 2 f s - f \nu)^2}{b} + 8 e + 8 g (2 s - \nu) \right)} \sum_{q=0}^{n} 2^{q-n} (-i (d + 2 f s - f \nu))^{n-q} (i (d + 2 f s - f \nu + 2 b z))^{q+1} \left(-\frac{i (d + 2 f s - f \nu + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 f s - f \nu + 2 b z)^2}{4 b} \right) + (i b)^{-n-1} e^{2 i e - \frac{i (d - 2 f s + f \nu)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (-i (d - 2 f s + f \nu))^{n-q} (i (d + f (\nu - 2 s) + 2 b z))^{q+1} \left(-\frac{i (d + f (\nu - 2 s) + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + f (\nu - 2 s) + 2 b z)^2}{4 b} \right) \right) \right) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\ b + d\,z + e\right) \cos^\nu(f\,z + g)\,dz = -2^{-2n-\nu-2}\, d^{-2(n+1)}\, e^{-\frac{i(b^2+4de)}{4d}} \left(e^{\frac{i(b^2+4de)}{4d}} \left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i(e+2gs-g\nu)} \binom{\nu}{s} \left(e^{-\frac{i b^2}{4(d-2fs+f\nu)}} \left((d-2fs+f\nu)^2\right)^{-2n-1} \left(e^{2ie} \left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k \right.\right.\right.\right.\right.$$

$$(i\,b)^{-h-k+2n} \left(i\left(b + 2(d-2fs+f\nu)\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b+2(d-2fs+f\nu)\sqrt{z}\right)^2}{d-2fs+f\nu}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k} \left(2\,i\,(d-2fs+f\nu)\sqrt{-\frac{i\left(b+2(d-2fs+f\nu)\sqrt{z}\right)^2}{d-2fs+f\nu}}\ \Gamma\left(\frac{1}{2}(h+k+2),\right.\right.$$

$$\left. -\frac{i\left(b+2(d-2fs+f\nu)\sqrt{z}\right)^2}{4(d-2fs+f\nu)}\right) - b\left(b+2(d-2fs+f\nu)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.$$

$$\left.\left.\left. -\frac{i\left(b+2(d-2fs+f\nu)\sqrt{z}\right)^2}{4(d-2fs+f\nu)}\right)\right)\right)(-i(d-2fs+f\nu))^{2n} + e^{\frac{1}{2} i\left(\frac{b^2}{d-2fs+f\nu}+8gs-4g\nu\right)}$$

$$(i(d-2fs+f\nu))^{2n} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,b)^{-h-k+2n} \left(-i\left(b+2(d-2fs+f\nu)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2(d-2fs+f\nu)\sqrt{z}\right)^2}{d-2fs+f\nu}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(-b\left(b+2(d-2fs+f\nu)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+2(d-2fs+f\nu)\sqrt{z}\right)^2}{4(d-2fs+f\nu)}\right) - 2\,i\,(d-2fs+f\nu)$$

$$\left.\left.\left.\sqrt{\frac{i\left(b+2(d-2fs+f\nu)\sqrt{z}\right)^2}{d-2fs+f\nu}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+2(d-2fs+f\nu)\sqrt{z}\right)^2}{4(d-2fs+f\nu)}\right)\right)\right)\right) +$$

$$\frac{1}{(d+2fs-f\nu)^2} \left(e^{\frac{i b^2}{4(d+2fs-f\nu)}} (i(d+2fs-f\nu))^{-2n} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,b)^{-h-k+2n}\right.$$

$$\left(-i\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right)^2}{d+2 f s-f v}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(-b\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right)^2}{4\left(d+2 f s-f v\right)}\right)-\right.$$

$$2 i\left(d+2 f s-f v\right) \sqrt{\frac{i\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right)^2}{d+2 f s-f v}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right)^2}{4\left(d+2 f s-f v\right)}\right)\right)\right)\right)+$$

$$\frac{1}{\left(d+2 f s-f v\right)^2}\left(e^{\frac{1}{4} i\left(-\frac{b^2}{d+2 f s-f v}+8 e+8 g(2 s-v)\right)}\left(i\left(d+2 f s-f v\right)\right)^{-2 n} \sum_{k=0}^n \sum_{h=0}^k(-1)^{k-h} 4^k\right.$$

$$(i b)^{-h-k+2 n}\left(i\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right)^2}{d+2 f s-f v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2 i\left(d+2 f s-f v\right) \sqrt{-\frac{i\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right)^2}{d+2 f s-f v}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right)^2}{4\left(d+2 f s-f v\right)}\right)-$$

$$\left.\left.\left.\left.\left.b\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+2\left(d+2 f s-f v\right) \sqrt{z}\right)^2}{4\left(d+2 f s-f v\right)}\right)\right)\right)\right)\right)\right)$$

$$d^{2 n+2}+(-1)^n e^{\frac{i b^2}{2 d}}\binom{v}{\frac{v}{2}}(v \bmod 2-1) \sum_{k=0}^n \sum_{h=0}^k(-1)^{k-h} 4^k(-i b)^{-h-k+2 n}\left(-i\left(b+2 d \sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k}\left(b\left(b+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.\left.2\sqrt{\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$(-1)^n\,e^{2\,i\,e}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\left(i\left(b+2\,d\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(b\left(b+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos(b\,z)\cos^v\left(c\,z^r\right)$

01.07.21.1567.01

$$\int z^n \cos(b\,z)\cos^\nu\!\left(c\,z^2\right) dz = (-1)^n\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(n+1,\, i\,b\,z)\,(-i\,b)^{-n-1} + (i\,b)^{-n-1}\,\Gamma(n+1,\, -i\,b\,z)\right)(1 - \nu \bmod 2) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i\,b^2}{4\,c\,(\nu-2\,s)}} \left(\sum_{j=0}^{n} 2^{j-n}\,(i\,b)^{n-j}\,(-i\,b - 2\,i\,c\,(\nu-2\,s)\,z)^{j+1} \left(-\frac{i\,(-i\,b - 2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\!\left(\frac{j+1}{2},\, -\frac{i\,(-i\,b - 2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right) (-i\,c\,(\nu-2\,s))^{-n-1} + e^{\frac{i\,b^2}{4\,c\,(\nu-2\,s)}} \left(\sum_{j=0}^{n} 2^{j-n}\,(-i\,b)^{n-j}\,(i\,b - 2\,i\,c\,(\nu-2\,s)\,z)^{j+1} \left(-\frac{i\,(i\,b - 2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\!\left(\frac{j+1}{2},\, -\frac{i\,(i\,b - 2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right) (-i\,c\,(\nu-2\,s))^{-n-1} + e^{-\frac{i\,b^2}{4\,c\,(\nu-2\,s)}}\,(i\,c\,(\nu-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(i\,b)^{n-j}\,(-i\,b + 2\,i\,c\,(\nu-2\,s)\,z)^{j+1} \left(\frac{i\,(-i\,b + 2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\!\left(\frac{j+1}{2},\, \frac{i\,(-i\,b + 2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) + e^{-\frac{i\,b^2}{4\,c\,(\nu-2\,s)}}\,(i\,c\,(\nu-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-i\,b)^{n-j}\,(i\,b + 2\,i\,c\,(\nu-2\,s)\,z)^{j+1} \left(\frac{i\,(i\,b + 2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\!\left(\frac{j+1}{2},\, \frac{i\,(i\,b + 2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right) /;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1568.01

$$\int z^n \cos(b\,z)\cos^\nu\!\left(\sqrt{z}\;c\right) dz = 2^{-2\,n-\nu-2}\,(i\,b)^{-2\,(n+1)} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{i\,c^2\,(\nu-2\,s)^2}{4\,b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,c\,(\nu-2\,s))^{-h-j+2\,n} \left(-i\,c\,(\nu-2\,s) + 2\,i\,b\,\sqrt{z}\right)^{h+j} \left(\frac{i\left(-i\,c\,(\nu-2\,s) + 2\,i\,b\,\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(2\,i\,b\,\sqrt{\frac{i\left(-i\,c\,(\nu-2\,s) + 2\,i\,b\,\sqrt{z}\right)^2}{b}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\, \frac{i\left(-i\,c\,(\nu-2\,s) + 2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right) - \right.\right.$$

$$i\, c\, (v-2\, s) \left(-i\, c\, (v-2\, s)+2\, i\, b \sqrt{z}\right) \Gamma\left(\frac{1}{2}\,(h+j+1),\, \frac{i\left(-i\, c\, (v-2\, s)+2\, i\, b \sqrt{z}\right)^2}{4\, b}\right)\Bigg) +$$

$$e^{-\frac{i\, c^2\, (v-2\, s)^2}{4\, b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, c\, (v-2\, s))^{-h-j+2\, n} \left(i\, c\, (v-2\, s)+2\, i\, b \sqrt{z}\right)^{h+j} \left(\frac{i\left(i\, c\, (v-2\, s)+2\, i\, b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\, i\, (v-2\, s) \left(i\, c\, (v-2\, s)+2\, i\, b \sqrt{z}\right) \Gamma\left(\frac{1}{2}\,(h+j+1),\, \frac{i\left(i\, c\, (v-2\, s)+2\, i\, b \sqrt{z}\right)^2}{4\, b}\right) +$$

$$2 \sqrt{\frac{i\left(i\, c\, (v-2\, s)+2\, i\, b \sqrt{z}\right)^2}{b}}\; b\, i\, \Gamma\left(\frac{1}{2}\,(h+j+2),\, \frac{i\left(i\, c\, (v-2\, s)+2\, i\, b \sqrt{z}\right)^2}{4\, b}\right)\Bigg) + e^{\frac{c^2\, i\, (v-2\, s)^2}{4\, b}}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, c\, (v-2\, s))^{-h-j+2\, n} \left(-i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right)^{h+j} \left(-\frac{i\left(-i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(-i\, c\, (v-2\, s) \left(-i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right) \Gamma\left(\frac{1}{2}\,(h+j+1),\, -\frac{i\left(-i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right)^2}{4\, b}\right) -$$

$$2\, i\, b \sqrt{-\frac{i\left(-i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right)^2}{b}}\; \Gamma\left(\frac{1}{2}\,(h+j+2),\, -\frac{i\left(-i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right)^2}{4\, b}\right)\Bigg) + e^{\frac{c^2\, i\, (v-2\, s)^2}{4\, b}}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, c\, (v-2\, s))^{-h-j+2\, n} \left(i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right)^{h+j} \left(-\frac{i\left(i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(i\, c\, (v-2\, s) \left(i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right) \Gamma\left(\frac{1}{2}\,(h+j+1),\, -\frac{i\left(i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right)^2}{4\, b}\right) -$$

$$2\, i\, b \sqrt{-\frac{i\left(i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right)^2}{b}}\; \Gamma\left(\frac{1}{2}\,(h+j+2),\, -\frac{i\left(i\, c\, (v-2\, s)-2\, i\, b \sqrt{z}\right)^2}{4\, b}\right)\Bigg)\Bigg) +$$

$$(-1)^n\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(n+1,\, i\, b\, z)\, (-i\, b)^{-n-1} + (i\, b)^{-n-1}\, \Gamma(n+1,\, -i\, b\, z)\right) (1 - \nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n \cos(d\, z + e) \cos^\nu(c\, z^r)$

01.07.21.1569.01

$$\int z^n \cos(d\, z + e) \cos^\nu(c\, z^2)\, dz = (-1)^n\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(e^{-i\, e}\, \Gamma(n+1,\, i\, d\, z)\, (-i\, d)^{-n-1} + (i\, d)^{-n-1}\, e^{i\, e}\, \Gamma(n+1,\, -i\, d\, z)\right) (1 - \nu \bmod 2) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i\, d^2}{4\, c\, (\nu-2\, s)} - i\, e} \left(\sum_{j=0}^{n} 2^{j-n}\, (i\, d)^{n-j}\, (-i\, d - 2\, i\, c\, (\nu - 2\, s)\, z)^{j+1} \left(-\frac{i\, (-i\, d - 2\, i\, c\, (\nu - 2\, s)\, z)^2}{c\, (\nu - 2\, s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2},\, -\frac{i\, (-i\, d - 2\, i\, c\, (\nu - 2\, s)\, z)^2}{4\, c\, (\nu - 2\, s)}\right)\right) (-i\, c\, (\nu - 2\, s))^{-n-1} + e^{\frac{i\, d^2}{4\, c\, (\nu-2\, s)} + i\, e} \left(\sum_{j=0}^{n} 2^{j-n}\, (-i\, d)^{n-j}\, (i\, d - 2\, i\, c\, (\nu - 2\, s)\, z)^{j+1} \left(-\frac{i\, (i\, d - 2\, i\, c\, (\nu - 2\, s)\, z)^2}{c\, (\nu - 2\, s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2},\, -\frac{i\, (i\, d - 2\, i\, c\, (\nu - 2\, s)\, z)^2}{4\, c\, (\nu - 2\, s)}\right)\right) (-i\, c\, (\nu - 2\, s))^{-n-1} + e^{-\frac{i\, d^2}{4\, c\, (\nu-2\, s)} - i\, e}\, (i\, c\, (\nu - 2\, s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (i\, d)^{n-j}\, (-i\, d + 2\, i\, c\, (\nu - 2\, s)\, z)^{j+1} \left(\frac{i\, (-i\, d + 2\, i\, c\, (\nu - 2\, s)\, z)^2}{c\, (\nu - 2\, s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2},\, \frac{i\, (-i\, d + 2\, i\, c\, (\nu - 2\, s)\, z)^2}{4\, c\, (\nu - 2\, s)}\right) + e^{-\frac{i\, d^2}{4\, c\, (\nu-2\, s)} + i\, e}\, (i\, c\, (\nu - 2\, s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (-i\, d)^{n-j}\, (i\, d + 2\, i\, c\, (\nu - 2\, s)\, z)^{j+1} \left(\frac{i\, (i\, d + 2\, i\, c\, (\nu - 2\, s)\, z)^2}{c\, (\nu - 2\, s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2},\, \frac{i\, (i\, d + 2\, i\, c\, (\nu - 2\, s)\, z)^2}{4\, c\, (\nu - 2\, s)}\right)\right) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1570.01

$$\int z^n \cos(e + d\, z) \cos^\nu\!\left(\sqrt{z}\; c\right) dz = 2^{-2\, n-\nu-2}\, (i\, d)^{-2\, (n+1)} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{i\, c^2\, (\nu-2\, s)^2}{4\, d} + i\, e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, c\, (\nu - 2\, s))^{-h-j+2\, n} \left(-i\, c\, (\nu - 2\, s) + 2\, i\, d\, \sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{i\left(-i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,i\,d\sqrt{\frac{i\left(-i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(-i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.i\,c\,(v-2\,s)\left(-i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(-i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}+i\,e}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,i\,(v-2\,s)\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d}-i\,e}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,s))^{-h-j+2\,n}\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(-i\,c\,(v-2\,s)\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\right.$$

$$\left.\sqrt{-\frac{i\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d}-i\,e}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(i\,c\,(v-2\,s)\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$(-1)^n\,2^{-v-1}\binom{v}{\frac{v}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)$$
$$(1-$$
$$v \bmod 2)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos(b\,z^r)\cos^v(c\,z^r)$

01.07.21.1571.01

$$\int z^{\alpha-1}\cos(b\,z^r)\cos^v(c\,z^r)\,dz=-\frac{1}{r}\left(2^{-v-1}\,z^\alpha\binom{v}{\frac{v}{2}}\left(\Gamma\left(\frac{\alpha}{r},\,-i\,b\,z^r\right)(-i\,b\,z^r)^{-\frac{\alpha}{r}}+(i\,b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,i\,b\,z^r\right)\right)(1-v\bmod 2)\right)-$$

$$\frac{2^{-v-1}\,z^\alpha}{r}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma\left(\frac{\alpha}{r},\,(-i\,b-2\,i\,c\,s+i\,c\,v)\,z^r\right)((-i\,b-2\,i\,c\,s+i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}+\right.$$

$$((i\,b-2\,i\,c\,s+i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(i\,b-2\,i\,c\,s+i\,c\,v)\,z^r\right)+((-i\,b+2\,i\,c\,s-i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}$$

$$\left.\Gamma\left(\frac{\alpha}{r},\,(-i\,b+2\,i\,c\,s-i\,c\,v)\,z^r\right)+((i\,b+2\,i\,c\,s-i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(i\,b+2\,i\,c\,s-i\,c\,v)\,z^r\right)\right)\;/;\;v\in\mathbb{N}^+$$

01.07.21.1572.01

$$\int z^n\cos\left(b\,z^2\right)\cos^v\left(c\,z^2\right)dz=$$

$$-2^{-v-2}\binom{v}{\frac{v}{2}}\left(\Gamma\left(\frac{n+1}{2},\,-i\,b\,z^2\right)\left(-i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}+\left(i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,i\,b\,z^2\right)\right)(1-v\bmod 2)\,z^{n+1}-$$

$$2^{-v-2}\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma\left(\frac{n+1}{2},\,(-i\,b+i\,c\,(v-2\,s))\,z^2\right)\left((-i\,b+i\,c\,(v-2\,s))\,z^2\right)^{\frac{1}{2}(-n-1)}+\left((i\,b+i\,c\,(v-2\,s))\,z^2\right)^{\frac{1}{2}(-n-1)}\right.$$

$$\Gamma\left(\frac{n+1}{2},\,(i\,b+i\,c\,(v-2\,s))\,z^2\right)+\left((-i\,b-i\,c\,(v-2\,s))\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(-i\,b-i\,c\,(v-2\,s))\,z^2\right)+$$

$$\left.\left((i\,b-i\,c\,(v-2\,s))\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(i\,b-i\,c\,(v-2\,s))\,z^2\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

01.07.21.1573.01

$$\int z^n \cos\left(\sqrt{z}\, b\right) \cos^\nu\left(c\sqrt{z}\right) dz = (-1)^n\, 2^{-\nu}\, b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), -i\, b\sqrt{z}\right) + \Gamma\left(2(n+1), i\, b\sqrt{z}\right)\right)(1-\nu \bmod 2) - 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma\left(2(n+1), (-i\, b + i\, c(\nu-2s))\sqrt{z}\right)(-i\, b + i\, c(\nu-2s))^{-2(n+1)} + (i\, b + i\, c(\nu-2s))^{-2(n+1)} \Gamma\left(2(n+1), (i\, b + i\, c(\nu-2s))\sqrt{z}\right) + (-i\, b - i\, c(\nu-2s))^{-2(n+1)} \Gamma\left(2(n+1), (-i\, b - i\, c(\nu-2s))\sqrt{z}\right) + (i\, b - i\, c(\nu-2s))^{-2(n+1)} \Gamma\left(2(n+1), (i\, b - i\, c(\nu-2s))\sqrt{z}\right)\right) /;\ n \in \mathbb{N} \wedge \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \cos(b\, z^r + e) \cos^\nu(c\, z^r)$

01.07.21.1574.01

$$\int z^{\alpha-1} \cos(b\, z^r + e) \cos^\nu(c\, z^r)\, dz = -\frac{1}{r}\left(2^{-\nu-1} z^\alpha \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(\frac{\alpha}{r}, -i\, b\, z^r\right)(-i\, b\, z^r)^{-\frac{\alpha}{r}} + e^{-i e} (i\, b\, z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, i\, b\, z^r\right)\right)(1-\nu \bmod 2)\right) - \frac{2^{-\nu-1} z^\alpha}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{i e}\, \Gamma\left(\frac{\alpha}{r}, (-i\, b - 2\, i\, c\, s + i\, c\, \nu)\, z^r\right)((-i\, b - 2\, i\, c\, s + i\, c\, \nu)\, z^r)^{-\frac{\alpha}{r}} + e^{-i e}\, ((i\, b - 2\, i\, c\, s + i\, c\, \nu)\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (i\, b - 2\, i\, c\, s + i\, c\, \nu)\, z^r\right) + e^{i e}\, ((-i\, b + 2\, i\, c\, s - i\, c\, \nu)\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (-i\, b + 2\, i\, c\, s - i\, c\, \nu)\, z^r\right) + e^{-i e}\, ((i\, b + 2\, i\, c\, s - i\, c\, \nu)\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (i\, b + 2\, i\, c\, s - i\, c\, \nu)\, z^r\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1575.01

$$\int z^n \cos\left(b\, z^2 + e\right) \cos^\nu\left(c\, z^2\right) dz = -2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(\frac{n+1}{2}, -i\, b\, z^2\right)\left(-i\, b\, z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e} \left(i\, b\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i\, b\, z^2\right)\right)(1-\nu \bmod 2)\, z^{n+1} - 2^{-\nu-2} z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{i e}\, \Gamma\left(\frac{n+1}{2}, (-i\, b + i\, c(\nu-2s))\, z^2\right)\left((-i\, b + i\, c(\nu-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e} \left((i\, b + i\, c(\nu-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i\, b + i\, c(\nu-2s))\, z^2\right) + e^{i e} \left((-i\, b - i\, c(\nu-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i\, b - i\, c(\nu-2s))\, z^2\right) + e^{-i e} \left((i\, b - i\, c(\nu-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i\, b - i\, c(\nu-2s))\, z^2\right)\right) /;\ n \in \mathbb{N} \wedge \nu \in \mathbb{N}^+$$

01.07.21.1576.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \cos^\nu\left(c \sqrt{z}\right) dz = =$$

$$(-1)^n\, 2^{-\nu}\, b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(2(n+1), -i\, b \sqrt{z}\right) + e^{-i e}\, \Gamma\left(2(n+1), i\, b \sqrt{z}\right)\right)(1 - \nu \bmod 2) -$$

$$2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{i e}\, \Gamma\left(2(n+1), (-i\, b + i\, c(\nu - 2s)) \sqrt{z}\right) (-i\, b + i\, c(\nu - 2s))^{-2(n+1)} + e^{-i e}\, (i\, b + i\, c(\nu - 2s))^{-2(n+1)}\right.$$

$$\Gamma\left(2(n+1), (i\, b + i\, c(\nu - 2s)) \sqrt{z}\right) + e^{i e}\, (-i\, b - i\, c(\nu - 2s))^{-2(n+1)}\, \Gamma\left(2(n+1), (-i\, b - i\, c(\nu - 2s)) \sqrt{z}\right) +$$

$$\left. e^{-i e}\, (i\, b - i\, c(\nu - 2s))^{-2(n+1)}\, \Gamma\left(2(n+1), (i\, b - i\, c(\nu - 2s)) \sqrt{z}\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n \cos\left(b z^r + d z\right) \cos^\nu\left(c z^r\right)$

01.07.21.1577.01

$$\int z^n \cos\left(b z^2 + d z\right) \cos^\nu\left(c z^2\right) dz = 2^{-\nu-2} \left(-\frac{1}{b^{2n+1}} e^{\frac{i d^2}{4b}} i \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{1}{d + 2 b z} b (-i b)^n e^{-\frac{i d^2}{2b}} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 b z))^q \left(-\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1-q}{2}} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4b} \right) - i (i b)^n \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^q (d + 2 b z) \left(\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4b} \right) \right) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i d^2}{-4b - 8cs + 4c\nu}} (-i(-b - 2cs + c\nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i (2(-b - 2cs + c\nu) z - d))^{q+1} \left(\frac{i (2(-b - 2cs + c\nu) z - d)^2}{-b - 2cs + c\nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2(-b - 2cs + c\nu) z - d)^2}{-4b - 8cs + 4c\nu} \right) + e^{-\frac{i d^2}{-4b - 8cs + 4c\nu}} (i(-b - 2cs + c\nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i (2(-b - 2cs + c\nu) z - d))^{q+1} \left(-\frac{i (2(-b - 2cs + c\nu) z - d)^2}{-b - 2cs + c\nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2(-b - 2cs + c\nu) z - d)^2}{-4b - 8cs + 4c\nu} \right) + \frac{1}{-b + 2cs - c\nu} \left(i e^{\frac{i d^2}{-4b + 8cs - 4c\nu}} (i (b + c(\nu - 2s)))^{-n} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i (-d - 2bz + 4csz - 2c\nu z))^{q+1} \left(\frac{i (d + 2(b - 2cs + c\nu) z)^2}{-b + 2cs - c\nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2(b - 2cs + c\nu) z)^2}{-4b + 8cs - 4c\nu} \right) \right) + e^{-\frac{i d^2}{-4b + 8cs - 4c\nu}} (i(-b + 2cs - c\nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i (-d - 2bz + 4csz - 2c\nu z))^{q+1} \left(-\frac{i (d + 2(b - 2cs + c\nu) z)^2}{-b + 2cs - c\nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2(b - 2cs + c\nu) z)^2}{-4b + 8cs - 4c\nu} \right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1578.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \cos^\nu\left(c \sqrt{z}\right) dz = 2^{-2n-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) (i d)^{-2n-2} \left(e^{-\frac{i b^2}{4d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2n} \left(i b + 2 i d \sqrt{z} \right)^{h+k} \right.$$

$$\left(\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\,i\left(i\,b+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{i\,b^2}{4\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^{h+k}\left(-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(-i\,b\left(-i\,b-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$2^{-2\,n-\nu-2}\,(i\,d)^{-2\,n-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{i\,(i\,b+i\,c\,(2\,s-\nu))^2}{4\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+i\,c\,(2\,s-\nu))^{-h-k+2\,n}\right.$$

$$\left(i\,b+i\,c\,(2\,s-\nu)+2\,i\,d\,\sqrt{z}\right)^{h+k}\left(\frac{i\left(i\,b+i\,c\,(2\,s-\nu)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((i\,b+i\,c\,(2\,s-\nu))\left(i\,b+i\,c\,(2\,s-\nu)+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(i\,b+i\,c\,(2\,s-\nu)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b+i\,c\,(2\,s-\nu)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(i\,b+i\,c\,(2\,s-\nu)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{i\,(i\,b+i\,c\,(\nu-2\,s))^2}{4\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+i\,c\,(\nu-2\,s))^{-h-k+2\,n}\left(i\,b+i\,c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((i\,b+i\,c\,(v-2\,s))\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\ d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i(-i\,b+i\,c\,(2\,s-v))^2}{4\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+i\,c\,(2\,s-v))^{-h-k+2\,n}\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left((-i\,b+i\,c\,(2\,s-v))\right.$$

$$\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i(-i\,b+i\,c\,(v-2\,s))^2}{4\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((-i\,b+i\,c\,(v-2\,s))\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\sqrt{-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\ \Gamma\Bigg($$

$$i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2\Bigg)\Bigg)$$

Involving $z^n \cos(b z^r + d z + e) \cos^v(c z^r)$

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$$\int z^n \cos(b z^2 + d z + e) \cos^v(c z^2)\, dz = 2^{-v-2}\left(-\frac{1}{b^{2n+1}}\left(e^{\frac{i(d^2+4be)}{4b}}\, i \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\left(\frac{1}{d+2bz}\left(b(-ib)^n e^{-\frac{id^2}{2b}} \sum_{q=0}^{n} 2^{q-n} (-id)^{n-q} (i(d+2bz))^q \left(-\frac{i(d+2bz)^2}{b}\right)^{\frac{1-q}{2}} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+2bz)^2}{4b}\right)\right) - i(ib)^n e^{-2ie} \sum_{q=0}^{n} 2^{q-n} (id)^{n-q} (-i(d+2bz))^q (d+2bz)\left(\frac{i(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+2bz)^2}{4b}\right)\right)\right) - \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{ie} \binom{v}{s}\left(e^{\frac{id^2}{-4b-8cs+4cv}}\left(\sum_{q=0}^{n} 2^{q-n} (-id)^{n-q} (-i(2(-b-2cs+cv)z-d))^{q+1} \left(\frac{i(2(-b-2cs+cv)z-d)^2}{-b-2cs+cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(2(-b-2cs+cv)z-d)^2}{-4b-8cs+4cv}\right)\right)(-i(-b-2cs+cv))^{-n-1} + e^{-\frac{id^2}{-4b-8cs+4cv}-2ie} (i(-b-2cs+cv))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (id)^{n-q} (i(2(-b-2cs+cv)z-d))^{q+1} \left(-\frac{i(2(-b-2cs+cv)z-d)^2}{-b-2cs+cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(2(-b-2cs+cv)z-d)^2}{-4b-8cs+4cv}\right) + \frac{1}{-b+2cs-cv}\left(i\, e^{\frac{id^2}{-4b+8cs-4cv}} (i(b+c(v-2s)))^{-n} \sum_{q=0}^{n} 2^{q-n} (-id)^{n-q} (-i(-d-2bz+4csz-2cvz))^{q+1} \left(\frac{i(d+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right) + e^{i\left(-\frac{d^2}{-4b+8cs-4cv}-2e\right)} (i(-b+2cs-cv))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (id)^{n-q} (i(-d-2bz+4csz-2cvz))^{q+1} \left(-\frac{i(d+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right)\right)\right)\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\, b + d\, z + e\right) \cos^\nu\left(\sqrt{z}\, c\right) dz ==$$

$$2^{-2n-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, (i\, d)^{-2n-2} \left(e^{i\, e - \frac{i\, b^2}{4\, d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i\, b + 2\, i\, d \sqrt{z}\right)^{h+k} \right.$$

$$\left(\frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\, i \left(i\, b + 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),\, \frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{4\, d} \right) + \right.$$

$$\left.\left. 2 \sqrt{\frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h+k+2),\, \frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{4\, d} \right) \right) \right) +$$

$$e^{\frac{i\, b^2}{4\, d} - i\, e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, b)^{-h-k+2n} \left(-i\, b - 2\, i\, d \sqrt{z}\right)^{h+k} \left(-\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(-i\, b \left(-i\, b - 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{4\, d} \right) - \right.$$

$$\left.\left. 2\, i\, d \sqrt{-\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{4\, d} \right) \right) \right) +$$

$$2^{-2n-\nu-2} (i\, d)^{-2n-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i (i\, b + i\, c\, (2s-\nu))^2}{4\, d} + i\, e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b + i\, c\, (2s-\nu))^{-h-k+2n} \right.$$

$$\left(i\, b + i\, c\, (2s-\nu) + 2\, i\, d \sqrt{z}\right)^{h+k} \left(\frac{i \left(i\, b + i\, c\, (2s-\nu) + 2\, i\, d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((i\, b + i\, c\, (2s-\nu)) \left(i\, b + i\, c\, (2s-\nu) + 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),\, \frac{i \left(i\, b + i\, c\, (2s-\nu) + 2\, i\, d \sqrt{z}\right)^2}{4\, d} \right) + \right.$$

$$2\sqrt{\frac{i\left(i\,b+i\,c\,(2\,s-v)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(i\,b+i\,c\,(2\,s-v)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{\frac{i\,(i\,b+i\,c\,(v-2\,s))^2}{4\,d}+i\,e}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((i\,b+i\,c\,(v-2\,s))\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\sqrt{\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,(-i\,b+i\,c\,(2\,s-v))^2}{4\,d}-i\,e}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+i\,c\,(2\,s-v))^{-h-k+2\,n}\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((-i\,b+i\,c\,(2\,s-v))$$

$$\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,(-i\,b+i\,c\,(v-2\,s))^2}{4\,d}-i\,e}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-i\, b + i\, c\, (v - 2\, s))\left(-i\, b + i\, c\, (v - 2\, s) - 2\, i\, d\, \sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h + k + 1), -\frac{i\left(-i\, b + i\, c\,(v - 2\, s) - 2\, i\, d\, \sqrt{z}\right)^2}{4\, d}\right) - 2\, i\, d\, \sqrt{-\frac{i\left(-i\, b + i\, c\,(v - 2\, s) - 2\, i\, d\, \sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}\,(h + k + 2), -\frac{i\left(-i\, b + i\, c\,(v - 2\, s) - 2\, i\, d\, \sqrt{z}\right)^2}{4\, d}\right)\right)\right)\right) /;\, n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving $z^n \cos(d\, z) \cos^v\left(c\, z^r + g\right)$

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$$\int z^n \cos(d\, z) \cos^v\left(c\, z^2 + g\right) dz = (-1)^n\, 2^{-v-1} \binom{v}{\frac{v}{2}} \left(\Gamma(n + 1,\, i\, d\, z)\,(-i\, d)^{-n-1} + (i\, d)^{-n-1}\, \Gamma(n + 1,\, -i\, d\, z)\right)(1 - v \bmod 2) - 2^{-v-2} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{\frac{i\, d^2}{4\, c\,(v-2\, s)} - i\, g\,(v-2\, s)} \left(\sum_{j=0}^{n} 2^{j-n}\, (i\, d)^{n-j}\, (-i\, d - 2\, i\, c\,(v - 2\, s)\, z)^{j+1} \left(-\frac{i\,(-i\, d - 2\, i\, c\,(v - 2\, s)\, z)^2}{c\,(v - 2\, s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j + 1}{2}, -\frac{i\,(-i\, d - 2\, i\, c\,(v - 2\, s)\, z)^2}{4\, c\,(v - 2\, s)}\right)\right)(-i\, c\,(v - 2\, s))^{-n-1} + e^{\frac{i\, d^2}{4\, c\,(v-2\, s)} - i\, g\,(v-2\, s)} \left(\sum_{j=0}^{n} 2^{j-n}\, (-i\, d)^{n-j}\, (i\, d - 2\, i\, c\,(v - 2\, s)\, z)^{j+1} \left(-\frac{i\,(i\, d - 2\, i\, c\,(v - 2\, s)\, z)^2}{c\,(v - 2\, s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j + 1}{2}, -\frac{i\,(i\, d - 2\, i\, c\,(v - 2\, s)\, z)^2}{4\, c\,(v - 2\, s)}\right)\right)(-i\, c\,(v - 2\, s))^{-n-1} + e^{i\, g\,(v-2\, s) - \frac{i\, d^2}{4\, c\,(v-2\, s)}}\, (i\, c\,(v - 2\, s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (i\, d)^{n-j}\, (-i\, d + 2\, i\, c\,(v - 2\, s)\, z)^{j+1} \left(\frac{i\,(-i\, d + 2\, i\, c\,(v - 2\, s)\, z)^2}{c\,(v - 2\, s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j + 1}{2}, \frac{i\,(-i\, d + 2\, i\, c\,(v - 2\, s)\, z)^2}{4\, c\,(v - 2\, s)}\right) + e^{i\, g\,(v-2\, s) - \frac{i\, d^2}{4\, c\,(v-2\, s)}}\, (i\, c\,(v - 2\, s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (-i\, d)^{n-j}\, (i\, d + 2\, i\, c\,(v - 2\, s)\, z)^{j+1} \left(\frac{i\,(i\, d + 2\, i\, c\,(v - 2\, s)\, z)^2}{c\,(v - 2\, s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j + 1}{2}, \frac{i\,(i\, d + 2\, i\, c\,(v - 2\, s)\, z)^2}{4\, c\,(v - 2\, s)}\right)\right) /;\, n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

01.07.21.1582.01

$$\int z^n \cos(d\,z)\cos^v\left(\sqrt{z}\;c+g\right) dz = 2^{-2n-v-2}\,(i\,d)^{-2(n+1)} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{i c^2 (v-2s)^2}{4d} - i g (v-2s)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,c\,(v-2s))^{-h-j+2n} \left(-i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)^{h+j} \left(\frac{i\left(-i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(2\,i\,d\,\sqrt{\frac{i\left(-i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2), \frac{i\left(-i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)^2}{4d}\right) - i\,c\,(v-2s) \left(-i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1), \frac{i\left(-i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)^2}{4d}\right) \right) + e^{i g (v-2s) - \frac{i c^2 (v-2s)^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\,c\,(v-2s))^{-h-j+2n} \left(i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)^{h+j} \left(\frac{i\left(i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(c\,i\,(v-2s)\left(i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1), \frac{i\left(i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{\frac{i\left(i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+j+2), \frac{i\left(i\,c\,(v-2s)+2\,i\,d\,\sqrt{z}\right)^2}{4d}\right) \right) + e^{\frac{i c^2 (v-2s)^2}{4d} - i g (v-2s)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,c\,(v-2s))^{-h-j+2n} \left(-i\,c\,(v-2s)-2\,i\,d\,\sqrt{z}\right)^{h+j} \left(-\frac{i\left(-i\,c\,(v-2s)-2\,i\,d\,\sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-i\,c\,(v-2s)\left(-i\,c\,(v-2s)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\,c\,(v-2s)-2\,i\,d\,\sqrt{z}\right)^2}{4d}\right) - \right.$$

$$2\,i\,d\sqrt{-\frac{i\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d}+g\,i\,(v-2\,s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(i\,c\,(v-2\,s)\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$(-1)^n\,2^{-v-1}\binom{v}{\frac{v}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,\Gamma(n+1,\,-i\,d\,z)\right)$$

$$(1-v \bmod 2)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos(d\,z+e)\cos^v\left(c\,z^r+g\right)$

01.07.21.1583.01

$$\int z^n \cos(d z + e) \cos^v\left(c z^2 + g\right) dz = (-1)^n 2^{-v-1} \binom{v}{\frac{v}{2}} \left(e^{-i e} \Gamma(n+1, i d z) (-i d)^{-n-1} + (i d)^{-n-1} e^{i e} \Gamma(n+1, -i d z)\right) (1 - v \bmod 2) - 2^{-v-2} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{\frac{i d^2}{4 c (v-2 s)} - i e - i g (v-2 s)} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i c (v-2 s) z)^{j+1} \left(-\frac{i (-i d - 2 i c (v-2 s) z)^2}{c (v-2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i c (v-2 s) z)^2}{4 c (v-2 s)}\right) \right) (-i c (v-2 s))^{-n-1} + e^{\frac{i d^2}{4 c (v-2 s)} + i e - i g (v-2 s)} \left(\sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d - 2 i c (v-2 s) z)^{j+1} \left(-\frac{i (i d - 2 i c (v-2 s) z)^2}{c (v-2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (i d - 2 i c (v-2 s) z)^2}{4 c (v-2 s)}\right) \right) (-i c (v-2 s))^{-n-1} + e^{-\frac{i d^2}{4 c (v-2 s)} - i e + g i (v-2 s)} (i c (v-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 i c (v-2 s) z)^{j+1} \left(\frac{i (-i d + 2 i c (v-2 s) z)^2}{c (v-2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (-i d + 2 i c (v-2 s) z)^2}{4 c (v-2 s)}\right) + e^{-\frac{i d^2}{4 c (v-2 s)} + i e + g i (v-2 s)} (i c (v-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i c (v-2 s) z)^{j+1} \left(\frac{i (i d + 2 i c (v-2 s) z)^2}{c (v-2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i c (v-2 s) z)^2}{4 c (v-2 s)}\right) \right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.07.21.1584.01

$$\int z^n \cos(e + d z) \cos^v\left(\sqrt{z}\, c + g\right) dz = 2^{-2 n - v - 2} (i d)^{-2(n+1)} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{i c^2 (v-2 s)^2}{4 d} - i g (v-2 s) + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i c (v-2 s))^{-h-j+2 n} \left(-i c (v-2 s) + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i \left(-i c (v-2 s) + 2 i d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2 i d \sqrt{\frac{i \left(-i c (v-2 s) + 2 i d \sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(-i c (v-2 s) + 2 i d \sqrt{z}\right)^2}{4 d}\right) - i c (v-2 s) \right.$$

$$\left(-i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(-i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}+g\,i\,(v-2\,s)+i\,e}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,i\,(v-2\,s)\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\,\sqrt{\frac{i\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d}-i\,g\,(v-2\,s)-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,s))^{-h-j+2\,n}\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(-i\,c\,(v-2\,s)\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\,\sqrt{-\frac{i\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d}+g\,i\,(v-2\,s)-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(i\,c\,(v-2\,s)\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\,\sqrt{-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$(-1)^n\,2^{-v-1}\binom{v}{\frac{v}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-v\bmod 2)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos(b\,z^r)\cos^v(c\,z^r+g)$

01.07.21.1585.01

$$\int z^{\alpha-1}\cos(b\,z^r)\cos^v(c\,z^r+g)\,dz = -\frac{2^{-v-1}\,z^\alpha\binom{v}{\frac{v}{2}}\left(\Gamma\!\left(\frac{\alpha}{r},\,-i\,b\,z^r\right)(-i\,b\,z^r)^{-\frac{\alpha}{r}}+(i\,b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,b\,z^r\right)\right)(1-v\bmod 2)}{r}-$$

$$\frac{1}{r}\Bigg(2^{-v-1}\,z^\alpha\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{2\,i\,g\,s-i\,g\,v}\,\Gamma\!\left(\frac{\alpha}{r},\,(-i\,b-2\,i\,c\,s+i\,c\,v)\,z^r\right)((-i\,b-2\,i\,c\,s+i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}+$$

$$e^{2\,i\,g\,s-i\,g\,v}\,((i\,b-2\,i\,c\,s+i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,b-2\,i\,c\,s+i\,c\,v)\,z^r\right)+e^{i\,g\,v-2\,i\,g\,s}\,((-i\,b+2\,i\,c\,s-i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\right.$$

$$\left.(-i\,b+2\,i\,c\,s-i\,c\,v)\,z^r\right)+e^{i\,g\,v-2\,i\,g\,s}\,((i\,b+2\,i\,c\,s-i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,b+2\,i\,c\,s-i\,c\,v)\,z^r\right)\Bigg)\Bigg)\;/;\;v\in\mathbb{N}^+$$

01.07.21.1586.01

$$\int z^n\cos(b\,z^2)\cos^v(c\,z^2+g)\,dz =$$

$$-2^{-v-2}\binom{v}{\frac{v}{2}}\left(\Gamma\!\left(\frac{n+1}{2},\,-i\,b\,z^2\right)\left(-i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}+\left(i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,i\,b\,z^2\right)\right)(1-v\bmod 2)\,z^{n+1}-$$

$$2^{-v-2}\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{-i\,g\,(v-2\,s)}\,\Gamma\!\left(\frac{n+1}{2},\,(-i\,b+i\,c\,(v-2\,s))\,z^2\right)\left((-i\,b+i\,c\,(v-2\,s))\,z^2\right)^{\frac{1}{2}(-n-1)}+$$

$$e^{-i\,g\,(v-2\,s)}\left((i\,b+i\,c\,(v-2\,s))\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(i\,b+i\,c\,(v-2\,s))\,z^2\right)+$$

$$e^{i\,g\,(v-2\,s)}\left((-i\,b-i\,c\,(v-2\,s))\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(-i\,b-i\,c\,(v-2\,s))\,z^2\right)+$$

$$e^{i\,g\,(v-2\,s)}\left((i\,b-i\,c\,(v-2\,s))\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(i\,b-i\,c\,(v-2\,s))\,z^2\right)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

01.07.21.1587.01

$$\int z^n \cos\left(b\sqrt{z}\right)\cos^\nu\left(\sqrt{z}\ c+g\right)dz = (-1)^n\, 2^{-\nu}\, b^{-2(n+1)}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma\left(2(n+1),\ -i\,b\sqrt{z}\right)+\Gamma\left(2(n+1),\ i\,b\sqrt{z}\right)\right)(1-\nu \bmod 2) - 2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{-i\,g(\nu-2s)}\,\Gamma\left(2(n+1),\ (-i\,b+i\,c(\nu-2s))\sqrt{z}\right)(-i\,b+i\,c(\nu-2s))^{-2(n+1)} + e^{-i\,g(\nu-2s)}\,(i\,b+i\,c(\nu-2s))^{-2(n+1)}\,\Gamma\left(2(n+1),\ (i\,b+i\,c(\nu-2s))\sqrt{z}\right) + e^{i\,g(\nu-2s)}\,(-i\,b-i\,c(\nu-2s))^{-2(n+1)}\,\Gamma\left(2(n+1),\ (-i\,b-i\,c(\nu-2s))\sqrt{z}\right) + e^{i\,g(\nu-2s)}\,(i\,b-i\,c(\nu-2s))^{-2(n+1)}\,\Gamma\left(2(n+1),\ (i\,b-i\,c(\nu-2s))\sqrt{z}\right)\right)\ /;\ n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos\left(b\,z^r+e\right)\cos^\nu\left(c\,z^r+g\right)$

01.07.21.1588.01

$$\int z^{\alpha-1}\cos(b\,z^r+e)\cos^\nu(c\,z^r+g)\,dz = -\frac{1}{r}\left(2^{-\nu-1}\,z^\alpha\binom{\nu}{\frac{\nu}{2}}\left(e^{i\,e}\,\Gamma\left(\frac{\alpha}{r},\ -i\,b\,z^r\right)(-i\,b\,z^r)^{-\frac{\alpha}{r}} + e^{-i\,e}\,(i\,b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\ i\,b\,z^r\right)\right)(1-\nu \bmod 2)\right) - \frac{2^{-\nu-1}\,z^\alpha}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{i\,e+2\,i\,g\,s-i\,g\,\nu}\,\Gamma\left(\frac{\alpha}{r},\ (-i\,b-2\,i\,c\,s+i\,c\,\nu)\,z^r\right)((-i\,b-2\,i\,c\,s+i\,c\,\nu)\,z^r)^{-\frac{\alpha}{r}} + e^{-i\,e+2\,i\,g\,s-i\,g\,\nu}\,((i\,b-2\,i\,c\,s+i\,c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\ (i\,b-2\,i\,c\,s+i\,c\,\nu)\,z^r\right) + e^{i\,e-2\,i\,g\,s+i\,g\,\nu}\,((-i\,b+2\,i\,c\,s-i\,c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\ (-i\,b+2\,i\,c\,s-i\,c\,\nu)\,z^r\right) + e^{-i\,e-2\,i\,g\,s+i\,g\,\nu}\,((i\,b+2\,i\,c\,s-i\,c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\ (i\,b+2\,i\,c\,s-i\,c\,\nu)\,z^r\right)\right)\ /;\ \nu\in\mathbb{N}^+$$

01.07.21.1589.01

$$\int z^n\cos\left(b\,z^2+e\right)\cos^\nu\left(c\,z^2+g\right)dz = -2^{-\nu-2}\binom{\nu}{\frac{\nu}{2}}\left(e^{i\,e}\,\Gamma\left(\frac{n+1}{2},\ -i\,b\,z^2\right)\left(-i\,b\,z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i\,e}\left(i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\ i\,b\,z^2\right)\right)(1-\nu \bmod 2)\,z^{n+1} - 2^{-\nu-2}\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{i\,e-i\,g(\nu-2s)}\,\Gamma\left(\frac{n+1}{2},\ (-i\,b+i\,c(\nu-2s))\,z^2\right)\left((-i\,b+i\,c(\nu-2s))\,z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i\,e-i\,g(\nu-2s)}\left((i\,b+i\,c(\nu-2s))\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\ (i\,b+i\,c(\nu-2s))\,z^2\right) + e^{i\,e+i\,g(\nu-2s)}\left((-i\,b-i\,c(\nu-2s))\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\ (-i\,b-i\,c(\nu-2s))\,z^2\right) + e^{-i\,e+i\,g(\nu-2s)}\left((i\,b-i\,c(\nu-2s))\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\ (i\,b-i\,c(\nu-2s))\,z^2\right)\right)\ /;\ n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.07.21.1590.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \cos^\nu\left(\sqrt{z}\, c + g\right) dz = (-1)^n\, 2^{-\nu}\, b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(2(n+1),\, -i\, b \sqrt{z}\right) + e^{-i e}\, \Gamma\left(2(n+1),\, i\, b \sqrt{z}\right)\right) (1 - \nu \bmod 2) - 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{i e - i g(\nu - 2s)}\, \Gamma\left(2(n+1),\, (-i\, b + i\, c\,(\nu - 2s)) \sqrt{z}\right) (-i\, b + i\, c\,(\nu - 2s))^{-2(n+1)} + e^{-i e - i g(\nu - 2s)}\, (i\, b + i\, c\,(\nu - 2s))^{-2(n+1)}\, \Gamma\left(2(n+1),\, (i\, b + i\, c\,(\nu - 2s)) \sqrt{z}\right) + e^{i e + i g(\nu - 2s)}\, (-i\, b - i\, c\,(\nu - 2s))^{-2(n+1)}\, \Gamma\left(2(n+1),\, (-i\, b - i\, c\,(\nu - 2s)) \sqrt{z}\right) + e^{-i e + i g(\nu - 2s)}\, (i\, b - i\, c\,(\nu - 2s))^{-2(n+1)}\, \Gamma\left(2(n+1),\, (i\, b - i\, c\,(\nu - 2s)) \sqrt{z}\right)\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n \cos\left(b\, z^r + d\, z\right) \cos^\nu\left(c\, z^r + g\right)$

01.07.21.1591.01

$$\int z^n \cos\left(b z^2 + d z\right) \cos^\nu\left(c z^2 + g\right) dz = 2^{-\nu-2} \left(-\frac{1}{b^{2n+1}} \left(e^{\frac{i d^2}{4b}} i \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{1}{d + 2 b z} \left(b (-i b)^n e^{-\frac{i d^2}{2b}} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 b z))^q \left(-\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1-q}{2}} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4 b}\right)\right) - i (i b)^n \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^q (d + 2 b z) \left(\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4 b}\right)\right)\right) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i (2 g s - g \nu)} \binom{\nu}{s} \left(e^{i \left(\frac{d^2}{-4b - 8 c s + 4 c \nu} + g (4 s - 2 \nu)\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i (2 (-b - 2 c s + c \nu) z - d))^{q+1} \left(\frac{i (2 (-b - 2 c s + c \nu) z - d)^2}{-b - 2 c s + c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2 (-b - 2 c s + c \nu) z - d)^2}{-4 b - 8 c s + 4 c \nu}\right)\right) (-i (-b - 2 c s + c \nu))^{-n-1} + e^{-\frac{i d^2}{-4b - 8 c s + 4 c \nu}} (i (-b - 2 c s + c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i (2 (-b - 2 c s + c \nu) z - d))^{q+1} \left(-\frac{i (2 (-b - 2 c s + c \nu) z - d)^2}{-b - 2 c s + c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2 (-b - 2 c s + c \nu) z - d)^2}{-4 b - 8 c s + 4 c \nu}\right) + \frac{1}{-b + 2 c s - c \nu} \left(i e^{\frac{i d^2}{-4b + 8 c s - 4 c \nu}} (i (b + c (\nu - 2 s)))^{-n} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i (-d - 2 b z + 4 c s z - 2 c \nu z))^{q+1} \left(\frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{-b + 2 c s - c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{-4 b + 8 c s - 4 c \nu}\right) + e^{i \left(g (4 s - 2 \nu) - \frac{d^2}{-4b + 8 c s - 4 c \nu}\right)} (i (-b + 2 c s - c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i (-d - 2 b z + 4 c s z - 2 c \nu z))^{q+1} \left(-\frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{-b + 2 c s - c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{-4 b + 8 c s - 4 c \nu}\right)\right)\right)\right) /; n \in \mathbb{N} \wedge \nu \in \mathbb{N}^+$$

01.07.21.1592.01

$$\int z^n \cos\left(\sqrt{z}\, b + d\, z\right) \cos^{\nu}\left(\sqrt{z}\, c + g\right) dz ==$$

$$2^{-2n-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, (i\, d)^{-2n-2} \left(e^{-\frac{i b^2}{4 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i\, b + 2\, i\, d \sqrt{z}\right)^{h+k} \right.$$

$$\left(\frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\, i \left(i\, b + 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{4 d}\right) + \right.$$

$$\left.\left. 2 \sqrt{\frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{4 d}\right)\right)\right. +$$

$$e^{\frac{i b^2}{4 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, b)^{-h-k+2n} \left(-i\, b - 2\, i\, d \sqrt{z}\right)^{h+k} \left(-\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k} \left(-i\, b \left(-i\, b - 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{4 d}\right) - \right.$$

$$\left.\left. 2\, i\, d \sqrt{-\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{4 d}\right)\right)\right) +$$

$$2^{-2n-\nu-2} (i\, d)^{-2n-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i (i b + i c (2 s - \nu))^2}{4 d} + g\, i\, (2 s - \nu)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b + i\, c\, (2 s - \nu))^{-h-k+2n} \right.$$

$$\left(i\, b + i\, c\, (2 s - \nu) + 2\, i\, d \sqrt{z}\right)^{h+k} \left(\frac{i \left(i\, b + i\, c\, (2 s - \nu) + 2\, i\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((i\, b + i\, c\, (2 s - \nu)) \left(i\, b + i\, c\, (2 s - \nu) + 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(i\, b + i\, c\, (2 s - \nu) + 2\, i\, d \sqrt{z}\right)^2}{4 d}\right) + \right.$$

$$2\sqrt{\frac{i\left(i\,b+i\,c\,(2\,s-v)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(i\,b+i\,c\,(2\,s-v)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{\frac{i\,(i\,b+i\,c\,(v-2\,s))^2}{4\,d}+g\,i\,(v-2\,s)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((i\,b+i\,c\,(v-2\,s))\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\sqrt{\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{i\,g\,(2\,s-v)-\frac{i\,(-i\,b+i\,c\,(2\,s-v))^2}{4\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+i\,c\,(2\,s-v))^{-h-k+2\,n}\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((-i\,b+i\,c\,(2\,s-v))$$

$$\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{i\,g\,(v-2\,s)-\frac{i\,(-i\,b+i\,c\,(v-2\,s))^2}{4\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-i\,b+i\,c\,(v-2\,s))\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}\,(h+k+2),\,-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r+d\,z+e\right)\cos^v\left(c\,z^r+g\right)$

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$$\int z^n \cos\left(b z^2+d z+e\right) \cos^{\nu}\left(c z^2+g\right) dz =$$

$$2^{-\nu-2}\left(-\frac{1}{b^{2n+1}}\left(e^{\frac{i\left(d^2+4 b e\right)}{4 b}}\, i \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)\left(\frac{1}{d+2 b z}\left(b(-i b)^n e^{-\frac{i d^2}{2 b}} \sum_{q=0}^{n} 2^{q-n}(-i d)^{n-q}\right.\right.\right.\right.$$

$$\left.(i(d+2 b z))^q\left(-\frac{i(d+2 b z)^2}{b}\right)^{\frac{1-q}{2}} \binom{n}{q} \Gamma\left(\frac{q+1}{2},-\frac{i(d+2 b z)^2}{4 b}\right)\right)-i(i b)^n e^{-2 i e}$$

$$\left.\left.\sum_{q=0}^{n} 2^{q-n}(i d)^{n-q}(-i(d+2 b z))^q(d+2 b z)\left(\frac{i(d+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+2 b z)^2}{4 b}\right)\right)\right)-$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i(-e+2 g s-g \nu)} \binom{\nu}{s}\left(e^{i\left(\frac{d^2}{-4 b-8 c s+4 c \nu}+g(4 s-2 \nu)\right)}\left(\sum_{q=0}^{n} 2^{q-n}(-i d)^{n-q}(-i(2(-b-2 c s+c \nu) z-d))^{q+1}\right.\right.$$

$$\left.\left(\frac{i(2(-b-2 c s+c \nu) z-d)^2}{-b-2 c s+c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(2(-b-2 c s+c \nu) z-d)^2}{-4 b-8 c s+4 c \nu}\right)\right)$$

$$(-i(-b-2 c s+c \nu))^{-n-1}+e^{-\frac{i d^2}{-4 b-8 c s+4 c \nu}-2 i e}\,(i(-b-2 c s+c \nu))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n}(i d)^{n-q}(i(2(-b-2 c s+c \nu) z-d))^{q+1}\left(-\frac{i(2(-b-2 c s+c \nu) z-d)^2}{-b-2 c s+c \nu}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2},-\frac{i(2(-b-2 c s+c \nu) z-d)^2}{-4 b-8 c s+4 c \nu}\right)+$$

$$\frac{1}{-b+2 c s-c \nu}\left(i e^{\frac{i d^2}{-4 b+8 c s-4 c \nu}}(i(b+c(\nu-2 s)))^{-n} \sum_{q=0}^{n} 2^{q-n}(-i d)^{n-q}(-i(-d-2 b z+4 c s z-2 c \nu z))^{q+1}\right.$$

$$\left(\frac{i(d+2(b-2 c s+c \nu) z)^2}{-b+2 c s-c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+2(b-2 c s+c \nu) z)^2}{-4 b+8 c s-4 c \nu}\right)+$$

$$e^{i\left(-\frac{d^2}{-4 b+8 c s-4 c \nu}-2 e+g(4 s-2 \nu)\right)}(i(-b+2 c s-c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n}(i d)^{n-q}(i(-d-2 b z+4 c s z-2 c \nu z))^{q+1}$$

$$\left.\left.\left.\left(-\frac{i(d+2(b-2 c s+c \nu) z)^2}{-b+2 c s-c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2},-\frac{i(d+2(b-2 c s+c \nu) z)^2}{-4 b+8 c s-4 c \nu}\right)\right)\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\, b + d\, z + e\right) \cos^{\nu}\left(\sqrt{z}\, c + g\right) dz = 2^{-2n-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) (i\, d)^{-2n-2} \left(e^{i\, e - \frac{i\, b^2}{4\, d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i\, b + 2\, i\, d \sqrt{z}\right)^{h+k} \left(\frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\, i \left(i\, b + 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{4\, d}\right) + 2 \sqrt{\frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{4\, d}\right)\right) + e^{\frac{i\, b^2}{4\, d} - i\, e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, b)^{-h-k+2n} \left(-i\, b - 2\, i\, d \sqrt{z}\right)^{h+k} \left(-\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-i\, b \left(-i\, b - 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{4\, d}\right) - 2\, i\, d \sqrt{-\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{4\, d}\right)\right)\right) + 2^{-2n-\nu-2} (i\, d)^{-2n-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i (i\, b + i\, c\, (2 s - \nu))^2}{4\, d} + i\, e + g\, i\, (2 s - \nu)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b + i\, c\, (2 s - \nu))^{-h-k+2n} \left(i\, b + i\, c\, (2 s - \nu) + 2\, i\, d \sqrt{z}\right)^{h+k} \left(\frac{i \left(i\, b + i\, c\, (2 s - \nu) + 2\, i\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((i\, b + i\, c\, (2 s - \nu)) \left(i\, b + i\, c\, (2 s - \nu) + 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(i\, b + i\, c\, (2 s - \nu) + 2\, i\, d \sqrt{z}\right)^2}{4\, d}\right) + \right.\right.$$

$$2\sqrt{\frac{i\left(i\,b+i\,c\,(2\,s-v)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,\frac{i\left(i\,b+i\,c\,(2\,s-v)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{\frac{i(i\,b+i\,c\,(v-2\,s))^2}{4\,d}+i\,e+g\,i\,(v-2\,s)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((i\,b+i\,c\,(v-2\,s))\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\,\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\sqrt{\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i(-i\,b+i\,c\,(2\,s-v))^2}{4\,d}-i\,e+g\,i\,(2\,s-v)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+i\,c\,(2\,s-v))^{-h-k+2\,n}\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((-i\,b+i\,c\,(2\,s-v))$$

$$\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(-i\,b+i\,c\,(2\,s-v)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i(-i\,b+i\,c\,(v-2\,s))^2}{4\,d}-i\,e+g\,i\,(v-2\,s)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-i\,b+i\,c\,(v-2\,s))\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}\,(h+k+2),\,-\frac{i\left(-i\,b+i\,c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos(d\,z)\cos^v\left(c\,z^r+f\,z\right)$

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$$\int z^n \cos(d\,z)\cos^\nu\!\left(c\,z^2+f\,z\right)dz = (-1)^n\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2)-$$
$$2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{-\frac{i\,(-i\,d-i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d+i\,f\,(\nu-2\,s))^{n-j}\right.\right.$$
$$(-i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{i\,(-i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-i\,c\,(\nu-2\,s))^{-n-1}+$$
$$e^{-\frac{i\,(i\,d-i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d+i\,f\,(\nu-2\,s))^{n-j}\,(i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^{j+1}\right.$$
$$\left(-\frac{i\,(i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$
$$\left.\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-i\,c\,(\nu-2\,s))^{-n-1}+$$
$$e^{\frac{i\,(-i\,d+i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}}\,(i\,c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d-i\,f\,(\nu-2\,s))^{n-j}\,(-i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^{j+1}$$
$$\left(\frac{i\,(-i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(-i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)+$$
$$e^{\frac{i\,(i\,d+i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}}\,(i\,c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d-i\,f\,(\nu-2\,s))^{n-j}\,(i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^{j+1}$$
$$\left(\frac{i\,(i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$
$$\left.\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\;/;\; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

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$$\int z^n \cos(d\,z)\cos^\nu\left(\sqrt{z}\,c+f\,z\right)dz = (-1)^n\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2)+ 2^{-2n-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{c^2(\nu-2s)^2}{4(-i\,d+i\,f(\nu-2s))}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(\nu-2s))^{-h-j+2n}\left(c\,i\,(\nu-2s)+2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(c\,i\,(\nu-2s)+2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{-i\,d+i\,f\,(\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,i\,(\nu-2s)\left(c\,i\,(\nu-2s)+\right.\right.$$

$$\left.2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(c\,i\,(\nu-2s)+2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(\nu-2s))}\right)+2$$

$$\sqrt{-\frac{\left(c\,i\,(\nu-2s)+2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{-i\,d+i\,f\,(\nu-2s)}}\;(-i\,d+i\,f\,(\nu-2s))$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c\,i\,(\nu-2s)+2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(\nu-2s))}\right)\right)\right)(-i\,d+i\,f\,(\nu-2s))^{-2(n+1)}+$$

$$e^{\frac{c^2(\nu-2s)^2}{4(i\,d+i\,f(\nu-2s))}}\,(i\,d+i\,f\,(\nu-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(\nu-2s))^{-h-j+2n}$$

$$\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{i\,d+i\,f\,(\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,i\,(\nu-2s)\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(\nu-2s))}\right)+2\sqrt{-\frac{\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{i\,d+i\,f\,(\nu-2s)}}$$

$$\left.(i\,d+i\,f\,(\nu-2s))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(\nu-2s))}\right)\right)+$$

$$e^{\frac{c^2 (v-2 s)^2}{4 (-i d-i f (v-2 s))}} (-i d - i f (v-2 s))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i c (v-2 s))^{-h-j+2 n}$$

$$\left(2 (-i d - i f (v-2 s)) \sqrt{z} - i c (v-2 s)\right)^{h+j} \left(-\frac{\left(2 (-i d - i f (v-2 s)) \sqrt{z} - i c (v-2 s)\right)^2}{-i d - i f (v-2 s)}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(2 (-i d - i f (v-2 s)) \sqrt{-\frac{\left(2 (-i d - i f (v-2 s)) \sqrt{z} - i c (v-2 s)\right)^2}{-i d - i f (v-2 s)}} \; \Gamma\left(\frac{1}{2} (h+j+2),\right.\right.$$

$$\left.-\frac{\left(2 (-i d - i f (v-2 s)) \sqrt{z} - i c (v-2 s)\right)^2}{4 (-i d - i f (v-2 s))}\right) - i c (v-2 s) \left(2 (-i d - i f (v-2 s)) \sqrt{z} - \right.$$

$$\left.\left. i c (v-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(2 (-i d - i f (v-2 s)) \sqrt{z} - i c (v-2 s)\right)^2}{4 (-i d - i f (v-2 s))}\right)\right) +$$

$$e^{\frac{c^2 (v-2 s)^2}{4 (i d-i f (v-2 s))}} (i d - i f (v-2 s))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i c (v-2 s))^{-h-j+2 n}$$

$$\left(2 (i d - i f (v-2 s)) \sqrt{z} - i c (v-2 s)\right)^{h+j} \left(-\frac{\left(2 (i d - i f (v-2 s)) \sqrt{z} - i c (v-2 s)\right)^2}{i d - i f (v-2 s)}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(2 (i d - i f (v-2 s)) \sqrt{-\frac{\left(2 (i d - i f (v-2 s)) \sqrt{z} - i c (v-2 s)\right)^2}{i d - i f (v-2 s)}} \; \Gamma\left(\frac{1}{2} (h+j+2),\right.\right.$$

$$\left.-\frac{\left(2 (i d - i f (v-2 s)) \sqrt{z} - i c (v-2 s)\right)^2}{4 (i d - i f (v-2 s))}\right) - i c (v-2 s) \left(2 (i d - i f (v-2 s)) \sqrt{z} - i c (v-2 s)\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(2 (i d - i f (v-2 s)) \sqrt{z} - i c (v-2 s)\right)^2}{4 (i d - i f (v-2 s))}\right)\right)\right) /; n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving $z^n \cos(d z + e) \cos^v(c z^r + f z)$

01.07.21.1597.01

$$\int z^n \cos(d\,z+e)\cos^\nu\!\left(c\,z^2+f\,z\right)dz = (-1)^n\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2)-$$
$$2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{-\frac{i\,(-i\,d-i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-i\,e}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d+i\,f\,(\nu-2\,s))^{n-j}\right.\right.$$
$$(-i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{i\,(-i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-i\,c\,(\nu-2\,s))^{-n-1}+$$
$$e^{-\frac{i\,(i\,d-i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+i\,e}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d+i\,f\,(\nu-2\,s))^{n-j}\,(i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^{j+1}\right.$$
$$\left.\left(-\frac{i\,(i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)$$
$$(-i\,c\,(\nu-2\,s))^{-n-1}+e^{\frac{i\,(-i\,d+i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-i\,e}\,(i\,c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d-i\,f\,(\nu-2\,s))^{n-j}$$
$$(-i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{i\,(-i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$
$$\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(-i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)+e^{\frac{i\,(i\,d+i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+i\,e}\,(i\,c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}$$
$$(-i\,d-i\,f\,(\nu-2\,s))^{n-j}\,(i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{i\,(i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.07.21.1598.01

$$\int z^n \cos(d\,z+e)\cos^\nu\!\left(\sqrt{z}\;c+f\,z\right)dz = (-1)^n\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2)+$$

$$2^{-2n-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{c^2(\nu-2s)^2}{4(-i d+i f(\nu-2s))}-i e}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(\nu-2s))^{-h-j+2n}\left(c\,i\,(\nu-2s)+2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(c\,i\,(\nu-2s)+2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{-i\,d+i\,f\,(\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,i\,(\nu-2s)\left(c\,i\,(\nu-2s)+\right.\right.$$

$$\left.2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(c\,i\,(\nu-2s)+2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(\nu-2s))}\right)+2$$

$$\sqrt{-\frac{\left(c\,i\,(\nu-2s)+2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{-i\,d+i\,f\,(\nu-2s)}}\;(-i\,d+i\,f\,(\nu-2s))$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c\,i\,(\nu-2s)+2\,(-i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(\nu-2s))}\right)\right)\right)(-i\,d+i\,f\,(\nu-2s))^{-2(n+1)}+$$

$$e^{\frac{c^2(\nu-2s)^2}{4(i d+i f(\nu-2s))}+i e}\;(i\,d+i\,f\,(\nu-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(\nu-2s))^{-h-j+2n}$$

$$\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{i\,d+i\,f\,(\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,i\,(\nu-2s)\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(\nu-2s))}\right)+2\sqrt{-\frac{\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{i\,d+i\,f\,(\nu-2s)}}$$

$$\left.(i\,d+i\,f\,(\nu-2s))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c\,i\,(\nu-2s)+2\,(i\,d+i\,f\,(\nu-2s))\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(\nu-2s))}\right)\right)+$$

$$e^{\frac{c^2(\nu-2s)^2}{4(-i d-i f(\nu-2s))}-i e}\;(-i\,d-i\,f\,(\nu-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(\nu-2s))^{-h-j+2n}$$

$$\left(2\,(-i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(-i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{-i\,d-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d-i\,f\,(v-2\,s))\sqrt{-\frac{\left(2\,(-i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{-i\,d-i\,f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(-i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,(-i\,d-i\,f\,(v-2\,s))}\right)-i\,c\,(v-2\,s)\left(2\,(-i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-\right.$$

$$\left.\left.i\,c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(-i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,(-i\,d-i\,f\,(v-2\,s))}\right)\right)+$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,(i\,d-i\,f\,(v-2\,s))}+i\,e}\,(i\,d-i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{i\,d-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(i\,d-i\,f\,(v-2\,s))\sqrt{-\frac{\left(2\,(i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{i\,d-i\,f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,(i\,d-i\,f\,(v-2\,s))}\right)-i\,c\,(v-2\,s)\left(2\,(i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(i\,d-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,(i\,d-i\,f\,(v-2\,s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \cos(b\,z^r)\cos^v(c\,z^r+f\,z)$

01.07.21.1599.01

$$\int z^n \cos(b z^2) \cos^\nu(c z^2 + f z) \, dz = -2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{n+1}{2}, -i b z^2\right) \left(-i b z^2\right)^{\frac{1}{2}(-n-1)} + \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right) \right) (1 - \nu \bmod 2) z^{n+1} - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i f^2 (\nu-2s)^2}{4(b+2cs-c\nu)}} \left(\sum_{j=0}^{n} 2^{j-n} (-i f (\nu-2s))^{n-j} (f i (\nu-2s) + 2(-i b + i c(\nu-2s)) z)^{j+1} \left(-\frac{(f i (\nu-2s) + 2(-i b + i c(\nu-2s)) z)^2}{-i b + i c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f i (\nu-2s) + 2(-i b + i c(\nu-2s)) z)^2}{4(-i b + i c(\nu-2s))}\right) \right) (-i b + i c(\nu-2s))^{-n-1} + e^{\frac{i f^2 (\nu-2s)^2}{4(-b+2cs-c\nu)}} (i b + i c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i f (\nu-2s))^{n-j} (f i (\nu-2s) + 2(i b + i c(\nu-2s)) z)^{j+1} \left(-\frac{(f i (\nu-2s) + 2(i b + i c(\nu-2s)) z)^2}{i b + i c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f i (\nu-2s) + 2(i b + i c(\nu-2s)) z)^2}{4(i b + i c(\nu-2s))}\right) + e^{-\frac{i f^2 (\nu-2s)^2}{4(-b+2cs-c\nu)}} (-i b - i c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i f (\nu-2s))^{n-j} (2(-i b - i c(\nu-2s)) z - i f (\nu-2s))^{j+1} \left(-\frac{(2(-i b - i c(\nu-2s)) z - i f (\nu-2s))^2}{-i b - i c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-i b - i c(\nu-2s)) z - i f (\nu-2s))^2}{4(-i b - i c(\nu-2s))}\right) + e^{-\frac{i f^2 (\nu-2s)^2}{4(b+2cs-c\nu)}} (i b - i c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i f (\nu-2s))^{n-j} (2(i b - i c(\nu-2s)) z - i f (\nu-2s))^{j+1} \left(-\frac{(2(i b - i c(\nu-2s)) z - i f (\nu-2s))^2}{i b - i c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - i c(\nu-2s)) z - i f (\nu-2s))^2}{4(i b - i c(\nu-2s))}\right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1600.01

$$\int z^n \cos\left(b \sqrt{z}\right) \cos^\nu\left(\sqrt{z}\, c + f z\right) dz = (-1)^n 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), -i b \sqrt{z}\right) + \Gamma\left(2(n+1), i b \sqrt{z}\right) \right) (1 - \nu \bmod 2) b^{-2(n+1)} + 2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{i(-i b - i c(\nu-2s))^2}{4 f (\nu-2s)}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b - i c(\nu-2s))^{-h-j+2n} \right.\right.$$

$$\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j} \left(-\frac{i\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b - i\,c\,(v-2\,s))\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) - 2$$

$$i\,f\,(v-2\,s)\,\sqrt{-\frac{i\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg)\Bigg)\Bigg)(-i\,f\,(v-2\,s))^{-2\,(n+1)} +$$

$$e^{-\frac{i\,(i\,b - i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b - i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b - i\,c\,(v-2\,s))\Big(i\,b - i\,c\,(v-2\,s) -$$

$$2\,i\,f\,(v-2\,s)\,\sqrt{z}\Big)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) - 2$$

$$i\,f\,(v-2\,s)\,\sqrt{-\frac{i\left(i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{i\left(i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)\Bigg)\Bigg)(-i\,f\,(v-2\,s))^{-2\,(n+1)} +$$

$$e^{\frac{i\,(-i\,b + i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b + i\,c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}\left(\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b+i\,c\,(v-2\,s))\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\ \frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)+$$

$$2\,f\,i\,(v-2\,s)\sqrt{\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\ \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)+e^{\frac{i\,(i\,b+i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+i\,c\,(v-2\,s))$$

$$\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),\ \frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)+$$

$$2\,f\,i\,(v-2\,s)\sqrt{\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\ \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r+e\right)\cos^v\left(c\,z^r+f\,z\right)$

01.07.21.1601.01

$$\int z^n \cos\left(b z^2 + e\right) \cos^\nu\left(c z^2 + f z\right) dz = -2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) \left(-i b z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e} \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2)\, z^{n+1} - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{b+2cs-c\nu} + 4e\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-i f (\nu - 2s))^{n-j} (f\, i (\nu - 2s) + 2(-i b + i c (\nu - 2s))\, z)^{j+1} \left(-\frac{(f\, i (\nu-2s) + 2(-i b + i c(\nu - 2s))\, z)^2}{-i b + i c (\nu - 2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f\, i (\nu - 2s) + 2(-i b + i c (\nu - 2s))\, z)^2}{4(-i b + i c (\nu - 2s))}\right)\right) (-i b + i c (\nu - 2s))^{-n-1} + e^{\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{-b+2cs-c\nu} + 4e\right)} (i b + i c (\nu - 2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i f (\nu - 2s))^{n-j} (f\, i (\nu - 2s) + 2(i b + i c (\nu - 2s))\, z)^{j+1} \left(-\frac{(f\, i (\nu - 2s) + 2(i b + i c (\nu - 2s))\, z)^2}{i b + i c (\nu - 2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f\, i (\nu - 2s) + 2(i b + i c (\nu - 2s))\, z)^2}{4(i b + i c (\nu - 2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{-b+2cs-c\nu} + 4e\right)} (-i b - i c (\nu - 2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i f (\nu - 2s))^{n-j} (2(-i b - i c (\nu - 2s))\, z - i f (\nu - 2s))^{j+1} \left(-\frac{(2(-i b - i c (\nu - 2s))\, z - i f (\nu - 2s))^2}{-i b - i c (\nu - 2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-i b - i c (\nu - 2s))\, z - i f (\nu - 2s))^2}{4(-i b - i c (\nu - 2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{b+2cs-c\nu} + 4e\right)} (i b - i c (\nu - 2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i f (\nu - 2s))^{n-j} (2(i b - i c (\nu - 2s))\, z - i f (\nu - 2s))^{j+1} \left(-\frac{(2(i b - i c (\nu - 2s))\, z - i f (\nu - 2s))^2}{i b - i c (\nu - 2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - i c (\nu - 2s))\, z - i f (\nu - 2s))^2}{4(i b - i c (\nu - 2s))}\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1602.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \cos^\nu\left(\sqrt{z}\, c + f z\right) dz = (-1)^n 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e} \Gamma\left(2(n+1), -i b \sqrt{z}\right) + e^{-i e} \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1 - \nu \bmod 2)\, b^{-2(n+1)} + 2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{i(-i b - i c (\nu-2s))^2}{4 f (\nu - 2s)} - i e} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b - i c (\nu - 2s))^{-h-j+2n} \right.\right.$$

$$\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j} \left(-\frac{i\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b - i\,c\,(v-2\,s))\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) - 2$$

$$i\,f\,(v-2\,s)\,\sqrt{-\frac{i\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{i\left(-i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg)\Bigg)\Bigg)(-i\,f\,(v-2\,s))^{-2\,(n+1)} +$$

$$e^{i\,e - \frac{i\,(i\,b - i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}} \Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b - i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg((i\,b - i\,c\,(v-2\,s))\Big(i\,b - i\,c\,(v-2\,s) -$$

$$2\,i\,f\,(v-2\,s)\,\sqrt{z}\Big)\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{i\left(i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) - 2$$

$$i\,f\,(v-2\,s)\,\sqrt{-\frac{i\left(i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{i\left(i\,b - i\,c\,(v-2\,s) - 2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)\Bigg)(-i\,f\,(v-2\,s))^{-2\,(n+1)} +$$

$$e^{\frac{i\,(-i\,b + i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)} - i\,e}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b + i\,c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b+i\,c\,(v-2\,s))\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\,\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)+$$

$$2\,f\,i\,(v-2\,s)\sqrt{\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)+e^{\frac{i\,(i\,b+i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+i\,e}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+i\,c\,(v-2\,s))$$

$$\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,i\,(v-2\,s)\sqrt{\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r+d\,z\right)\cos^v\left(c\,z^r+f\,z\right)$

01.07.21.1603.01

$$\int z^n \cos\left(b z^2 + d z\right) \cos^\nu\left(c z^2 + f z\right) dz = 2^{-\nu-2} \left(\frac{1}{b^{n+1}} e^{\frac{i d^2}{4 b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \right.$$

$$\left(\frac{1}{d + 2 b z} \left(\left(b (-i)^{n+1}\right) e^{-\frac{i d^2}{2 b}} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 b z))^q \left(-\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1-q}{2}} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4 b} \right) \right) - \right.$$

$$\left. i^n (d + 2 b z) \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^q \left(\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4 b} \right) \right) -$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i (-d - 2 f s + f \nu)^2}{-4 b - 8 c s + 4 c \nu}} \left(\sum_{q=0}^{n} 2^{q-n} (i (-d - 2 f s + f \nu))^{n-q} (-i (-d + f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z))^{q+1} \right. \right.$$

$$\left(\frac{i (-d + f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-b - 2 c s + c \nu} \right)^{\frac{1}{2} (-q-1)} \binom{n}{q}$$

$$\left. \Gamma\left(\frac{q+1}{2}, \frac{i (-d + f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-4 b - 8 c s + 4 c \nu} \right) \right) (-i (-b - 2 c s + c \nu))^{-n-1} +$$

$$e^{-\frac{i (-d - 2 f s + f \nu)^2}{-4 b - 8 c s + 4 c \nu}} (i (-b - 2 c s + c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (-d - 2 f s + f \nu))^{n-q}$$

$$(i (-d + f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z))^{q+1} \left(-\frac{i (-d + f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-b - 2 c s + c \nu} \right)^{\frac{1}{2} (-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-d + f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-4 b - 8 c s + 4 c \nu} \right) +$$

$$\frac{1}{-b + 2 c s - c \nu} \left(i e^{\frac{i (d + f (\nu - 2 s))^2}{-4 b + 8 c s - 4 c \nu}} (i (b + c (\nu - 2 s)))^{-n} \sum_{q=0}^{n} 2^{q-n} (i (-d + 2 f s - f \nu))^{n-q} \right.$$

$$(-i (-d + 2 f s - f \nu - 2 b z + 4 c s z - 2 c \nu z))^{q+1} \left(\frac{i (d + f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{-b + 2 c s - c \nu} \right)^{\frac{1}{2} (-q-1)}$$

$$\left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{-4 b + 8 c s - 4 c \nu} \right) \right) +$$

$$e^{-\frac{i(d+f(v-2s))^2}{-4b+8cs-4cv}} (i(-b+2cs-cv))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i(-d+2fs-fv))^{n-q}$$

$$(i(-d+2fs-fv-2bz+4csz-2cvz))^{q+1} \left(-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right)\Bigg)\Bigg) /; n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

01.07.21.1604.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \cos^v\left(\sqrt{z}\, c + f z\right) dz =$$

$$2^{-2n-v-2} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(e^{-\frac{i b^2}{4d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2n} \left(i b + 2 i d \sqrt{z}\right)^{h+k} \left(\frac{i\left(i b + 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(b\, i \left(i b + 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(i b + 2 i d \sqrt{z}\right)^2}{4d}\right) +\right.$$

$$\left. 2\sqrt{\frac{i\left(i b + 2 i d \sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(i b + 2 i d \sqrt{z}\right)^2}{4d}\right)\right) +$$

$$e^{\frac{i b^2}{4d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2n} \left(-i b - 2 i d \sqrt{z}\right)^{h+k} \left(-\frac{i\left(-i b - 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k}\left(-i b \left(-i b - 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(-i b - 2 i d \sqrt{z}\right)^2}{4d}\right) -\right.$$

$$\left.\left. 2 i d \sqrt{-\frac{i\left(-i b - 2 i d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(-i b - 2 i d \sqrt{z}\right)^2}{4d}\right)\right)\right) (i d)^{-2n-2} +$$

$$2^{-2n-v-2} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{(-i b + i c(2s-v))^2}{4(-i d + i f(2s-v))}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b + i c (2s-v))^{-h-k+2n} \left(-i b + i c (2s-v) + \right.\right.\right.$$

$$2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\Big)^{h+k}\left(-\frac{\left(-i\,b+i\,c\,(2\,s-v)+2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{-i\,d+i\,f\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((-i\,b+i\,c\,(2\,s-v))\left(-i\,b+i\,c\,(2\,s-v)+2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(-i\,b+i\,c\,(2\,s-v)+2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(2\,s-v))}\right)+$$

$$2\,(-i\,d+i\,f\,(2\,s-v))\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(-i\,b+i\,c\,(2\,s-v)+2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(2\,s-v))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+i\,c\,(2\,s-v)+2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{-i\,d+i\,f\,(2\,s-v)}}\Bigg)\Bigg)(-i\,d+i\,f\,(2\,s-v))^{-2\,n-2}+$$

$$e^{-\frac{(i\,b+i\,c\,(2\,s-v))^2}{4\,(i\,d+i\,f\,(2\,s-v))}}\,(i\,d+i\,f\,(2\,s-v))^{-2\,n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+i\,c\,(2\,s-v))^{-h-k+2\,n}\Big(i\,b+i\,c\,(2\,s-v)+$$

$$2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\Big)^{h+k}\left(-\frac{\left(i\,b+i\,c\,(2\,s-v)+2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{i\,d+i\,f\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((i\,b+i\,c\,(2\,s-v))\left(i\,b+i\,c\,(2\,s-v)+2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+k+1),\,-\frac{\left(i\,b+i\,c\,(2\,s-v)+2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(2\,s-v))}\Bigg)+$$

$$2\,(i\,d+i\,f\,(2\,s-v))\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(i\,b+i\,c\,(2\,s-v)+2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(2\,s-v))}\right)$$

$$\sqrt{-\frac{\left(i\,b+i\,c\,(2\,s-v)+2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{i\,d+i\,f\,(2\,s-v)}}\Bigg)+e^{-\frac{(-i\,b+i\,c\,(v-2\,s))^2}{4\,(-i\,d+i\,f\,(v-2\,s))}}\,(-i\,d+i\,f\,(v-2\,s))^{-2\,n-2}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{-i\,d+i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-i\,b+i\,c\,(v-2\,s))\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+k+1),\,-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(v-2\,s))}\Bigg)+$$

$$2\,(-i\,d+i\,f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(v-2\,s))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{-i\,d+i\,f\,(v-2\,s)}}\Bigg)+e^{-\frac{(i\,b+i\,c\,(v-2\,s))^2}{4\,(i\,d+i\,f\,(v-2\,s))}}\,(i\,d+i\,f\,(v-2\,s))^{-2\,n-2}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{i\,d+i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((i\,b+i\,c\,(v-2\,s))\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+k+1),\,-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(v-2\,s))}\Bigg)+$$

$$2\,(i\,d+i\,f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(v-2\,s))}\right)$$

$$\sqrt{-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{i\,d+i\,f\,(v-2\,s)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \cos\left(b z^r + d z + e\right) \cos^v\left(c z^r + f z\right)$

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$$\int z^n \cos\left(b z^2 + d z + e\right) \cos^v\left(c z^2 + f z\right) dz = 2^{-v-2} \left(\frac{1}{b^{n+1}} e^{\frac{i\left(d^2+4 b e\right)}{4 b}} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \right.$$

$$\left(\frac{1}{d+2 b z} \left(\left(b (-i)^{n+1}\right) e^{-\frac{i d^2}{2 b}} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 b z))^q \left(-\frac{i (d+2 b z)^2}{b}\right)^{\frac{1-q}{2}} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d+2 b z)^2}{4 b}\right)\right) - \right.$$

$$\left. i^n e^{-2 i e} (d + 2 b z) \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^q \left(\frac{i (d+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d+2 b z)^2}{4 b}\right)\right) -$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{i e} \binom{v}{s} \left(e^{\frac{i (-d-2 f s+f v)^2}{-4 b-8 c s+4 c v}} \left(\sum_{q=0}^{n} 2^{q-n} (i (-d - 2 f s + f v))^{n-q} (-i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z))^{q+1} \right.\right.$$

$$\left(\frac{i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-b - 2 c s + c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$

$$\left.\Gamma\left(\frac{q+1}{2}, \frac{i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-4 b - 8 c s + 4 c v}\right)\right) (-i (-b - 2 c s + c v))^{-n-1} +$$

$$e^{-\frac{i (-d-2 f s+f v)^2}{-4 b-8 c s+4 c v} - 2 i e} (i (-b - 2 c s + c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (-d - 2 f s + f v))^{n-q}$$

$$(i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z))^{q+1} \left(-\frac{i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-b - 2 c s + c v}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-4 b - 8 c s + 4 c v}\right) +$$

$$\frac{1}{-b + 2 c s - c v} \left(i e^{\frac{i (d+f (v-2 s))^2}{-4 b+8 c s-4 c v}} (i (b + c (v - 2 s)))^{-n} \sum_{q=0}^{n} 2^{q-n} (i (-d + 2 f s - f v))^{n-q} \right.$$

$$(-i (-d + 2 f s - f v - 2 b z + 4 c s z - 2 c v z))^{q+1} \left(\frac{i (d + f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-b + 2 c s - c v}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-4 b + 8 c s - 4 c v}\right)\right) +$$

$$e^{i\left(-\frac{(d+f(v-2s))^2}{-4b+8cs-4cv}-2e\right)}(i(-b+2cs-cv))^{-n-1}\sum_{q=0}^{n}2^{q-n}(-i(-d+2fs-fv))^{n-q}$$

$$(i(-d+2fs-fv-2bz+4csz-2cvz))^{q+1}\left(-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right)\Bigg)\Bigg)\Bigg)\text{ /; } n\in\mathbb{N}\land v\in\mathbb{N}^+$$

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$$\int z^n\cos\left(\sqrt{z}\,b+dz+e\right)\cos^v\left(\sqrt{z}\,c+fz\right)dz=$$

$$2^{-2n-v-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\Bigg(e^{ie-\frac{ib^2}{4d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(ib)^{-h-k+2n}\left(ib+2id\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(ib+2id\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(bi\left(ib+2id\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(ib+2id\sqrt{z}\right)^2}{4d}\right)+$$

$$2\sqrt{\frac{i\left(ib+2id\sqrt{z}\right)^2}{d}}\,di\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(ib+2id\sqrt{z}\right)^2}{4d}\right)\Bigg)+$$

$$e^{\frac{ib^2}{4d}-ie}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-ib)^{-h-k+2n}\left(-ib-2id\sqrt{z}\right)^{h+k}\left(-\frac{i\left(-ib-2id\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(-ib\left(-ib-2id\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(-ib-2id\sqrt{z}\right)^2}{4d}\right)-$$

$$2id\sqrt{-\frac{i\left(-ib-2id\sqrt{z}\right)^2}{d}}\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(-ib-2id\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)(id)^{-2n-2}+$$

$$2^{-2n-v-2}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{-\frac{(-ib+ic(2s-v))^2}{4(-id+if(2s-v))}-ie}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-ib+ic(2s-v))^{-h-k+2n}\left(-ib+ic(2s-v)+\right.$$

$$2(-i d + i f(2s-v))\sqrt{z}\Big)^{h+k}\left(-\frac{\left(-i b + i c(2s-v) + 2(-i d + i f(2s-v))\sqrt{z}\right)^2}{-i d + i f(2s-v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-i b + i c(2s-v))\left(-i b + i c(2s-v) + 2(-i d + i f(2s-v))\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(-i b + i c(2s-v) + 2(-i d + i f(2s-v))\sqrt{z}\right)^2}{4(-i d + i f(2s-v))}\right) + 2$$

$$(-i d + i f(2s-v))\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(-i b + i c(2s-v) + 2(-i d + i f(2s-v))\sqrt{z}\right)^2}{4(-i d + i f(2s-v))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(-i b + i c(2s-v) + 2(-i d + i f(2s-v))\sqrt{z}\right)^2}{-i d + i f(2s-v)}}\right)\right)(-i d + i f(2s-v))^{-2n-2} +$$

$$e^{i e - \frac{(i b + i c(2s-v))^2}{4(i d + i f(2s-v))}}(i d + i f(2s-v))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i b + i c(2s-v))^{-h-k+2n}\Big(i b + i c(2s-v) +$$

$$2(i d + i f(2s-v))\sqrt{z}\Big)^{h+k}\left(-\frac{\left(i b + i c(2s-v) + 2(i d + i f(2s-v))\sqrt{z}\right)^2}{i d + i f(2s-v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((i b + i c(2s-v))\left(i b + i c(2s-v) + 2(i d + i f(2s-v))\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+k+1), -\frac{\left(i b + i c(2s-v) + 2(i d + i f(2s-v))\sqrt{z}\right)^2}{4(i d + i f(2s-v))}\right) +$$

$$2(i d + i f(2s-v))\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(i b + i c(2s-v) + 2(i d + i f(2s-v))\sqrt{z}\right)^2}{4(i d + i f(2s-v))}\right)$$

$$\left.\sqrt{-\frac{\left(i b + i c(2s-v) + 2(i d + i f(2s-v))\sqrt{z}\right)^2}{i d + i f(2s-v)}}\right) + e^{-\frac{(-i b + i c(v-2s))^2}{4(-i d + i f(v-2s))} - i e}(-i d + i f(v-2s))^{-2n-2}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{-i\,d+i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-i\,b+i\,c\,(v-2\,s))\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),\,-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(v-2\,s))}\Bigg)+$$

$$2\,(-i\,d+i\,f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(v-2\,s))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,(-i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{-i\,d+i\,f\,(v-2\,s)}}\Bigg)+e^{i\,e-\frac{(i\,b+i\,c\,(v-2\,s))^2}{4\,(i\,d+i\,f\,(v-2\,s))}}\,(i\,d+i\,f\,(v-2\,s))^{-2\,n-2}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{i\,d+i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((i\,b+i\,c\,(v-2\,s))\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),\,-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(v-2\,s))}\Bigg)+$$

$$2\,(i\,d+i\,f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(v-2\,s))}\right)$$

$$\sqrt{-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,(i\,d+i\,f\,(v-2\,s))\sqrt{z}\right)^2}{i\,d+i\,f\,(v-2\,s)}}\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \cos(d\,z) \cos^\nu(c\,z^r + f\,z + g)$

01.07.21.1607.01

$$\int z^n \cos(d\,z) \cos^\nu\left(c\,z^2 + f\,z + g\right) dz = (-1)^n\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(n+1, i\,d\,z)\,(-i\,d)^{-n-1} + (i\,d)^{-n-1}\,\Gamma(n+1, -i\,d\,z)\right)(1 - \nu \bmod 2) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \Bigg(e^{-\frac{i\,(-i\,d - i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)} - i\,g\,(\nu-2\,s)} \Bigg(\sum_{j=0}^{n} 2^{j-n}\,(i\,d + i\,f\,(\nu-2\,s))^{n-j} (-i\,d - i\,f\,(\nu-2\,s) - 2\,i\,c\,(\nu-2\,s)\,z)^{j+1} \left(-\frac{i\,(-i\,d - i\,f\,(\nu-2\,s) - 2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\,\Gamma\left(\frac{j+1}{2}, -\frac{i\,(-i\,d - i\,f\,(\nu-2\,s) - 2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\Bigg) (-i\,c\,(\nu-2\,s))^{-n-1} + e^{-\frac{i\,(i\,d - i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)} - i\,g\,(\nu-2\,s)} \Bigg(\sum_{j=0}^{n} 2^{j-n}\,(-i\,d + i\,f\,(\nu-2\,s))^{n-j}\,(i\,d - i\,f\,(\nu-2\,s) - 2\,i\,c\,(\nu-2\,s)\,z)^{j+1} \left(-\frac{i\,(i\,d - i\,f\,(\nu-2\,s) - 2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\,\Gamma\left(\frac{j+1}{2}, -\frac{i\,(i\,d - i\,f\,(\nu-2\,s) - 2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\Bigg) (-i\,c\,(\nu-2\,s))^{-n-1} + e^{\frac{i\,(-i\,d + i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)} + g\,i\,(\nu-2\,s)} (i\,c\,(\nu-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(i\,d - i\,f\,(\nu-2\,s))^{n-j} (-i\,d + i\,f\,(\nu-2\,s) + 2\,i\,c\,(\nu-2\,s)\,z)^{j+1} \left(\frac{i\,(-i\,d + i\,f\,(\nu-2\,s) + 2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i\,(-i\,d + i\,f\,(\nu-2\,s) + 2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) + e^{\frac{i\,(i\,d + i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)} + g\,i\,(\nu-2\,s)} (i\,c\,(\nu-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\,d - i\,f\,(\nu-2\,s))^{n-j}\,(i\,d + i\,f\,(\nu-2\,s) + 2\,i\,c\,(\nu-2\,s)\,z)^{j+1} \left(\frac{i\,(i\,d + i\,f\,(\nu-2\,s) + 2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\,\Gamma\left(\frac{j+1}{2}, \frac{i\,(i\,d + i\,f\,(\nu-2\,s) + 2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\Bigg) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1608.01

$$\int z^n \cos(d\,z) \cos^\nu\left(\sqrt{z}\;c + f\,z + g\right) dz = (-1)^n\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(n+1, i\,d\,z)\,(-i\,d)^{-n-1} + (i\,d)^{-n-1}\,\Gamma(n+1, -i\,d\,z)\right)(1 - \nu \bmod 2) + 2^{-2\,n-\nu-2}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{\frac{c^2(v-2s)^2}{4(-i d+i f(v-2s))}+g i(v-2s)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(i c(v-2s))^{-h-j+2n}\left(c i(v-2s)+2(-i d+i f(v-2s))\sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(c i(v-2s)+2(-i d+i f(v-2s))\sqrt{z}\right)^2}{-i d+i f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c i(v-2s)\left(c i(v-2s)+\right.\right.$$

$$\left.2(-i d+i f(v-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c i(v-2s)+2(-i d+i f(v-2s))\sqrt{z}\right)^2}{4(-i d+i f(v-2s))}\right)+2$$

$$\sqrt{-\frac{\left(c i(v-2s)+2(-i d+i f(v-2s))\sqrt{z}\right)^2}{-i d+i f(v-2s)}}\;(-i d+i f(v-2s))$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c i(v-2s)+2(-i d+i f(v-2s))\sqrt{z}\right)^2}{4(-i d+i f(v-2s))}\right)\right)\right)(-i d+i f(v-2s))^{-2(n+1)}+$$

$$e^{\frac{c^2(v-2s)^2}{4(i d+i f(v-2s))}+g i(v-2s)}(i d+i f(v-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(i c(v-2s))^{-h-j+2n}$$

$$\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)^2}{i d+i f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c i(v-2s)\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)^2}{4(i d+i f(v-2s))}\right)+2\sqrt{-\frac{\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)^2}{i d+i f(v-2s)}}$$

$$\left.(i d+i f(v-2s))\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)^2}{4(i d+i f(v-2s))}\right)\right)+$$

$$e^{\frac{c^2(v-2s)^2}{4(-i d-i f(v-2s))}-i g(v-2s)}(-i d-i f(v-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-i c(v-2s))^{-h-j+2n}$$

$$\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{-i\,d-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{-i\,d-i\,f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{4\left(-i\,d-i\,f\,(v-2\,s)\right)}\right)-i\,c\,(v-2\,s)\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-\right.$$

$$\left.\left.i\,c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{4\left(-i\,d-i\,f\,(v-2\,s)\right)}\right)\right)+$$

$$e^{\frac{c^{2}(v-2\,s)^{2}}{4\left(i\,d-i\,f\,(v-2\,s)\right)}-i\,g\,(v-2\,s)}\left(i\,d-i\,f\,(v-2\,s)\right)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\left(-i\,c\,(v-2\,s)\right)^{-h-j+2\,n}$$

$$\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{i\,d-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{i\,d-i\,f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{4\left(i\,d-i\,f\,(v-2\,s)\right)}\right)-i\,c\,(v-2\,s)\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{4\left(i\,d-i\,f\,(v-2\,s)\right)}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^{+}$$

Involving $z^n \cos(d\,z+e)\cos^{v}(c\,z^{r}+f\,z+g)$

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$$\int z^n \cos(d\,z+e)\cos^{\nu}\!\left(c\,z^2+f\,z+g\right)dz = (-1)^n\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2)- 2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{-\frac{i\,(-i\,d-i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-i\,e-i\,g\,(\nu-2\,s)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d+i\,f\,(\nu-2\,s))^{n-j} (-i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{i\,(-i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-i\,c\,(\nu-2\,s))^{-n-1}+ e^{-\frac{i\,(i\,d-i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+i\,e-i\,g\,(\nu-2\,s)}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d+i\,f\,(\nu-2\,s))^{n-j}\,(i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^{j+1} \left(-\frac{i\,(i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(i\,d-i\,f\,(\nu-2\,s)-2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right) (-i\,c\,(\nu-2\,s))^{-n-1}+e^{\frac{i\,(-i\,d+i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-i\,e+g\,i\,(\nu-2\,s)}\,(i\,c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d-i\,f\,(\nu-2\,s))^{n-j} (-i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{i\,(-i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j} \Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(-i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)+e^{\frac{i\,(i\,d+i\,f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+i\,e+g\,i\,(\nu-2\,s)}\,(i\,c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n} (-i\,d-i\,f\,(\nu-2\,s))^{n-j}\,(i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{i\,(i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(i\,d+i\,f\,(\nu-2\,s)+2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\;/;\;n\in\mathbb{N}\bigwedge\nu\in\mathbb{N}^+$$

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$$\int z^n \cos(d\,z+e)\cos^{\nu}\!\left(\sqrt{z}\;c+f\,z+g\right)dz = (-1)^n\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2)+2^{-2\,n-\nu-2}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{\frac{c^2(v-2s)^2}{4(-i d+i f(v-2s))}+g i(v-2s)-i e}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(i c(v-2s))^{-h-j+2n}\left(c i(v-2s)+2(-i d+i f(v-2s))\sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(c i(v-2s)+2(-i d+i f(v-2s))\sqrt{z}\right)^2}{-i d+i f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c i(v-2s)\left(c i(v-2s)+\right.\right.$$

$$\left.2(-i d+i f(v-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c i(v-2s)+2(-i d+i f(v-2s))\sqrt{z}\right)^2}{4(-i d+i f(v-2s))}\right)+2$$

$$\sqrt{-\frac{\left(c i(v-2s)+2(-i d+i f(v-2s))\sqrt{z}\right)^2}{-i d+i f(v-2s)}}(-i d+i f(v-2s))$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c i(v-2s)+2(-i d+i f(v-2s))\sqrt{z}\right)^2}{4(-i d+i f(v-2s))}\right)\right)\right)(-i d+i f(v-2s))^{-2(n+1)}+$$

$$e^{\frac{c^2(v-2s)^2}{4(i d+i f(v-2s))}+g i(v-2s)+i e}(i d+i f(v-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(i c(v-2s))^{-h-j+2n}$$

$$\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)^2}{i d+i f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c i(v-2s)\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)^2}{4(i d+i f(v-2s))}\right)+2\sqrt{-\frac{\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)^2}{i d+i f(v-2s)}}$$

$$\left.(i d+i f(v-2s))\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c i(v-2s)+2(i d+i f(v-2s))\sqrt{z}\right)^2}{4(i d+i f(v-2s))}\right)\right)+$$

$$e^{\frac{c^2(v-2s)^2}{4(-i d-i f(v-2s))}-i g(v-2s)-i e}(-i d-i f(v-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-i c(v-2s))^{-h-j+2n}$$

$$\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{-i\,d-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$
$$\binom{j}{h}\binom{n}{j}\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{-i\,d-i\,f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$
$$\left.-\frac{\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{4\left(-i\,d-i\,f\,(v-2\,s)\right)}\right)-i\,c\,(v-2\,s)\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-\right.$$
$$\left.\left.i\,c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\left(-i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{4\left(-i\,d-i\,f\,(v-2\,s)\right)}\right)\right)+$$
$$e^{\frac{c^2(v-2s)^2}{4(i\,d-i\,f\,(v-2s))}-i\,g\,(v-2\,s)+i\,e}\left(i\,d-i\,f\,(v-2\,s)\right)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\left(-i\,c\,(v-2\,s)\right)^{-h-j+2n}$$
$$\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{i\,d-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$
$$\binom{j}{h}\binom{n}{j}\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{i\,d-i\,f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$
$$\left.-\frac{\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{4\left(i\,d-i\,f\,(v-2\,s)\right)}\right)-i\,c\,(v-2\,s)\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)$$
$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\left(i\,d-i\,f\,(v-2\,s)\right)\sqrt{z}-i\,c\,(v-2\,s)\right)^{2}}{4\left(i\,d-i\,f\,(v-2\,s)\right)}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^{+}$$

Involving $z^n \cos(b\,z^r)\cos^v(c\,z^r+f\,z+g)$

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$$\int z^n \cos\left(b z^2\right) \cos^v\left(c z^2 + f z + g\right) dz = -2^{-v-2} \binom{v}{\frac{v}{2}} \left(\Gamma\left(\frac{n+1}{2}, -i b z^2\right) \left(-i b z^2\right)^{\frac{1}{2}(-n-1)} + \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - v \bmod 2)\, z^{n+1} - 2^{-v-2} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (v-2s)^2}{b+2cs-cv} - 4 g (v-2s)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-i f (v-2s))^{n-j} (f i (v-2s) + 2(-i b + i c (v-2s)) z)^{j+1} \left(-\frac{(f i (v-2s) + 2(-i b + i c (v-2s)) z)^2}{-i b + i c (v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f i (v-2s) + 2(-i b + i c (v-2s)) z)^2}{4(-i b + i c (v-2s))}\right)\right) (-i b + i c (v-2s))^{-n-1} + e^{\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{-b+2cs-cv} + 4 g (v-2s)\right)} (i b + i c (v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i f (v-2s))^{n-j} (f i (v-2s) + 2(i b + i c (v-2s)) z)^{j+1} \left(-\frac{(f i (v-2s) + 2(i b + i c (v-2s)) z)^2}{i b + i c (v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f i (v-2s) + 2(i b + i c (v-2s)) z)^2}{4(i b + i c (v-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{-b+2cs-cv} + 4 g (v-2s)\right)} (-i b - i c (v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i f (v-2s))^{n-j} (2(-i b - i c (v-2s)) z - i f (v-2s))^{j+1} \left(-\frac{(2(-i b - i c (v-2s)) z - i f (v-2s))^2}{-i b - i c (v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-i b - i c (v-2s)) z - i f (v-2s))^2}{4(-i b - i c (v-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2 (v-2s)^2}{b+2cs-cv} - 4 g (v-2s)\right)} (i b - i c (v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i f (v-2s))^{n-j} (2(i b - i c (v-2s)) z - i f (v-2s))^{j+1} \left(-\frac{(2(i b - i c (v-2s)) z - i f (v-2s))^2}{i b - i c (v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - i c (v-2s)) z - i f (v-2s))^2}{4(i b - i c (v-2s))}\right)\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\, b\right) \cos^v\left(\sqrt{z}\, c + g + f z\right) dz = (-1)^n 2^{-v} \binom{v}{\frac{v}{2}} \left(\Gamma\left(2(n+1), -i b \sqrt{z}\right) + \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1 - v \bmod 2)\, b^{-2(n+1)} + 2^{-2n-v-2} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{i(-i b - i c (v-2s))^2}{4 f (v-2s)} - i g (v-2s)} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b - i c (v-2s))^{-h-j+2n}\right.\right.$$

$$\left(-i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\,b-i\,c\,(v-2\,s))\left(-i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2$$

$$i\,f\,(v-2\,s)\sqrt{-\frac{i\left(-i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)(-i\,f\,(v-2\,s))^{-2\,(n+1)}+$$

$$e^{-\frac{i\,(i\,b-i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}-i\,g\,(v-2\,s)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b-i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((i\,b-i\,c\,(v-2\,s))\left(i\,b-i\,c\,(v-2\,s)-\right.\right.$$

$$\left.2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2$$

$$i\,f\,(v-2\,s)\sqrt{-\frac{i\left(i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)(-i\,f\,(v-2\,s))^{-2\,(n+1)}+$$

$$e^{\frac{i\,(-i\,b+i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+g\,i\,(v-2\,s)}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+i\,c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}\left(\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b+i\,c\,(v-2\,s))\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\ \frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)+$$

$$2\,f\,i\,(v-2\,s)\sqrt{\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\ \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)+e^{\frac{i\,(i\,b+i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+g\,i\,(v-2\,s)}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+i\,c\,(v-2\,s))$$

$$\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),\ \frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)+$$

$$2\,f\,i\,(v-2\,s)\sqrt{\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\ \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r+e\right)\cos^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \cos\left(b z^2+e\right) \cos^\nu\left(c z^2+f z+g\right) dz = -2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(\frac{n+1}{2}, -i b z^2\right) \left(-i b z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e} \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1-\nu \bmod 2)\, z^{n+1} - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{b+2cs-c\nu} - 4 g (\nu-2s) + 4e\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-i f (\nu-2s))^{n-j} (f\, i (\nu-2s) + 2(-i b + i c (\nu-2s)) z)^{j+1} \left(-\frac{(f\, i (\nu-2s) + 2(-i b + i c(\nu-2s)) z)^2}{-i b + i c (\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f\, i(\nu-2s) + 2(-i b + i c(\nu-2s)) z)^2}{4(-i b + i c(\nu-2s))}\right)\right) (-i b + i c (\nu-2s))^{-n-1} + e^{\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{-b+2cs-c\nu} + 4 g(\nu-2s) + 4e\right)} (i b + i c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i f (\nu-2s))^{n-j} (f\, i(\nu-2s) + 2(i b + i c(\nu-2s)) z)^{j+1} \left(-\frac{(f\, i(\nu-2s) + 2(i b + i c(\nu-2s)) z)^2}{i b + i c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f\, i(\nu-2s) + 2(i b + i c(\nu-2s)) z)^2}{4(i b + i c(\nu-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2(\nu-2s)^2}{-b+2cs-c\nu} + 4 g(\nu-2s) + 4e\right)} (-i b - i c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i f(\nu-2s))^{n-j} (2(-i b - i c(\nu-2s)) z - i f(\nu-2s))^{j+1} \left(-\frac{(2(-i b - i c(\nu-2s)) z - i f(\nu-2s))^2}{-i b - i c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-i b - i c(\nu-2s)) z - i f(\nu-2s))^2}{4(-i b - i c(\nu-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2(\nu-2s)^2}{b+2cs-c\nu} - 4 g(\nu-2s) + 4e\right)} (i b - i c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i f(\nu-2s))^{n-j} (2(i b - i c(\nu-2s)) z - i f(\nu-2s))^{j+1} \left(-\frac{(2(i b - i c(\nu-2s)) z - i f(\nu-2s))^2}{i b - i c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - i c(\nu-2s)) z - i f(\nu-2s))^2}{4(i b - i c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1614.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \cos^\nu\left(\sqrt{z}\, c + g + f z\right) dz = (-1)^n 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(2(n+1), -i b \sqrt{z}\right) + e^{-i e}\, \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1-\nu \bmod 2)\, b^{-2(n+1)} +$$

$$2^{-2n-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{-\frac{i(-i b-i c(\nu-2s))^2}{4 f(\nu-2s)}-i e-i g(\nu-2s)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i b-i c(\nu-2s))^{-h-j+2n}\right.\right.$$

$$\left(-i b-i c(\nu-2s)-2 i f(\nu-2s)\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i b-i c(\nu-2s)-2 i f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i b-i c(\nu-2s))\left(-i b-i c(\nu-2s)-2 i f(\nu-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\frac{i\left(-i b-i c(\nu-2s)-2 i f(\nu-2s)\sqrt{z}\right)^2}{4 f(\nu-2s)}\right)-2$$

$$i f(\nu-2s)\sqrt{-\frac{i\left(-i b-i c(\nu-2s)-2 i f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),-\frac{i\left(-i b-i c(\nu-2s)-2 i f(\nu-2s)\sqrt{z}\right)^2}{4 f(\nu-2s)}\right)\right)\right)(-i f(\nu-2s))^{-2(n+1)}+$$

$$e^{-\frac{i(i b-i c(\nu-2s))^2}{4 f(\nu-2s)}+i e-i g(\nu-2s)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i b-i c(\nu-2s))^{-h-j+2n}\left(i b-i c(\nu-2s)-2 i f(\nu-2s)\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(i b-i c(\nu-2s)-2 i f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((i b-i c(\nu-2s))\left(i b-i c(\nu-2s)-\right.\right.$$

$$\left.2 i f(\nu-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{i\left(i b-i c(\nu-2s)-2 i f(\nu-2s)\sqrt{z}\right)^2}{4 f(\nu-2s)}\right)-2$$

$$i f(\nu-2s)\sqrt{-\frac{i\left(i b-i c(\nu-2s)-2 i f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$-\frac{i\left(i\,b-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)\Bigg)\,(-i\,f\,(v-2\,s))^{-2\,(n+1)}+$$

$$e^{\frac{i\,(-i\,b+i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}-i\,e+g\,i\,(v-2\,s)}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+i\,c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b+i\,c\,(v-2\,s))\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)+$$

$$2\,f\,i\,(v-2\,s)\,\sqrt{\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$\frac{i\left(-i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)+e^{\frac{i\,(i\,b+i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+i\,e+g\,i\,(v-2\,s)}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+i\,c\,(v-2\,s))$$

$$\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,i\,(v-2\,s)\,\sqrt{\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$\frac{i\left(i\,b+i\,c\,(v-2\,s)+2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{\ldots}\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \cos(b z^r + d z) \cos^v(c z^r + f z + g)$

01.07.21.1615.01

$$\int z^n \cos(b z^2 + d z) \cos^v(c z^2 + f z + g)\, dz = 2^{-v-2} \left(-\frac{1}{b^{n+1}} e^{\frac{i d^2}{4b}} i \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \right.$$

$$\left((-i)^n e^{-\frac{i d^2}{2b}} \sum_{q=0}^{n} \frac{1}{d + 2 b z} \left(b\, 2^{q-n} (-i d)^{n-q} (i (d + 2 b z))^q \left(-\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1-q}{2}} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4 b} \right) \right) - \right.$$

$$\left. i^{n+1} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^q (d + 2 b z) \left(\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4 b} \right) \right) -$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i (2 g s - g v)} \binom{v}{s} \left(e^{i \left(\frac{(-d - 2 f s + f v)^2}{-4 b - 8 c s + 4 c v} + g (4 s - 2 v) \right)} \left(\sum_{q=0}^{n} 2^{q-n} (i (-d - 2 f s + f v))^{n-q} \right. \right.$$

$$(-i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z))^{q+1} \left(\frac{i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-b - 2 c s + c v} \right)^{\frac{1}{2}(-q-1)}$$

$$\left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-4 b - 8 c s + 4 c v} \right) \right) (-i (-b - 2 c s + c v))^{-n-1} +$$

$$e^{-\frac{i (-d - 2 f s + f v)^2}{-4 b - 8 c s + 4 c v}} (i (-b - 2 c s + c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (-d - 2 f s + f v))^{n-q}$$

$$(i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z))^{q+1} \left(-\frac{i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-b - 2 c s + c v} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-d + f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-4 b - 8 c s + 4 c v} \right) +$$

$$\frac{1}{-b + 2 c s - c v} \left(i\, e^{\frac{i (d + f (v - 2 s))^2}{-4 b + 8 c s - 4 c v}} (i (b + c (v - 2 s)))^{-n} \sum_{q=0}^{n} 2^{q-n} (i (-d + 2 f s - f v))^{n-q} \right.$$

$$(-i (-d + 2 f s - f v - 2 b z + 4 c s z - 2 c v z))^{q+1} \left(\frac{i (d + f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-b + 2 c s - c v} \right)^{\frac{1}{2}(-q-1)}$$

$$\left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-4 b + 8 c s - 4 c v} \right) \right) +$$

$$e^{i\left(g(4s-2v)-\frac{(d+f(v-2s))^2}{-4b+8cs-4cv}\right)}(i(-b+2cs-cv))^{-n-1}\sum_{q=0}^{n}2^{q-n}(-i(-d+2fs-fv))^{n-q}$$

$$(i(-d+2fs-fv-2bz+4csz-2cvz))^{q+1}\left(-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right)\right)\right)\text{/; } n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

01.07.21.1616.01

$$\int z^n\cos\left(\sqrt{z}\,b+d\,z\right)\cos^v\left(\sqrt{z}\,c+f\,z+g\right)dz=$$

$$2^{-2n-v-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(e^{\frac{ib^2}{4d}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-ib)^{-h-k+2n}\left(-ib-2id\sqrt{z}\right)^{h+k}\left(-\frac{i\left(-ib-2id\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(-ib\left(-ib-2id\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(-ib-2id\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.\left.\left.2id\sqrt{-\frac{i\left(-ib-2id\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(-ib-2id\sqrt{z}\right)^2}{4d}\right)\right)\right)(-id)^{-2n-2}+$$

$$(id)^{-2n-2}e^{-\frac{ib^2}{4d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(ib)^{-h-k+2n}\left(ib+2id\sqrt{z}\right)^{h+k}\left(\frac{i\left(ib+2id\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(b\,i\left(ib+2id\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(ib+2id\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.\left.\left.2\sqrt{\frac{i\left(ib+2id\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(ib+2id\sqrt{z}\right)^2}{4d}\right)\right)\right)\right)+$$

$$2^{-2n-v-2}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{ig(2s-v)-\frac{(-ib+ic(2s-v))^2}{4(-id+if(2s-v))}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-ib+ic(2s-v))^{-h-k+2n}\left(-ib+ic(2s-v)+\right.\right.\right.$$

$$2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\Big)^{h+k}\left(-\frac{\left(-i\,b+i\,c\,(2\,s-v)+2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{-i\,d+i\,f\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((-i\,b+i\,c\,(2\,s-v))\left(-i\,b+i\,c\,(2\,s-v)+2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(-i\,b+i\,c\,(2\,s-v)+2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(2\,s-v))}\right)+2$$

$$(-i\,d+i\,f\,(2\,s-v))\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(-i\,b+i\,c\,(2\,s-v)+2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(-i\,d+i\,f\,(2\,s-v))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+i\,c\,(2\,s-v)+2\,(-i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{-i\,d+i\,f\,(2\,s-v)}}\Bigg)\Bigg)$$

$$(-i\,d+i\,f\,(2\,s-v))^{-2\,n-2}+e^{i\,g\,(2\,s-v)-\frac{(i\,b+i\,c\,(2\,s-v))^2}{4\,(i\,d+i\,f\,(2\,s-v))}}\,(i\,d+i\,f\,(2\,s-v))^{-2\,n-2}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+i\,c\,(2\,s-v))^{-h-k+2\,n}\left(i\,b+i\,c\,(2\,s-v)+2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(i\,b+i\,c\,(2\,s-v)+2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{i\,d+i\,f\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((i\,b+i\,c\,(2\,s-v))\left(i\,b+i\,c\,(2\,s-v)+2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+k+1),\,-\frac{\left(i\,b+i\,c\,(2\,s-v)+2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(2\,s-v))}\Bigg)+$$

$$2\,(i\,d+i\,f\,(2\,s-v))\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(i\,b+i\,c\,(2\,s-v)+2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(i\,d+i\,f\,(2\,s-v))}\right)$$

$$\sqrt{-\frac{\left(i\,b+i\,c\,(2\,s-v)+2\,(i\,d+i\,f\,(2\,s-v))\,\sqrt{z}\right)^2}{i\,d+i\,f\,(2\,s-v)}}\Bigg)+$$

$$e^{i g (v-2 s)-\frac{(-i b+i c (v-2 s))^2}{4 (-i d+i f (v-2 s))}} (-i d+i f (v-2 s))^{-2 n-2} \sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (-i b+i c (v-2 s))^{-h-k+2 n}$$

$$\left(-i b+i c (v-2 s)+2 (-i d+i f (v-2 s)) \sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(-i b+i c (v-2 s)+2 (-i d+i f (v-2 s)) \sqrt{z}\right)^2}{-i d+i f (v-2 s)}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((-i b+i c (v-2 s)) \left(-i b+i c (v-2 s)+2 (-i d+i f (v-2 s)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), -\frac{\left(-i b+i c (v-2 s)+2 (-i d+i f (v-2 s)) \sqrt{z}\right)^2}{4 (-i d+i f (v-2 s))}\right)+\right.$$

$$2 (-i d+i f (v-2 s)) \Gamma\left(\frac{1}{2} (h+k+2), -\frac{\left(-i b+i c (v-2 s)+2 (-i d+i f (v-2 s)) \sqrt{z}\right)^2}{4 (-i d+i f (v-2 s))}\right)$$

$$\left.\sqrt{-\frac{\left(-i b+i c (v-2 s)+2 (-i d+i f (v-2 s)) \sqrt{z}\right)^2}{-i d+i f (v-2 s)}}\right)+$$

$$e^{i g (v-2 s)-\frac{(i b+i c (v-2 s))^2}{4 (i d+i f (v-2 s))}} (i d+i f (v-2 s))^{-2 n-2} \sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (i b+i c (v-2 s))^{-h-k+2 n}$$

$$\left(i b+i c (v-2 s)+2 (i d+i f (v-2 s)) \sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(i b+i c (v-2 s)+2 (i d+i f (v-2 s)) \sqrt{z}\right)^2}{i d+i f (v-2 s)}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((i b+i c (v-2 s)) \left(i b+i c (v-2 s)+2 (i d+i f (v-2 s)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), -\frac{\left(i b+i c (v-2 s)+2 (i d+i f (v-2 s)) \sqrt{z}\right)^2}{4 (i d+i f (v-2 s))}\right)+\right.$$

$$2 (i d+i f (v-2 s)) \Gamma\left(\frac{1}{2} (h+k+2), -\frac{\left(i b+i c (v-2 s)+2 (i d+i f (v-2 s)) \sqrt{z}\right)^2}{4 (i d+i f (v-2 s))}\right)$$

Involving $z^n \cos\left(b z^r + d z + e\right) \cos^v\left(c z^r + f z + g\right)$

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$$\int z^n \cos\left(b z^2 + d z + e\right) \cos^v\left(c z^2 + f z + g\right) dz = \frac{i\, 2^{-v-2} \left(b^2\right)^{-n}}{b} e^{-\frac{i\left(d^2+4 b e\right)}{4 b}}$$

$$\left((i b)^n e^{\frac{i d^2}{2 b}} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^{q+1} \left(\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4 b}\right) - \right.$$

$$(-i b)^n e^{2 i e} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1)$$

$$\sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 b z))^{q+1} \left(-\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4 b}\right) +$$

$$b \left(b^2\right)^n e^{\frac{i\left(d^2+4 b e\right)}{4 b}} i \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i (e+2 g s-g v)} \binom{v}{s} \left(e^{\frac{1}{4} i \left(\frac{(d-2 f s+f v)^2}{b-2 c s+c v}+8 g (2 s-v)\right)} \left(\sum_{q=0}^{n} 2^{q-n} (i (d - 2 f s + f v))^{n-q}\right.\right.$$

$$(-i (d + f (v - 2 s) + 2 (b - 2 c s + c v) z))^{q+1} \left(\frac{i (d + f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{b - 2 c s + c v}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{4 (b - 2 c s + c v)}\right)\right) (-i (b - 2 c s + c v))^{-n-1} +$$

$$e^{2 i e-\frac{i (d-2 f s+f v)^2}{4 (b-2 c s+c v)}} (i (b - 2 c s + c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (d - 2 f s + f v))^{n-q}$$

$$(i (d + f (v - 2 s) + 2 (b - 2 c s + c v) z))^{q+1} \left(-\frac{i (d + f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{b - 2 c s + c v}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{4 (b - 2 c s + c v)}\right) +$$

$$e^{\frac{i (d+2 f s-f v)^2}{4 (b+2 c s-c v)}} (-i (b + 2 c s - c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i (d + 2 f s - f v))^{n-q}$$

$$(-i (d + 2 f s - f v + 2 b z + 4 c s z - 2 c v z))^{q+1} \left(\frac{i (d + 2 f s - f v + 2 b z + 4 c s z - 2 c v z)^2}{b + 2 c s - c v}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 f s - f v + 2 b z + 4 c s z - 2 c v z)^2}{4 (b + 2 c s - c v)}\right) +$$

$$e^{\frac{1}{4} i \left(-\frac{(d+2 f s-f v)^2}{b+2 c s-c v}+8 e+8 g (2 s-v)\right)} (i (b+2 c s-c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (d+2 f s-f v))^{n-q}$$

$$(i (d+2 f s-f v+2 b z+4 c s z-2 c v z))^{q+1} \left(-\frac{i (d+2 f s-f v+2 b z+4 c s z-2 c v z)^2}{b+2 c s-c v}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d+2 f s-f v+2 b z+4 c s z-2 c v z)^2}{4 (b+2 c s-c v)}\right)\right)\right) /; n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

01.07.21.1618.01

$$\int z^n \cos\left(\sqrt{z}\, b+d z+e\right) \cos^v\left(\sqrt{z}\, c+f z+g\right) dz = $$

$$-2^{-2 n-v-2} \left(d^2\right)^{-2 n-1} e^{-\frac{i \left(b^2+4 d e\right)}{4 d}} \left(e^{2 i e} \binom{v}{\frac{v}{2}} (v \bmod 2-1) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2 n} \left(i \left(b+2 d \sqrt{z}\right)\right)^{h+k}\right.\right.$$

$$\left(-\frac{i \left(b+2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), -\frac{i \left(b+2 d \sqrt{z}\right)^2}{4 d}\right)-\right.$$

$$\left.\left.2 i d \sqrt{-\frac{i \left(b+2 d \sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2} (h+k+2), -\frac{i \left(b+2 d \sqrt{z}\right)^2}{4 d}\right)\right)\right) (-i d)^{2 n} +$$

$$(i d)^{2 n} e^{\frac{i b^2}{2 d}} \binom{v}{\frac{v}{2}} (v \bmod 2-1) \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2 n} \left(-i \left(b+2 d \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b+2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(b \left(b+2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), \frac{i \left(b+2 d \sqrt{z}\right)^2}{4 d}\right)+\right.$$

$$\left.\left.2 \sqrt{\frac{i \left(b+2 d \sqrt{z}\right)^2}{d}}\, d i \Gamma\left(\frac{1}{2} (h+k+2), \frac{i \left(b+2 d \sqrt{z}\right)^2}{4 d}\right)\right)\right) +$$

$$\left(d^2\right)^{2 n+1} e^{\frac{i \left(b^2+4 d e\right)}{4 d}} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i (e+2 g s-g v)} \binom{v}{s} \left(e^{-\frac{i (b-2 c s+c v)^2}{4 (d-2 f s+f v)}} \left((d-2 f s+f v)^2\right)^{-2 n-1}\right.$$

$$\left(e^{2ie}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-2\,c\,s+c\,v))^{-h-k+2\,n}\left(i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)\right)^{h+k}\right.\right.$$

$$\left(-\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{d-2\,f\,s+f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,(d-2\,f\,s+f\,v)\sqrt{-\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{d-2\,f\,s+f\,v}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{4\,(d-2\,f\,s+f\,v)}\right)-$$

$$(b-2\,c\,s+c\,v)\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{4\,(d-2\,f\,s+f\,v)}\right)\right)\right)$$

$$(-i\,(d-2\,f\,s+f\,v))^{2\,n}+e^{\frac{1}{2}i\left(\frac{(b-2\,c\,s+c\,v)^2}{d-2\,f\,s+f\,v}+8\,g\,s-4\,g\,v\right)}\,(i\,(d-2\,f\,s+f\,v))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b-2\,c\,s+c\,v))^{-h-k+2\,n}\left(-i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{d-2\,f\,s+f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(-(b-2\,c\,s+c\,v)\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{4\,(d-2\,f\,s+f\,v)}\right)-$$

$$2\,i\,(d-2\,f\,s+f\,v)\sqrt{\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\,\sqrt{z}\,\right)^2}{d-2\,f\,s+f\,v}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+c(v-2s)+2(d-2fs+fv)\sqrt{z}\right)^2}{4(d-2fs+fv)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(d+2fs-fv)^2}\Bigg(e^{\frac{i(b+2cs-cv)^2}{4(d+2fs-fv)}}(-i(d+2fs-fv))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i(b+2cs-cv))^{-h-k+2n}$$

$$\left(-i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(-(b+2cs-cv)\left(b+c(2s-v)+\right.$$

$$\left.2(d+2fs-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4(d+2fs-fv)}\right)-$$

$$2i(d+2fs-fv)\sqrt{\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4(d+2fs-fv)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(d+2fs-fv)^2}\Bigg(e^{\frac{1}{4}i\left(-\frac{(b+2cs-cv)^2}{d+2fs-fv}+8e+8g(2s-v)\right)}(i(d+2fs-fv))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(i(b+2cs-cv))^{-h-k+2n}\left(i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(2i(d+2fs-fv)\sqrt{-\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4(d+2fs-fv)}\right) -$$

$$(b+2cs-cv)\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.$$

$$\left.\left.\left.\left.\left. -\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4(d+2fs-fv)}\right)\right)\right)\right)\right) /; n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving product of powers of two direct functions and a power function

Involving $z^{\alpha-1}\cos^{\mu}(c\,z)\cos^{v}(a\,z)$

01.07.21.1619.01

$$\int z^{\alpha-1}\cos^m(c\,z)\cos^v(a\,z)\,dz = -2^{-m-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(\alpha, i\,c\,(m-2k)\,z)\,(i\,c\,(m-2k)\,z)^{-\alpha} + ((2\,i\,c\,k - i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha, (2\,i\,c\,k - i\,c\,m)\,z)\right)\right) z^{\alpha} - 2^{-m-v}\binom{m}{\frac{m}{2}}$$

$$(1-m\bmod 2)\left(\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma(\alpha, -i\,a\,(v-2s)\,z)\,(-i\,a\,(v-2s)\,z)^{-\alpha} + ((i\,a\,v - 2\,i\,a\,s)\,z)^{-\alpha}\,\Gamma(\alpha, (i\,a\,v-2\,i\,a\,s)\,z)\right)\right) z^{\alpha} +$$

$$2^{-m-v}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(-\Gamma(\alpha, (-2\,c\,i\,k + i\,c\,m - 2\,i\,a\,s + i\,a\,v)\,z)\,((-2\,c\,i\,k + i\,c\,m - 2\,i\,a\,s + i\,a\,v)\,z)^{-\alpha} -\right.\right.$$

$$((2\,i\,c\,k - i\,c\,m - 2\,i\,a\,s + i\,a\,v)\,z)^{-\alpha}\,\Gamma(\alpha, (2\,i\,c\,k - i\,c\,m - 2\,i\,a\,s + i\,a\,v)\,z) +$$
$$\left(-\Gamma(\alpha, (-2\,c\,i\,k + i\,c\,m + 2\,i\,a\,s - i\,a\,v)\,z)\,((-2\,c\,i\,k + i\,c\,m + 2\,i\,a\,s - i\,a\,v)\,z)^{-\alpha} -\right.$$

$$\left.\left.\left.((2\,i\,c\,k - i\,c\,m + 2\,i\,a\,s - i\,a\,v)\,z)^{-\alpha}\,\Gamma(\alpha, (2\,i\,c\,k - i\,c\,m + 2\,i\,a\,s - i\,a\,v)\,z)\right)\right)\right)$$

$$z^{\alpha} + \frac{2^{-m-v}\,z^{\alpha}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{\alpha} /; m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.07.21.1620.01

$$\int z^n \cos^\mu(c\,z)\cos^\nu(a\,z)\,dz = 2^{-\nu}\left(1+e^{2\,i\,c\,z}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)$$
$$\cos^\mu(c\,z)\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-i\,c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{\mu}{2},\ldots,-\frac{\mu}{2},-\mu;1-\frac{\mu}{2},\ldots,1-\frac{\mu}{2};-e^{2\,i\,c\,z}\right)+$$
$$2^{-\nu}\left(1+e^{2\,i\,c\,z}\right)^{-\mu} n!\cos^\mu(c\,z)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{-i\,a\,(\nu-2\,k)\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-i\,a\,(\nu-2\,k)-i\,c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{a\,(-2\,k+\nu)+c\,\mu}{2\,c},\right.\right.$$
$$\left.\ldots,-\frac{a\,(-2\,k+\nu)+c\,\mu}{2\,c},-\mu;1-\frac{a\,(-2\,k+\nu)+c\,\mu}{2\,c},\ldots,1-\frac{a\,(-2\,k+\nu)+c\,\mu}{2\,c};-e^{2\,i\,c\,z}\right)+$$
$$e^{i\,a\,(\nu-2\,k)\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(i\,a\,(\nu-2\,k)-i\,c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(\frac{a\,(-2\,k+\nu)-c\,\mu}{2\,c},\ldots,\frac{a\,(-2\,k+\nu)-c\,\mu}{2\,c},\right.$$
$$\left.\left.-\mu;1+\frac{a\,(-2\,k+\nu)-c\,\mu}{2\,c},\ldots,1+\frac{a\,(-2\,k+\nu)-c\,\mu}{2\,c};-e^{2\,i\,c\,z}\right)\right)\;/;\;\nu\in\mathbb{N}\land n\in\mathbb{N}$$

Involving $z^{\alpha-1}\cos^\mu(c\,z)\cos^\nu(a\,z+b)$

01.07.21.1621.01

$$\int z^{\alpha-1}\cos^m(c\,z)\cos^\nu(b+a\,z)\,dz =$$
$$-2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(\alpha,\,i\,c\,(m-2\,k)\,z)\,(i\,c\,(m-2\,k)\,z)^{-\alpha}+((2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,i\,c\,k-i\,c\,m)\,z)\right)\right)$$
$$z^\alpha-2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-2\,b\,i\,s-i\,b\,\nu}\binom{\nu}{s}\right.$$
$$\left.\left(e^{2\,i\,b\,\nu}\,\Gamma(\alpha,\,-i\,a\,(\nu-2\,s)\,z)\,(-i\,a\,(\nu-2\,s)\,z)^{-\alpha}+e^{4\,i\,b\,s}\,((i\,a\,\nu-2\,i\,a\,s)\,z)^{-\alpha}\,\Gamma(\alpha,\,(i\,a\,\nu-2\,i\,a\,s)\,z)\right)\right)z^\alpha+2^{-m-\nu}$$
$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-2\,b\,i\,s-i\,b\,\nu}\binom{\nu}{s}\left(-e^{4\,i\,b\,s}\,\Gamma(\alpha,\,(-2\,c\,i\,k+i\,c\,m-2\,i\,a\,s+i\,a\,\nu)\,z)\,((-2\,c\,i\,k+i\,c\,m-2\,i\,a\,s+i\,a\,\nu)\,z)^{-\alpha}-\right.\right.$$
$$e^{4\,i\,b\,s}\,((2\,i\,c\,k-i\,c\,m-2\,i\,a\,s+i\,a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,i\,c\,k-i\,c\,m-2\,i\,a\,s+i\,a\,\nu)\,z)+$$
$$e^{2\,i\,b\,\nu}\left(-\Gamma(\alpha,\,(-2\,c\,i\,k+i\,c\,m+2\,i\,a\,s-i\,a\,\nu)\,z)\,((-2\,c\,i\,k+i\,c\,m+2\,i\,a\,s-i\,a\,\nu)\,z)^{-\alpha}-\right.$$
$$\left.\left.\left.((2\,i\,c\,k-i\,c\,m+2\,i\,a\,s-i\,a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,i\,c\,k-i\,c\,m+2\,i\,a\,s-i\,a\,\nu)\,z)\right)\right)\right)$$
$$z^\alpha+\frac{2^{-m-\nu}z^\alpha\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)}{\alpha}\;/;\;m\in\mathbb{N}^+\bigwedge\nu\in\mathbb{N}^+$$

01.07.21.1622.01

$$\int z^n \cos^\mu(c\,z)\cos^\nu(a\,z+b)\,dz = 2^{-\nu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\cos^\mu(c\,z)\left(1+e^{2\,i\,c\,z}\right)^{-\mu} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}}{(n-j)!\,(-i\,c\,\mu)^{j+1}}\;{}_{j+2}F_{j+1}\!\left(-\frac{\mu}{2},\,\ldots,\,-\frac{\mu}{2},\,-\mu;\,1-\frac{\mu}{2},\,\ldots,\,1-\frac{\mu}{2};\,-e^{2\,i\,c\,z}\right)+2^{-\nu}\,n!\cos^\mu(c\,z)\left(1+e^{2\,i\,c\,z}\right)^{-\mu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{-i\,b\,(\nu-2\,k)-i\,a\,(\nu-2\,k)\,z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(-i\,a\,(\nu-2\,k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(-\frac{a\,(-2\,k+\nu)+c\,\mu}{2\,c},\,\ldots,\,-\frac{a\,(-2\,k+\nu)+c\,\mu}{2\,c},\,-\mu;\,1-\frac{a\,(-2\,k+\nu)+c\,\mu}{2\,c},\,\ldots,\,1-\frac{a\,(-2\,k+\nu)+c\,\mu}{2\,c};\,-e^{2\,i\,c\,z}\right)+e^{b\,i\,(\nu-2\,k)+a\,i\,(\nu-2\,k)\,z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(a\,i\,(\nu-2\,k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(-\frac{-a\,(-2\,k+\nu)+c\,\mu}{2\,c},\,\ldots,\,-\frac{-a\,(-2\,k+\nu)+c\,\mu}{2\,c},\,-\mu;\,1-\frac{-a\,(-2\,k+\nu)+c\,\mu}{2\,c},\,\ldots,\,1-\frac{-a\,(-2\,k+\nu)+c\,\mu}{2\,c};\,-e^{2\,i\,c\,z}\right)\right)\;/;\;n\in\mathbb{N}\bigwedge\nu\in\mathbb{N}^+$$

01.07.21.1623.01

$$\int z^n \cos^m(c\,z)\cos^\nu(b+a\,z)\,dz = 2^{-m}\binom{m}{\frac{m}{2}} n!\,(1-m \bmod 2)\cos^\nu(b+a\,z)\left(1+e^{2\,i\,(b+a\,z)}\right)^{-\nu} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(-i\,a\,\nu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(-\frac{\nu}{2},\,\ldots,\,-\frac{\nu}{2},\,-\nu;\,1-\frac{\nu}{2},\,\ldots,\,1-\frac{\nu}{2};\,-e^{2\,i\,(b+a\,z)}\right)+2^{-m}\,n!\cos^\nu(b+a\,z)\left(1+e^{2\,i\,(b+a\,z)}\right)^{-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{-\frac{1}{2}\,i\,(-2\,c\,z\,m+4\,c\,k\,z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(i\,c\,(m-2\,k)-i\,a\,\nu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(-\frac{a\,\nu-c\,(m-2\,k)}{2\,a},\,\ldots,\,-\frac{a\,\nu-c\,(m-2\,k)}{2\,a},\,-\nu;\,1-\frac{a\,\nu-c\,(m-2\,k)}{2\,a},\,\ldots,\,1-\frac{a\,\nu-c\,(m-2\,k)}{2\,a};\,-e^{2\,i\,(b+a\,z)}\right)+e^{\frac{1}{2}\,i\,(-2\,c\,z\,m+4\,c\,k\,z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(-i\,c\,(m-2\,k)-i\,a\,\nu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(-\frac{c\,(m-2\,k)+a\,\nu}{2\,a},\,\ldots,\,-\frac{c\,(m-2\,k)+a\,\nu}{2\,a},\,-\nu;\,1-\frac{c\,(m-2\,k)+a\,\nu}{2\,a},\,\ldots,\,1-\frac{c\,(m-2\,k)+a\,\nu}{2\,a};\,-e^{2\,i\,(b+a\,z)}\right)\right)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^\mu(c\,z+d)\cos^\nu(a\,z+b)$

01.07.21.1624.01

$$\int z^{\alpha-1}\cos^m(d+c\,z)\cos^\nu(b+a\,z)\,dz = -2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$
$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} e^{2 i d k+i d m}\binom{m}{k}\left(e^{-2 i d m}\,\Gamma(\alpha,\, i\,c\,(m-2k)\,z)\,(i\,c\,(m-2k)\,z)^{-\alpha}+e^{-4 i d k}\,((2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,i\,c\,k-i\,c\,m)\,z)\right)\right)$$
$$z^\alpha - 2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$
$$\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-2 b i s-i b \nu}\binom{\nu}{s}\left(e^{2 i b \nu}\,\Gamma(\alpha,\,-i\,a\,(\nu-2s)\,z)\,(-i\,a\,(\nu-2s)\,z)^{-\alpha}+e^{4 i b s}\,((i\,a\,\nu-2\,i\,a\,s)\,z)^{-\alpha}\,\Gamma(\alpha,\,(i\,a\,\nu-2\,i\,a\,s)\,z)\right)\right)$$
$$z^\alpha + 2^{-m-\nu}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{2 i d k+i d m-2 i b s-i b \nu}\binom{\nu}{s}\right.$$
$$\left(-e^{4 i b s-2 i d m}\,\Gamma(\alpha,\,(-2\,c\,i\,k+i\,c\,m-2\,i\,a\,s+i\,a\,\nu)\,z)\,((-2\,c\,i\,k+i\,c\,m-2\,i\,a\,s+i\,a\,\nu)\,z)^{-\alpha}-\right.$$
$$e^{4 i b s-4 i d k}\,((2\,i\,c\,k-i\,c\,m-2\,i\,a\,s+i\,a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,i\,c\,k-i\,c\,m-2\,i\,a\,s+i\,a\,\nu)\,z)+$$
$$e^{2 i b \nu}\left(-e^{-2 i d m}\,\Gamma(\alpha,\,(-2\,c\,i\,k+i\,c\,m+2\,i\,a\,s-i\,a\,\nu)\,z)\,((-2\,c\,i\,k+i\,c\,m+2\,i\,a\,s-i\,a\,\nu)\,z)^{-\alpha}-\right.$$
$$\left.\left.\left.e^{-4 i d k}\,((2\,i\,c\,k-i\,c\,m+2\,i\,a\,s-i\,a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,i\,c\,k-i\,c\,m+2\,i\,a\,s-i\,a\,\nu)\,z)\right)\right)\right)$$
$$z^\alpha + \frac{2^{-m-\nu}\,z^\alpha\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)}{\alpha}\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.1625.01

$$\int z^n\cos^\mu(c\,z+d)\cos^\nu(a\,z+b)\,dz = 2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\,n!\,(1-\nu \bmod 2)\cos^\mu(d+c\,z)\left(1+e^{2 i (d+c z)}\right)^{-\mu}$$
$$\sum_{j=0}^{n}\frac{\left((-1)^j\,z^{n-j}\right)}{(n-j)!\,(-i\,c\,\mu)^{j+1}}\;{}_{j+2}F_{j+1}\!\left(-\frac{\mu}{2},\,\ldots,\,-\frac{\mu}{2},\,-\mu;\,1-\frac{\mu}{2},\,\ldots,\,1-\frac{\mu}{2};\,-e^{2 i (d+c z)}\right)+2^{-\nu}\left(1+e^{2 i (d+c z)}\right)^{-\mu} n!$$
$$\cos^\mu(d+c\,z)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{-\frac{1}{2} i (4 b k+4 a z k-2 b \nu-2 a \nu z)}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(i\,a\,(\nu-2k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(-\frac{c\,\mu-a\,(\nu-2k)}{2\,c},\right.\right.$$
$$\left.\ldots,\,-\frac{c\,\mu-a\,(\nu-2k)}{2\,c},\,-\mu;\,1-\frac{c\,\mu-a\,(\nu-2k)}{2\,c},\,\ldots,\,1-\frac{c\,\mu-a\,(\nu-2k)}{2\,c};\,-e^{2 i (d+c z)}\right)+$$
$$e^{\frac{1}{2} i (4 b k+4 a z k-2 b \nu-2 a \nu z)}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(-i\,a\,(\nu-2k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(-\frac{a\,(\nu-2k)+c\,\mu}{2\,c},\,\ldots,\right.$$
$$\left.\left.-\frac{a\,(\nu-2k)+c\,\mu}{2\,c},\,-\mu;\,1-\frac{a\,(\nu-2k)+c\,\mu}{2\,c},\,\ldots,\,1-\frac{a\,(\nu-2k)+c\,\mu}{2\,c};\,-e^{2 i (d+c z)}\right)\right)\;/;\; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

Involving $z^n \cos^m(b z) \cos^v(c z^r)$

01.07.21.1626.01

$$\int z^n \cos^m(b\,z)\cos^\nu\!\left(c\,z^2\right) d z = -(-1)^m\, 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\Gamma\!\left(\frac{n+1}{2}, (i\,c\,\nu - 2\,i\,c\,k)\,z^2\right) \left((i\,c\,\nu - 2\,i\,c\,k)\,z^2\right)^{\frac{1}{2}(-n-1)} + \left((2\,i\,c\,k - i\,c\,\nu)\,z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (2\,i\,c\,k - i\,c\,\nu)\,z^2\right)\right)\right) z^{n+1} - 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma(n+1, (i\,b\,m - 2\,i\,b\,k)\,z)\,((i\,b\,m - 2\,i\,b\,k)\,z)^{-n-1} + ((2\,i\,b\,k - i\,b\,m)\,z)^{-n-1}\,\Gamma(n+1, (2\,i\,b\,k - i\,b\,m)\,z)\right)\right) z^{n+1} + \frac{(-1)^m\, 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} - 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{i\,b^2 (2\,k-m)^2}{4\,c\,(2\,s-\nu)}} \left(\sum_{j=0}^{n} 2^{j-n} (i\,b\,(2\,k-m))^{n-j} (2\,i\,c\,(2\,s-\nu)\,z - i\,b\,(2\,k-m))^{j+1} \left(\frac{i\,(2\,i\,c\,(2\,s-\nu)\,z - i\,b\,(2\,k-m))^2}{c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{i\,(2\,i\,c\,(2\,s-\nu)\,z - i\,b\,(2\,k-m))^2}{4\,c\,(2\,s-\nu)}\right)\right) (i\,c\,(2\,s-\nu))^{-n-1} + e^{-\frac{i\,b^2 (m-2\,k)^2}{4\,c\,(2\,s-\nu)}} \left(\sum_{j=0}^{n} 2^{j-n} (i\,b\,(m-2\,k))^{n-j} (2\,i\,c\,(2\,s-\nu)\,z - i\,b\,(m-2\,k))^{j+1} \left(\frac{i\,(2\,i\,c\,(2\,s-\nu)\,z - i\,b\,(m-2\,k))^2}{c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{i\,(2\,i\,c\,(2\,s-\nu)\,z - i\,b\,(m-2\,k))^2}{4\,c\,(2\,s-\nu)}\right)\right) (i\,c\,(2\,s-\nu))^{-n-1} + e^{-\frac{i\,b^2 (2\,k-m)^2}{4\,c\,(\nu-2\,s)}} (i\,c\,(\nu-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i\,b\,(2\,k-m))^{n-j} (2\,i\,c\,(\nu-2\,s)\,z - i\,b\,(2\,k-m))^{j+1} \left(\frac{i\,(2\,i\,c\,(\nu-2\,s)\,z - i\,b\,(2\,k-m))^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{i\,(2\,i\,c\,(\nu-2\,s)\,z - i\,b\,(2\,k-m))^2}{4\,c\,(\nu-2\,s)}\right) + e^{-\frac{i\,b^2 (m-2\,k)^2}{4\,c\,(\nu-2\,s)}} (i\,c\,(\nu-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i\,b\,(m-2\,k))^{n-j} (2\,i\,c\,(\nu-2\,s)\,z - i\,b\,(m-2\,k))^{j+1} \left(\frac{i\,(2\,i\,c\,(\nu-2\,s)\,z - i\,b\,(m-2\,k))^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{i\,(2\,i\,c\,(\nu-2\,s)\,z - i\,b\,(m-2\,k))^2}{4\,c\,(\nu-2\,s)}\right)\right) /;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.1627.01

$$\int z^n \cos^m(b\,z)\cos^\nu\!\left(c\,\sqrt{z}\right) dz = \frac{(-1)^m\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\,(1 - \nu \bmod 2)}{n+1} + \frac{i\, 2^{-m-\nu}\, z^n}{b} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{2\,k-m}$$

$$\left(\binom{m}{k}\left((-i\,b\,(m-2\,k)\,z)^{-n}\,\Gamma(n+1,\,-i\,b\,(m-2\,k)\,z) - (-i\,b\,(2\,k-m)\,z)^{-n}\,\Gamma(n+1,\,-i\,b\,(2\,k-m)\,z)\right)\right) - (-1)^m\, 2^{-m-\nu+1}$$

$$\binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} (2\,i\,c\,k - i\,c\,\nu)^{-2\,(n+1)} \left(\Gamma\!\left(2\,(n+1),\,(i\,c\,\nu - 2\,i\,c\,k)\,\sqrt{z}\right) + \Gamma\!\left(2\,(n+1),\,(2\,i\,c\,k - i\,c\,\nu)\,\sqrt{z}\right)\right) +$$

$$2^{-m-2\,n-\nu-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} (i\,b\,(2\,k-m))^{-2\,n-2} \left(e^{\frac{i\,c^2\,(\nu-2\,s)^2}{4\,b\,(2\,k-m)}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,c\,(\nu-2\,s))^{-h-j+2\,n} \left(-2\,i\,b\,\sqrt{z}\,(2\,k-m) - \right.\right.$$

$$\left. i\,c\,(\nu-2\,s)\right)^{h+j} \left(-\frac{i\left(-2\,i\,b\,\sqrt{z}\,(2\,k-m) - i\,c\,(\nu-2\,s)\right)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-i\,c\,(\nu-2\,s)\right.$$

$$\left(-2\,i\,b\,\sqrt{z}\,(2\,k-m) - i\,c\,(\nu-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-2\,i\,b\,\sqrt{z}\,(2\,k-m) - i\,c\,(\nu-2\,s)\right)^2}{4\,b\,(2\,k-m)}\right) -$$

$$2\,i\,b\,(2\,k-m)\,\sqrt{-\frac{i\left(-2\,i\,b\,\sqrt{z}\,(2\,k-m) - i\,c\,(\nu-2\,s)\right)^2}{b\,(2\,k-m)}}$$

$$\left.\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-2\,i\,b\,\sqrt{z}\,(2\,k-m) - i\,c\,(\nu-2\,s)\right)^2}{4\,b\,(2\,k-m)}\right)\right) +$$

$$e^{\frac{i\,c^2\,(\nu-2\,s)^2}{4\,b\,(2\,k-m)}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\,c\,(\nu-2\,s))^{-h-j+2\,n} \left(i\,c\,(\nu-2\,s) - 2\,i\,b\,(2\,k-m)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(i\,c\,(\nu-2\,s) - 2\,i\,b\,(2\,k-m)\,\sqrt{z}\right)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(i\,c\,(\nu-2\,s)\right.$$

$$\left(i\,c\,(\nu-2\,s) - 2\,i\,b\,(2\,k-m)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(i\,c\,(\nu-2\,s) - 2\,i\,b\,(2\,k-m)\,\sqrt{z}\right)^2}{4\,b\,(2\,k-m)}\right) -$$

$$2\,i\,b\,(2\,k-m)\sqrt{-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,b\,(2\,k-m)\,\sqrt{z}\,\right)^2}{b\,(2\,k-m)}}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,b\,(2\,k-m)\,\sqrt{z}\,\right)^2}{4\,b\,(2\,k-m)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,c^2\,(v-2\,s)^2}{4\,b\,(m-2\,k)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,s))^{-h-j+2\,n}\left(-2\,i\,b\,\sqrt{z}\,\,(m-2\,k)-i\,c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{i\left(-2\,i\,b\,\sqrt{z}\,\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,c\,(v-2\,s)$$

$$\left(-2\,i\,b\,\sqrt{z}\,\,(m-2\,k)-i\,c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-2\,i\,b\,\sqrt{z}\,\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)-$$

$$2\,i\,b\,(m-2\,k)\sqrt{-\frac{i\left(-2\,i\,b\,\sqrt{z}\,\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-2\,i\,b\,\sqrt{z}\,\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,c^2\,(v-2\,s)^2}{4\,b\,(m-2\,k)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\,\sqrt{z}\,\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(i\,c\,(v-2\,s)$$

$$\left(i\,c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\,\sqrt{z}\,\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\,\sqrt{z}\,\right)^2}{4\,b\,(m-2\,k)}\right)-$$

$$2\,i\,b\,(m-2\,k)\sqrt{-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\,\sqrt{z}\,\right)^2}{b\,(m-2\,k)}}\;\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\,\sqrt{z}\,\right)^2}{4\,b\,(m-2\,k)}\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos^m(d z + e) \cos^\nu(c z^r)$

01.07.21.1628.01

$$\int z^n \cos^m(e + d z) \cos^\nu(c z^2) \, dz = \frac{(-1)^m 2^{-m-\nu} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} - (-1)^m 2^{-m-\nu-1} z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\Gamma\left(\frac{n+1}{2}, (i c \nu - 2 i c k) z^2\right) \left((i c \nu - 2 i c k) z^2\right)^{\frac{1}{2}(-n-1)} + \left((2 i c k - i c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i c k - i c \nu) z^2\right)\right) -$$

$$2^{-m-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{2 i e k - i e m} \Gamma(n+1, (i d m - 2 i d k) z) ((i d m - 2 i d k) z)^{-n-1} + \right.$$

$$\left. e^{i e m - 2 i e k} ((2 i d k - i d m) z)^{-n-1} \Gamma(n+1, (2 i d k - i d m) z)\right) -$$

$$2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{i d^2 (2k-m)^2}{4 c (2 s - \nu)} - i e (2 k - m)} \left(\sum_{j=0}^{n} 2^{j-n} (i d (2 k - m))^{n-j} (2 i c (2 s - \nu) z - i d (2 k - m))^{j+1} \right.\right.$$

$$\left.\left(\frac{i (2 i c (2 s - \nu) z - i d (2 k - m))^2}{c (2 s - \nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i c (2 s - \nu) z - i d (2 k - m))^2}{4 c (2 s - \nu)}\right)\right)$$

$$(i c (2 s - \nu))^{-n-1} + e^{-\frac{i d^2 (m-2k)^2}{4 c (2 s - \nu)} - i e (m - 2 k)} \left(\sum_{j=0}^{n} 2^{j-n} (i d (m - 2 k))^{n-j} (2 i c (2 s - \nu) z - i d (m - 2 k))^{j+1} \right.$$

$$\left.\left(\frac{i (2 i c (2 s - \nu) z - i d (m - 2 k))^2}{c (2 s - \nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i c (2 s - \nu) z - i d (m - 2 k))^2}{4 c (2 s - \nu)}\right)\right)$$

$$(i c (2 s - \nu))^{-n-1} + e^{-\frac{i d^2 (2k-m)^2}{4 c (\nu - 2 s)} - i e (2 k - m)} (i c (\nu - 2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d (2 k - m))^{n-j}$$

$$(2 i c (\nu - 2 s) z - i d (2 k - m))^{j+1} \left(\frac{i (2 i c (\nu - 2 s) z - i d (2 k - m))^2}{c (\nu - 2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, \frac{i (2 i c (\nu - 2 s) z - i d (2 k - m))^2}{4 c (\nu - 2 s)}\right) + e^{-\frac{i d^2 (m-2k)^2}{4 c (\nu - 2 s)} - i e (m - 2 k)} (i c (\nu - 2 s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (i d (m - 2 k))^{n-j} (2 i c (\nu - 2 s) z - i d (m - 2 k))^{j+1} \left(\frac{i (2 i c (\nu - 2 s) z - i d (m - 2 k))^2}{c (\nu - 2 s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i c (\nu - 2 s) z - i d (m - 2 k))^2}{4 c (\nu - 2 s)}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.1629.01

$$\int z^n \cos^m(e+d\,z)\cos^\nu\!\left(c\sqrt{z}\right)dz = \frac{2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{n+1} +$$

$$(-1)^n 2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\Big(e^{-i e(m-2k)}\,\Gamma(n+1,\, i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1} +$$

$$e^{i e(m-2k)}\,(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\Big) + (-1)^n 2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}(c\,(\nu-2k))^{-2(n+1)}\left(\Gamma\!\left(2(n+1),\,-i\,c\,(\nu-2k)\sqrt{z}\right)+\Gamma\!\left(2(n+1),\,i\,c\,(\nu-2k)\sqrt{z}\right)\right)+$$

$$2^{-m-2n-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}(i\,d\,(m-2k))^{-2(n+1)}\left(e^{i e(m-2k)-\frac{i c^2(\nu-2s)^2}{4d(m-2k)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-i\,c\,(\nu-2s))^{-h-j+2n}\right.$$

$$\left(2\,i\,d\,(m-2k)\sqrt{z}-i\,c\,(\nu-2s)\right)^{h+j}\left(\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-i\,c\,(\nu-2s)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,d\,(m-2k)\sqrt{\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-i\,c\,(\nu-2s)\right)^2}{d\,(m-2k)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-i\,c\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\right)-i\,c\,(\nu-2s)$$

$$\left.\left(2\,i\,d\,(m-2k)\sqrt{z}-i\,c\,(\nu-2s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-i\,c\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\right)\right)+$$

$$e^{i e(m-2k)-\frac{i c^2(\nu-2s)^2}{4d(m-2k)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(i\,c\,(\nu-2s))^{-h-j+2n}\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,i\,(\nu-2s)\right)^{h+j}$$

$$\left(\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,i\,(\nu-2s)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,i\,(\nu-2s)$$

$$\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,i\,(\nu-2s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,i\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\right)+$$

$$2\,d\,i\,(m-2\,k)\sqrt{\frac{i\left(2\,d\,i\,\sqrt{z}\,(m-2\,k)+c\,i\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(2\,d\,i\,\sqrt{z}\,(m-2\,k)+c\,i\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,c^2\,(v-2\,s)^2}{4\,d\,(m-2\,k)}-i\,e\,(m-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,s))^{-h-j+2\,n}\left(-2\,i\,d\,\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{i\left(-2\,i\,d\,\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,c\,(v-2\,s)$$

$$\left(-2\,i\,d\,\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-2\,i\,d\,\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-2\,i\,d\,\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-2\,i\,d\,\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,c^2\,(v-2\,s)^2}{4\,d\,(m-2\,k)}-i\,e\,(m-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(i\,c\,(v-2\,s)$$

$$\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}}\;\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^m(b z^r+e)\cos^v(c z^r)$

01.07.21.1630.01

$$\int z^{\alpha-1}\cos^m(b z^r)\cos^v(c z^r)\,dz = \frac{2^{-m-v} z^\alpha \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)}{\alpha} - \frac{2^{-m-v} z^\alpha}{r}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma\left(\frac{\alpha}{r}, (i\, b\, m-2\, i\, b\, k) z^r\right)((i\, b\, m-2\, i\, b\, k) z^r)^{-\frac{\alpha}{r}} + ((2\, i\, b\, k-i\, b\, m) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (2\, i\, b\, k-i\, b\, m) z^r\right)\right) - \frac{2^{-m-v} z^\alpha}{r}$$
$$\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(\Gamma\left(\frac{\alpha}{r}, (i\, c\, v-2\, i\, c\, k) z^r\right)((i\, c\, v-2\, i\, c\, k) z^r)^{-\frac{\alpha}{r}} + ((2\, i\, c\, k-i\, c\, v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (2\, i\, c\, k-i\, c\, v) z^r\right)\right) -$$
$$\frac{2^{-m-v} z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma\left(\frac{\alpha}{r}, (-2\, b\, i\, k+i\, b\, m-2\, i\, c\, s+i\, c\, v) z^r\right)((-2\, b\, i\, k+i\, b\, m-2\, i\, c\, s+i\, c\, v) z^r)^{-\frac{\alpha}{r}} +\right.$$
$$((2\, i\, b\, k-i\, b\, m-2\, i\, c\, s+i\, c\, v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (2\, i\, b\, k-i\, b\, m-2\, i\, c\, s+i\, c\, v) z^r\right) +$$
$$((-2\, b\, i\, k+i\, b\, m+2\, i\, c\, s-i\, c\, v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (-2\, b\, i\, k+i\, b\, m+2\, i\, c\, s-i\, c\, v) z^r\right) +$$
$$\left.((2\, i\, b\, k-i\, b\, m+2\, i\, c\, s-i\, c\, v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (2\, i\, b\, k-i\, b\, m+2\, i\, c\, s-i\, c\, v) z^r\right)\right) /;\ m\in\mathbb{N}^+ \land v\in\mathbb{N}^+$$

01.07.21.1631.01

$$\int z^n \cos^m(b z^2) \cos^v(c z^2)\, dz = -2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\, z^{n+1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \left(\Gamma\!\left(\frac{n+1}{2}, -i\, b\, (m-2k)\, z^2\right) \left(-i\, b\, (m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} + \left(i\, b\, (m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, i\, b\, (m-2k)\, z^2\right)\right) -$$

$$2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, z^{n+1}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} \left(\Gamma\!\left(\frac{n+1}{2}, -i\, c\, (v-2s)\, z^2\right) \left(-i\, c\, (v-2s)\, z^2\right)^{\frac{1}{2}(-n-1)} + \left(i\, c\, (v-2s)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, i\, c\, (v-2s)\, z^2\right)\right) -$$

$$2^{-m-v-1} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} \left(\Gamma\!\left(\frac{n+1}{2}, (i\, c\, (v-2s) - i\, b\, (m-2k))\, z^2\right) \left((i\, c\, (v-2s) - i\, b\, (m-2k))\, z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$

$$\left((b\, i\, (m-2k) + c\, i\, (v-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (b\, i\, (m-2k) + c\, i\, (v-2s))\, z^2\right) +$$

$$\left((-i\, b\, (m-2k) - i\, c\, (v-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (-i\, b\, (m-2k) - i\, c\, (v-2s))\, z^2\right) +$$

$$\left.\left((i\, b\, (m-2k) - i\, c\, (v-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (i\, b\, (m-2k) - i\, c\, (v-2s))\, z^2\right)\right) +$$

$$\frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1632.01

$$\int z^n \cos^m\left(\sqrt{z}\; b\right) \cos^v\left(\sqrt{z}\; c\right) dz = (-1)^n\, 2^{-m-v+1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\, b^{-2\,(n+1)}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (m-2\,k)^{-2\,(n+1)} \left(\Gamma\left(2\,(n+1),\, -i\, b\,(m-2\,k)\sqrt{z}\right) + \Gamma\left(2\,(n+1),\, i\, b\,(m-2\,k)\sqrt{z}\right)\right) +$$

$$\frac{2^{-m-v}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)\,(1 - v \bmod 2)}{n+1} + 2^{-m-v+1}\, (-1)^n\, c^{-2\,(n+1)} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} (v-2\,s)^{-2\,(n+1)} \left(\Gamma\left(2\,(n+1),\, -i\, c\,(v-2\,s)\sqrt{z}\right) + \Gamma\left(2\,(n+1),\, i\, c\,(v-2\,s)\sqrt{z}\right)\right) -$$

$$2^{-m-v+1}\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \Big(\Gamma\left(2\,(n+1),\, (i\, c\,(v-2\,s) - i\, b\,(m-2\,k))\sqrt{z}\right) \left((i\, c\,(v-2\,s) - i\, b\,(m-2\,k))\sqrt{z}\right)^{-2\,(n+1)} +$$

$$\left((b\, i\,(m-2\,k) + c\, i\,(v-2\,s))\sqrt{z}\right)^{-2\,(n+1)} \Gamma\left(2\,(n+1),\, (b\, i\,(m-2\,k) + c\, i\,(v-2\,s))\sqrt{z}\right) +$$

$$\left((-i\, b\,(m-2\,k) - i\, c\,(v-2\,s))\sqrt{z}\right)^{-2\,(n+1)} \Gamma\left(2\,(n+1),\, (-i\, b\,(m-2\,k) - i\, c\,(v-2\,s))\sqrt{z}\right) +$$

$$\left((i\, b\,(m-2\,k) - i\, c\,(v-2\,s))\sqrt{z}\right)^{-2\,(n+1)}$$

$$\Gamma\left(2\,(n+1),\, (i\, b\,(m-2\,k) - i\, c\,(v-2\,s))\sqrt{z}\right)\Big) \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^n \cos^m(d\, z) \cos^v\left(c\, z^r + g\right)$

01.07.21.1633.01

$$\int z^n \cos^m(d\,z)\cos^\nu\left(c\,z^2+g\right)dz = -2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\,z^{n+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\Bigg(e^{i\,g\,(\nu-2k)}\,\Gamma\!\left(\frac{n+1}{2},\,-i\,c\,(\nu-2k)\,z^2\right)\left(-i\,c\,(\nu-2k)\,z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i\,g\,(\nu-2k)}\left(i\,c\,(\nu-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},\,i\,c\,(\nu-2k)\,z^2\right)\Bigg) + \frac{2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)}{n+1} + (-1)^n\,2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(n+1,\,i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1} + (i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\right) - 2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Bigg(e^{\frac{d^2\,i\,(m-2k)^2}{4\,c\,(\nu-2s)}-i\,g\,(\nu-2s)}\Bigg(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2\,i\,c\,(\nu-2s)\,z)^{j+1}\left(-\frac{i\,(-i\,d\,(m-2k)-2\,i\,c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d\,(m-2k)-2\,i\,c\,(\nu-2s)\,z)^2}{4\,c\,(\nu-2s)}\right)\Bigg)(-i\,c\,(\nu-2s))^{-n-1} + e^{\frac{d^2\,i\,(m-2k)^2}{4\,c\,(\nu-2s)}-i\,g\,(\nu-2s)}\Bigg(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(i\,d\,(m-2k)-2\,i\,c\,(\nu-2s)\,z)^{j+1}\left(-\frac{i\,(i\,d\,(m-2k)-2\,i\,c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(i\,d\,(m-2k)-2\,i\,c\,(\nu-2s)\,z)^2}{4\,c\,(\nu-2s)}\right)\Bigg)(-i\,c\,(\nu-2s))^{-n-1} + e^{-\frac{i\,d^2\,(m-2k)^2}{4\,c\,(\nu-2s)}+g\,i\,(\nu-2s)}\,(i\,c\,(\nu-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(2\,i\,c\,(\nu-2s)\,z-i\,d\,(m-2k))^{j+1}\left(\frac{i\,(2\,i\,c\,(\nu-2s)\,z-i\,d\,(m-2k))^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(2\,i\,c\,(\nu-2s)\,z-i\,d\,(m-2k))^2}{4\,c\,(\nu-2s)}\right) + e^{-\frac{i\,d^2\,(m-2k)^2}{4\,c\,(\nu-2s)}+g\,i\,(\nu-2s)}\,(i\,c\,(\nu-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2\,c\,i\,(\nu-2s)\,z)^{j+1}\left(\frac{i\,(d\,i\,(m-2k)+2\,c\,i\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(d\,i\,(m-2k)+2\,c\,i\,(\nu-2s)\,z)^2}{4\,c\,(\nu-2s)}\right)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.1634.01

$$\int z^n \cos^m(d\,z)\cos^\nu\left(\sqrt{z}\,c+g\right)dz = \frac{2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{n+1} + (-1)^n\, 2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(n+1,\, i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1} + (i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\, -i\,d\,(m-2k)\,z)\right) +$$

$$2^{-m-\nu+1}(-1)^n\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(c\,(\nu-2k))^{-2(n+1)}\binom{\nu}{k}$$

$$\left(e^{i\,g\,(\nu-2k)}\,\Gamma\left(2(n+1),\, -i\,c\,(\nu-2k)\sqrt{z}\right) + e^{-i\,g\,(\nu-2k)}\,\Gamma\left(2(n+1),\, i\,c\,(\nu-2k)\sqrt{z}\right)\right) + 2^{-m-2n-\nu-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{c^2\, i\,(\nu-2s)^2}{4\,d\,(m-2k)} - i\,g\,(\nu-2s)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(\nu-2s))^{-h-j+2n}\left(-2\,i\,d\sqrt{z}\,(m-2k) - i\,c\,(\nu-2s)\right)^{h+j}\right.\right.$$

$$\left(-\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2k) - i\,c\,(\nu-2s)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,c\,(\nu-2s)\left(-2\,i\,d\sqrt{z}\,(m-2k) - \right.\right.$$

$$\left. i\,c\,(\nu-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2k) - i\,c\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\right) -$$

$$2\,i\,d\,(m-2k)\sqrt{-\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2k) - i\,c\,(\nu-2s)\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2k) - i\,c\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\right)\right)\right)(-i\,d\,(m-2k))^{-2(n+1)} +$$

$$e^{\frac{c^2\, i\,(\nu-2s)^2}{4\,d\,(m-2k)} + g\,i\,(\nu-2s)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(\nu-2s))^{-h-j+2n}\left(i\,c\,(\nu-2s) - 2\,i\,d\,(m-2k)\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(i\,c\,(\nu-2s) - 2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(i\,c\,(\nu-2s)\right.$$

$$\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{d\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)(-i\,d\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d\,(m-2\,k)}-i\,g\,(v-2\,s)}\,(i\,d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,i\,d\,(m-2\,k)\sqrt{z}-i\,c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,d\,(m-2\,k)\sqrt{\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-i\,c\,(v-2\,s)\left(2\,i\,d\,(m-2\,k)\sqrt{z}-i\,c\,(v-2\,s)\right)$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\right)+e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d\,(m-2\,k)}+g\,i\,(v-2\,s)}$$

$$(i\,d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(2\,d\,i\sqrt{z}\,(m-2\,k)+c\,i\,(v-2\,s)\right)^{h+j}$$

$$\left(\frac{i\left(2\,d\,i\sqrt{z}\,(m-2\,k)+c\,i\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,i\,(v-2\,s)\right.$$

$$\left(2\, d\, i \sqrt{z}\, (m-2k) + c\, i\, (v-2s)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(2\, d\, i \sqrt{z}\, (m-2k) + c\, i\, (v-2s)\right)^2}{4\, d\, (m-2k)}\right) +$$

$$2\, d\, i\, (m-2k) \sqrt{\frac{i\left(2\, d\, i \sqrt{z}\, (m-2k) + c\, i\, (v-2s)\right)^2}{d\, (m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.\frac{i\left(2\, d\, i \sqrt{z}\, (m-2k) + c\, i\, (v-2s)\right)^2}{4\, d\, (m-2k)}\right)\right)\right) /;\ n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving $z^n \cos^m(d\, z + e) \cos^v\left(c\, z^r + g\right)$

01.07.21.1635.01

$$\int z^n \cos^m(e+d\,z)\cos^\nu(c\,z^2+g)\,dz ==$$

$$-2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\,z^{n+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{i\,g\,(\nu-2\,k)}\,\Gamma\!\left(\frac{n+1}{2},\,-i\,c\,(\nu-2\,k)\,z^2\right)\left(-i\,c\,(\nu-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$
$$\left.e^{-i\,g\,(\nu-2\,k)}\left(i\,c\,(\nu-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,i\,c\,(\nu-2\,k)\,z^2\right)\right)+$$
$$\frac{2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)}{n+1}+(-1)^n\,2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$
$$\left(e^{-i\,e\,(m-2\,k)}\,\Gamma(n+1,\,i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1}+e^{i\,e\,(m-2\,k)}\,(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2\,k)\,z)\right)-$$
$$2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{d^2\,i\,(m-2\,k)^2}{4\,c\,(\nu-2\,s)}-i\,e\,(m-2\,k)-i\,g\,(\nu-2\,s)}\right.$$
$$\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,k))^{n-j}\,(-i\,d\,(m-2\,k)-2\,i\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{i\,(-i\,d\,(m-2\,k)-2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\right.$$
$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d\,(m-2\,k)-2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-i\,c\,(\nu-2\,s))^{-n-1}+$$
$$e^{\frac{d^2\,i\,(m-2\,k)^2}{4\,c\,(\nu-2\,s)}+e\,i\,(m-2\,k)-i\,g\,(\nu-2\,s)}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k))^{n-j}\,(i\,d\,(m-2\,k)-2\,i\,c\,(\nu-2\,s)\,z)^{j+1}\right.$$
$$\left.\left(-\frac{i\,(i\,d\,(m-2\,k)-2\,i\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(i\,d\,(m-2\,k)-2\,i\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)$$
$$(-i\,c\,(\nu-2\,s))^{-n-1}+e^{-\frac{i\,d^2\,(m-2\,k)^2}{4\,c\,(\nu-2\,s)}-i\,e\,(m-2\,k)+g\,i\,(\nu-2\,s)}\,(i\,c\,(\nu-2\,s))^{-n-1}$$
$$\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,k))^{n-j}\,(2\,i\,c\,(\nu-2\,s)\,z-i\,d\,(m-2\,k))^{j+1}\left(\frac{i\,(2\,i\,c\,(\nu-2\,s)\,z-i\,d\,(m-2\,k))^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(2\,i\,c\,(\nu-2\,s)\,z-i\,d\,(m-2\,k))^2}{4\,c\,(\nu-2\,s)}\right)+e^{-\frac{i\,d^2\,(m-2\,k)^2}{4\,c\,(\nu-2\,s)}+e\,i\,(m-2\,k)+g\,i\,(\nu-2\,s)}\,(i\,c\,(\nu-2\,s))^{-n-1}$$
$$\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k))^{n-j}\,(d\,i\,(m-2\,k)+2\,c\,i\,(\nu-2\,s)\,z)^{j+1}\left(\frac{i\,(d\,i\,(m-2\,k)+2\,c\,i\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(d\,i\,(m-2\,k)+2\,c\,i\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.1636.01

$$\int z^n \cos^m(e+d\,z)\cos^\nu\!\left(\sqrt{z}\;c+g\right)dz = \frac{2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{n+1} +$$

$$(-1)^n\, 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \Big(e^{-i\,e\,(m-2k)}\, \Gamma(n+1,\, i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1} +$$

$$e^{i\,e\,(m-2k)}\,(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\Big) + (-1)^n\, 2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{k} (c\,(\nu-2k))^{-2\,(n+1)} \left(e^{i\,g\,(\nu-2k)}\,\Gamma\!\left(2\,(n+1),\,-i\,c\,(\nu-2k)\sqrt{z}\right) + e^{-i\,g\,(\nu-2k)}\,\Gamma\!\left(2\,(n+1),\,i\,c\,(\nu-2k)\sqrt{z}\right)\right) +$$

$$2^{-m-2n-\nu-1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} (i\,d\,(m-2k))^{-2\,(n+1)} \left(e^{-\frac{i\,c^2\,(\nu-2s)^2}{4\,d\,(m-2k)} - i\,g\,(\nu-2s) + e\,i\,(m-2k)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,c\,(\nu-2s))^{-h-j+2n} \right.$$

$$\left(2\,i\,d\,(m-2k)\sqrt{z} - i\,c\,(\nu-2s)\right)^{h+j} \left(\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z} - i\,c\,(\nu-2s)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,d\,(m-2k)\sqrt{\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z} - i\,c\,(\nu-2s)\right)^2}{d\,(m-2k)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\, \frac{i\left(2\,i\,d\,(m-2k)\sqrt{z} - i\,c\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\right) - i\,c\,(\nu-2s)$$

$$\left.\left.\left(2\,i\,d\,(m-2k)\sqrt{z} - i\,c\,(\nu-2s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{i\left(2\,i\,d\,(m-2k)\sqrt{z} - i\,c\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\right)\right)\right. +$$

$$e^{-\frac{i\,c^2\,(\nu-2s)^2}{4\,d\,(m-2k)} + g\,i\,(\nu-2s) + e\,i\,(m-2k)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\,c\,(\nu-2s))^{-h-j+2n} \left(2\,d\,i\sqrt{z}\;(m-2k) + c\,i\,(\nu-2s)\right)^{h+j}$$

$$\left(\frac{i\left(2\,d\,i\sqrt{z}\;(m-2k) + c\,i\,(\nu-2s)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(c\,i\,(\nu-2s)\right.$$

$$\left.\left(2\,d\,i\sqrt{z}\;(m-2k) + c\,i\,(\nu-2s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{i\left(2\,d\,i\sqrt{z}\;(m-2k) + c\,i\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\right)\right. +$$

$$2\,d\,i\,(m-2\,k)\sqrt{\frac{i\left(2\,d\,i\sqrt{z}\,(m-2\,k)+c\,i\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\;\frac{i\left(2\,d\,i\sqrt{z}\,(m-2\,k)+c\,i\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d\,(m-2\,k)}-i\,g\,(v-2\,s)-i\,e\,(m-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,s))^{-h-j+2\,n}\left(-2\,i\,d\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,c\,(v-2\,s)\right.$$

$$\left(-2\,i\,d\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2\,k)-i\,c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d\,(m-2\,k)}+g\,i\,(v-2\,s)-i\,e\,(m-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(i\,c\,(v-2\,s)\right.$$

$$\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{d\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(i\,c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^m(b z^r+e)\cos^\nu(c z^r+g)$

01.07.21.1637.01

$$\int z^{\alpha-1}\cos^m(b z^r)\cos^\nu(c z^r+g)\,dz = \frac{(-1)^m 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{\alpha} - \frac{2^{-m-\nu} z^\alpha}{r}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma\left(\frac{\alpha}{r},(i b m-2 i b k) z^r\right)((i b m-2 i b k) z^r)^{-\frac{\alpha}{r}}+((2 i b k-i b m) z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(2 i b k-i b m) z^r\right)\right)-$$
$$\frac{(-1)^m 2^{-m-\nu} z^\alpha}{r}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}$$
$$\left(e^{2 i g k-i g \nu}\Gamma\left(\frac{\alpha}{r},(i c \nu-2 i c k) z^r\right)((i c \nu-2 i c k) z^r)^{-\frac{\alpha}{r}}+e^{i g \nu-2 i g k}((2 i c k-i c \nu) z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(2 i c k-i c \nu) z^r\right)\right)-$$
$$\frac{2^{-m-\nu} z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{2 i g s-i g \nu}\Gamma\left(\frac{\alpha}{r},(-2 b i k+i b m-2 i c s+i c \nu) z^r\right)((-2 b i k+i b m-2 i c s+i c \nu) z^r)^{-\frac{\alpha}{r}}+\right.$$
$$e^{2 i g s-i g \nu}((2 i b k-i b m-2 i c s+i c \nu) z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(2 i b k-i b m-2 i c s+i c \nu) z^r\right)+$$
$$e^{i g \nu-2 i g s}((-2 b i k+i b m+2 i c s-i c \nu) z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(-2 b i k+i b m+2 i c s-i c \nu) z^r\right)+$$
$$\left.e^{i g \nu-2 i g s}((2 i b k-i b m+2 i c s-i c \nu) z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(2 i b k-i b m+2 i c s-i c \nu) z^r\right)\right)\text{ /; } m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.1638.01

$$\int z^n \cos^m\left(b z^2\right) \cos^v\left(c z^2+g\right) dz = -2^{-m-v-1} \binom{v}{\frac{v}{2}} (1-v \bmod 2)\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma\left(\frac{n+1}{2}, -i\, b\,(m-2k)\, z^2\right) \left(-i\, b\,(m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} + \left(i\, b\,(m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i\, b\,(m-2k)\, z^2\right)\right) -$$

$$2^{-m-v-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2)\, z^{n+1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{i g (v-2s)}\, \Gamma\left(\frac{n+1}{2}, -i\, c\,(v-2s)\, z^2\right) \left(-i\, c\,(v-2s)\, z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i g (v-2s)} \left(i\, c\,(v-2s)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i\, c\,(v-2s)\, z^2\right)\right) -$$

$$2^{-m-v-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-i g (v-2s)}\, \Gamma\left(\frac{n+1}{2}, (i\, c\,(v-2s) - i\, b\,(m-2k))\, z^2\right) \left((i\, c\,(v-2s) - i\, b\,(m-2k))\, z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i g (v-2s)} \left((b\, i\,(m-2k) + c\, i\,(v-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (b\, i\,(m-2k) + c\, i\,(v-2s))\, z^2\right) + e^{g i (v-2s)} \left((-i\, b\,(m-2k) - i\, c\,(v-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i\, b\,(m-2k) - i\, c\,(v-2s))\, z^2\right) + e^{i g (v-2s)} \left((i\, b\,(m-2k) - i\, c\,(v-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i\, b\,(m-2k) - i\, c\,(v-2s))\, z^2\right)\right) +$$

$$\frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1639.01

$$\int z^n \cos^m\left(\sqrt{z}\, b\right) \cos^\nu\left(\sqrt{z}\, c+g\right) dz = (-1)^n\, 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)\, b^{-2(n+1)} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (m-2k)^{-2(n+1)} \left(\Gamma\left(2(n+1), -i\, b\,(m-2k)\sqrt{z}\right) + \Gamma\left(2(n+1), i\, b\,(m-2k)\sqrt{z}\right)\right) + \frac{2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{n+1} + (-1)^n\, 2^{-m-\nu+1} c^{-2(n+1)} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} (\nu-2s)^{-2(n+1)} \left(e^{i g(\nu-2s)}\, \Gamma\left(2(n+1), -i\, c\,(\nu-2s)\sqrt{z}\right) + e^{-i g(\nu-2s)}\, \Gamma\left(2(n+1), i\, c\,(\nu-2s)\sqrt{z}\right)\right) - 2^{-m-\nu+1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-i g(\nu-2s)}\, \Gamma\left(2(n+1), (i\, c\,(\nu-2s) - i\, b\,(m-2k))\sqrt{z}\right) \left((i\, c\,(\nu-2s) - i\, b\,(m-2k))\sqrt{z}\right)^{-2(n+1)} + e^{-i g(\nu-2s)} \left((b\, i\,(m-2k) + c\, i\,(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (b\, i\,(m-2k) + c\, i\,(\nu-2s))\sqrt{z}\right) + e^{g\, i\,(\nu-2s)} \left((-i\, b\,(m-2k) - i\, c\,(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-i\, b\,(m-2k) - i\, c\,(\nu-2s))\sqrt{z}\right) + e^{i g(\nu-2s)} \left((i\, b\,(m-2k) - i\, c\,(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i\, b\,(m-2k) - i\, c\,(\nu-2s))\sqrt{z}\right)\right) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \cos^m\left(b\, z^r + e\right) \cos^\nu\left(c\, z^r + g\right)$

01.07.21.1640.01

$$\int z^{\alpha-1}\cos^m(b\,z^r+e)\cos^v(c\,z^r+g)\,dz == \frac{(-1)^m\,2^{-m-v}\,z^\alpha\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{\alpha} - \frac{2^{-m-v}\,z^\alpha}{r}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{2ike-ime}\,\Gamma\left(\frac{\alpha}{r},\,(i\,b\,m-2\,i\,b\,k)\,z^r\right)((i\,b\,m-2\,i\,b\,k)\,z^r)^{-\frac{\alpha}{r}} + e^{ime-2ike}\,((2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m)\,z^r\right)\right) - \frac{(-1)^m\,2^{-m-v}\,z^\alpha}{r}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(e^{2igk-igv}\,\Gamma\left(\frac{\alpha}{r},\,(i\,c\,v-2\,i\,c\,k)\,z^r\right)((i\,c\,v-2\,i\,c\,k)\,z^r)^{-\frac{\alpha}{r}} + e^{igv-2igk}\,((2\,i\,c\,k-i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(2\,i\,c\,k-i\,c\,v)\,z^r\right)\right) - \frac{2^{-m-v}\,z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{2iek-ime+2igs-igv}\,\Gamma\left(\frac{\alpha}{r},\,(-2\,b\,i\,k+i\,b\,m-2\,i\,c\,s+i\,c\,v)\,z^r\right)((-2\,b\,i\,k+i\,b\,m-2\,i\,c\,s+i\,c\,v)\,z^r)^{-\frac{\alpha}{r}} + e^{-2eik+iem+2igs-igv}\,((2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,v)\,z^r\right) + e^{2iek-ime-2igs+igv}\,((-2\,b\,i\,k+i\,b\,m+2\,i\,c\,s-i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(-2\,b\,i\,k+i\,b\,m+2\,i\,c\,s-i\,c\,v)\,z^r\right) + e^{-2eik+iem-2igs+igv}\,((2\,i\,b\,k-i\,b\,m+2\,i\,c\,s-i\,c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m+2\,i\,c\,s-i\,c\,v)\,z^r\right)\right)\ /;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.07.21.1641.01

$$\int z^n \cos^m\left(b z^2+e\right) \cos^v\left(c z^2+g\right) dz = -2^{-m-v-1} \binom{v}{\frac{v}{2}} (1-v \bmod 2)\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{i e (m-2k)}\, \Gamma\left(\frac{n+1}{2}, -i b (m-2k) z^2\right) \left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e (m-2k)} \left(i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b (m-2k) z^2\right)\right) - 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2)\, z^{n+1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{i g (v-2s)}\, \Gamma\left(\frac{n+1}{2}, -i c (v-2s) z^2\right) \left(-i c (v-2s) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i g (v-2s)} \left(i c (v-2s) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i c (v-2s) z^2\right)\right) - 2^{-m-v-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{i e (m-2k) - i g (v-2s)}\, \Gamma\left(\frac{n+1}{2}, (i c (v-2s) - i b (m-2k)) z^2\right) \left((i c (v-2s) - i b (m-2k)) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e (m-2k) - i g (v-2s)} \left((b i (m-2k) + c i (v-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (b i (m-2k) + c i (v-2s)) z^2\right) + e^{e i (m-2k) + g i (v-2s)} \left((-i b (m-2k) - i c (v-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i b (m-2k) - i c (v-2s)) z^2\right) + e^{i g (v-2s) - i e (m-2k)} \left((i b (m-2k) - i c (v-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b (m-2k) - i c (v-2s)) z^2\right)\right) + \frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1642.01

$$\int z^n \cos^m\left(\sqrt{z}\, b+e\right) \cos^\nu\left(\sqrt{z}\, c+g\right) dz = (-1)^n\, 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)\, b^{-2(n+1)}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} (m-2k)^{-2(n+1)} \left(e^{i e (m-2k)}\, \Gamma\left(2(n+1), -i\, b\, (m-2k) \sqrt{z}\right) + e^{-i e (m-2k)}\, \Gamma\left(2(n+1), i\, b\, (m-2k) \sqrt{z}\right)\right) +$$
$$\frac{2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{n+1} + (-1)^n\, 2^{-m-\nu+1}\, c^{-2(n+1)} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} (\nu-2s)^{-2(n+1)} \left(e^{i g (\nu-2s)}\, \Gamma\left(2(n+1), -i\, c\, (\nu-2s) \sqrt{z}\right) + e^{-i g (\nu-2s)}\, \Gamma\left(2(n+1), i\, c\, (\nu-2s) \sqrt{z}\right)\right) -$$
$$2^{-m-\nu+1}\, z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{i e (m-2k) - i g (\nu-2s)}\, \Gamma\left(2(n+1), (i\, c\, (\nu-2s) - i\, b\, (m-2k)) \sqrt{z}\right)\right.$$
$$\left((i\, c\, (\nu-2s) - i\, b\, (m-2k)) \sqrt{z}\right)^{-2(n+1)} + e^{-i e (m-2k) - i g (\nu-2s)} \left((b\, i\, (m-2k) + c\, i\, (\nu-2s)) \sqrt{z}\right)^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (b\, i\, (m-2k) + c\, i\, (\nu-2s)) \sqrt{z}\right) + e^{e\, i\, (m-2k) + g\, i\, (\nu-2s)} \left((-i\, b\, (m-2k) - i\, c\, (\nu-2s)) \sqrt{z}\right)^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (-i\, b\, (m-2k) - i\, c\, (\nu-2s)) \sqrt{z}\right) + e^{i g (\nu-2s) - i e (m-2k)} \left((i\, b\, (m-2k) - i\, c\, (\nu-2s)) \sqrt{z}\right)^{-2(n+1)}$$
$$\left.\Gamma\left(2(n+1), (i\, b\, (m-2k) - i\, c\, (\nu-2s)) \sqrt{z}\right)\right) /;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $z^n \cos^m(d\, z) \cos^\nu\left(c\, z^r + f\, z\right)$

01.07.21.1643.01

$$\int z^n \cos^m(d\, z) \cos^\nu\left(c\, z^2 + f\, z\right) dz = \frac{2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{n+1} + (-1)^n\, 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \left(\Gamma(n+1, i\, d\, (m-2k)\, z)\, (-i\, d\, (m-2k))^{-n-1} + (i\, d\, (m-2k))^{-n-1}\, \Gamma(n+1, -i\, d\, (m-2k)\, z)\right) -$$
$$2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{k} \left(e^{\frac{i f^2 (\nu-2k)}{4c}} \left(\sum_{j=0}^{n} 2^{j-n}\, (i\, f\, (\nu-2k))^{n-j}\, (-i\, f\, (\nu-2k) - 2\, i\, c\, z\, (\nu-2k))^{j+1}\right.\right.$$
$$\left.\left(-\frac{i\, (-i\, f\, (\nu-2k) - 2\, i\, c\, z\, (\nu-2k))^2}{c\, (\nu-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\left(\frac{j+1}{2}, -\frac{i\, (-i\, f\, (\nu-2k) - 2\, i\, c\, z\, (\nu-2k))^2}{4\, c\, (\nu-2k)}\right)\right)$$
$$(-i\, c\, (\nu-2k))^{-n-1} + e^{-\frac{i f^2 (\nu-2k)}{4c}}\, (i\, c\, (\nu-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (-i\, f\, (\nu-2k))^{n-j}\, (f\, i\, (\nu-2k) + 2\, c\, i\, z\, (\nu-2k))^{j+1}$$

$$\left(\frac{i\,(f\,i\,(v-2\,k)+2\,c\,i\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(f\,i\,(v-2\,k)+2\,c\,i\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\Bigg)-$$

$$2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{-\frac{i\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))^2}{4\,c\,(v-2\,s)}}\Bigg(\sum_{j=0}^{n}2^{j-n}\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))^{n-j}\,(-i\,d\,(m-2\,k)-$$

$$i\,f\,(v-2\,s)-2\,i\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{i\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)-2\,i\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)-2\,i\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)(-i\,c\,(v-2\,s))^{-n-1}+$$

$$e^{-\frac{i\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}}\Bigg(\sum_{j=0}^{n}2^{j-n}\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))^{n-j}\,(d\,i\,(m-2\,k)-i\,f\,(v-2\,s)-2\,i\,c\,(v-2\,s)\,z)^{j+1}$$

$$\left(-\frac{i\,(d\,i\,(m-2\,k)-i\,f\,(v-2\,s)-2\,i\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(d\,i\,(m-2\,k)-i\,f\,(v-2\,s)-2\,i\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)(-i\,c\,(v-2\,s))^{-n-1}+e^{\frac{i\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))^2}{4\,c\,(v-2\,s)}}$$

$$(i\,c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^{n-j}\,(-i\,d\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^{j+1}$$

$$\left(\frac{i\,(-i\,d\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},\,\frac{i\,(-i\,d\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)+$$

$$e^{\frac{i\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))^2}{4\,c\,(v-2\,s)}}\,(i\,c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^{n-j}$$

$$(d\,i\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^{j+1}\left(\frac{i\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.07.21.1644.01

$$\int z^n \cos^m(d\,z)\cos^\nu\left(\sqrt{z}\;c+f\,z\right)dz = \frac{2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)}{n+1}+(-1)^n\,2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(n+1,\,i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1}+(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2\,k)\,z)\right)-$$

$$2^{-m-2\,n-\nu-1}\,(-1)^n\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(f\,(\nu-2\,k))^{-2\,(n+1)}\binom{\nu}{k}\left(e^{-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(\nu-2\,k))^{-h-j+2\,n}\left(c\,i\,(\nu-2\,k)+2\,f\,i\sqrt{z}\;(\nu-2\,k)\right)^{h+j}\right.$$

$$\left(\frac{i\left(c\,i\,(\nu-2\,k)+2\,f\,i\sqrt{z}\;(\nu-2\,k)\right)^2}{f\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,i\,(\nu-2\,k)\left(c\,i\,(\nu-2\,k)+2\,f\,i\sqrt{z}\;(\nu-2\,k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,\frac{i\left(c\,i\,(\nu-2\,k)+2\,f\,i\sqrt{z}\;(\nu-2\,k)\right)^2}{4\,f\,(\nu-2\,k)}\right)+2\,f\,i\,(\nu-2\,k)$$

$$\left.\left.\sqrt{\frac{i\left(c\,i\,(\nu-2\,k)+2\,f\,i\sqrt{z}\;(\nu-2\,k)\right)^2}{f\,(\nu-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(c\,i\,(\nu-2\,k)+2\,f\,i\sqrt{z}\;(\nu-2\,k)\right)^2}{4\,f\,(\nu-2\,k)}\right)\right)+\right.$$

$$e^{\frac{i\,c^2\,(\nu-2\,k)}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(\nu-2\,k))^{-h-j+2\,n}\left(-i\,c\,(\nu-2\,k)-2\,i\,f\sqrt{z}\;(\nu-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,c\,(\nu-2\,k)-2\,i\,f\sqrt{z}\;(\nu-2\,k)\right)^2}{f\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,c\,(\nu-2\,k)\right.$$

$$\left(-i\,c\,(\nu-2\,k)-2\,i\,f\sqrt{z}\;(\nu-2\,k)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,c\,(\nu-2\,k)-2\,i\,f\sqrt{z}\;(\nu-2\,k)\right)^2}{4\,f\,(\nu-2\,k)}\right)-$$

$$2\,i\,f\,(\nu-2\,k)\sqrt{-\frac{i\left(-i\,c\,(\nu-2\,k)-2\,i\,f\sqrt{z}\;(\nu-2\,k)\right)^2}{f\,(\nu-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$-\frac{\mathbb{i}\left(-\mathbb{i}\, c\,(v-2k)-2\,\mathbb{i}\, f\sqrt{z}\,(v-2k)\right)^2}{4\, f\,(v-2k)}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{\frac{c^2 (v-2s)^2}{4(\mathbb{i} f (v-2s)-\mathbb{i} d (m-2k))}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(\mathbb{i}\, c\,(v-2s))^{-h-j+2n}\left(c\,\mathbb{i}\,(v-2s)+2\,(\mathbb{i}\, f\,(v-2s)-\right.$$

$$\left.\mathbb{i}\, d\,(m-2k))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,\mathbb{i}\,(v-2s)+2\,(\mathbb{i}\, f\,(v-2s)-\mathbb{i}\, d\,(m-2k))\sqrt{z}\right)^2}{\mathbb{i}\, f\,(v-2s)-\mathbb{i}\, d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,\mathbb{i}\,(v-2s)\left(c\,\mathbb{i}\,(v-2s)+2\,(\mathbb{i}\, f\,(v-2s)-\mathbb{i}\, d\,(m-2k))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(c\,\mathbb{i}\,(v-2s)+2\,(\mathbb{i}\, f\,(v-2s)-\mathbb{i}\, d\,(m-2k))\sqrt{z}\right)^2}{4\,(\mathbb{i}\, f\,(v-2s)-\mathbb{i}\, d\,(m-2k))}\Bigg)+2\,(\mathbb{i}\, f\,(v-2s)-\mathbb{i}\, d\,(m-2k))$$

$$\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c\,\mathbb{i}\,(v-2s)+2\,(\mathbb{i}\, f\,(v-2s)-\mathbb{i}\, d\,(m-2k))\sqrt{z}\right)^2}{4\,(\mathbb{i}\, f\,(v-2s)-\mathbb{i}\, d\,(m-2k))}\right)$$

$$\sqrt{-\frac{\left(c\,\mathbb{i}\,(v-2s)+2\,(\mathbb{i}\, f\,(v-2s)-\mathbb{i}\, d\,(m-2k))\sqrt{z}\right)^2}{\mathbb{i}\, f\,(v-2s)-\mathbb{i}\, d\,(m-2k)}}\Bigg)\Bigg)$$

$$(\mathbb{i}\, f\,(v-2s)-\mathbb{i}\, d\,(m-2k))^{-2(n+1)}+e^{\frac{c^2 (v-2s)^2}{4(d\,\mathbb{i}\,(m-2k)+f\,\mathbb{i}\,(v-2s))}}\,(d\,\mathbb{i}\,(m-2k)+f\,\mathbb{i}\,(v-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(\mathbb{i}\, c\,(v-2s))^{-h-j+2n}\left(c\,\mathbb{i}\,(v-2s)+2\,(d\,\mathbb{i}\,(m-2k)+f\,\mathbb{i}\,(v-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,\mathbb{i}\,(v-2s)+2\,(d\,\mathbb{i}\,(m-2k)+f\,\mathbb{i}\,(v-2s))\sqrt{z}\right)^2}{d\,\mathbb{i}\,(m-2k)+f\,\mathbb{i}\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,\mathbb{i}\,(v-2s)\left(c\,\mathbb{i}\,(v-2s)+2\,(d\,\mathbb{i}\,(m-2k)+f\,\mathbb{i}\,(v-2s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))}\Bigg)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))}\right)$$

$$\sqrt{-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,i\,(v-2\,s)}}\Bigg)+$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}}\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{-\frac{\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}\right)-$$

$$i\,c\,(v-2\,s)\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}\right)\Bigg)+$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}}\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{-\frac{\left(2\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}\right)-$$

$$i\,c\,(v-2\,s)\left(2\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{z}-i\,c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.$$

$$\left.\left.\left.-\frac{\left(2\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}\right)\right)\right)\Big/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos^m(d\,z+e)\cos^v\left(c\,z^r+f\,z\right)$

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$$\int z^n\cos^m(e+d\,z)\cos^v\left(c\,z^2+f\,z\right)dz=$$

$$\frac{2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$

$$\left(e^{-i\,e\,(m-2\,k)}\,\Gamma(n+1,\,i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1}+e^{i\,e\,(m-2\,k)}\,(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2\,k)\,z)\right)-$$

$$2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(e^{\frac{i\,f^2\,(v-2\,k)}{4\,c}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,f\,(v-2\,k))^{n-j}\,(-i\,f\,(v-2\,k)-2\,i\,c\,z\,(v-2\,k))^{j+1}\right.\right.$$

$$\left.\left(-\frac{i\,(-i\,f\,(v-2\,k)-2\,i\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(-i\,f\,(v-2\,k)-2\,i\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\right)$$

$$(-i\,c\,(v-2\,k))^{-n-1}+e^{-\frac{i\,f^2\,(v-2\,k)}{4\,c}}\,(i\,c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,f\,(v-2\,k))^{n-j}\,(f\,i\,(v-2\,k)+2\,c\,i\,z\,(v-2\,k))^{j+1}$$

$$\left.\left(\frac{i\,(f\,i\,(v-2\,k)+2\,c\,i\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(f\,i\,(v-2\,k)+2\,c\,i\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\right)-$$

$$2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{-\frac{i\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}-i\,e\,(m-2\,k)}\left(\sum_{j=0}^{n}2^{j-n}\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))^{n-j}\,(-i\,d\,(m-2\,k)-\right.\right.$$

$$i\, f\,(v-2\,s) - 2\,i\,c\,(v-2\,s)\,z)^{j+1} \left(-\frac{i\,(-i\,d\,(m-2\,k) - i\,f\,(v-2\,s) - 2\,i\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{i\,(-i\,d\,(m-2\,k) - i\,f\,(v-2\,s) - 2\,i\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)(-i\,c\,(v-2\,s))^{-n-1} +$$

$$e^{i\,e\,(m-2\,k) - \frac{i\,(i\,d\,(m-2\,k) - i\,f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}} \left(\sum_{j=0}^{n} 2^{j-n}\,(i\,f\,(v-2\,s) - i\,d\,(m-2\,k))^{n-j}\,(d\,i\,(m-2\,k) - i\,f\,(v-2\,s) -\right.$$

$$2\,i\,c\,(v-2\,s)\,z)^{j+1} \left(-\frac{i\,(d\,i\,(m-2\,k) - i\,f\,(v-2\,s) - 2\,i\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\left.\Gamma\!\left(\frac{j+1}{2}, -\frac{i\,(d\,i\,(m-2\,k) - i\,f\,(v-2\,s) - 2\,i\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)(-i\,c\,(v-2\,s))^{-n-1} +$$

$$e^{\frac{i\,(i\,f\,(v-2\,s) - i\,d\,(m-2\,k))^2}{4\,c\,(v-2\,s)} - i\,e\,(m-2\,k)}\,(i\,c\,(v-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(i\,d\,(m-2\,k) - i\,f\,(v-2\,s))^{n-j}\,(-i\,d\,(m-2\,k) +$$

$$f\,i\,(v-2\,s) + 2\,c\,i\,(v-2\,s)\,z)^{j+1} \left(\frac{i\,(-i\,d\,(m-2\,k) + f\,i\,(v-2\,s) + 2\,c\,i\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{i\,(-i\,d\,(m-2\,k) + f\,i\,(v-2\,s) + 2\,c\,i\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right) +$$

$$e^{\frac{i\,(d\,i\,(m-2\,k) + f\,i\,(v-2\,s))^2}{4\,c\,(v-2\,s)} + e\,i\,(m-2\,k)}\,(i\,c\,(v-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-i\,d\,(m-2\,k) - i\,f\,(v-2\,s))^{n-j}$$

$$(d\,i\,(m-2\,k) + f\,i\,(v-2\,s) + 2\,c\,i\,(v-2\,s)\,z)^{j+1} \left(\frac{i\,(d\,i\,(m-2\,k) + f\,i\,(v-2\,s) + 2\,c\,i\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2\,k) + f\,i\,(v-2\,s) + 2\,c\,i\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\Bigg) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n \cos^m(d\,z+e)\cos^v\!\left(\sqrt{z}\;c + f\,z\right) dz =$$

$$\frac{2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)}{n+1} + (-1)^n\,2^{-m-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$

$$\left(e^{-i\,e\,(m-2\,k)}\,\Gamma(n+1,\, i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1} + e^{i\,e\,(m-2\,k)}\,(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\, -i\,d\,(m-2\,k)\,z)\right) -$$

$$2^{-m-2\,n-v-1}\,(-1)^n\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(f\,(v-2\,k))^{-2\,(n+1)}\binom{v}{k}$$

$$\left(e^{-\frac{i c^2 (v-2k)}{4f}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i c (v-2k))^{-h-j+2n} \left(c i (v-2k) + 2 f i \sqrt{z}\, (v-2k)\right)^{h+j}\right.$$

$$\left(\frac{i\left(c i (v-2k) + 2 f i \sqrt{z}\, (v-2k)\right)^2}{f (v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(c i (v-2k)\left(c i (v-2k) + 2 f i \sqrt{z}\, (v-2k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1), \frac{i\left(c i (v-2k) + 2 f i \sqrt{z}\, (v-2k)\right)^2}{4 f (v-2k)}\right) + 2 f i (v-2k)$$

$$\left.\left.\sqrt{\frac{i\left(c i (v-2k) + 2 f i \sqrt{z}\, (v-2k)\right)^2}{f (v-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(c i (v-2k) + 2 f i \sqrt{z}\, (v-2k)\right)^2}{4 f (v-2k)}\right)\right)\right) +$$

$$e^{\frac{i c^2 (v-2k)}{4f}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-i c (v-2k))^{-h-j+2n} \left(-i c (v-2k) - 2 i f \sqrt{z}\, (v-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i c (v-2k) - 2 i f \sqrt{z}\, (v-2k)\right)^2}{f (v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-i c (v-2k)\right.$$

$$\left(-i c (v-2k) - 2 i f \sqrt{z}\, (v-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i c (v-2k) - 2 i f \sqrt{z}\, (v-2k)\right)^2}{4 f (v-2k)}\right) -$$

$$2 i f (v-2k) \sqrt{-\frac{i\left(-i c (v-2k) - 2 i f \sqrt{z}\, (v-2k)\right)^2}{f (v-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(-i c (v-2k) - 2 i f \sqrt{z}\, (v-2k)\right)^2}{4 f (v-2k)}\right)\right)\right) + 2^{-m-2n-v-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{\frac{c^2 (v-2s)^2}{4(i f (v-2s) - i d (m-2k))} - i e (m-2k)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (i c (v-2s))^{-h-j+2n}\left(c i (v-2s) + 2(i f (v-2s) -\right.\right.\right.$$

$$\left. i d (m-2k))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c i (v-2s) + 2 (i f (v-2s) - i d (m-2k))\sqrt{z}\right)^2}{i f (v-2s) - i d (m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,i\,(v-2\,s)\left(c\,i\,(v-2\,s)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,i\,(v-2\,s)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))\sqrt{z}\right)^2}{4\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c\,i\,(v-2\,s)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))\sqrt{z}\right)^2}{4\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(c\,i\,(v-2\,s)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))\sqrt{z}\right)^2}{i\,f\,(v-2\,s)-i\,d\,(m-2\,k)}}\right)\right)$$

$$(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))^{-2\,(n+1)}+e^{\frac{c^2\,(v-2\,s)^2}{4\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))}+e\,i\,(m-2\,k)}\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,i\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,i\,(v-2\,s)\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))}\right)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,i\,(v-2\,s)}}\right)+$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}-i\,e\,(m-2\,k)}\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{z}-i\,c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\left(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{z}\;-i\,c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\left(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{z}\;-i\,c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\left(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{z}\;-i\,c\,(v-2\,s)\right)^2}{4\left(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)}\right)-$$

$$i\,c\,(v-2\,s)\left(2\left(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{z}\;-i\,c\,(v-2\,s)\right)$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\left(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{z}\;-i\,c\,(v-2\,s)\right)^2}{4\left(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)}\right)\right)+$$

$$e^{\frac{c^2(v-2\,s)^2}{4(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}+e\,i\,(m-2\,k)}\left(i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$\left(-i\,c\,(v-2\,s)\right)^{-h-j+2\,n}\left(2\left(i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{z}\;-i\,c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\left(i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{z}\;-i\,c\,(v-2\,s)\right)^2}{i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\left(i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{z}\;-i\,c\,(v-2\,s)\right)^2}{i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\left(i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{z}\;-i\,c\,(v-2\,s)\right)^2}{4\left(i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)}\right)-$$

$$i\,c\,(v-2\,s)\left(2\left(i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{z}\;-i\,c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.$$

$$\left.\left.\left.-\frac{\left(2\left(i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)\sqrt{z}\;-i\,c\,(v-2\,s)\right)^2}{4\left(i\,d\,(m-2\,k)-i\,f\,(v-2\,s)\right)}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos^m(b\,z^r)\cos^v(c\,z^r+f\,z)$

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$$\int z^n \cos^m\left(b z^2\right) \cos^v\left(c z^2 + f z\right) dz = -2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma\left(\frac{n+1}{2}, -i\, b\,(m-2k)\, z^2\right) \left(-i\, b\,(m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} + \left(i\, b\,(m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i\, b\,(m-2k)\, z^2\right)\right)\right)$$

$$z^{n+1} + \frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} -$$

$$2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(e^{\frac{i f^2 (v-2k)}{4c}} \left(\sum_{j=0}^{n} 2^{j-n} (i\, f\,(v-2k))^{n-j} (-i\, f\,(v-2k) - 2\, i\, c\, z\,(v-2k))^{j+1} \right.\right.$$

$$\left. \left(-\frac{i\,(-i\, f\,(v-2k) - 2\, i\, c\, z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i\,(-i\, f\,(v-2k) - 2\, i\, c\, z\,(v-2k))^2}{4\, c\,(v-2k)}\right)\right)$$

$$(-i\, c\,(v-2k))^{-n-1} + e^{-\frac{i f^2 (v-2k)}{4c}} (i\, c\,(v-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\, f\,(v-2k))^{n-j} (f\, i\,(v-2k) + 2\, c\, i\, z\,(v-2k))^{j+1}$$

$$\left. \left(\frac{i\,(f\, i\,(v-2k) + 2\, c\, i\, z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i\,(f\, i\,(v-2k) + 2\, c\, i\, z\,(v-2k))^2}{4\, c\,(v-2k)}\right)\right) -$$

$$2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{\frac{i f^2 (v-2s)^2}{4(-2bk+bm+2cs-cv)}} \left(\sum_{j=0}^{n} 2^{j-n} (-i\, f\,(v-2s))^{n-j} (f\, i\,(v-2s) + 2\,(i\, c\,(v-2s) - i\, b\,(m-2k))\, z)^{j+1} \right.\right.$$

$$\left(-\frac{(f\, i\,(v-2s) + 2\,(i\, c\,(v-2s) - i\, b\,(m-2k))\, z)^2}{i\, c\,(v-2s) - i\, b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\left.\Gamma\left(\frac{j+1}{2}, -\frac{(f\, i\,(v-2s) + 2\,(i\, c\,(v-2s) - i\, b\,(m-2k))\, z)^2}{4\,(i\, c\,(v-2s) - i\, b\,(m-2k))}\right)\right) (i\, c\,(v-2s) - i\, b\,(m-2k))^{-n-1} +$$

$$e^{\frac{i f^2 (v-2s)^2}{4(2bk-bm+2cs-cv)}} (b\, i\,(m-2k) + c\, i\,(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\, f\,(v-2s))^{n-j} (f\, i\,(v-2s) +$$

$$2\,(b\, i\,(m-2k) + c\, i\,(v-2s))\, z)^{j+1} \left(-\frac{(f\, i\,(v-2s) + 2\,(b\, i\,(m-2k) + c\, i\,(v-2s))\, z)^2}{b\, i\,(m-2k) + c\, i\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f\, i\,(v-2s) + 2\,(b\, i\,(m-2k) + c\, i\,(v-2s))\, z)^2}{4\,(b\, i\,(m-2k) + c\, i\,(v-2s))}\right) + e^{-\frac{i f^2 (v-2s)^2}{4(2bk-bm+2cs-cv)}}$$

$$(-i\, b\,(m-2k) - i\, c\,(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i\, f\,(v-2s))^{n-j} (2\,(-i\, b\,(m-2k) - i\, c\,(v-2s))\, z - i\, f\,(v-2s))^{j+1}$$

$$\left(-\frac{(2(-i\,b\,(m-2k)-i\,c\,(v-2s))\,z-i\,f\,(v-2s))^2}{-i\,b\,(m-2k)-i\,c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(2(-i\,b\,(m-2k)-i\,c\,(v-2s))\,z-i\,f\,(v-2s))^2}{4(-i\,b\,(m-2k)-i\,c\,(v-2s))}\right)+e^{-\frac{i\,f^2(v-2s)^2}{4(-2bk+bm+2cs-cv)}}$$

$$(i\,b\,(m-2k)-i\,c\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,f\,(v-2s))^{n-j}\,(2(i\,b\,(m-2k)-i\,c\,(v-2s))\,z-i\,f\,(v-2s))^{j+1}$$

$$\left(-\frac{(2(i\,b\,(m-2k)-i\,c\,(v-2s))\,z-i\,f\,(v-2s))^2}{i\,b\,(m-2k)-i\,c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\left.\Gamma\left(\frac{j+1}{2},-\frac{(2(i\,b\,(m-2k)-i\,c\,(v-2s))\,z-i\,f\,(v-2s))^2}{4(i\,b\,(m-2k)-i\,c\,(v-2s))}\right)\right)\right)/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\cos^m\left(b\sqrt{z}\right)\cos^v\left(\sqrt{z}\;c+f\,z\right)dz = -(-1)^{n+1}\,2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(m-2k)^{-2(n+1)}\binom{m}{k}\left(\Gamma\left(2(n+1),-i\,b\,(m-2k)\sqrt{z}\right)+\Gamma\left(2(n+1),i\,b\,(m-2k)\sqrt{z}\right)\right)\right)b^{-2(n+1)}+$$

$$\frac{2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}+2^{-m-2n-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(e^{\frac{i\,c^2(v-2k)}{4f}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2k))^{-h-j+2n}\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\;(v-2k)\right)^{h+j}\right.\right.$$

$$\left(-\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\;(v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,c\,(v-2k)\right.$$

$$\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\;(v-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\;(v-2k)\right)^2}{4\,f\,(v-2k)}\right)-2$$

$$i\,f\,(v-2k)\sqrt{-\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\;(v-2k)\right)^2}{f\,(v-2k)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\,(v-2k)\right)^2}{4\,f\,(v-2k)}\right)\Bigg)\Bigg)\Bigg)(-i\,f\,(v-2k))^{-2(n+1)}+$$

$$e^{-\frac{i\,c^2\,(v-2k)}{4f}}\,(i\,f\,(v-2k))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2k))^{-h-j+2n}\left(c\,i\,(v-2k)+2\,f\,i\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(\frac{i\left(c\,i\,(v-2k)+2\,f\,i\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,i\,(v-2k)\left(c\,i\,(v-2k)+2\,f\,i\sqrt{z}\,(v-2k)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), \frac{i\left(c\,i\,(v-2k)+2\,f\,i\sqrt{z}\,(v-2k)\right)^2}{4\,f\,(v-2k)}\Bigg)+2\,f\,i\,(v-2k)$$

$$\sqrt{\frac{i\left(c\,i\,(v-2k)+2\,f\,i\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(c\,i\,(v-2k)+2\,f\,i\sqrt{z}\,(v-2k)\right)^2}{4\,f\,(v-2k)}\right)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{-\frac{i(-i\,b\,(m-2k)-i\,c\,(v-2s))^2}{4\,f\,(v-2s)}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2k)-i\,c\,(v-2s))^{-h-j+2n}$$

$$\left(-i\,b\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b\,(m-2k)-i\,c\,(v-2s))\left(-i\,b\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\,b\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)-$$

$$2\,i\,f\,(v-2s)\sqrt{-\frac{i\left(-i\,b\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{i\left(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)\Bigg)(-i\,f\,(v-2\,s))^{-2\,(n+1)}+$$

$$e^{-\frac{i\,(i\,b\,(m-2\,k)-i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,k)-i\,c\,(v-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-\right.\right.$$

$$\left.2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\left(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{i\left(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-$$

$$2\,i\,f\,(v-2\,s)\sqrt{-\frac{i\left(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{i\left(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)\Bigg)(-i\,f\,(v-2\,s))^{-2\,(n+1)}+$$

$$e^{\frac{i\,(i\,c\,(v-2\,s)-i\,b\,(m-2\,k))^2}{4\,f\,(v-2\,s)}}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s)-i\,b\,(m-2\,k))^{-h-j+2\,n}$$

$$\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,c\,(v-2\,s)-i\,b\,(m-2\,k))\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{i\left(-i\,b\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)+$$

$$2\,f\,i\,(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{i\left(-i\,b\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)$$

$$\sqrt{\frac{i\left(-i\,b\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\Bigg)+e^{\frac{i\,(b\,i\,(m-2k)+c\,i\,(v-2s))^2}{4\,f\,(v-2s)}}\,(i\,f\,(v-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2k)+c\,i\,(v-2s))^{-h-j+2n}\left(b\,i\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2k)+c\,i\,(v-2s))\left(b\,i\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{i\left(b\,i\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)+$$

$$2\,f\,i\,(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{i\left(b\,i\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\Bigg)\Bigg)\Bigg)\,/;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(b\,z^r+e)\cos^v(c\,z^r+f\,z)$

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$$\int z^n\cos^m(b\,z^2+e)\cos^v(c\,z^2+f\,z)\,dz=$$

$$-2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{i\,e\,(m-2k)}\,\Gamma\left(\frac{n+1}{2},\,-i\,b\,(m-2k)\,z^2\right)\left(-i\,b\,(m-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.\right.$$

$$e^{-i e (m-2 k)} \left(i b (m-2 k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b (m-2 k) z^2\right)\Bigg)\Bigg) z^{n+1} +$$

$$\frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} - 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \Bigg(e^{\frac{i f^2 (v-2k)}{4c}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (i f (v-2k))^{n-j} (-i f (v-2k) - 2 i c z (v-2k))^{j+1}$$

$$\left(-\frac{i (-i f (v-2k) - 2 i c z (v-2k))^2}{c (v-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i f (v-2k) - 2 i c z (v-2k))^2}{4 c (v-2k)}\right)\Bigg)$$

$$(-i c (v-2k))^{-n-1} + e^{-\frac{i f^2 (v-2k)}{4c}} (i c (v-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i f (v-2k))^{n-j} (f i (v-2k) + 2 c i z (v-2k))^{j+1}$$

$$\left(\frac{i (f i (v-2k) + 2 c i z (v-2k))^2}{c (v-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f i (v-2k) + 2 c i z (v-2k))^2}{4 c (v-2k)}\right)\Bigg) -$$

$$2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \Bigg(e^{-\frac{1}{4} i \left(4 e (m-2k) - \frac{f^2 (v-2s)^2}{-2bk + bm + 2cs - cv}\right)} \Bigg(\sum_{j=0}^{n} 2^{j-n} (-i f (v-2s))^{n-j} (f i (v-2s) +$$

$$2 (i c (v-2s) - i b (m-2k)) z)^{j+1} \left(-\frac{(f i (v-2s) + 2 (i c (v-2s) - i b (m-2k)) z)^2}{i c (v-2s) - i b (m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f i (v-2s) + 2 (i c (v-2s) - i b (m-2k)) z)^2}{4 (i c (v-2s) - i b (m-2k))}\right)\Bigg) (i c (v-2s) - i b (m-2k))^{-n-1} +$$

$$e^{\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{2bk - bm + 2cs - cv} + 4 e (m-2k)\right)} (b i (m-2k) + c i (v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i f (v-2s))^{n-j} (f i (v-2s) +$$

$$2 (b i (m-2k) + c i (v-2s)) z)^{j+1} \left(-\frac{(f i (v-2s) + 2 (b i (m-2k) + c i (v-2s)) z)^2}{b i (m-2k) + c i (v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f i (v-2s) + 2 (b i (m-2k) + c i (v-2s)) z)^2}{4 (b i (m-2k) + c i (v-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{2bk - bm + 2cs - cv} + 4 e (m-2k)\right)}$$

$$(-i b (m-2k) - i c (v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i f (v-2s))^{n-j} (2 (-i b (m-2k) - i c (v-2s)) z - i f (v-2s))^{j+1}$$

$$\left(-\frac{(2 (-i b (m-2k) - i c (v-2s)) z - i f (v-2s))^2}{-i b (m-2k) - i c (v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(2(-i\,b(m-2k)-i\,c(v-2s))z-i\,f(v-2s))^2}{4(-i\,b(m-2k)-i\,c(v-2s))}\right)+e^{\frac{1}{4}i\left(4e(m-2k)-\frac{f^2(v-2s)^2}{-2bk+bm+2cs-cv}\right)}$$

$$(i\,b(m-2k)-i\,c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(i\,f(v-2s))^{n-j}(2(i\,b(m-2k)-i\,c(v-2s))z-i\,f(v-2s))^{j+1}$$

$$\left(-\frac{(2(i\,b(m-2k)-i\,c(v-2s))z-i\,f(v-2s))^2}{i\,b(m-2k)-i\,c(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\left.\Gamma\left(\frac{j+1}{2}, -\frac{(2(i\,b(m-2k)-i\,c(v-2s))z-i\,f(v-2s))^2}{4(i\,b(m-2k)-i\,c(v-2s))}\right)\right)\Bigg)\Bigg/;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\cos^m\left(\sqrt{z}\,b+e\right)\cos^v\left(\sqrt{z}\,c+f\,z\right)dz = (-1)^n\,2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(m-2k)^{-2(n+1)}\binom{m}{k}\left(e^{i\,e(m-2k)}\,\Gamma\left(2(n+1), -i\,b(m-2k)\sqrt{z}\right)+e^{-i\,e(m-2k)}\,\Gamma\left(2(n+1), i\,b(m-2k)\sqrt{z}\right)\right)\right)$$

$$b^{-2(n+1)}+\frac{2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{n+1}+2^{-m-2n-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(e^{\frac{i\,c^2(v-2k)}{4f}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c(v-2k))^{-h-j+2n}\left(-i\,c(v-2k)-2\,i\,f\sqrt{z}\,(v-2k)\right)^{h+j}\right.\right.$$

$$\left(-\frac{i\left(-i\,c(v-2k)-2\,i\,f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,c(v-2k)$$

$$\left(-i\,c(v-2k)-2\,i\,f\sqrt{z}\,(v-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\,c(v-2k)-2\,i\,f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right)-2$$

$$i\,f(v-2k)\sqrt{-\frac{i\left(-i\,c(v-2k)-2\,i\,f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-i\,c(v-2k)-2\,i\,f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right)\right)\right)\right)(-i\,f(v-2k))^{-2(n+1)}+$$

$$e^{-\frac{i c^2 (v-2k)}{4f}} (i f (v-2k))^{-2(n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i c (v-2k))^{-h-j+2n} \left(c i (v-2k) + 2 f i \sqrt{z} (v-2k)\right)^{h+j}$$

$$\left(\frac{i \left(c i (v-2k) + 2 f i \sqrt{z} (v-2k)\right)^2}{f (v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c i (v-2k) \left(c i (v-2k) + 2 f i \sqrt{z} (v-2k)\right) \Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1), \frac{i \left(c i (v-2k) + 2 f i \sqrt{z} (v-2k)\right)^2}{4 f (v-2k)}\right) + 2 f i (v-2k)$$

$$\left.\left.\sqrt{\frac{i \left(c i (v-2k) + 2 f i \sqrt{z} (v-2k)\right)^2}{f (v-2k)}} \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(c i (v-2k) + 2 f i \sqrt{z} (v-2k)\right)^2}{4 f (v-2k)}\right)\right)\right) +$$

$$2^{-m-2n-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{i (-i b (m-2k) - i c (v-2s))^2}{4 f (v-2s)} - i e (m-2k)} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2k) - i c (v-2s))^{-h-j+2n}\right.\right.$$

$$\left(-i b (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i \left(-i b (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right)^2}{f (v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((-i b (m-2k) - i c (v-2s)) \left(-i b (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(-i b (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right)^2}{4 f (v-2s)}\right) - 2 i f (v-2s)$$

$$\sqrt{\left(-\frac{1}{f (v-2s)} \left(i \left(-i b (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right)^2\right)\right)} \Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.\left.-\frac{i \left(-i b (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right)^2}{4 f (v-2s)}\right)\right)\right)\right) (-i f (v-2s))^{-2(n+1)} +$$

$$e^{i e (m-2k)-\frac{i (i b (m-2k)-i c (v-2s))^2}{4 f (v-2s)}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2k) - i c (v-2s))^{-h-j+2n} \left(b i (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right)^{h+j} \left(-\frac{i \left(b i (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right)^2}{f (v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i b (m-2k) - i c (v-2s)) \left(b i (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(b i (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right)^2}{4 f (v-2s)}\right) - 2 i f (v-2s) \sqrt{-\frac{i \left(b i (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right)^2}{f (v-2s)}} \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i \left(b i (m-2k) - i c (v-2s) - 2 i f (v-2s) \sqrt{z}\right)^2}{4 f (v-2s)}\right) \right) \right)$$

$$(-i f (v-2s))^{-2(n+1)} + e^{\frac{i (i c (v-2s) - i b (m-2k))^2}{4 f (v-2s)} - i e (m-2k)} (i f (v-2s))^{-2(n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i c (v-2s) - i b (m-2k))^{-h-j+2n} \left(-i b (m-2k) + c i (v-2s) + 2 f i (v-2s) \sqrt{z}\right)^{h+j} \left(\frac{i \left(-i b (m-2k) + c i (v-2s) + 2 f i (v-2s) \sqrt{z}\right)^2}{f (v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i c (v-2s) - i b (m-2k)) \left(-i b (m-2k) + c i (v-2s) + 2 f i (v-2s) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(-i b (m-2k) + c i (v-2s) + 2 f i (v-2s) \sqrt{z}\right)^2}{4 f (v-2s)}\right) + 2 f i (v-2s) \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(-i b (m-2k) + c i (v-2s) + 2 f i (v-2s) \sqrt{z}\right)^2}{4 f (v-2s)}\right) \right.$$

$$\left.\sqrt{\frac{i\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\right)+$$

$$e^{\frac{i\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+e\,i\,(m-2\,k)}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))^{-h-j+2\,n}$$
$$\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$
$$\left(\frac{i\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\left((b\,i\,(m-2\,k)+c\,i\,(v-2\,s))\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)\right.$$
$$\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$
$$2\,f\,i\,(v-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$
$$\left.\left.\sqrt{\frac{i\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\right)\right)\text{/; } n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos^m\left(b\,z^r+d\,z\right)\cos^v\left(c\,z^r+f\,z\right)$

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$$\int z^n\cos^m\left(b\,z^2+d\,z\right)\cos^v\left(c\,z^2+f\,z\right)dz=$$
$$\frac{(-1)^m\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}-2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{\frac{i\,d^2\,(2\,k-m)}{4\,b}}\right.$$
$$\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(2\,k-m))^{n-j}\,(-i\,d\,(2\,k-m)-2\,i\,b\,z\,(2\,k-m))^{j+1}\left(-\frac{i\,(-i\,d\,(2\,k-m)-2\,i\,b\,z\,(2\,k-m))^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{i(-i d(2k-m)-2 i b z(2k-m))^2}{4b(2k-m)}\right)\Bigg)(-i b(2k-m))^{-n-1} +$$

$$e^{\frac{i d^2(m-2k)}{4b}}(-i b(m-2k))^{-n-1}\sum_{j=0}^{n} 2^{j-n}(i d(m-2k))^{n-j}(-i d(m-2k)-2 i b z(m-2k))^{j+1}$$

$$\left(-\frac{i(-i d(m-2k)-2 i b z(m-2k))^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{i(-i d(m-2k)-2 i b z(m-2k))^2}{4b(m-2k)}\right)\Bigg) -$$

$$(-1)^m 2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\Bigg(e^{-\frac{i f^2(2k-v)}{4c}}\Bigg(\sum_{j=0}^{n} 2^{j-n}(-i f(2k-v))^{n-j}(f i(2k-v)+2 c i z(2k-v))^{j+1}$$

$$\left(\frac{i(f i(2k-v)+2 c i z(2k-v))^2}{c(2k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i(f i(2k-v)+2 c i z(2k-v))^2}{4c(2k-v)}\right)\Bigg)$$

$$(i c(2k-v))^{-n-1} + e^{-\frac{i f^2(v-2k)}{4c}}(i c(v-2k))^{-n-1}\sum_{j=0}^{n} 2^{j-n}(-i f(v-2k))^{n-j}(f i(v-2k)+2 c i z(v-2k))^{j+1}$$

$$\left(\frac{i(f i(v-2k)+2 c i z(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i(f i(v-2k)+2 c i z(v-2k))^2}{4c(v-2k)}\right)\Bigg) -$$

$$2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{-\frac{(i f(2s-v)-i d(2k-m))^2}{4(i c(2s-v)-i b(2k-m))}}\Bigg(\sum_{j=0}^{n} 2^{j-n}(i d(2k-m)-i f(2s-v))^{n-j}$$

$$(-i d(2k-m)+f i(2s-v)+2(i c(2s-v)-i b(2k-m))z)^{j+1}\big(-(-i d(2k-m)+f i(2s-v)+$$

$$2(i c(2s-v)-i b(2k-m))z)^2\big/(i c(2s-v)-i b(2k-m))\big)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\Bigg(\frac{j+1}{2},$$

$$-(-i d(2k-m)+f i(2s-v)+2(i c(2s-v)-i b(2k-m))z)^2\big/(4(i c(2s-v)-i b(2k-m)))\Bigg)\Bigg)$$

$$(i c(2s-v)-i b(2k-m))^{-n-1} + e^{-\frac{(i f(2s-v)-i d(m-2k))^2}{4(i c(2s-v)-i b(m-2k))}}(i c(2s-v)-i b(m-2k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}(i d(m-2k)-i f(2s-v))^{n-j}(-i d(m-2k)+f i(2s-v)+2(i c(2s-v)-i b(m-2k))z)^{j+1}$$

$$\big(-(-i d(m-2k)+f i(2s-v)+2(i c(2s-v)-i b(m-2k))z)^2\big/(i c(2s-v)-i b(m-2k))\big)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\Bigg(\frac{j+1}{2}, -(-i d(m-2k)+f i(2s-v)+2(i c(2s-v)-i b(m-2k))z)^2\big/$$

$$(4(i c(2s-v)-i b(m-2k)))\Bigg) + e^{-\frac{(i f(v-2s)-i d(2k-m))^2}{4(i c(v-2s)-i b(2k-m))}}(i c(v-2s)-i b(2k-m))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}(i d(2k-m)-i f(v-2s))^{n-j}(-i d(2k-m)+f i(v-2s)+2(i c(v-2s)-i b(2k-m))z)^{j+1}$$

$$\left(-(-i\, d\,(2k-m)+f\, i\,(v-2s)+2\,(i\, c\,(v-2s)-i\, b\,(2k-m))\, z)^2 \big/ (i\, c\,(v-2s)-i\, b\,(2k-m))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -(-i\, d\,(2k-m)+f\, i\,(v-2s)+2\,(i\, c\,(v-2s)-i\, b\,(2k-m))\, z)^2 \big/\right.$$

$$\left.(4\,(i\, c\,(v-2s)-i\, b\,(2k-m)))\right)\bigg) + e^{-\frac{(i\, f\,(v-2s)-i\, d\,(m-2k))^2}{4\,(i\, c\,(v-2s)-i\, b\,(m-2k))}}\,(i\, c\,(v-2s)-i\, b\,(m-2k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\,(i\, d\,(m-2k)-i\, f\,(v-2s))^{n-j}\,(-i\, d\,(m-2k)+f\, i\,(v-2s)+2\,(i\, c\,(v-2s)-i\, b\,(m-2k))\, z)^{j+1}$$

$$\left(-(-i\, d\,(m-2k)+f\, i\,(v-2s)+2\,(i\, c\,(v-2s)-i\, b\,(m-2k))\, z)^2 \big/ (i\, c\,(v-2s)-i\, b\,(m-2k))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -(-i\, d\,(m-2k)+f\, i\,(v-2s)+2\,(i\, c\,(v-2s)-i\, b\,(m-2k))\, z)^2 \big/\right.$$

$$\left.(4\,(i\, c\,(v-2s)-i\, b\,(m-2k)))\right)\Bigg) /;\; n\in\mathbb{N} \land m\in\mathbb{N}^+ \land v\in\mathbb{N}^+$$

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$$\int z^n \cos^m\left(\sqrt{z}\; b+d\, z\right)\cos^v\left(\sqrt{z}\; c+f\, z\right) dz =$$

$$\frac{(-1)^m\, 2^{-m-v}\, z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)}{n+1} + 2^{-m-2n-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{\frac{i\, b^2\,(2k-m)}{4d}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(-i\, b\,(2k-m))^{-h-j+2n}\left(-i\, b\,(2k-m)-2\, i\, d\sqrt{z}\;(2k-m)\right)^{h+j}\right.\right.$$

$$\left(-\frac{i\left(-i\, b\,(2k-m)-2\, i\, d\sqrt{z}\;(2k-m)\right)^2}{d\,(2k-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\, b\,(2k-m)$$

$$\left(-i\, b\,(2k-m)-2\, i\, d\sqrt{z}\;(2k-m)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b\,(2k-m)-2\, i\, d\sqrt{z}\;(2k-m)\right)^2}{4\, d\,(2k-m)}\right)-$$

$$2\, i\, d\,(2k-m)\sqrt{-\frac{i\left(-i\, b\,(2k-m)-2\, i\, d\sqrt{z}\;(2k-m)\right)^2}{d\,(2k-m)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-i\, b\,(2k-m)-2\, i\, d\sqrt{z}\;(2k-m)\right)^2}{4\, d\,(2k-m)}\right)\Bigg)\right)(-i\, d\,(2k-m))^{-2n-2}+\right.$$

$$e^{\frac{i\, b^2\,(m-2k)}{4d}}\,(-i\, d\,(m-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(-i\, b\,(m-2k))^{-h-j+2n}\left(-i\, b\,(m-2k)-2\, i\, d\sqrt{z}\;(m-2k)\right)^{h+j}$$

$$\left(-\frac{i \left(-i\, b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-i\, b\,(m-2\,k)\right.$$

$$\left(-i\, b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{i\left(-i\, b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-i\, b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(-i\, b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)+(-1)^m\, 2^{-m-2\,n-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{-\frac{i\,c^2\,(2\,k-\nu)}{4\,f}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(2\,k-\nu))^{-h-j+2\,n}\left(c\,i\,(2\,k-\nu)+2\,f\,i\,\sqrt{z}\,(2\,k-\nu)\right)^{h+j}\right.\right.$$

$$\left(\frac{i\left(c\,i\,(2\,k-\nu)+2\,f\,i\,\sqrt{z}\,(2\,k-\nu)\right)^2}{f\,(2\,k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,i\,(2\,k-\nu)\left(c\,i\,(2\,k-\nu)+2\,f\,i\,\sqrt{z}\,(2\,k-\nu)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c\,i\,(2\,k-\nu)+2\,f\,i\,\sqrt{z}\,(2\,k-\nu)\right)^2}{4\,f\,(2\,k-\nu)}\right)+2\,f\,i\,(2\,k-\nu)$$

$$\left.\left.\sqrt{\frac{i\left(c\,i\,(2\,k-\nu)+2\,f\,i\,\sqrt{z}\,(2\,k-\nu)\right)^2}{f\,(2\,k-\nu)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c\,i\,(2\,k-\nu)+2\,f\,i\,\sqrt{z}\,(2\,k-\nu)\right)^2}{4\,f\,(2\,k-\nu)}\right)\right)\right)$$

$$(i\,f\,(2\,k-\nu))^{-2\,n-2}+e^{-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}}\,(i\,f\,(\nu-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(\nu-2\,k))^{-h-j+2\,n}$$

$$\left(c\,i\,(\nu-2\,k)+2\,f\,i\,\sqrt{z}\,(\nu-2\,k)\right)^{h+j}\left(\frac{i\left(c\,i\,(\nu-2\,k)+2\,f\,i\,\sqrt{z}\,(\nu-2\,k)\right)^2}{f\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,i\,(\nu-2\,k)\left(c\,i\,(\nu-2\,k)+2\,f\,i\,\sqrt{z}\,(\nu-2\,k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c\,i\,(\nu-2\,k)+2\,f\,i\,\sqrt{z}\,(\nu-2\,k)\right)^2}{4\,f\,(\nu-2\,k)}\right)+\right.$$

$$2 f i (v - 2k) \sqrt{\frac{i \left(c i (v - 2k) + 2 f i \sqrt{z} (v - 2k)\right)^2}{f (v - 2k)}} \, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{i \left(c i (v - 2k) + 2 f i \sqrt{z} (v - 2k)\right)^2}{4 f (v - 2k)}\right)\Bigg)\Bigg)\Bigg) +$$

$$2^{-m-2n-v-1} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(e^{-\frac{(i c (2k-v) - i b (2s-m))^2}{4 (i f (2k-v) - i d (2s-m))}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i c (2k - v) - i b (2s - m))^{-h-j+2n}$$

$$\left(-i b (2s - m) + c i (2k - v) + 2 (i f (2k - v) - i d (2s - m)) \sqrt{z}\right)^{h+j}$$

$$\left(-\left(-i b (2s - m) + c i (2k - v) + 2 (i f (2k - v) - i d (2s - m)) \sqrt{z}\right)^2 \Big/ (i f (2k - v) - i d (2s - m))\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i c (2k - v) - i b (2s - m)) \left(-i b (2s - m) + c i (2k - v) + 2 (i f (2k - v) - i d (2s - m)) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h + j + 1), -\left(-i b (2s - m) + c i (2k - v) + 2 (i f (2k - v) - i d (2s - m)) \sqrt{z}\right)^2 \Big/ (4 (i f (2k - v) - i d (2s - m)))\right) + 2 (i f (2k - v) - i d (2s - m))$$

$$\Gamma\left(\frac{1}{2}(h + j + 2), -\left(-i b (2s - m) + c i (2k - v) + 2 (i f (2k - v) - i d (2s - m)) \sqrt{z}\right)^2 \Big/ (4 (i f (2k - v) - i d (2s - m)))\right) \sqrt{\left(-\left(-i b (2s - m) + c i (2k - v) + 2 (i f (2k - v) - i d (2s - m)) \sqrt{z}\right)^2 \Big/ (i f (2k - v) - i d (2s - m))\right)}\Bigg)\Bigg)$$

$$(i f (2k - v) - i d (2s - m))^{-2n-2} + e^{-\frac{(i c (2k-v) - i b (m-2s))^2}{4 (i f (2k-v) - i d (m-2s))}} (i f (2k - v) - i d (m - 2s))^{-2n-2}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i c (2k - v) - i b (m - 2s))^{-h-j+2n}$$

$$\left(-i b (m - 2s) + c i (2k - v) + 2 (i f (2k - v) - i d (m - 2s)) \sqrt{z}\right)^{h+j} \left(-\left(-i b (m - 2s) + c i (2k - v) + 2 (i f (2k - v) - i d (m - 2s)) \sqrt{z}\right)^2 \Big/ (i f (2k - v) - i d (m - 2s))\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \Bigg((i c (2k - v) - i b (m - 2s)) \left(-i b (m - 2s) + c i (2k - v) + 2 (i f (2k - v) - i d (m - 2s)) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h + j + 1), -\left(-i b (m - 2s) + c i (2k - v) + 2 (i f (2k - v) - i d (m - 2s)) \sqrt{z}\right)^2 \Big/ (4 (i f (2k - v) - i d (m - 2s)))\right) + 2 (i f (2k - v) - i d (m - 2s))$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\left(-i\,b\,(m-2s)+c\,i\,(2k-v)+2\,(i\,f\,(2k-v)-i\,d\,(m-2s))\sqrt{z}\right)^2 \Big/ (4\,(i\,f\,(2k-v)-i\,d\,(m-2s)))\right)\sqrt{\left(-\left(-i\,b\,(m-2s)+c\,i\,(2k-v)+2\,(i\,f\,(2k-v)-i\,d\,(m-2s))\sqrt{z}\right)^2 \Big/ (i\,f\,(2k-v)-i\,d\,(m-2s))\right)}\Bigg)+$$

$$e^{-\frac{(i\,c\,(v-2k)-i\,b\,(2s-m))^2}{4\,(i\,f\,(v-2k)-i\,d\,(2s-m))}}\,(i\,f\,(v-2k)-i\,d\,(2s-m))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2k)-i\,b\,(2s-m))^{-h-j+2n}$$

$$\left(-i\,b\,(2s-m)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(2s-m))\sqrt{z}\right)^{h+j}$$

$$\left(-\left(-i\,b\,(2s-m)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(2s-m))\sqrt{z}\right)^2 \Big/ (i\,f\,(v-2k)-i\,d\,(2s-m))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,c\,(v-2k)-i\,b\,(2s-m))\left(-i\,b\,(2s-m)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(2s-m))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\left(-i\,b\,(2s-m)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(2s-m))\sqrt{z}\right)^2 \Big/ (4\,(i\,f\,(v-2k)-i\,d\,(2s-m)))\right)+2\,(i\,f\,(v-2k)-i\,d\,(2s-m))$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\left(-i\,b\,(2s-m)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(2s-m))\sqrt{z}\right)^2 \Big/ (4\,(i\,f\,(v-2k)-i\,d\,(2s-m)))\right)\sqrt{\left(-\left(-i\,b\,(2s-m)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(2s-m))\sqrt{z}\right)^2 \Big/ (i\,f\,(v-2k)-i\,d\,(2s-m))\right)}\Bigg)+$$

$$e^{-\frac{(i\,c\,(v-2k)-i\,b\,(m-2s))^2}{4\,(i\,f\,(v-2k)-i\,d\,(m-2s))}}\,(i\,f\,(v-2k)-i\,d\,(m-2s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2k)-i\,b\,(m-2s))^{-h-j+2n}$$

$$\left(-i\,b\,(m-2s)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(m-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\left(-i\,b\,(m-2s)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(m-2s))\sqrt{z}\right)^2 \Big/ (i\,f\,(v-2k)-i\,d\,(m-2s))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,c\,(v-2k)-i\,b\,(m-2s))\left(-i\,b\,(m-2s)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(m-2s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\left(-i\,b\,(m-2s)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(m-2s))\sqrt{z}\right)^2 \Big/ (4\,(i\,f\,(v-2k)-i\,d\,(m-2s)))\right)+2\,(i\,f\,(v-2k)-i\,d\,(m-2s))\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.-\left(-i\,b\,(m-2s)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(m-2s))\sqrt{z}\right)^2 \Big/ (4\,(i\,f\,(v-2k)-i\,d\,(m-2s)))\right)\sqrt{\left(-\left(-i\,b\,(m-2s)+c\,i\,(v-2k)+2\,(i\,f\,(v-2k)-i\,d\,(m-2s))\sqrt{z}\right)^2 \Big/ (i\,f\,(v-2k)-i\,d\,(m-2s))\right)}\Bigg)\Bigg) /;\; n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(d\,z)\cos^v\left(c\,z^r + f\,z + g\right)$

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$$\int z^n \cos^m(d\,z)\cos^v\left(c\,z^2 + f\,z + g\right)dz = \frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} + (-1)^n 2^{-m-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \Big(\Gamma(n+1,\, i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1} + (i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\, -i\,d\,(m-2k)\,z)\Big) -$$
$$2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{k} \Bigg(e^{\frac{i f^2 (v-2k)}{4c} - i\,g\,(v-2k)}$$
$$\left(\sum_{j=0}^{n} 2^{j-n} (i\,f\,(v-2k))^{n-j} (-i\,f\,(v-2k) - 2\,i\,c\,z\,(v-2k))^{j+1} \left(-\frac{i\,(-i\,f\,(v-2k) - 2\,i\,c\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\right.$$
$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\, -\frac{i\,(-i\,f\,(v-2k) - 2\,i\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\right)(-i\,c\,(v-2k))^{-n-1} +$$
$$e^{i\,g\,(v-2k) - \frac{i f^2 (v-2k)}{4c}} (i\,c\,(v-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\,f\,(v-2k))^{n-j} (f\,i\,(v-2k) + 2\,c\,i\,z\,(v-2k))^{j+1}$$
$$\left(\frac{i\,(f\,i\,(v-2k) + 2\,c\,i\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\Gamma\left(\frac{j+1}{2},\, \frac{i\,(f\,i\,(v-2k) + 2\,c\,i\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\Bigg) -$$
$$2^{-m-v-1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} \Bigg(e^{-\frac{i\,(-i\,d\,(m-2k) - i\,f\,(v-2s))^2}{4\,c\,(v-2s)} - i\,g\,(v-2s)} \left(\sum_{j=0}^{n} 2^{j-n} (d\,i\,(m-2k) + f\,i\,(v-2s))^{n-j} (-i\,d\,(m-2k) - \right.$$
$$i\,f\,(v-2s) - 2\,i\,c\,(v-2s)\,z)^{j+1} \left(-\frac{i\,(-i\,d\,(m-2k) - i\,f\,(v-2s) - 2\,i\,c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\, -\frac{i\,(-i\,d\,(m-2k) - i\,f\,(v-2s) - 2\,i\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)}\right)\right)(-i\,c\,(v-2s))^{-n-1} +$$
$$e^{-\frac{i\,(i\,d\,(m-2k) - i\,f\,(v-2s))^2}{4\,c\,(v-2s)} - i\,g\,(v-2s)} \left(\sum_{j=0}^{n} 2^{j-n} (i\,f\,(v-2s) - i\,d\,(m-2k))^{n-j} (d\,i\,(m-2k) - i\,f\,(v-2s) - \right.$$
$$2\,i\,c\,(v-2s)\,z)^{j+1} \left(-\frac{i\,(d\,i\,(m-2k) - i\,f\,(v-2s) - 2\,i\,c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{i\,(d\,i\,(m-2\,k)-i\,f\,(v-2\,s)-2\,i\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)(-i\,c\,(v-2\,s))^{-n-1}+$$

$$e^{\frac{i\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))^2}{4\,c\,(v-2\,s)}+g\,i\,(v-2\,s)}\,(i\,c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n} 2^{j-n}\,(i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^{n-j}\,(-i\,d\,(m-2\,k)+$$

$$f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^{j+1}\left(\frac{i\,(-i\,d\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(-i\,d\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)+$$

$$e^{\frac{i\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))^2}{4\,c\,(v-2\,s)}+g\,i\,(v-2\,s)}\,(i\,c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n} 2^{j-n}\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^{n-j}$$

$$(d\,i\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^{j+1}\left(\frac{i\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\,/;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n \cos^m(d\,z)\cos^v\left(\sqrt{z}\;c+f\,z+g\right)dz = \frac{2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(n+1, i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1}+(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1, -i\,d\,(m-2\,k)\,z)\right)-$$

$$2^{-m-2\,n-v-1}\,(-1)^n\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(f\,(v-2\,k))^{-2\,(n+1)}\binom{v}{k}\Bigg(e^{i\,g\,(v-2\,k)-\frac{i\,c^2\,(v-2\,k)}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,k))^{-h-j+2\,n}\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\;(v-2\,k)\right)^{h+j}$$

$$\left(\frac{i\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\;(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,i\,(v-2\,k)\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\;(v-2\,k)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), \frac{i\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\;(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)+2\,f\,i\,(v-2\,k)$$

$$\sqrt{\frac{i\left(c\,i\,(v-2k)+2\,f\,i\,\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c\,i\,(v-2k)+2\,f\,i\,\sqrt{z}\,(v-2k)\right)^2}{4\,f\,(v-2k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,c^2\,(v-2k)}{4f}-i\,g\,(v-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2k))^{-h-j+2n}\left(-i\,c\,(v-2k)-2\,i\,f\,\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\,\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,c\,(v-2k)$$

$$\left(-i\,c\,(v-2k)-2\,i\,f\,\sqrt{z}\,(v-2k)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\,\sqrt{z}\,(v-2k)\right)^2}{4\,f\,(v-2k)}\right)-$$

$$2\,i\,f\,(v-2k)\sqrt{-\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\,\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\,\sqrt{z}\,(v-2k)\right)^2}{4\,f\,(v-2k)}\Bigg)\Bigg)\Bigg)\Bigg)+2^{-m-2n-v-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{\frac{c^2\,(v-2s)^2}{4\,(i\,f\,(v-2s)-i\,d\,(m-2k))}+g\,i\,(v-2s)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2s))^{-h-j+2n}\Big(c\,i\,(v-2s)+2\,(i\,f\,(v-2s)-$$

$$i\,d\,(m-2k))\,\sqrt{z}\Big)^{h+j}\left(-\frac{\left(c\,i\,(v-2s)+2\,(i\,f\,(v-2s)-i\,d\,(m-2k))\,\sqrt{z}\right)^2}{i\,f\,(v-2s)-i\,d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,i\,(v-2s)\left(c\,i\,(v-2s)+2\,(i\,f\,(v-2s)-i\,d\,(m-2k))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(c\,i\,(v-2s)+2\,(i\,f\,(v-2s)-i\,d\,(m-2k))\,\sqrt{z}\right)^2}{4\,(i\,f\,(v-2s)-i\,d\,(m-2k))}\Bigg)+2\,(i\,f\,(v-2s)-i\,d\,(m-2k))$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c\,i\,(v-2s)+2\,(i\,f\,(v-2s)-i\,d\,(m-2k))\,\sqrt{z}\right)^2}{4\,(i\,f\,(v-2s)-i\,d\,(m-2k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(c\,i\,(v-2\,s)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{i\,f\,(v-2\,s)-i\,d\,(m-2\,k)}}\right)\right)$$

$$(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))^{-2\,(n+1)}+e^{\frac{c^2\,(v-2\,s)^2}{4\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))}+g\,i\,(v-2\,s)}\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,i\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,i\,(v-2\,s)\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))}\right)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,i\,(v-2\,s)}}\right)+$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}-i\,g\,(v-2\,s)}\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(-i\,c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{-\frac{\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\left(-i\,d\,(m-2k)-i\,f\,(v-2s)\right)\sqrt{z}-i\,c\,(v-2s)\right)^2}{4\left(-i\,d\,(m-2k)-i\,f\,(v-2s)\right)}\right)-$$

$$i\,c\,(v-2s)\left(2\left(-i\,d\,(m-2k)-i\,f\,(v-2s)\right)\sqrt{z}-i\,c\,(v-2s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\left(-i\,d\,(m-2k)-i\,f\,(v-2s)\right)\sqrt{z}-i\,c\,(v-2s)\right)^2}{4\left(-i\,d\,(m-2k)-i\,f\,(v-2s)\right)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{c^2(v-2s)^2}{4(i\,d\,(m-2k)-i\,f\,(v-2s))}-i\,g\,(v-2s)}\left(i\,d\,(m-2k)-i\,f\,(v-2s)\right)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\left(-i\,c\,(v-2s)\right)^{-h-j+2n}$$

$$\left(2\left(i\,d\,(m-2k)-i\,f\,(v-2s)\right)\sqrt{z}-i\,c\,(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2\left(i\,d\,(m-2k)-i\,f\,(v-2s)\right)\sqrt{z}-i\,c\,(v-2s)\right)^2}{i\,d\,(m-2k)-i\,f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\left(i\,d\,(m-2k)-i\,f\,(v-2s)\right)\sqrt{-\frac{\left(2\left(i\,d\,(m-2k)-i\,f\,(v-2s)\right)\sqrt{z}-i\,c\,(v-2s)\right)^2}{i\,d\,(m-2k)-i\,f\,(v-2s)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\left(i\,d\,(m-2k)-i\,f\,(v-2s)\right)\sqrt{z}-i\,c\,(v-2s)\right)^2}{4\left(i\,d\,(m-2k)-i\,f\,(v-2s)\right)}\right)-$$

$$i\,c\,(v-2s)\left(2\left(i\,d\,(m-2k)-i\,f\,(v-2s)\right)\sqrt{z}-i\,c\,(v-2s)\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(2\left(i\,d\,(m-2k)-i\,f\,(v-2s)\right)\sqrt{z}-i\,c\,(v-2s)\right)^2}{4\left(i\,d\,(m-2k)-i\,f\,(v-2s)\right)}\Bigg)\Bigg)\Bigg)\Bigg)\;/;\; n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(d\,z+e)\cos^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n\cos^m(d\,z+e)\cos^v\left(c\,z^2+f\,z+g\right)dz = $$

$$\frac{2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$

$$\left(e^{-i\,e\,(m-2k)}\,\Gamma(n+1, i\,d\,(m-2k)\,z)\left(-i\,d\,(m-2k)\right)^{-n-1}+e^{i\,e\,(m-2k)}\left(i\,d\,(m-2k)\right)^{-n-1}\Gamma(n+1, -i\,d\,(m-2k)\,z)\right)-$$

$$2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\Bigg(e^{\frac{i f^2 (v-2k)}{4c}-i g (v-2k)}$$

$$\left(\sum_{j=0}^{n}2^{j-n}(i f (v-2k))^{n-j}(-i f (v-2k)-2 i c z (v-2k))^{j+1}\left(-\frac{i(-i f (v-2k)-2 i c z (v-2k))^2}{c (v-2k)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{i(-i f (v-2k)-2 i c z (v-2k))^2}{4 c (v-2k)}\right)\right)(-i c (v-2k))^{-n-1}+$$

$$e^{i g (v-2k)-\frac{i f^2 (v-2k)}{4c}}(i c (v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-i f (v-2k))^{n-j}(f i (v-2k)+2 c i z (v-2k))^{j+1}$$

$$\left(\frac{i(f i (v-2k)+2 c i z (v-2k))^2}{c (v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{i(f i (v-2k)+2 c i z (v-2k))^2}{4 c (v-2k)}\right)\Bigg)-$$

$$2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{-\frac{i(-i d (m-2k)-i f (v-2s))^2}{4 c (v-2s)}-i e (m-2k)-i g (v-2s)}\left(\sum_{j=0}^{n}2^{j-n}(d i (m-2k)+f i (v-2s))^{n-j}(-i d (m-2k)-\right.$$

$$i f (v-2s)-2 i c (v-2s) z)^{j+1}\left(-\frac{i(-i d (m-2k)-i f (v-2s)-2 i c (v-2s) z)^2}{c (v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{i(-i d (m-2k)-i f (v-2s)-2 i c (v-2s) z)^2}{4 c (v-2s)}\right)\right)(-i c (v-2s))^{-n-1}+$$

$$e^{-\frac{i(i d (m-2k)-i f (v-2s))^2}{4 c (v-2s)}+e i (m-2k)-i g (v-2s)}\left(\sum_{j=0}^{n}2^{j-n}(i f (v-2s)-i d (m-2k))^{n-j}(d i (m-2k)-\right.$$

$$i f (v-2s)-2 i c (v-2s) z)^{j+1}\left(-\frac{i(d i (m-2k)-i f (v-2s)-2 i c (v-2s) z)^2}{c (v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{i(d i (m-2k)-i f (v-2s)-2 i c (v-2s) z)^2}{4 c (v-2s)}\right)\right)(-i c (v-2s))^{-n-1}+$$

$$e^{\frac{i(i f (v-2s)-i d (m-2k))^2}{4 c (v-2s)}-i e (m-2k)+g i (v-2s)}(i c (v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(i d (m-2k)-i f (v-2s))^{n-j}(-i d (m-2k)+$$

$$f i (v-2s)+2 c i (v-2s) z)^{j+1}\left(\frac{i(-i d (m-2k)+f i (v-2s)+2 c i (v-2s) z)^2}{c (v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(-i\,d\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)+$$

$$e^{\frac{i\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))^2}{4\,c\,(v-2\,s)}+e\,i\,(m-2\,k)+g\,i\,(v-2\,s)}\,(i\,c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^{n-j}$$

$$(d\,i\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^{j+1}\left(\frac{i\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s)+2\,c\,i\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\cos^m(d\,z+e)\cos^v\left(\sqrt{z}\,c+f\,z+g\right)dz = $$

$$\frac{2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$

$$\left(e^{-i\,e\,(m-2\,k)}\,\Gamma(n+1,\,i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1}+e^{i\,e\,(m-2\,k)}\,(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2\,k)\,z)\right)-$$

$$2^{-m-2\,n-v-1}\,(-1)^n\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}(f\,(v-2\,k))^{-2\,(n+1)}$$

$$\left(e^{i\,g\,(v-2\,k)-\frac{i\,c^2\,(v-2\,k)}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,k))^{-h-j+2\,n}\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\,(v-2\,k)\right)^{h+j}\right.$$

$$\left(\frac{i\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,i\,(v-2\,k)\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\,(v-2\,k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),\,\frac{i\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)+2\,f\,i\,(v-2\,k)$$

$$\left.\left.\sqrt{\frac{i\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\right)\right)+$$

$$e^{\frac{i\,c^2\,(v-2\,k)}{4\,f}-i\,g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,c\,(v-2\,k)-2\,i\,f\,\sqrt{z}\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,c\,(v-2\,k)-2\,i\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,c\,(v-2\,k)$$

$$\left(-i\,c\,(v-2\,k)-2\,i\,f\,\sqrt{z}\,(v-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,c\,(v-2\,k)-2\,i\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)-$$

$$2\,i\,f\,(v-2\,k)\sqrt{-\frac{i\left(-i\,c\,(v-2\,k)-2\,i\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{i\left(-i\,c\,(v-2\,k)-2\,i\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{\frac{c^2\,(v-2\,s)^2}{4\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))}+g\,i\,(v-2\,s)-i\,e\,(m-2\,k)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(c\,i\,(v-2\,s)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,i\,(v-2\,s)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{i\,f\,(v-2\,s)-i\,d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,i\,(v-2\,s)\left(c\,i\,(v-2\,s)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)\Gamma\!\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(c\,i\,(v-2\,s)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))}\Bigg)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,i\,(v-2\,s)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)$$

$$\sqrt{-\frac{\left(c\,i\,(v-2\,s)+2\,(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{i\,f\,(v-2\,s)-i\,d\,(m-2\,k)}}\Bigg)\Bigg)$$

$$(i\,f\,(v-2\,s)-i\,d\,(m-2\,k))^{-2\,(n+1)}+e^{\frac{c^2\,(v-2\,s)^2}{4\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))}+g\,i\,(v-2\,s)+e\,i\,(m-2\,k)}\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s))^{-h-j+2\,n}\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,i\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,i\,(v-2\,s)\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))}\Bigg)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))$$

$$\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))}\right)$$

$$\sqrt{-\frac{\left(c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,i\,(v-2\,s)}}\Bigg)+$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}-i\,g\,(v-2\,s)-i\,e\,(m-2\,k)}\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{z}-i\,c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{-\frac{\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-i\,f\,(v-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}\right)-$$

$$i\,c\,(v-2\,s)\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{z}-i\,c\,(v-2\,s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,k)-i\,f\,(v-2\,s))}\right)\Bigg)+$$

$$e^{\frac{c^2 (v-2s)^2}{4 (i d (m-2k)-i f (v-2s))}-i g (v-2s)+e i (m-2k)} (i d (m-2k) - i f (v-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i c (v-2s))^{-h-j+2n} \left(2 (i d (m-2k) - i f (v-2s)) \sqrt{z} - i c (v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2 (i d (m-2k) - i f (v-2s)) \sqrt{z} - i c (v-2s)\right)^2}{i d (m-2k) - i f (v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(2 (i d (m-2k) - i f (v-2s)) \sqrt{-\frac{\left(2 (i d (m-2k) - i f (v-2s)) \sqrt{z} - i c (v-2s)\right)^2}{i d (m-2k) - i f (v-2s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2 (i d (m-2k) - i f (v-2s)) \sqrt{z} - i c (v-2s)\right)^2}{4 (i d (m-2k) - i f (v-2s))}\right) -$$

$$i c (v-2s) \left(2 (i d (m-2k) - i f (v-2s)) \sqrt{z} - i c (v-2s)\right) \Gamma\left(\frac{1}{2}(h+j+1),\right.$$

$$\left.\left.\left. -\frac{\left(2 (i d (m-2k) - i f (v-2s)) \sqrt{z} - i c (v-2s)\right)^2}{4 (i d (m-2k) - i f (v-2s))}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^n \cos^m(b z^r) \cos^v(c z^r + f z + g)$

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$$\int z^n \cos^m(b z^2) \cos^v(c z^2 + f z + g) \, dz = -2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma\left(\frac{n+1}{2}, -i b (m-2k) z^2\right) \left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + \left(i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b (m-2k) z^2\right)\right)\right)$$

$$z^{n+1} + \frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} - 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(e^{\frac{i f^2 (v-2k)}{4c} - i g (v-2k)}\right.$$

$$\left(\sum_{j=0}^{n} 2^{j-n} (i f (v-2k))^{n-j} (-i f (v-2k) - 2 i c z (v-2k))^{j+1} \left(-\frac{i (-i f (v-2k) - 2 i c z (v-2k))^2}{c (v-2k)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i f (v-2k) - 2 i c z (v-2k))^2}{4 c (v-2k)}\right)\right) (-i c (v-2k))^{-n-1} +$$

$$e^{i g (v-2k) - \frac{i f^2 (v-2k)}{4c}} (i c (v-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i f (v-2k))^{n-j} (f i (v-2k) + 2 c i z (v-2k))^{j+1}$$

$$\left(\frac{i (f i (v-2k) + 2 c i z (v-2k))^2}{c (v-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f i (v-2k) + 2 c i z (v-2k))^2}{4 c (v-2k)}\right)\Bigg) -$$

$$2^{-m-v-1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} \left(e^{\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{-2bk+bm+2cs-cv} + 4 g (v-2s)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-i f (v-2s))^{n-j} (f i (v-2s) + \right.\right.$$

$$2 (i c (v-2s) - i b (m-2k)) z)^{j+1} \left(-\frac{(f i (v-2s) + 2 (i c (v-2s) - i b (m-2k)) z)^2}{i c (v-2s) - i b (m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f i (v-2s) + 2 (i c (v-2s) - i b (m-2k)) z)^2}{4 (i c (v-2s) - i b (m-2k))}\right)\Bigg) (i c (v-2s) - i b (m-2k))^{-n-1} +$$

$$e^{\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{2bk-bm+2cs-cv} + 4 g (v-2s)\right)} (b i (m-2k) + c i (v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i f (v-2s))^{n-j} (f i (v-2s) +$$

$$2 (b i (m-2k) + c i (v-2s)) z)^{j+1} \left(-\frac{(f i (v-2s) + 2 (b i (m-2k) + c i (v-2s)) z)^2}{b i (m-2k) + c i (v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f i (v-2s) + 2 (b i (m-2k) + c i (v-2s)) z)^2}{4 (b i (m-2k) + c i (v-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{2bk-bm+2cs-cv} + 4 g (v-2s)\right)}$$

$$(-i b (m-2k) - i c (v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i f (v-2s))^{n-j} (2 (-i b (m-2k) - i c (v-2s)) z - i f (v-2s))^{j+1}$$

$$\left(-\frac{(2 (-i b (m-2k) - i c (v-2s)) z - i f (v-2s))^2}{-i b (m-2k) - i c (v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(2 (-i b (m-2k) - i c (v-2s)) z - i f (v-2s))^2}{4 (-i b (m-2k) - i c (v-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{-2bk+bm+2cs-cv} + 4 g (v-2s)\right)}$$

$$(i b (m-2k) - i c (v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i f (v-2s))^{n-j} (2 (i b (m-2k) - i c (v-2s)) z - i f (v-2s))^{j+1}$$

$$\left(-\frac{(2 (i b (m-2k) - i c (v-2s)) z - i f (v-2s))^2}{i b (m-2k) - i c (v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(2 (i b (m-2k) - i c (v-2s)) z - i f (v-2s))^2}{4 (i b (m-2k) - i c (v-2s))}\right)\Bigg)\Bigg) /; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

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$$\int z^n \cos^m\left(b\sqrt{z}\right)\cos^v\left(\sqrt{z}\; c+g+f\,z\right)dz = (-1)^n\, 2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(m-2k)^{-2(n+1)}\binom{m}{k}\left(\Gamma\left(2(n+1),\,-i\,b\,(m-2k)\sqrt{z}\right)+\Gamma\left(2(n+1),\,i\,b\,(m-2k)\sqrt{z}\right)\right)\right)b^{-2(n+1)}+$$

$$\frac{2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)}{n+1}+2^{-m-2n-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(e^{\frac{i\,c^2(v-2k)}{4f}-i\,g\,(v-2k)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,c\,(v-2k))^{-h-j+2n}\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\;(v-2k)\right)^{h+j}\right.\right.$$

$$\left(-\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\;(v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,c\,(v-2k)\right.$$

$$\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\;(v-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\;(v-2k)\right)^2}{4\,f\,(v-2k)}\right)-2$$

$$i\,f\,(v-2k)\sqrt{-\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\;(v-2k)\right)^2}{f\,(v-2k)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,c\,(v-2k)-2\,i\,f\sqrt{z}\;(v-2k)\right)^2}{4\,f\,(v-2k)}\right)\right)\right)(-i\,f\,(v-2k))^{-2(n+1)}+$$

$$e^{i\,g\,(v-2k)-\frac{i\,c^2(v-2k)}{4f}}\,(i\,f\,(v-2k))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2k))^{-h-j+2n}\left(c\,i\,(v-2k)+2\,f\,i\sqrt{z}\;(v-2k)\right)^{h+j}$$

$$\left(\frac{i\left(c\,i\,(v-2k)+2\,f\,i\sqrt{z}\;(v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,i\,(v-2k)\left(c\,i\,(v-2k)+2\,f\,i\sqrt{z}\;(v-2k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),\,\frac{i\left(c\,i\,(v-2k)+2\,f\,i\sqrt{z}\;(v-2k)\right)^2}{4\,f\,(v-2k)}\right)+2\,f\,i\,(v-2k)$$

$$\sqrt{\frac{i\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(c\,i\,(v-2\,k)+2\,f\,i\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{-\frac{i\,(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}-i\,g\,(v-2\,s)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\left(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,i\,f\,(v-2\,s)$$

$$\sqrt{\left(-\frac{1}{f\,(v-2\,s)}\left(i\left(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2\right)\right)}\;\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{i\left(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)\Bigg)\Bigg)(-i\,f\,(v-2\,s))^{-2\,(n+1)}+$$

$$e^{-\frac{i\,(i\,b\,(m-2\,k)-i\,c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}-i\,g\,(v-2\,s)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,k)-i\,c\,(v-2\,s))^{-h-j+2\,n}\,\Big(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-$$

$$2\,i\,f\,(v-2\,s)\,\sqrt{z}\Big)^{h+j}\left(-\frac{i\left(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\left(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(b\,i\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)-$$

$$2\,i\,f\,(v-2s)\sqrt{-\frac{i\left(b\,i\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(b\,i\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)\right)\right)\right)$$

$$(-i\,f\,(v-2s))^{-2(n+1)}+e^{\frac{i\,(i\,c\,(v-2s)-i\,b\,(m-2k))^2}{4\,f\,(v-2s)}+g\,i\,(v-2s)}\,(i\,f\,(v-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2s)-i\,b\,(m-2k))^{-h-j+2n}\left(-i\,b\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(-i\,b\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,c\,(v-2s)-i\,b\,(m-2k))\left(-i\,b\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(-i\,b\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)+$$

$$2\,f\,i\,(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(-i\,b\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)$$

$$\left.\sqrt{\frac{i\left(-i\,b\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\right)+$$

$$e^{\frac{i\,(b\,i\,(m-2k)+c\,i\,(v-2s))^2}{4\,f\,(v-2s)}+g\,i\,(v-2s)}\,(i\,f\,(v-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2k)+c\,i\,(v-2s))^{-h-j+2n}$$

$$\left(b\,i\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2k)+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b\,i\,(m-2\,k)+c\,i\,(v-2\,s))\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{i\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,i\,(v-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{i\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\right)\right)\,/;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\cos^m(b\,z^r+e)\cos^v(c\,z^r+f\,z+g)$

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$$\int z^n\cos^m(b\,z^2+e)\cos^v(c\,z^2+f\,z+g)\,dz ==$$

$$-2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{i\,e\,(m-2\,k)}\,\Gamma\left(\frac{n+1}{2},\,-i\,b\,(m-2\,k)\,z^2\right)\left(-i\,b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.\right.$$

$$\left.\left.e^{-i\,e\,(m-2\,k)}\left(i\,b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,i\,b\,(m-2\,k)\,z^2\right)\right)\right)z^{n+1}+$$

$$\frac{2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}-2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(e^{\frac{i\,f^2\,(v-2\,k)}{4\,c}-i\,g\,(v-2\,k)}\right.$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(i\,f\,(v-2\,k))^{n-j}\,(-i\,f\,(v-2\,k)-2\,i\,c\,z\,(v-2\,k))^{j+1}\left(-\frac{i\,(-i\,f\,(v-2\,k)-2\,i\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(-i\,f\,(v-2\,k)-2\,i\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\right)(-i\,c\,(v-2\,k))^{-n-1}+$$

$$e^{i\,g\,(v-2\,k)-\frac{i\,f^2\,(v-2\,k)}{4\,c}}\,(i\,c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,f\,(v-2\,k))^{n-j}\,(f\,i\,(v-2\,k)+2\,c\,i\,z\,(v-2\,k))^{j+1}$$

$$\left(\frac{i\,(f\,i\,(v-2\,k)+2\,c\,i\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(f\,i\,(v-2\,k)+2\,c\,i\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\Bigg)-$$

$$2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{-\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{-2bk+bm+2cs-cv}-4g(v-2s)+4e(m-2k)\right)}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,f\,(v-2\,s))^{n-j}\,(f\,i\,(v-2\,s)+\right.\right.$$

$$2\,(i\,c\,(v-2\,s)-i\,b\,(m-2\,k))\,z)^{j+1}\left(-\frac{(f\,i\,(v-2\,s)+2\,(i\,c\,(v-2\,s)-i\,b\,(m-2\,k))\,z)^2}{i\,c\,(v-2\,s)-i\,b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(f\,i\,(v-2\,s)+2\,(i\,c\,(v-2\,s)-i\,b\,(m-2\,k))\,z)^2}{4\,(i\,c\,(v-2\,s)-i\,b\,(m-2\,k))}\right)\right)(i\,c\,(v-2\,s)-i\,b\,(m-2\,k))^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{2bk-bm+2cs-cv}+4g(v-2s)+4e(m-2k)\right)}\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,f\,(v-2\,s))^{n-j}\,(f\,i\,(v-2\,s)+$$

$$2\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))\,z)^{j+1}\left(-\frac{(f\,i\,(v-2\,s)+2\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))\,z)^2}{b\,i\,(m-2\,k)+c\,i\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(f\,i\,(v-2\,s)+2\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))\,z)^2}{4\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))}\right)+e^{-\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{2bk-bm+2cs-cv}+4g(v-2s)+4e(m-2k)\right)}$$

$$(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,f\,(v-2\,s))^{n-j}\,(2\,(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\,z-i\,f\,(v-2\,s))^{j+1}$$

$$\left(-\frac{(2\,(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\,z-i\,f\,(v-2\,s))^2}{-i\,b\,(m-2\,k)-i\,c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},\,-\frac{(2\,(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\,z-i\,f\,(v-2\,s))^2}{4\,(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))}\right)+e^{\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{-2bk+bm+2cs-cv}-4g(v-2s)+4e(m-2k)\right)}$$

$$(i\,b\,(m-2\,k)-i\,c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,f\,(v-2\,s))^{n-j}\,(2\,(i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\,z-i\,f\,(v-2\,s))^{j+1}$$

$$\left(-\frac{(2\,(i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\,z-i\,f\,(v-2\,s))^2}{i\,b\,(m-2\,k)-i\,c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\left.\Gamma\left(\frac{j+1}{2},\,-\frac{(2\,(i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\,z-i\,f\,(v-2\,s))^2}{4\,(i\,b\,(m-2\,k)-i\,c\,(v-2\,s))}\right)\right)/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n \cos^m\left(\sqrt{z}\, b + e\right) \cos^v\left(\sqrt{z}\, c + g + f\, z\right) dz = -2^{-m-v+1} (-1)^{n+1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (m-2k)^{-2(n+1)} \left(e^{i\,e\,(m-2k)}\, \Gamma\left(2(n+1), -i\, b\, (m-2k) \sqrt{z}\right) + e^{-i\,e\,(m-2k)}\, \Gamma\left(2(n+1), i\, b\, (m-2k) \sqrt{z}\right)\right)\right)$$

$$b^{-2(n+1)} + \frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} + 2^{-m-2n-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(e^{\frac{i c^2 (v-2k)}{4f} - i\, g\,(v-2k)} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j \left(-i\, c\,(v-2k)\right)^{-h-j+2n} \left(-i\, c\,(v-2k) - 2\, i\, f \sqrt{z}\, (v-2k)\right)^{h+j} \right.\right.$$

$$\left(-\frac{i\left(-i\, c\,(v-2k) - 2\, i\, f \sqrt{z}\, (v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, c\,(v-2k)\right.$$

$$\left(-i\, c\,(v-2k) - 2\, i\, f \sqrt{z}\, (v-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, c\,(v-2k) - 2\, i\, f \sqrt{z}\, (v-2k)\right)^2}{4\, f\,(v-2k)}\right) - 2$$

$$i\, f\,(v-2k) \sqrt{-\frac{i\left(-i\, c\,(v-2k) - 2\, i\, f \sqrt{z}\, (v-2k)\right)^2}{f\,(v-2k)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-i\, c\,(v-2k) - 2\, i\, f \sqrt{z}\, (v-2k)\right)^2}{4\, f\,(v-2k)}\right)\right)\right)\right) \left(-i\, f\,(v-2k)\right)^{-2(n+1)} +$$

$$e^{i\, g\,(v-2k) - \frac{i c^2 (v-2k)}{4f}} \left(i\, f\,(v-2k)\right)^{-2(n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j \left(i\, c\,(v-2k)\right)^{-h-j+2n} \left(c\, i\,(v-2k) + 2\, f\, i \sqrt{z}\, (v-2k)\right)^{h+j}$$

$$\left(\frac{i\left(c\, i\,(v-2k) + 2\, f\, i \sqrt{z}\, (v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c\, i\,(v-2k) \left(c\, i\,(v-2k) + 2\, f\, i \sqrt{z}\, (v-2k)\right) \Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1), \frac{i\left(c\, i\,(v-2k) + 2\, f\, i \sqrt{z}\, (v-2k)\right)^2}{4\, f\,(v-2k)}\right) + 2\, f\, i\,(v-2k)$$

$$\sqrt{\frac{i\left(c\,i\,(v-2k)+2f\,i\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c\,i\,(v-2k)+2f\,i\sqrt{z}\,(v-2k)\right)^2}{4f\,(v-2k)}\right)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{-\frac{i(-i\,b\,(m-2k)-i\,c\,(v-2s))^2}{4f\,(v-2s)}-i\,e\,(m-2k)-i\,g\,(v-2s)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(-i\,b\,(m-2k)-i\,c\,(v-2s))^{-h-j+2n}\left(-i\,b\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b\,(m-2k)-i\,c\,(v-2s))\left(-i\,b\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^2}{4f\,(v-2s)}\right)-$$

$$2\,i\,f\,(v-2s)\sqrt{\left(-\frac{1}{f\,(v-2s)}\left(i\left(-i\,b\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^2\right)\right)}$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^2}{4f\,(v-2s)}\right)\Bigg)\Bigg)$$

$$(-i\,f\,(v-2s))^{-2(n+1)}+e^{-\frac{i(i\,b\,(m-2k)-i\,c\,(v-2s))^2}{4f\,(v-2s)}+e\,i\,(m-2k)-i\,g\,(v-2s)}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2k)-i\,c\,(v-2s))^{-h-j+2n}\left(b\,i\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(b\,i\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2k)-i\,c\,(v-2s))\left(b\,i\,(m-2k)-i\,c\,(v-2s)-2\,i\,f\,(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{i\left(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-$$

$$2\,i\,f\,(v-2\,s)\sqrt{-\frac{i\left(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\, -\frac{i\left(b\,i\,(m-2\,k)-i\,c\,(v-2\,s)-2\,i\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)\right)$$

$$(-i\,f\,(v-2\,s))^{-2\,(n+1)}+e^{\frac{i\,(i\,c\,(v-2\,s)-i\,b\,(m-2\,k))^2}{4\,f\,(v-2\,s)}-i\,e\,(m-2\,k)+g\,i\,(v-2\,s)}\,(i\,f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,c\,(v-2\,s)-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,c\,(v-2\,s)-i\,b\,(m-2\,k))\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{i\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,i\,(v-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\, \frac{i\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\left.\sqrt{\frac{i\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\right)+e^{\frac{i\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+e\,i\,(m-2\,k)+g\,i\,(v-2\,s)}$$

$$(i\,f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+\right.$$

$$\left.2\,f\,i\,(v-2\,s)\sqrt{z}\right)^{h+j}\left(\frac{i\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b\,i\,(m-2\,k)+c\,i\,(v-2\,s))\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{i\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,i\,(v-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{i\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\cos^m(b\,z^r+d\,z)\cos^v(c\,z^r+f\,z+g)$

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$$\int z^n\cos^m(b\,z^2+d\,z)\cos^v(c\,z^2+f\,z+g)\,dz=$$

$$2^{-m-v-1}\left(\frac{2\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)(v\bmod 2-1)\,z^{n+1}}{n+1}-\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i(2\,g\,s-g\,v)}\binom{v}{s}\left(e^{i\left(\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}+g\,(4\,s-2\,v)\right)}\right.\right.$$

$$\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\,(-i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z))^{q+1}\right.$$

$$\left(\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\Bigg($$

$$\left.\frac{q+1}{2},\ \frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)\Bigg)$$

$$(-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}+e^{-\frac{i\,(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}}\,(i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\,(i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2}, -\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)+\frac{1}{2\,b\,k-b\,m+2\,c\,s-c\,v}$$

$$\Bigg(i\,e^{\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}}\,(i\,(b\,(m-2\,k)+c\,(v-2\,s)))^{-n}\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}$$

$$(-i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2}, \frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)\Bigg)+$$

$$e^{i\left(g\,(4\,s-2\,v)-\frac{(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)}\,(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}$$

$$(i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2}, -\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)\Bigg)\Bigg)+$$

$$\frac{1}{b}\Bigg(((1-v \bmod 2)\,i)\binom{v}{\frac{v}{2}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{2\,k-m}\Bigg(e^{-\frac{i\,d^2\,(2\,k-m)}{4\,b}}\left(b^2\,(m-2\,k)^2\right)^{-n}\binom{m}{k}\Bigg(e^{\frac{i\,d^2\,(2\,k-m)}{2\,b}}\,(i\,b\,(2\,k-m))^n$$

$$\sum_{q=0}^{n}\frac{1}{d+2\,b\,z}\Bigg(2^{q-n}\,b\,(-i\,d\,(m-2\,k))^{n-q}\,(i\,(m-2\,k)\,(d+2\,b\,z))^q$$

$$\left(\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1-q}{2}}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)\Bigg)-$$

$$\frac{1}{d}\Bigg((i\,b\,(m-2\,k))^n\sum_{q=0}^{n}2^{q-n}\,(-i\,d\,(2\,k-m))^{n-q+1}\,(d+2\,b\,z)\,(i\,(2\,k-m)\,(d+2\,b\,z))^q$$

$$\left(-\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{c}\Bigg(((1-m \bmod 2)\, i)\binom{m}{\frac{m}{2}}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{2s-v}\Bigg(e^{-\frac{i(f^2+4cg)(2s-v)}{4c}}\left(c^2 (v-2s)^2\right)^{-n}\binom{v}{s}\Bigg(e^{\frac{i f^2 (2s-v)}{2c}}(i\, c\,(2s-v))^n$$

$$\sum_{q=0}^{n}\frac{1}{f+2cz}\Bigg(2^{q-n} c\,(-i\, f\,(v-2s))^{n-q}(i\,(v-2s)\,(f+2cz))^q\left(\frac{i\,(2s-v)\,(f+2cz)^2}{c}\right)^{\frac{1-q}{2}}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i\,(2s-v)\,(f+2cz)^2}{4c}\right)\Bigg)-\frac{1}{f}\Bigg(\left(e^{2 i g (2s-v)}(i\, c\,(v-2s))^n\right)$$

$$\sum_{q=0}^{n}2^{q-n}(-i\, f\,(2s-v))^{n-q+1}(f+2cz)\,(i\,(2s-v)\,(f+2cz))^q\left(-\frac{i\,(2s-v)\,(f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i\,(2s-v)\,(f+2cz)^2}{4c}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg) /;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n \cos^m\left(\sqrt{z}\, b+d\, z\right)\cos^v\left(\sqrt{z}\, c+g+f\, z\right)dz =$$

$$\frac{2^{-m-v} z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)}{n+1}+2^{-m-2n-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{j=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{j}\Bigg(e^{-\frac{i b^2 (2j-m)}{4d}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k (i\, b\,(2j-m))^{-h-k+2n}\left(b\, i\,(2j-m)+2\, d\, i\sqrt{z}\,(2j-m)\right)^{h+k}$$

$$\left(\frac{i\left(b\, i\,(2j-m)+2\, d\, i\sqrt{z}\,(2j-m)\right)^2}{d\,(2j-m)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(b\, i\,(2j-m)\left(b\, i\,(2j-m)+2\, d\, i\sqrt{z}\,(2j-m)\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),$$

$$\frac{i\left(b\, i\,(2j-m)+2\, d\, i\sqrt{z}\,(2j-m)\right)^2}{4\, d\,(2j-m)}\Bigg)+2\, d\, i\,(2j-m)\sqrt{\frac{i\left(b\, i\,(2j-m)+2\, d\, i\sqrt{z}\,(2j-m)\right)^2}{d\,(2j-m)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b\,i\,(2j-m)+2\,d\,i\sqrt{z}\,(2j-m)\right)^2}{4\,d\,(2j-m)}\right)\Bigg)\Bigg)\Bigg)(i\,d\,(2j-m))^{-2n-2}+$$

$$e^{-\frac{i\,b^2\,(m-2j)}{4d}}\,(i\,d\,(m-2j))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b\,(m-2j))^{-h-k+2n}\left(b\,i\,(m-2j)+2\,d\,i\sqrt{z}\,(m-2j)\right)^{h+k}$$

$$\left(\frac{i\left(b\,i\,(m-2j)+2\,d\,i\sqrt{z}\,(m-2j)\right)^2}{d\,(m-2j)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(b\,i\,(m-2j)\left(b\,i\,(m-2j)+2\,d\,i\sqrt{z}\,(m-2j)\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b\,i\,(m-2j)+2\,d\,i\sqrt{z}\,(m-2j)\right)^2}{4\,d\,(m-2j)}\right)+$$

$$2\,d\,i\,(m-2j)\sqrt{\frac{i\left(b\,i\,(m-2j)+2\,d\,i\sqrt{z}\,(m-2j)\right)^2}{d\,(m-2j)}}\;\Gamma\Bigg(\frac{1}{2}(h+k+2),$$

$$\frac{i\left(b\,i\,(m-2j)+2\,d\,i\sqrt{z}\,(m-2j)\right)^2}{4\,d\,(m-2j)}\Bigg)\Bigg)\Bigg)\Bigg)+2^{-m-2n-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{i\,g\,(2s-v)-\frac{i\,c^2\,(2s-v)}{4f}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(2s-v))^{-h-k+2n}\left(c\,i\,(2s-v)+2\,f\,i\sqrt{z}\,(2s-v)\right)^{h+k}$$

$$\left(\frac{i\left(c\,i\,(2s-v)+2\,f\,i\sqrt{z}\,(2s-v)\right)^2}{f\,(2s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(c\,i\,(2s-v)\left(c\,i\,(2s-v)+2\,f\,i\sqrt{z}\,(2s-v)\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(c\,i\,(2s-v)+2\,f\,i\sqrt{z}\,(2s-v)\right)^2}{4\,f\,(2s-v)}\right)+2\,f\,i\,(2s-v)$$

$$\sqrt{\frac{i\left(c\,i\,(2s-v)+2\,f\,i\sqrt{z}\,(2s-v)\right)^2}{f\,(2s-v)}}\;\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(c\,i\,(2s-v)+2\,f\,i\sqrt{z}\,(2s-v)\right)^2}{4\,f\,(2s-v)}\right)\Bigg)\Bigg)\Bigg)$$

$$(i\,f\,(2s-v))^{-2n-2}+e^{i\,g\,(v-2s)-\frac{i\,c^2\,(v-2s)}{4f}}\,(i\,f\,(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2s))^{-h-k+2n}$$

$$\left(c\,i\,(v-2s)+2\,f\,i\sqrt{z}\,(v-2s)\right)^{h+k}\left(\frac{i\left(c\,i\,(v-2s)+2\,f\,i\sqrt{z}\,(v-2s)\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(c\,i\,(v-2s)\left(c\,i\,(v-2s)+2\,f\,i\sqrt{z}\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(c\,i\,(v-2s)+2\,f\,i\sqrt{z}\,(v-2s)\right)^2}{4\,f\,(v-2s)}\right)+$$

$$2\,f\,i\,(v-2s)\sqrt{\frac{i\left(c\,i\,(v-2s)+2\,f\,i\sqrt{z}\,(v-2s)\right)^2}{f\,(v-2s)}}\;\Gamma\Bigg($$

$$\frac{1}{2}(h+k+2),\,\frac{i\left(c\,i\,(v-2s)+2\,f\,i\sqrt{z}\,(v-2s)\right)^2}{4\,f\,(v-2s)}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\sum_{j=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{j}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{i\,g\,(2s-v)-\frac{(b\,i\,(2j-m)+c\,i\,(2s-v))^2}{4\,(d\,i\,(2j-m)+f\,i\,(2s-v))}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b\,i\,(2j-m)+c\,i\,(2s-v))^{-h-k+2n}$$

$$\left(b\,i\,(2j-m)+c\,i\,(2s-v)+2\,(d\,i\,(2j-m)+f\,i\,(2s-v))\sqrt{z}\right)^{h+k}\Big(-\big(b\,i\,(2j-m)+c\,i\,(2s-v)+$$

$$2\,(d\,i\,(2j-m)+f\,i\,(2s-v))\sqrt{z}\big)^2\Big/(d\,i\,(2j-m)+f\,i\,(2s-v))\Big)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Big((b\,i\,(2j-m)+c\,i\,(2s-v))\left(b\,i\,(2j-m)+c\,i\,(2s-v)+2\,(d\,i\,(2j-m)+f\,i\,(2s-v))\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}(h+k+1),\,-\big(b\,i\,(2j-m)+c\,i\,(2s-v)+2\,(d\,i\,(2j-m)+f\,i\,(2s-v))\sqrt{z}\big)^2\Big/$$

$$(4\,(d\,i\,(2j-m)+f\,i\,(2s-v)))\Big)+2\,(d\,i\,(2j-m)+f\,i\,(2s-v))$$

$$\Gamma\Big(\frac{1}{2}(h+k+2),\,-\big(b\,i\,(2j-m)+c\,i\,(2s-v)+2\,(d\,i\,(2j-m)+f\,i\,(2s-v))\sqrt{z}\big)^2\Big/$$

$$(4\,(d\,i\,(2j-m)+f\,i\,(2s-v)))\Big)\sqrt{\Big(-\big(b\,i\,(2j-m)+c\,i\,(2s-v)+}$$

$$\overline{2\,(d\,i\,(2j-m)+f\,i\,(2s-v))\sqrt{z}\big)^2\Big/(d\,i\,(2j-m)+f\,i\,(2s-v))\Big)}\Big)\Bigg)$$

$$(d\,i\,(2j-m)+f\,i\,(2s-v))^{-2n-2}+e^{i\,g\,(2s-v)-\frac{(b\,i\,(m-2j)+c\,i\,(2s-v))^2}{4\,(d\,i\,(m-2j)+f\,i\,(2s-v))}}\,(d\,i\,(m-2j)+f\,i\,(2s-v))^{-2n-2}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b\,i\,(m-2j)+c\,i\,(2s-v))^{-h-k+2n}$$

$$\left(b\,i\,(m-2j)+c\,i\,(2s-v)+2\,(d\,i\,(m-2j)+f\,i\,(2s-v))\sqrt{z}\right)^{h+k}\Big(-\big(b\,i\,(m-2j)+c\,i\,(2s-v)+$$

$$2\,(d\,i\,(m-2j)+f\,i\,(2s-v))\sqrt{z}\big)^2\Big/(d\,i\,(m-2j)+f\,i\,(2s-v))\Big)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Big((b\,i\,(m-2\,j)+c\,i\,(2\,s-v))\left(b\,i\,(m-2\,j)+c\,i\,(2\,s-v)+2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\,\sqrt{z}\right)$$
$$\Gamma\Big(\frac{1}{2}\,(h+k+1),\,-\left(b\,i\,(m-2\,j)+c\,i\,(2\,s-v)+2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2\Big/$$
$$(4\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v)))\Big)+2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))$$
$$\Gamma\Big(\frac{1}{2}\,(h+k+2),\,-\left(b\,i\,(m-2\,j)+c\,i\,(2\,s-v)+2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2\Big/$$
$$(4\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v)))\Big)\sqrt{\Big(-\Big(b\,i\,(m-2\,j)+c\,i\,(2\,s-v)+}$$
$$\overline{2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\,\sqrt{z}\Big)^2\Big/(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\Big)}\Big)+$$

$$e^{i\,g\,(v-2\,s)-\frac{(b\,i\,(2\,j-m)+c\,i\,(v-2\,s))^2}{4\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))}}\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))^{-2\,n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b\,i\,(2\,j-m)+$$
$$c\,i\,(v-2\,s))^{-h-k+2\,n}\left(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^{h+k}$$
$$\Big(-\left(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2\Big/$$
$$(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\Big)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$
$$\Big((b\,i\,(2\,j-m)+c\,i\,(v-2\,s))\left(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\right)$$
$$\Gamma\Big(\frac{1}{2}\,(h+k+1),\,-\left(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2\Big/$$
$$(4\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s)))\Big)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))$$
$$\Gamma\Big(\frac{1}{2}\,(h+k+2),\,-\left(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2\Big/$$
$$(4\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s)))\Big)\sqrt{\Big(-\Big(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+}$$
$$\overline{2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\Big)^2\Big/(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\Big)}\Big)+$$

$$e^{i\,g\,(v-2\,s)-\frac{(b\,i\,(m-2\,j)+c\,i\,(v-2\,s))^2}{4\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))}}\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))^{-2\,n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b\,i\,(m-2\,j)+$$
$$c\,i\,(v-2\,s))^{-h-k+2\,n}\left(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^{h+k}$$
$$\Big(-\left(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2\Big/$$
$$(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\Big)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$
$$\Big((b\,i\,(m-2\,j)+c\,i\,(v-2\,s))\left(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\sqrt{z}\right)$$
$$\Gamma\Big(\frac{1}{2}\,(h+k+1),\,-\left(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2\Big/$$
$$(4\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s)))\Big)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\Gamma\Big(\frac{1}{2}\,(h+k+2),$$

$$-\left(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2\Big/(4\,(d\,i\,(m-2\,j)+$$

$$f\,i\,(v-2\,s)))\Bigg)\sqrt{\left(-\left(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\right.\right.}$$

$$\left.\left.\sqrt{z}\right)^2\Big/(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos^m\left(b\,z^r+d\,z+e\right)\cos^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n\cos^m\left(b\,z^2+d\,z+e\right)\cos^v\left(c\,z^2+f\,z+g\right)dz==$$

$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\;(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}-\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(2\,e\,k-e\,m+2\,g\,s-g\,v)}\binom{v}{s}\left(e^{i\left(\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}+g\,(4\,s-2\,v)\right)}\right.\right.$$

$$\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\,(-i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z))^{q+1}\right.$$

$$\left(\left(i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2\right)\Big/(2\,b\,k-b\,m-2\,c\,s+c\,v)\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)\right)\right)$$

$$(-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}+e^{2\,i\,e\,(2\,k-m)-\frac{i\,(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}}\,(i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\,(i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z))^{q+1}$$

$$\left(-\left(i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2\right)\Big/(2\,b\,k-b\,m-2\,c\,s+c\,v)\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)+$$

$$\left(i\,e^{\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}}\,(i\,(b\,(m-2\,k)+c\,(v-2\,s)))^{-n}\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}\right.$$

$$(-i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(\left(i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2\right)\Big/(2\,b\,k-b\,m+2\,c\,s-c\,v)\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\left(i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2\right)\Big/\right.$$

$$\left.\left.(8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v)\right)\right)\Big/(2\,b\,k-b\,m+2\,c\,s-c\,v)+$$

$$e^{i\left(-\frac{(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}+e\,(4\,k-2\,m)+g\,(4\,s-2\,v)\right)}\,(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}$$

$$(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}\,(i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(-\left(i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2\right)\Big/(2\,b\,k-b\,m+2\,c\,s-c\,v)\right)^{\frac{1}{2}(-q-1)}$$
$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\left(i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2\right)\Big/\right.$$
$$\left.(8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v)\right)\Bigg)+$$

$$\frac{1}{b}\left(((1-v \bmod 2)\,i)\binom{v}{\frac{v}{2}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{2\,k-m}\left(e^{-\frac{i\left(d^2+4\,b\,e\right)(2\,k-m)}{4\,b}}\left(b^2\,(m-2\,k)^2\right)^{-n}\binom{m}{k}\right.\right.$$
$$\left(e^{\frac{i\,d^2\,(2\,k-m)}{2\,b}}\,(i\,b\,(2\,k-m))^n\sum_{q=0}^{n}\frac{1}{d+2\,b\,z}\left(2^{q-n}\,b\,(-i\,d\,(m-2\,k))^{n-q}\,(i\,(m-2\,k)\,(d+2\,b\,z))^q\right.\right.$$
$$\left.\left(\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1-q}{2}}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)\right)-$$
$$\frac{1}{d}\left(e^{2\,i\,e\,(2\,k-m)}\,(i\,b\,(m-2\,k))^n\sum_{q=0}^{n}2^{q-n}\,(-i\,d\,(2\,k-m))^{n-q+1}\,(d+2\,b\,z)\,(i\,(2\,k-m)\,(d+2\,b\,z))^q\right.$$
$$\left.\left.\left.\left.\left(-\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)\right)\right)\right)\right)+$$

$$\frac{1}{c}\left(((1-m \bmod 2)\,i)\binom{m}{\frac{m}{2}}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{2\,s-v}\left(e^{-\frac{i\left(f^2+4\,c\,g\right)(2\,s-v)}{4\,c}}\left(c^2\,(v-2\,s)^2\right)^{-n}\binom{v}{s}\left(e^{\frac{i\,f^2\,(2\,s-v)}{2\,c}}\,(i\,c\,(2\,s-v))^n\right.\right.\right.$$
$$\sum_{q=0}^{n}\frac{1}{f+2\,c\,z}\left(2^{q-n}\,c\,(-i\,f\,(v-2\,s))^{n-q}\,(i\,(v-2\,s)\,(f+2\,c\,z))^q\left(\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1-q}{2}}\right.$$
$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)\right)-\frac{1}{f}\left(\left(e^{2\,i\,g\,(2\,s-v)}\,(i\,c\,(v-2\,s))^n\right)\right.$$
$$\sum_{q=0}^{n}2^{q-n}\,(-i\,f\,(2\,s-v))^{n-q+1}\,(f+2\,c\,z)\,(i\,(2\,s-v)\,(f+2\,c\,z))^q\left(-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}$$
$$\left.\left.\left.\left.\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)\right)\right)\right)\right)\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n \cos^m\left(\sqrt{z}\, b + d\, z + e\right) \cos^\nu\left(\sqrt{z}\, c + f\, z + g\right) dz = \frac{2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + 2^{-m-2n-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{j=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{j} \left(e^{i e (2j-m) - \frac{i b^2 (2j-m)}{4d}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i\, b\, (2j-m))^{-h-k+2n} \left(b\, i\, (2j-m) + 2\, d\, i \sqrt{z}\, (2j-m)\right)^{h+k} \right.\right.$$

$$\left(\frac{i \left(b\, i\, (2j-m) + 2\, d\, i \sqrt{z}\, (2j-m)\right)^2}{d\, (2j-m)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left(b\, i\, (2j-m) \left(b\, i\, (2j-m) + 2\, d\, i \sqrt{z}\, (2j-m)\right) \Gamma\left(\frac{1}{2}(h+k+1), \right.\right.$$

$$\left.\frac{i \left(b\, i\, (2j-m) + 2\, d\, i \sqrt{z}\, (2j-m)\right)^2}{4\, d\, (2j-m)} \right) + 2\, d\, i\, (2j-m) \sqrt{\frac{i \left(b\, i\, (2j-m) + 2\, d\, i \sqrt{z}\, (2j-m)\right)^2}{d\, (2j-m)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b\, i\, (2j-m) + 2\, d\, i \sqrt{z}\, (2j-m)\right)^2}{4\, d\, (2j-m)} \right)\right)\right) (i\, d\, (2j-m))^{-2n-2} +$$

$$e^{i e (m-2j) - \frac{i b^2 (m-2j)}{4d}} (i\, d\, (m-2j))^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i\, b\, (m-2j))^{-h-k+2n}$$

$$\left(b\, i\, (m-2j) + 2\, d\, i \sqrt{z}\, (m-2j)\right)^{h+k} \left(\frac{i \left(b\, i\, (m-2j) + 2\, d\, i \sqrt{z}\, (m-2j)\right)^2}{d\, (m-2j)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left(b\, i\, (m-2j) \left(b\, i\, (m-2j) + 2\, d\, i \sqrt{z}\, (m-2j)\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b\, i\, (m-2j) + 2\, d\, i \sqrt{z}\, (m-2j)\right)^2}{4\, d\, (m-2j)} \right) + \right.$$

$$2\, d\, i\, (m-2j) \sqrt{\frac{i \left(b\, i\, (m-2j) + 2\, d\, i \sqrt{z}\, (m-2j)\right)^2}{d\, (m-2j)}}\; \Gamma\left(\frac{1}{2}(h+k+2), \right.$$

$$\left.\left.\left.\frac{i\left(b\,i\,(m-2\,j)+2\,d\,i\,\sqrt{z}\,\,(m-2\,j)\right)^2}{4\,d\,(m-2\,j)}\right)\right)\right)+2^{-m-2\,n-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{i\,g\,(2\,s-v)-\frac{i\,c^2\,(2\,s-v)}{4\,f}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(2\,s-v))^{-h-k+2\,n}\left(c\,i\,(2\,s-v)+2\,f\,i\,\sqrt{z}\,\,(2\,s-v)\right)^{h+k}\right.\right.$$

$$\left(\frac{i\left(c\,i\,(2\,s-v)+2\,f\,i\,\sqrt{z}\,\,(2\,s-v)\right)^2}{f\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\,i\,(2\,s-v)\left(c\,i\,(2\,s-v)+2\,f\,i\,\sqrt{z}\,\,(2\,s-v)\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c\,i\,(2\,s-v)+2\,f\,i\,\sqrt{z}\,\,(2\,s-v)\right)^2}{4\,f\,(2\,s-v)}\right)+2\,f\,i\,(2\,s-v)$$

$$\left.\left.\left.\sqrt{\frac{i\left(c\,i\,(2\,s-v)+2\,f\,i\,\sqrt{z}\,\,(2\,s-v)\right)^2}{f\,(2\,s-v)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c\,i\,(2\,s-v)+2\,f\,i\,\sqrt{z}\,\,(2\,s-v)\right)^2}{4\,f\,(2\,s-v)}\right)\right)\right)\right)$$

$$(i\,f\,(2\,s-v))^{-2\,n-2}+e^{i\,g\,(v-2\,s)-\frac{i\,c^2\,(v-2\,s)}{4\,f}}\,(i\,f\,(v-2\,s))^{-2\,n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}$$

$$\left(c\,i\,(v-2\,s)+2\,f\,i\,\sqrt{z}\,\,(v-2\,s)\right)^{h+k}\left(\frac{i\left(c\,i\,(v-2\,s)+2\,f\,i\,\sqrt{z}\,\,(v-2\,s)\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(c\,i\,(v-2\,s)\left(c\,i\,(v-2\,s)+2\,f\,i\,\sqrt{z}\,\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c\,i\,(v-2\,s)+2\,f\,i\,\sqrt{z}\,\,(v-2\,s)\right)^2}{4\,f\,(v-2\,s)}\right)+\right.$$

$$2\,f\,i\,(v-2\,s)\sqrt{\frac{i\left(c\,i\,(v-2\,s)+2\,f\,i\,\sqrt{z}\,\,(v-2\,s)\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\right.$$

$$\left.\left.\left.\left.\frac{1}{2}\,(h+k+2),\,\frac{i\left(c\,i\,(v-2\,s)+2\,f\,i\,\sqrt{z}\,\,(v-2\,s)\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)\right)+$$

$$2^{-m-2\,n-v-1}\sum_{j=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{j}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{-\frac{(b\,i\,(2\,j-m)+c\,i\,(2\,s-v))^2}{4\,(d\,i\,(2\,j-m)+f\,i\,(2\,s-v))}+e\,i\,(2\,j-m)+g\,i\,(2\,s-v)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b\,i\,(2\,j-m)+c\,i\,(2\,s-v))^{-h-k+2\,n}\right.\right.$$

$$\left(b\,i\,(2\,j-m)+c\,i\,(2\,s-v)+2\,(d\,i\,(2\,j-m)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^{h+k}\left(-\left(b\,i\,(2\,j-m)+c\,i\,(2\,s-v)+2\,(d\,i\,(2\,j-m)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2\Big/(d\,i\,(2\,j-m)+f\,i\,(2\,s-v))\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((b\,i\,(2\,j-m)+c\,i\,(2\,s-v))\left(b\,i\,(2\,j-m)+c\,i\,(2\,s-v)+2\,(d\,i\,(2\,j-m)+f\,i\,(2\,s-v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\left(b\,i\,(2\,j-m)+c\,i\,(2\,s-v)+2\,(d\,i\,(2\,j-m)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2\Big/(4\,(d\,i\,(2\,j-m)+f\,i\,(2\,s-v)))\right)+2\,(d\,i\,(2\,j-m)+f\,i\,(2\,s-v))\,\Gamma\left(\frac{1}{2}(h+k+2),-\left(b\,i\,(2\,j-m)+c\,i\,(2\,s-v)+2\,(d\,i\,(2\,j-m)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2\Big/(4\,(d\,i\,(2\,j-m)+f\,i\,(2\,s-v)))\right)\sqrt{\left(-\left(b\,i\,(2\,j-m)+c\,i\,(2\,s-v)+2\,(d\,i\,(2\,j-m)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2\Big/(d\,i\,(2\,j-m)+f\,i\,(2\,s-v))\right)}\right)\right)$$

$$(d\,i\,(2\,j-m)+f\,i\,(2\,s-v))^{-2\,n-2}+e^{-\frac{(b\,i\,(m-2\,j)+c\,i\,(2\,s-v))^2}{4\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))}+e\,i\,(m-2\,j)+g\,i\,(2\,s-v)}\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))^{-2\,n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b\,i\,(m-2\,j)+c\,i\,(2\,s-v))^{-h-k+2\,n}$$

$$\left(b\,i\,(m-2\,j)+c\,i\,(2\,s-v)+2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^{h+k}\left(-\left(b\,i\,(m-2\,j)+c\,i\,(2\,s-v)+2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2\Big/(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((b\,i\,(m-2\,j)+c\,i\,(2\,s-v))\left(b\,i\,(m-2\,j)+c\,i\,(2\,s-v)+2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\left(b\,i\,(m-2\,j)+c\,i\,(2\,s-v)+2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2\Big/(4\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v)))\right)+2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\,\Gamma\left(\frac{1}{2}(h+k+2),-\left(b\,i\,(m-2\,j)+c\,i\,(2\,s-v)+2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2\Big/(4\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v)))\right)\sqrt{\left(-\left(b\,i\,(m-2\,j)+c\,i\,(2\,s-v)+2\,(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2\Big/(d\,i\,(m-2\,j)+f\,i\,(2\,s-v))\right)}\right)+$$

$$e^{-\frac{(b\,i\,(2\,j-m)+c\,i\,(v-2\,s))^2}{4\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))}+e\,i\,(2\,j-m)+g\,i\,(v-2\,s)}\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))^{-2\,n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(b\,i\,(2\,j-m)+c\,i\,(v-2\,s))^{-h-k+2\,n}\left(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^{h+k}\left(-\left(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2\Big/(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Big((b\,i\,(2\,j-m)+c\,i\,(v-2\,s))\,\big(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\big)$$
$$\Gamma\Big(\frac{1}{2}\,(h+k+1),\,-\big(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\big)^2\Big/$$
$$(4\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s)))\Big)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))$$
$$\Gamma\Big(\frac{1}{2}\,(h+k+2),\,-\big(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\big)^2\Big/$$
$$(4\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s)))\Big)\sqrt{\Big(-\big(b\,i\,(2\,j-m)+c\,i\,(v-2\,s)+}$$
$$\overline{2\,(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\,\sqrt{z}\big)^2\Big/(d\,i\,(2\,j-m)+f\,i\,(v-2\,s))\Big)}\Big)+$$
$$e^{-\frac{(b\,i\,(m-2\,j)+c\,i\,(v-2\,s))^2}{4\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))}+e\,i\,(m-2\,j)+g\,i\,(v-2\,s)}\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))^{-2\,n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$
$$(b\,i\,(m-2\,j)+c\,i\,(v-2\,s))^{-h-k+2\,n}\,\big(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\sqrt{z}\big)^{h+k}$$
$$\Big(-\big(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\sqrt{z}\big)^2\Big/$$
$$(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\Big)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$
$$\Big((b\,i\,(m-2\,j)+c\,i\,(v-2\,s))\,\big(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\sqrt{z}\big)$$
$$\Gamma\Big(\frac{1}{2}\,(h+k+1),\,-\big(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\sqrt{z}\big)^2\Big/$$
$$(4\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s)))\Big)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\Gamma\Big(\frac{1}{2}\,(h+k+2),$$
$$-\big(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\,\sqrt{z}\big)^2\Big/(4\,(d\,i\,(m-2\,j)+$$
$$f\,i\,(v-2\,s)))\Big)\sqrt{\Big(-\big(b\,i\,(m-2\,j)+c\,i\,(v-2\,s)+2\,(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))}$$
$$\overline{\sqrt{z}\big)^2\Big/(d\,i\,(m-2\,j)+f\,i\,(v-2\,s))\Big)}\Big)\Big)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving rational functions of the direct function and a power function

Involving $\frac{z}{a+b\cos(c\,z+d)}$

01.07.21.1665.01

$$\int\frac{z}{1-\cos(c\,z)}\,dz=\frac{2\log\big(\sin\big(\frac{c\,z}{2}\big)\big)-c\,z\cot\big(\frac{c\,z}{2}\big)}{c^2}$$

01.07.21.1666.01

$$\int\frac{z}{\cos(c\,z)+1}\,dz=\frac{2\log\big(\cos\big(\frac{c\,z}{2}\big)\big)+c\,z\tan\big(\frac{c\,z}{2}\big)}{c^2}$$

01.07.21.1667.01

$$\int \frac{z}{a+b\cos(c\,z)}\,dz = \frac{1}{\sqrt{b^2-a^2}\;c^2}\left(2\,c\,z\tanh^{-1}\left(\frac{(a+b)\cot\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right) - 2\cos^{-1}\left(-\frac{a}{b}\right)\tanh^{-1}\left(\frac{(b-a)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right) + \right.$$
$$\left(\cos^{-1}\left(-\frac{a}{b}\right) + 2\,i\left(\tanh^{-1}\left(\frac{(a+b)\cot\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right) - \tanh^{-1}\left(\frac{(b-a)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right)\right)\right)\log\left(\frac{\sqrt{b^2-a^2}\;e^{\frac{i\,c\,z}{2}}}{\sqrt{2}\;\sqrt{b}\;\sqrt{a+b\cos(c\,z)}}\right) +$$
$$\left(\cos^{-1}\left(-\frac{a}{b}\right) - 2\,i\tanh^{-1}\left(\frac{(a+b)\cot\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right) + 2\,i\tanh^{-1}\left(\frac{(b-a)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right)\right)\log\left(\frac{\sqrt{b^2-a^2}\;e^{-\frac{1}{2}i\,c\,z}}{\sqrt{2}\;\sqrt{b}\;\sqrt{a+b\cos(c\,z)}}\right) -$$
$$\left(\cos^{-1}\left(-\frac{a}{b}\right) - 2\,i\tanh^{-1}\left(\frac{(b-a)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right)\right)\log\left(\frac{(a+b)\left(-i\,a+i\,b+\sqrt{b^2-a^2}\right)\left(-i+\tan\left(\frac{c\,z}{2}\right)\right)}{b\left(a+b+\sqrt{b^2-a^2}\;\tan\left(\frac{c\,z}{2}\right)\right)}\right) -$$
$$\left(\cos^{-1}\left(-\frac{a}{b}\right) + 2\,i\tanh^{-1}\left(\frac{(b-a)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right)\right)\log\left(\frac{(a+b)\left(i\,a-i\,b+\sqrt{b^2-a^2}\right)\left(i+\tan\left(\frac{c\,z}{2}\right)\right)}{b\left(a+b+\sqrt{b^2-a^2}\;\tan\left(\frac{c\,z}{2}\right)\right)}\right) +$$
$$\left. i\left(\mathrm{Li}_2\left(\frac{\left(a-i\sqrt{b^2-a^2}\right)\left(a+b-\sqrt{b^2-a^2}\;\tan\left(\frac{c\,z}{2}\right)\right)}{b\left(a+b+\sqrt{b^2-a^2}\;\tan\left(\frac{c\,z}{2}\right)\right)}\right) - \mathrm{Li}_2\left(\frac{\left(a+i\sqrt{b^2-a^2}\right)\left(a+b-\sqrt{b^2-a^2}\;\tan\left(\frac{c\,z}{2}\right)\right)}{b\left(a+b+\sqrt{b^2-a^2}\;\tan\left(\frac{c\,z}{2}\right)\right)}\right)\right)\right)$$

01.07.21.1668.01

$$\int \frac{z}{a+b\cos(c\,z+d)}\,dz = \frac{1}{\sqrt{b^2-a^2}\;c^2}\left(2\,(d+c\,z)\tanh^{-1}\!\left(\frac{(a+b)\cot\left(\frac{1}{2}(d+c\,z)\right)}{\sqrt{b^2-a^2}}\right) - 2\left(d+\cos^{-1}\!\left(-\frac{a}{b}\right)\right)\tanh^{-1}\!\left(\frac{(b-a)\tan\left(\frac{1}{2}(d+c\,z)\right)}{\sqrt{b^2-a^2}}\right) + \right.$$
$$\left(\cos^{-1}\!\left(-\frac{a}{b}\right) + 2\,i\left(\tanh^{-1}\!\left(\frac{(a+b)\cot\left(\frac{1}{2}(d+c\,z)\right)}{\sqrt{b^2-a^2}}\right) - \tanh^{-1}\!\left(\frac{(b-a)\tan\left(\frac{1}{2}(d+c\,z)\right)}{\sqrt{b^2-a^2}}\right)\right)\right)$$
$$\log\left(\frac{\sqrt{b^2-a^2}\;e^{\frac{1}{2}i(d+c\,z)}}{\sqrt{2}\,\sqrt{b}\,\sqrt{a+b\cos(d+c\,z)}}\right) + \left(\cos^{-1}\!\left(-\frac{a}{b}\right) - 2\,i\tanh^{-1}\!\left(\frac{(a+b)\cot\left(\frac{1}{2}(d+c\,z)\right)}{\sqrt{b^2-a^2}}\right) + \right.$$
$$\left. 2\,i\tanh^{-1}\!\left(\frac{(b-a)\tan\left(\frac{1}{2}(d+c\,z)\right)}{\sqrt{b^2-a^2}}\right)\right)\log\left(\frac{\sqrt{b^2-a^2}\;e^{-\frac{1}{2}i(d+c\,z)}}{\sqrt{2}\,\sqrt{b}\,\sqrt{a+b\cos(d+c\,z)}}\right) -$$
$$\left(\cos^{-1}\!\left(-\frac{a}{b}\right) + 2\,i\tanh^{-1}\!\left(\frac{(b-a)\tan\left(\frac{1}{2}(d+c\,z)\right)}{\sqrt{b^2-a^2}}\right)\right)\log\left(\frac{(a+b)\left(i\,a-i\,b+\sqrt{b^2-a^2}\right)\left(i+\tan\left(\frac{1}{2}(d+c\,z)\right)\right)}{b\left(a+b+\sqrt{b^2-a^2}\,\tan\left(\frac{1}{2}(d+c\,z)\right)\right)}\right) -$$
$$\left(\cos^{-1}\!\left(-\frac{a}{b}\right) - 2\,i\tanh^{-1}\!\left(\frac{(b-a)\tan\left(\frac{1}{2}(d+c\,z)\right)}{\sqrt{b^2-a^2}}\right)\right)\log\left(\frac{(a+b)\left(-a+b-i\sqrt{b^2-a^2}\right)\left(i\tan\left(\frac{1}{2}(d+c\,z)\right)+1\right)}{b\left(a+b+\sqrt{b^2-a^2}\,\tan\left(\frac{1}{2}(d+c\,z)\right)\right)}\right) +$$
$$i\left(\mathrm{Li}_2\!\left(\frac{\left(a-i\sqrt{b^2-a^2}\right)\left(a+b-\sqrt{b^2-a^2}\,\tan\left(\frac{1}{2}(d+c\,z)\right)\right)}{b\left(a+b+\sqrt{b^2-a^2}\,\tan\left(\frac{1}{2}(d+c\,z)\right)\right)}\right) - \right.$$
$$\left.\left.\mathrm{Li}_2\!\left(\frac{\left(a+i\sqrt{b^2-a^2}\right)\left(a+b-\sqrt{b^2-a^2}\,\tan\left(\frac{1}{2}(d+c\,z)\right)\right)}{b\left(a+b+\sqrt{b^2-a^2}\,\tan\left(\frac{1}{2}(d+c\,z)\right)\right)}\right)\right)\right)$$

Involving $\frac{z\cos(c\,z)}{a+b\cos(2\,c\,z)}$

01.07.21.1669.01

$$\int \frac{z\cos(c\,z)}{a+b\cos(2\,c\,z)}\,dz = \frac{1}{4\sqrt{2}\sqrt{b}\sqrt{a+b}\,c^2}\left(-8\,i\sin^{-1}\left(\frac{1}{2}\sqrt{\frac{\sqrt{2}\sqrt{a+b}}{\sqrt{b}}+2}\right)\tan^{-1}\left(\frac{\left(\sqrt{2}\sqrt{a+b}-2\sqrt{b}\right)\tan\left(\frac{1}{4}(\pi-2\,c\,z)\right)}{\sqrt{2\,a-2\,b}}\right)+\right.$$
$$8\,i\sin^{-1}\left(\frac{1}{2}\sqrt{2-\frac{\sqrt{2}\sqrt{a+b}}{\sqrt{b}}}\right)\tan^{-1}\left(\frac{\left(2\sqrt{b}+\sqrt{2}\sqrt{a+b}\right)\tan\left(\frac{1}{4}(\pi-2\,c\,z)\right)}{\sqrt{2\,a-2\,b}}\right)+$$
$$\left(-2\,c\,z+4\sin^{-1}\left(\frac{1}{2}\sqrt{2-\frac{\sqrt{2}\sqrt{a+b}}{\sqrt{b}}}\right)+\pi\right)\log\left(\frac{1}{2}\left(2+\frac{i\sqrt{2}\left(\sqrt{a-b}-\sqrt{a+b}\right)e^{-i\,c\,z}}{\sqrt{b}}\right)\right)-$$
$$\left(-2\,c\,z-4\sin^{-1}\left(\frac{1}{2}\sqrt{\frac{\sqrt{2}\sqrt{a+b}}{\sqrt{b}}+2}\right)+\pi\right)\log\left(\frac{1}{2}\left(2+\frac{i\sqrt{2}\left(\sqrt{a-b}+\sqrt{a+b}\right)e^{-i\,c\,z}}{\sqrt{b}}\right)\right)-$$
$$\left(-2\,c\,z+4\sin^{-1}\left(\frac{1}{2}\sqrt{\frac{\sqrt{2}\sqrt{a+b}}{\sqrt{b}}+2}\right)+\pi\right)\log\left(\frac{1}{2}\left(2-\frac{i\sqrt{2}\left(\sqrt{a-b}-\sqrt{a+b}\right)e^{-i\,c\,z}}{\sqrt{b}}\right)\right)+$$
$$\left(-2\,c\,z-4\sin^{-1}\left(\frac{1}{2}\sqrt{2-\frac{\sqrt{2}\sqrt{a+b}}{\sqrt{b}}}\right)+\pi\right)\log\left(\frac{1}{2}\left(2-\frac{i\sqrt{2}\left(\sqrt{a-b}+\sqrt{a+b}\right)e^{-i\,c\,z}}{\sqrt{b}}\right)\right)+$$
$$(\pi-2\,c\,z)\log\left(2\sqrt{b}\sin(c\,z)+\sqrt{2}\sqrt{a+b}\right)+$$
$$2\,c\,z\left(\log\left(2\sqrt{b}\sin(c\,z)+\sqrt{2}\sqrt{a+b}\right)-\log\left(\sqrt{2}\sqrt{a+b}-2\sqrt{b}\sin(c\,z)\right)\right)-(\pi-2\,c\,z)$$
$$\log\left(\sqrt{2}\sqrt{a+b}-2\sqrt{b}\sin(c\,z)\right)-2\,i\left(\mathrm{Li}_2\left(\frac{i\left(\sqrt{a-b}+\sqrt{a+b}\right)e^{-i\,c\,z}}{\sqrt{2}\sqrt{b}}\right)+\mathrm{Li}_2\left(-\frac{i\left(\sqrt{a-b}-\sqrt{a+b}\right)e^{-i\,c\,z}}{\sqrt{2}\sqrt{b}}\right)\right)+$$
$$\left.2\,i\left(\mathrm{Li}_2\left(\frac{i\left(\sqrt{a-b}-\sqrt{a+b}\right)e^{-i\,c\,z}}{\sqrt{2}\sqrt{b}}\right)+\mathrm{Li}_2\left(-\frac{i\left(\sqrt{a-b}+\sqrt{a+b}\right)e^{-i\,c\,z}}{\sqrt{2}\sqrt{b}}\right)\right)\right)$$

Involving algebraic functions of the direct function and a power function

Involving $\frac{z\cos(c\,z)}{\left(a+b\cos^2(c\,z)\right)^\beta}$

01.07.21.1670.01

$$\int \frac{z\cos(c\,z)}{\left(a+b\cos^2(c\,z)\right)^{3/2}}\,dz = \frac{\log\left(\sqrt{2}\sqrt{b}\cos(c\,z)+\sqrt{2\,a+b+b\cos(2\,c\,z)}\right)}{\sqrt{b}\,(a+b)\,c^2}+\frac{\sqrt{2}\,z\sin(c\,z)}{(a+b)\,c\sqrt{2\,a+b+b\cos(2\,c\,z)}}$$

Involving functions of the direct function and algebraic functions

Involving products of the direct function and algebraic functions

Involving products of two direct functions and algebraic functions

Involving $(f+e\,z)^{\alpha-1}\cos(d+c\,z)\cos(b+a\,z)$

01.07.21.1671.01

$$\int (f+e\,z)^{\alpha-1}\cos(d+c\,z)\cos(b+a\,z)\,dz = -\frac{1}{4\,e}\left((f+e\,z)^{\alpha}\left(\frac{(a-c)^2\,(f+e\,z)^2}{e^2}\right)^{-\alpha}\left(\frac{(a+c)^2\,(f+e\,z)^2}{e^2}\right)^{-\alpha}\right.$$
$$\left(\left(\Gamma\left(\alpha,-\frac{i\,(a+c)\,(f+e\,z)}{e}\right)\left(\cos\left(b+d-\frac{(a+c)\,f}{e}\right)+i\sin\left(b+d-\frac{(a+c)\,f}{e}\right)\right)\left(\frac{i\,(a+c)\,(f+e\,z)}{e}\right)^{\alpha}+\right.\right.$$
$$\left.\left(-\frac{i\,(a+c)\,(f+e\,z)}{e}\right)^{\alpha}\Gamma\left(\alpha,\frac{i\,(a+c)\,(f+e\,z)}{e}\right)\left(\cos\left(b+d-\frac{(a+c)\,f}{e}\right)-i\sin\left(b+d-\frac{(a+c)\,f}{e}\right)\right)\right)$$
$$\left(\frac{(a-c)^2\,(f+e\,z)^2}{e^2}\right)^{\alpha}+\left(\frac{i\,(a-c)\,(f+e\,z)}{e}\right)^{\alpha}\left(\frac{(a+c)^2\,(f+e\,z)^2}{e^2}\right)^{\alpha}\Gamma\left(\alpha,\frac{i\,(c-a)\,(f+e\,z)}{e}\right)$$
$$\left(\cos\left(b-d+\frac{(c-a)\,f}{e}\right)+i\sin\left(b-d+\frac{(c-a)\,f}{e}\right)\right)+\left(\frac{i\,(c-a)\,(f+e\,z)}{e}\right)^{\alpha}\left(\frac{(a+c)^2\,(f+e\,z)^2}{e^2}\right)^{\alpha}$$
$$\left.\left.\Gamma\left(\alpha,\frac{i\,(a-c)\,(f+e\,z)}{e}\right)\left(\cos\left(b-d+\frac{(c-a)\,f}{e}\right)-i\sin\left(b-d+\frac{(c-a)\,f}{e}\right)\right)\right)\right)$$

01.07.21.1672.01

$$\int \frac{\cos(d+c\,z)\cos(b+a\,z)}{f+e\,z}\,dz =$$
$$\frac{1}{2\,e}\left(\cos\left(\frac{b\,e-d\,e-a\,f+c\,f}{e}\right)\operatorname{Ci}\left(\frac{(a-c)\,(f+e\,z)}{e}\right)+\cos\left(b+d-\frac{(a+c)\,f}{e}\right)\operatorname{Ci}\left(\frac{(a+c)\,(f+e\,z)}{e}\right)-\right.$$
$$\left.\sin\left(\frac{b\,e-d\,e-a\,f+c\,f}{e}\right)\operatorname{Si}\left(\frac{(a-c)\,(f+e\,z)}{e}\right)-\sin\left(b+d-\frac{(a+c)\,f}{e}\right)\operatorname{Si}\left(\frac{(a+c)\,(f+e\,z)}{e}\right)\right)$$

01.07.21.1673.01

$$\int \frac{\cos(a\,z)\cos(b+a\,z)}{b+a\,z}\,dz = \frac{\cos(b)\operatorname{Ci}(2\,(b+a\,z))+\cos(b)\log(b+a\,z)+\sin(b)\operatorname{Si}(2\,(b+a\,z))}{2\,a}$$

Involving functions of the direct function and exponential function

Involving powers of the direct function and exponential function

Involving powers of cos and exp

Involving $e^{b\,z}\cos^{\nu}(a\,z)$

01.07.21.1674.01

$$\int e^{b z} \cos^{\nu}(a z)\, dz = \frac{e^{b z} \left(1+e^{2 i a z}\right)^{-\nu} \cos^{\nu}(a z)}{b - i a \nu}\, {}_2F_1\!\left(-\frac{i b + a \nu}{2 a}, -\nu; 1 - \frac{i b}{2 a} - \frac{\nu}{2}; -e^{2 i a z}\right)$$

01.07.21.1675.01

$$\int e^{b z} \cos^{\nu}(a z)\, dz = \frac{e^{b z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{b\, 2^{\nu}} + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\frac{e^{(b+2 i a k - i a \nu) z}}{b + 2 i a k - i a \nu} + \frac{e^{(b-2 i a k + i a \nu) z}}{b - 2 i a k + i a \nu}\right) \binom{\nu}{k} /; \nu \in \mathbb{N}$$

01.07.21.1676.01

$$\int e^{b z} \cos^2(a z)\, dz = \frac{e^{b z} \left(4 a^2 + 2 b \sin(2 a z)\, a + b^2 + b^2 \cos(2 a z)\right)}{2 \left(b^3 + 4 a^2 b\right)}$$

01.07.21.1677.01

$$\int e^{i a z} \cos^2(a z)\, dz = -\frac{i e^{-i a z} \left(-3 + 6 e^{2 i a z} + e^{4 i a z}\right)}{12 a}$$

01.07.21.1678.01

$$\int e^{2 i a z} \cos^2(a z)\, dz = -\frac{4 i e^{2 i a z} + i e^{4 i a z} - 4 a z}{16 a}$$

01.07.21.1679.01

$$\int e^{b z} \cos^3(a z)\, dz = \left(e^{b z} \left(3 b \left(9 a^2 + b^2\right) \cos(a z) + b \left(a^2 + b^2\right) \cos(3 a z) + 6 a \left(5 a^2 + b^2 + \left(a^2 + b^2\right) \cos(2 a z)\right) \sin(a z)\right)\right) \Big/ \left(4 \left(9 a^4 + 10 b^2 a^2 + b^4\right)\right)$$

01.07.21.1680.01

$$\int e^{b z} \cos^4(a z)\, dz = \frac{1}{8 \left(b^5 + 20 a^2 b^3 + 64 a^4 b\right)} \left(e^{b z} \left(192 a^4 + 128 b \sin(2 a z)\, a^3 + 16 b \sin(4 a z)\, a^3 + 60 b^2 a^2 + 8 b^3 \sin(2 a z)\, a + 4 b^3 \sin(4 a z)\, a + 3 b^4 + 4 b^2 \left(16 a^2 + b^2\right) \cos(2 a z) + b^2 \left(4 a^2 + b^2\right) \cos(4 a z)\right)\right)$$

01.07.21.1681.01

$$\int e^{2 i a z} \cos^4(a z)\, dz = \frac{3 i e^{-2 i a z} - 18 i e^{2 i a z} - 6 i e^{4 i a z} - i e^{6 i a z} + 24 a z}{96 a}$$

01.07.21.1682.01

$$\int e^{-2 i a z} \cos^4(a z)\, dz = \frac{18 i e^{-2 i a z} - 3 i e^{2 i a z} + 6 i e^{-4 i a z} + i e^{-6 i a z} + 24 a z}{96 a}$$

01.07.21.1683.01

$$\int \frac{\cos^3(a z)}{\sqrt{e^{b z}}}\, dz = \left(-3 b \left(36 a^2 + b^2\right) \cos(a z) - b \left(4 a^2 + b^2\right) \cos(3 a z) + 12 a \left(20 a^2 + b^2 + \left(4 a^2 + b^2\right) \cos(2 a z)\right) \sin(a z)\right) \Big/ \left(2 \left(144 a^4 + 40 b^2 a^2 + b^4\right) \sqrt{e^{b z}}\right)$$

Involving $e^{b z + e} \cos^{\nu}(a z)$

01.07.21.1684.01

$$\int e^{e+b z}\cos^{\nu}(a z)\,dz = \frac{e^{e+b z}\left(1+e^{2 i a z}\right)^{-\nu}\cos^{\nu}(a z)}{b-i a \nu}\,{}_2F_1\!\left(-\frac{i b+a \nu}{2 a},-\nu;1-\frac{i b}{2 a}-\frac{\nu}{2};-e^{2 i a z}\right)$$

01.07.21.1685.01

$$\int e^{e+b z}\cos^{\nu}(a z)\,dz = \frac{e^{e+b z}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b\,2^{\nu}} + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(\frac{e^{e+(b+2 i a k-i a \nu) z}}{b+2 i a k-i a \nu}+\frac{e^{e+(b-2 i a k+i a \nu) z}}{b-2 i a k+i a \nu}\right)\binom{\nu}{k}\;/;\;\nu\in\mathbb{N}$$

Involving $e^{p z}\cos^{\nu}(a z+b)$

01.07.21.1686.01

$$\int e^{p z}\cos^{\nu}(b+a z)\,dz = \frac{e^{p z}\left(1+e^{2 i (b+a z)}\right)^{-\nu}\cos^{\nu}(b+a z)}{p-i a \nu}\,{}_2F_1\!\left(-\frac{i p+a \nu}{2 a},-\nu;\frac{1}{2}\left(-\frac{i p}{a}-\nu+2\right);-e^{2 i (b+a z)}\right)$$

01.07.21.1687.01

$$\int e^{p z}\cos^{\nu}(b+a z)\,dz =$$

$$\frac{2^{-\nu} e^{p z}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{p} + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i b (2 k+\nu)}\left(\frac{e^{2 i b \nu+(-2 a i k+p+i a \nu) z}}{-2 a i k+p+i a \nu}+\frac{e^{i (4 b k+2 a z k-i p z-a \nu z)}}{p+a i (2 k-\nu)}\right)\binom{\nu}{k}\;/;\;\nu\in\mathbb{N}$$

Involving $e^{p z+e}\cos^{\nu}(a z+b)$

01.07.21.1688.01

$$\int e^{e+p z}\cos^{\nu}(b+a z)\,dz = \frac{e^{e+p z}\left(1+e^{2 i (b+a z)}\right)^{-\nu}\cos^{\nu}(b+a z)}{p-i a \nu}\,{}_2F_1\!\left(-\frac{i p+a \nu}{2 a},-\nu;\frac{1}{2}\left(-\frac{i p}{a}-\nu+2\right);-e^{2 i (b+a z)}\right)$$

01.07.21.1689.01

$$\int e^{e+p z}\cos^{\nu}(b+a z)\,dz =$$

$$\frac{2^{-\nu} e^{e+p z}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{p} + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{e-i b (2 k+\nu)}\left(\frac{e^{2 i b \nu+(-2 a i k+p+i a \nu) z}}{-2 a i k+p+i a \nu}+\frac{e^{i (4 b k+2 a z k-i p z-a \nu z)}}{p+a i (2 k-\nu)}\right)\binom{\nu}{k}\;/;\;\nu\in\mathbb{N}$$

Involving $e^{b z^r}\cos^{\nu}(c z)$

01.07.21.1690.01

$$\int e^{b z^2}\cos^{\nu}(c z)\,dz = \frac{1}{\sqrt{b}}\,2^{-\nu-1}\sqrt{\pi}$$

$$\left(\binom{\nu}{\frac{\nu}{2}}\operatorname{erfi}\left(\sqrt{b}\,z\right)(1-\nu \bmod 2)+\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{\frac{c^2 (\nu-2 s)^2}{4 b}}\binom{\nu}{s}\left(\operatorname{erfi}\left(\frac{2 i c s-i c \nu+2 b z}{2\sqrt{b}}\right)+\operatorname{erfi}\left(\frac{c i (\nu-2 s)+2 b z}{2\sqrt{b}}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^{+}$$

01.07.21.1691.01

$$\int e^{\sqrt{z}\, b} \cos^{\nu}(c z)\, dz = \frac{2^{1-\nu} e^{\sqrt{z}\, b} \left(b \sqrt{z} - 1\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{b^2} + 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(2 e^{b\sqrt{z}} \left(\frac{e^{(2 i c k - i c \nu) z}}{2 i c k - i c \nu} + \frac{e^{(i c \nu - 2 i c k) z}}{i c \nu - 2 i c k}\right) - \frac{b\, e^{\frac{b^2}{8 i c k - 4 i c \nu}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b + 2 (i c \nu - 2 i c k) \sqrt{z}}{2 \sqrt{i c \nu - 2 i c k}}\right)}{(i c \nu - 2 i c k)^{3/2}} - \frac{b\, e^{\frac{b^2}{4 i c \nu - 8 i c k}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b + 2 (2 i c k - i c \nu) \sqrt{z}}{2 \sqrt{2 i c k - i c \nu}}\right)}{(2 i c k - i c \nu)^{3/2}}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \cos^{\nu}(c z)$

01.07.21.1692.01

$$\int e^{b z^2 + e} \cos^{\nu}(c z)\, dz = \frac{2^{-\nu-1} e^{e} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) (1 - \nu \bmod 2)}{\sqrt{b}} + \frac{2^{-\nu-1} \sqrt{\pi}}{\sqrt{b}} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{\frac{c^2 (\nu - 2k)^2 + 4 b e}{4 b}} \binom{\nu}{k} \left(\operatorname{erfi}\left(\frac{-2 c i k + i c \nu + 2 b z}{2 \sqrt{b}}\right) + \operatorname{erfi}\left(\frac{2 i c k - i c \nu + 2 b z}{2 \sqrt{b}}\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1693.01

$$\int e^{\sqrt{z}\, b + e} \cos^{\nu}(c z)\, dz = \frac{2^{1-\nu} e^{\sqrt{z}\, b + e} \left(b \sqrt{z} - 1\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{b^2} + 2^{-\nu-1} e^{e} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(2 e^{b\sqrt{z}} \left(\frac{e^{(2 i c k - i c \nu) z}}{2 i c k - i c \nu} + \frac{e^{(i c \nu - 2 i c k) z}}{i c \nu - 2 i c k}\right) - \frac{b\, e^{\frac{b^2}{8 i c k - 4 i c \nu}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b + 2 (i c \nu - 2 i c k) \sqrt{z}}{2 \sqrt{i c \nu - 2 i c k}}\right)}{(i c \nu - 2 i c k)^{3/2}} - \frac{b\, e^{\frac{b^2}{4 i c \nu - 8 i c k}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b + 2 (2 i c k - i c \nu) \sqrt{z}}{2 \sqrt{2 i c k - i c \nu}}\right)}{(2 i c k - i c \nu)^{3/2}}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z} \cos^{\nu}(c z)$

01.07.21.1694.01

$$\int e^{b z^2+d z}\cos^{\nu}(c z)\,dz = \frac{2^{-\nu-1} e^{-\frac{d^2}{4b}}\sqrt{\pi}\;(1-\nu \bmod 2)}{\sqrt{b}}\binom{\nu}{\frac{\nu}{2}}\operatorname{erfi}\left(\frac{d+2 b z}{2\sqrt{b}}\right)+\frac{1}{\sqrt{b}}2^{-\nu-1}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-\frac{d^2+2 c i (2 s+\nu) d-c^2(\nu-2 s)^2}{4 b}}\binom{\nu}{s}\left(e^{\frac{2 i c d s}{b}}\operatorname{erfi}\left(\frac{d-2 i c s+i c \nu+2 b z}{2\sqrt{b}}\right)+e^{\frac{i c d \nu}{b}}\operatorname{erfi}\left(\frac{d+2 i c s-i c \nu+2 b z}{2\sqrt{b}}\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1695.01

$$\int e^{\sqrt{z}\,b+d z}\cos^{\nu}(c z)\,dz = 2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\left(\frac{e^{\sqrt{z}\,b+d z}}{d}-\frac{b\,e^{-\frac{b^2}{4d}}\sqrt{\pi}\operatorname{erfi}\left(\frac{b+2 d\sqrt{z}}{2\sqrt{d}}\right)}{2 d^{3/2}}\right)(1-\nu \bmod 2)+2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{b\sqrt{z}}\left(\frac{e^{(d+2 i c s-i c \nu)z}}{d+2 i c s-i c \nu}+\frac{e^{(d-2 i c s+i c \nu)z}}{d-2 i c s+i c \nu}\right)-\frac{b\,e^{\frac{b^2}{-4d+8 i c s-4 i c \nu}}\sqrt{\pi}\operatorname{erfi}\left(\frac{b+2(d-2 i c s+i c \nu)\sqrt{z}}{2\sqrt{d-2 i c s+i c \nu}}\right)}{2(d-2 i c s+i c \nu)^{3/2}}-\frac{b\,e^{\frac{b^2}{-4d-8 i c s+4 i c \nu}}\sqrt{\pi}\operatorname{erfi}\left(\frac{b+2(d+2 i c s-i c \nu)\sqrt{z}}{2\sqrt{d+2 i c s-i c \nu}}\right)}{2(d+2 i c s-i c \nu)^{3/2}}\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $e^{b z^r+d z+e}\cos^{\nu}(c z)$

01.07.21.1696.01

$$\int e^{b z^2+d z+e}\cos^{\nu}(c z)\,dz = \frac{2^{-\nu-1}\sqrt{\pi}\;(1-\nu \bmod 2)}{\sqrt{b}}\binom{\nu}{\frac{\nu}{2}} e^{e-\frac{d^2}{4b}}\operatorname{erfi}\left(\frac{d+2 b z}{2\sqrt{b}}\right)+\frac{1}{\sqrt{b}}2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-\frac{d^2+2 c i (2 k+\nu) d-c^2(\nu-2 k)^2-4 b e}{4 b}}\binom{\nu}{k}\left(e^{\frac{2 i c d k}{b}}\operatorname{erfi}\left(\frac{d-2 i c k+i c \nu+2 b z}{2\sqrt{b}}\right)+e^{\frac{i c d \nu}{b}}\operatorname{erfi}\left(\frac{d+2 i c k-i c \nu+2 b z}{2\sqrt{b}}\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1697.01

$$\int e^{\sqrt{z}\, b+e+d\,z} \cos^{\nu}(c\,z)\,dz = 2^{-\nu}\left(\frac{e^{\sqrt{z}\, b+e+d\,z}}{d} - \frac{b\,e^{e-\frac{b^2}{4d}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+2\,d\sqrt{z}}{2\sqrt{d}}\right)}{2\,d^{3/2}}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) + 2^{-\nu-1}\,e^{e}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(2\,e^{b\sqrt{z}}\left(\frac{e^{(d+2\,i\,c\,k-i\,c\,\nu)z}}{d+2\,i\,c\,k-i\,c\,\nu} + \frac{e^{(d-2\,i\,c\,k+i\,c\,\nu)z}}{d-2\,i\,c\,k+i\,c\,\nu}\right) - \frac{b\,e^{\frac{b^2}{-4d+8\,i\,c\,k-4\,i\,c\,\nu}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+2\,(d-2\,i\,c\,k+i\,c\,\nu)\sqrt{z}}{2\sqrt{d-2\,i\,c\,k+i\,c\,\nu}}\right)}{(d-2\,i\,c\,k+i\,c\,\nu)^{3/2}} - \frac{b\,e^{\frac{b^2}{-4d-8\,i\,c\,k+4\,i\,c\,\nu}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+2\,(d+2\,i\,c\,k-i\,c\,\nu)\sqrt{z}}{2\sqrt{d+2\,i\,c\,k-i\,c\,\nu}}\right)}{(d+2\,i\,c\,k-i\,c\,\nu)^{3/2}}\right) /;\ \nu\in\mathbb{N}^+$$

Involving $e^{b\,z^r}\cos^{\nu}(f\,z+g)$

01.07.21.1698.01

$$\int e^{b\,z^2}\cos^{\nu}(f\,z+g)\,dz = \frac{2^{-\nu-1}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}\operatorname{erfi}\left(\sqrt{b}\,z\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{e^{\frac{f^2(\nu-2k)^2}{4b}+g\,i\,(\nu-2k)}\operatorname{erfi}\left(\frac{-2\,f\,i\,k+i\,f\,\nu+2\,b\,z}{2\sqrt{b}}\right)}{\sqrt{b}} - \frac{e^{\frac{1}{4}\left(-\frac{(2\,i\,f\,k-i\,f\,\nu)^2}{b}+8\,i\,g\,k-4\,i\,g\,\nu\right)}\operatorname{erf}\left(\frac{2\,i\,f\,k-i\,f\,\nu+2\,b\,z}{2\sqrt{-b}}\right)}{\sqrt{-b}}\right) /;\ \nu\in\mathbb{N}^+$$

01.07.21.1699.01

$$\int e^{\sqrt{z}\,b}\cos^{\nu}(f\,z+g)\,dz = 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(-\frac{b\,e^{\frac{i\,b^2}{4f(\nu-2k)}-2\,i\,g\,k+i\,g\,\nu}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+2\,(i\,f\,\nu-2\,i\,f\,k)\sqrt{z}}{2\sqrt{i\,f\,(\nu-2k)}}\right)}{2\,(i\,f\,\nu-2\,i\,f\,k)^{3/2}} + \frac{e^{\sqrt{z}\,b+\frac{1}{2}(-4\,i\,g\,k+2\,i\,g\,\nu)+(i\,f\,\nu-2\,i\,f\,k)z}}{i\,f\,\nu-2\,i\,f\,k} + \frac{e^{\sqrt{z}\,b+\frac{1}{2}(4\,i\,g\,k-2\,i\,g\,\nu)+(2\,i\,f\,k-i\,f\,\nu)z}}{2\,i\,f\,k-i\,f\,\nu} - \frac{b\,e^{\frac{i\,b^2}{4f(2k-\nu)}+2\,i\,g\,k-i\,g\,\nu}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+2\,(2\,i\,f\,k-i\,f\,\nu)\sqrt{z}}{2\sqrt{2\,i\,f\,k-i\,f\,\nu}}\right)}{2\,(2\,i\,f\,k-i\,f\,\nu)^{3/2}}\right) + \frac{2^{1-\nu}\,e^{\sqrt{z}\,b}\left(b\sqrt{z}-1\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b^2} /;\ \nu\in\mathbb{N}^+$$

Involving $e^{b\,z^r+e}\cos^{\nu}(f\,z+g)$

01.07.21.1700.01

$$\int e^{b z^2+e} \cos^\nu(f z+g)\, dz = \frac{2^{-\nu-1} e^e \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1}\sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\frac{f^2(\nu-2k)^2}{4b}+g i(\nu-2k)+e} \operatorname{erfi}\left(\frac{-2 f i k+i f \nu+2 b z}{2\sqrt{b}}\right)}{\sqrt{b}} - \frac{e^{\frac{1}{4}\left(-\frac{(2 i f k-i f \nu)^2}{b}+4e+8 i g k-4 i g \nu\right)} \operatorname{erf}\left(\frac{2 i f k-i f \nu+2 b z}{2\sqrt{-b}}\right)}{\sqrt{-b}} \right) /; \nu \in \mathbb{N}^+$$

01.07.21.1701.01

$$\int e^{\sqrt{z}\, b+e} \cos^\nu(f z+g)\, dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(-\frac{b\, e^{\frac{i b^2}{4 f(\nu-2k)}+e-2 i g k+i g \nu} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(i f \nu-2 i f k)\sqrt{z}}{2\sqrt{i f(\nu-2k)}}\right)}{2(i f \nu-2 i f k)^{3/2}} + \frac{e^{\sqrt{z}\, b+\frac{1}{2}(2e-4 i g k+2 i g \nu)+(i f \nu-2 i f k) z}}{i f \nu-2 i f k} + \frac{e^{\sqrt{z}\, b+\frac{1}{2}(2e+4 i g k-2 i g \nu)+(2 i f k-i f \nu) z}}{2 i f k-i f \nu} - \frac{b\, e^{\frac{i b^2}{4 f(2k-\nu)}+e+2 i g k-i g \nu} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(2 i f k-i f \nu)\sqrt{z}}{2\sqrt{2 i f k-i f \nu}}\right)}{2(2 i f k-i f \nu)^{3/2}} \right) + \frac{2^{1-\nu} e^{\sqrt{z}\, b+e}\left(b\sqrt{z}-1\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b^2} /; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+d z} \cos^\nu(f z+g)$

01.07.21.1702.01

$$\int e^{b z^2+d z} \cos^\nu(g+f z)\, dz = \frac{2^{-\nu-1} e^{-\frac{d^2}{4b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d+2 b z}{2\sqrt{b}}\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1}\sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{-\frac{(d+f i(\nu-2k))^2}{4b}+g i(\nu-2k)} \operatorname{erfi}\left(\frac{d-2 i f k+i f \nu+2 b z}{2\sqrt{b}}\right)}{\sqrt{b}} - \frac{e^{\frac{1}{4}\left(-\frac{(d+2 i f k-i f \nu)^2}{b}+8 i g k-4 i g \nu\right)} \operatorname{erf}\left(\frac{d+2 i f k-i f \nu+2 b z}{2\sqrt{-b}}\right)}{\sqrt{-b}} \right) /; \nu \in \mathbb{N}^+$$

01.07.21.1703.01

$$\int e^{\sqrt{z}\, b+d z} \cos^\nu(g+f z)\, dz = 2^{-\nu}\left(\frac{e^{\sqrt{z}\, b+d z}}{d} - \frac{b\, e^{-\frac{b^2}{4 d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2 d \sqrt{z}}{2\sqrt{d}}\right)}{2 d^{3/2}}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)+$$

$$2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{e^{\sqrt{z}\, b+\frac{1}{2}(2 i g \nu-4 i g k)+(d-2 i f k+i f \nu) z}}{d-2 i f k+i f \nu} - \frac{b\, e^{-\frac{b^2}{4(d+f i(\nu-2k))}-2 i g k+i g \nu} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(d-2 i f k+i f \nu)\sqrt{z}}{2\sqrt{d+f i(\nu-2k)}}\right)}{2(d-2 i f k+i f \nu)^{3/2}}+\right.$$

$$\left.\frac{e^{\sqrt{z}\, b+\frac{1}{2}(4 i g k-2 i g \nu)+(d+2 i f k-i f \nu) z}}{d+2 i f k-i f \nu} - \frac{b\, e^{-\frac{b^2}{4(d+f i(2k-\nu))}+2 i g k-i g \nu} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(d+2 i f k-i f \nu)\sqrt{z}}{2\sqrt{d+2 i f k-i f \nu}}\right)}{2(d+2 i f k-i f \nu)^{3/2}}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \cos^\nu(f z+g)$

01.07.21.1704.01

$$\int e^{b z^2+d z+e} \cos^\nu(g+f z)\, dz = \frac{2^{-\nu-1} e^{e-\frac{d^2}{4b}} \sqrt{\pi}\binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d+2 b z}{2\sqrt{b}}\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1}\sqrt{\pi}$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{e^{-\frac{(d+f i(\nu-2k))^2}{4b}+e+g i(\nu-2k)} \operatorname{erfi}\left(\frac{d-2 i f k+i f \nu+2 b z}{2\sqrt{b}}\right)}{\sqrt{b}} - \frac{e^{\frac{1}{4}\left(-\frac{(d+2 i f k-i f \nu)^2}{b}+4 e+8 i g k-4 i g \nu\right)} \operatorname{erf}\left(\frac{d+2 i f k-i f \nu+2 b z}{2\sqrt{-b}}\right)}{\sqrt{-b}}\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1705.01

$$\int e^{\sqrt{z}\, b+d z+e} \cos^\nu(f z+g)\, dz =$$

$$2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{e^{\sqrt{z}\, b+\frac{1}{2}(2 e-4 i g k+2 i g \nu)+(d-2 i f k+i f \nu) z}}{d-2 i f k+i f \nu} - \frac{b\, e^{-\frac{b^2}{4(d+f i(\nu-2k))}+e-2 i g k+i g \nu} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(d-2 i f k+i f \nu)\sqrt{z}}{2\sqrt{d+f i(\nu-2k)}}\right)}{2(d-2 i f k+i f \nu)^{3/2}}+\right.$$

$$\left.\frac{e^{\sqrt{z}\, b+\frac{1}{2}(2 e+4 i g k-2 i g \nu)+(d+2 i f k-i f \nu) z}}{d+2 i f k-i f \nu} - \frac{b\, e^{-\frac{b^2}{4(d+f i(2k-\nu))}+e+2 i g k-i g \nu} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(d+2 i f k-i f \nu)\sqrt{z}}{2\sqrt{d+2 i f k-i f \nu}}\right)}{2(d+2 i f k-i f \nu)^{3/2}}\right)+$$

$$2^{-\nu}\left(\frac{e^{\sqrt{z}\, b+e+d z}}{d} - \frac{b\, e^{e-\frac{b^2}{4d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2 d\sqrt{z}}{2\sqrt{d}}\right)}{2 d^{3/2}}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{bz}\cos^{\nu}(c z^r)$

01.07.21.1706.01

$$\int e^{bz}\cos^{\nu}(c z^2)\,dz = \frac{e^{bz}(1-\nu \bmod 2)}{2^{\nu} b}\binom{\nu}{\frac{\nu}{2}} + \frac{2^{-\nu-1}\sqrt{\pi}}{\sqrt{i c}}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{\nu-2k}}\,e^{\frac{b^2}{8ick-4ic\nu}}\binom{\nu}{k}\left(e^{\frac{b^2}{2ic\nu-4ick}}\operatorname{erf}\left(\frac{2ic(\nu-2k)z-b}{2\sqrt{ic}\sqrt{\nu-2k}}\right)+\operatorname{erfi}\left(\frac{b+2ci(\nu-2k)z}{2\sqrt{ic}\sqrt{\nu-2k}}\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.07.21.1707.01

$$\int e^{bz}\cos^{\nu}(c\sqrt{z})\,dz = \frac{e^{bz}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{2^{\nu} b} + \frac{1}{b^{3/2}}\left(2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{\frac{(4k^2+\nu^2)c^2}{4b}+i(2k-\nu)\sqrt{z}\,c}\binom{\nu}{k}\left(-i c\, e^{ic\left(\frac{ick\nu}{b}+(\nu-2k)\sqrt{z}\right)}\sqrt{\pi}\,(2k-\nu)\left(\operatorname{erfi}\left(\frac{2\sqrt{z}\,b+2ick-ic\nu}{2\sqrt{b}}\right)+\operatorname{erfi}\left(\frac{-2\sqrt{z}\,b+2ick-ic\nu}{2\sqrt{b}}\right)\right)+2\sqrt{b}\,e^{bz-\frac{c^2(4k^2+\nu^2)}{4b}}+2\sqrt{b}\,e^{-\frac{(4k^2+\nu^2)c^2}{4b}+2i(\nu-2k)\sqrt{z}\,c+bz}\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $e^{bz+e}\cos^{\nu}(c z^r)$

01.07.21.1708.01

$$\int e^{bz+e}\cos^{\nu}(c z^2)\,dz = \frac{e^{bz+e}(1-\nu \bmod 2)}{2^{\nu} b}\binom{\nu}{\frac{\nu}{2}} + \frac{2^{-\nu-1}\sqrt{\pi}}{\sqrt{i c}}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{\nu-2k}}\,e^{\frac{b^2}{8ick-4ic\nu}+e}\binom{\nu}{k}\left(e^{\frac{b^2}{2ic\nu-4ick}}\operatorname{erf}\left(\frac{2ic(\nu-2k)z-b}{2\sqrt{ic}\sqrt{\nu-2k}}\right)+\operatorname{erfi}\left(\frac{b+2ci(\nu-2k)z}{2\sqrt{ic}\sqrt{\nu-2k}}\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.07.21.1709.01

$$\int e^{e+bz}\cos^{\nu}(c\sqrt{z})\,dz = \frac{e^{e+bz}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{2^{\nu} b} + \frac{1}{b^{3/2}}\left(2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{\frac{(4k^2+\nu^2)c^2}{4b}+i(2k-\nu)\sqrt{z}\,c+e}\binom{\nu}{k}\left(-i c\, e^{ic\left(\frac{ick\nu}{b}+(\nu-2k)\sqrt{z}\right)}\sqrt{\pi}\,(2k-\nu)\left(\operatorname{erfi}\left(\frac{2\sqrt{z}\,b+2ick-ic\nu}{2\sqrt{b}}\right)+\operatorname{erfi}\left(\frac{-2\sqrt{z}\,b+2ick-ic\nu}{2\sqrt{b}}\right)\right)+2\sqrt{b}\,e^{bz-\frac{c^2(4k^2+\nu^2)}{4b}}+2\sqrt{b}\,e^{-\frac{(4k^2+\nu^2)c^2}{4b}+2i(\nu-2k)\sqrt{z}\,c+bz}\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $e^{b z^r}\cos^{\nu}(c z^r)$

01.07.21.1710.01

$$\int e^{b z^r} \cos^v(c z^r)\, dz = -\frac{2^{-v} z (-b z^r)^{-1/r} (1 - v \bmod 2)}{r} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right) - \frac{2^{-v} z}{r} \sum_{i=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{i} \left(\Gamma\left(\frac{1}{r}, (i c (v - 2 i) - b) z^r\right) ((i c (v - 2 i) - b) z^r)^{-1/r} + ((-b - i c (v - 2 i)) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b - i c (v - 2 i)) z^r\right)\right) /; v \in \mathbb{N}^+$$

01.07.21.1711.01

$$\int e^{b z^2} \cos^v(c z^2)\, dz = \frac{2^{-v-1} \sqrt{\pi} (1 - v \bmod 2)}{\sqrt{b}} \binom{v}{\frac{v}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) + 2^{-v-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\sqrt{b + 2 i c s - i c v}\, (b + c i (v - 2 s)) \operatorname{erfi}\left(\sqrt{b + 2 i c s - i c v}\, z\right) + (b + 2 i c s - i c v) \sqrt{b + c i (v - 2 s)} \operatorname{erfi}\left(\sqrt{b + c i (v - 2 s)}\, z\right)\right) \Big/ ((b + 2 i c s - i c v)(b + c i (v - 2 s))) /; v \in \mathbb{N}^+$$

01.07.21.1712.01

$$\int e^{b \sqrt{z}} \cos^v\left(c \sqrt{z}\right) dz = \frac{2^{1-v} e^{b \sqrt{z}} \left(b \sqrt{z} - 1\right) (1 - v \bmod 2)}{b^2} \binom{v}{\frac{v}{2}} + 2^{1-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(e^{(b - 2 i c k + i c v) \sqrt{z}} \left(\frac{\sqrt{z}}{b - 2 i c k + i c v} - \frac{1}{(b - 2 i c k + i c v)^2}\right) + e^{(b + 2 i c k - i c v) \sqrt{z}} \left(\frac{\sqrt{z}}{b + 2 i c k - i c v} - \frac{1}{(b + 2 i c k - i c v)^2}\right)\right) /; v \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \cos^v(c z^r)$

01.07.21.1713.01

$$\int e^{b z^r + e} \cos^v(c z^r)\, dz = -\frac{2^{-v} e^e z (-b z^r)^{-1/r} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right) (1 - v \bmod 2)}{r} - \frac{2^{-v} z e^e}{r} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(\Gamma\left(\frac{1}{r}, (-b - 2 i c k + i c v) z^r\right) ((-b - 2 i c k + i c v) z^r)^{-1/r} + ((-b - i c (v - 2 k)) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b - i c (v - 2 k)) z^r\right)\right) /; v \in \mathbb{N}^+$$

01.07.21.1714.01

$$\int e^{b z^2 + e} \cos^v\left(c z^2\right) dz = \frac{2^{-v-1} e^e \sqrt{\pi} \binom{v}{\frac{v}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) (1 - v \bmod 2)}{\sqrt{b}} + 2^{-v-1} e^e \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(\frac{\operatorname{erfi}\left(\frac{2 b z - 4 i c k z + 2 i c v z}{2 \sqrt{b - 2 i c k + i c v}}\right)}{\sqrt{b - 2 i c k + i c v}} - \frac{\operatorname{erf}\left(\frac{2 b z + 4 i c k z - 2 i c v z}{2 \sqrt{-b - 2 i c k + i c v}}\right)}{\sqrt{-b - 2 i c k + i c v}}\right) /; v \in \mathbb{N}^+$$

01.07.21.1715.01

$$\int e^{\sqrt{z}\, b+e} \cos^{\nu}\left(c \sqrt{z}\right) dz = \frac{2^{1-\nu} e^{\sqrt{z}\, b+e} \left(b \sqrt{z} - 1\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{b^2} + 2^{2-\nu} e^{\sqrt{z}\, b+e} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\left(b^2 + c^2 (2k-\nu)^2\right)^2} \left(\binom{\nu}{k} \left(\left(\sqrt{z}\, b^3 - b^2 + c^2 (2k-\nu)^2 \sqrt{z}\, b + c^2 (2k-\nu)^2\right) \cos\left(c \sqrt{z}\, (2k-\nu)\right) + c (2k-\nu) \left(\sqrt{z}\, b^2 - 2b + c^2 (2k-\nu)^2 \sqrt{z}\right) \sin\left(c \sqrt{z}\, (2k-\nu)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z} \cos^{\nu}(c z^r)$

01.07.21.1716.01

$$\int e^{b z^2 + d z} \cos^{\nu}\left(c z^2\right) dz = \frac{2^{-\nu-1} \sqrt{\pi}\, (1 - \nu \bmod 2)}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} e^{-\frac{d^2}{4b}} \operatorname{erfi}\left(\frac{d + 2bz}{2\sqrt{b}}\right) + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{-\frac{d^2}{4(b - 2 i c k + i c \nu)}} \operatorname{erfi}\left(\frac{d + 2(b - 2 i c k + i c \nu) z}{2\sqrt{b + c i (\nu - 2k)}}\right)}{\sqrt{b + c i (\nu - 2k)}} - \frac{e^{\frac{d^2}{-4b - 8 i c k + 4 i c \nu}} \operatorname{erf}\left(\frac{d + 2(b + 2 i c k - i c \nu) z}{2\sqrt{i c (\nu - 2k) - b}}\right)}{\sqrt{i c (\nu - 2k) - b}}\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1717.01

$$\int e^{\sqrt{z}\, b + d z} \cos^{\nu}\left(c \sqrt{z}\right) dz = 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\frac{e^{\sqrt{z}\, b + d z}}{d} - \frac{b\, e^{-\frac{b^2}{4d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b + 2d\sqrt{z}}{2\sqrt{d}}\right)}{2 d^{3/2}}\right) (1 - \nu \bmod 2) + \frac{2^{-\nu-1}}{d^{3/2}} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-\frac{b^2 + 2 c i (2k+\nu) b - c^2 \left(4k^2 + \nu^2\right)}{4d}} \binom{\nu}{k} \left(-e^{\frac{\left(-k c^2 + i b c\right) \nu}{d}} \sqrt{\pi}\, (b + 2 i c k - i c \nu) \operatorname{erfi}\left(\frac{b + 2 i c k - i c \nu + 2 d \sqrt{z}}{2\sqrt{d}}\right) + 2\sqrt{d}\, e^{\frac{b^2 + 2\left(2\sqrt{z}\, d + c i (2k+\nu)\right) b - c^2 \left(4k^2 + \nu^2\right) + 4 d^2 z + 4 c d i (\nu - 2k) \sqrt{z}}{4d}} + 2\sqrt{d}\, e^{\frac{b^2 + 2\left(2\sqrt{z}\, d + c i (2k+\nu)\right) b - c^2 \left(4k^2 + \nu^2\right) + 4 d^2 z + 4 c d i (2k - \nu) \sqrt{z}}{4d}} - e^{\frac{i c k (2b + i c \nu)}{d}} \sqrt{\pi}\, (b + c i (\nu - 2k)) \operatorname{erfi}\left(\frac{b + c i (\nu - 2k) + 2 d \sqrt{z}}{2\sqrt{d}}\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z + e} \cos^{\nu}(c z^r)$

01.07.21.1718.01

$$\int e^{b z^2+d z+e} \cos^{\nu}\left(c z^2\right) dz = \frac{2^{-\nu-1}\sqrt{\pi}\,(1-\nu \bmod 2)}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} e^{e-\frac{d^2}{4b}} \operatorname{erfi}\left(\frac{d+2 b z}{2\sqrt{b}}\right) + 2^{-\nu-1} e^{e} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{-\frac{d^2}{4(b-2 i c k+i c \nu)}} \operatorname{erfi}\left(\frac{d+2(b-2 i c k+i c \nu) z}{2\sqrt{b+c\, i(\nu-2k)}}\right)}{\sqrt{b+c\, i\,(\nu-2k)}} - \frac{e^{\frac{d^2}{-4b-8 i c k+4 i c \nu}} \operatorname{erf}\left(\frac{d+2(b+2 i c k-i c \nu) z}{2\sqrt{i c(\nu-2k)-b}}\right)}{\sqrt{i\, c\,(\nu-2k)-b}} \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1719.01

$$\int e^{\sqrt{z}\, b+d z+e} \cos^{\nu}\left(c\sqrt{z}\right) dz = 2^{-\nu} \left(\frac{e^{\sqrt{z}\, b+e+d z}}{d} - \frac{b\, e^{e-\frac{b^2}{4d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2 d\sqrt{z}}{2\sqrt{d}}\right)}{2 d^{3/2}} \right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) + \frac{1}{d^{3/2}} \left(2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-\frac{b^2+2 c i(2k+\nu) b-4 d e-c^2\left(4k^2+\nu^2\right)}{4d}} \binom{\nu}{k} \left(-e^{\frac{\left(i b c-c^2 k\right)\nu}{d}} \sqrt{\pi}\,(b+2 i c k-i c \nu) \operatorname{erfi}\left(\frac{b+2 i c k-i c \nu+2 d\sqrt{z}}{2\sqrt{d}}\right) + 2\sqrt{d}\, e^{\frac{b^2+2\left(2\sqrt{z}\, d+c\, i(2k+\nu)\right) b-c^2\left(4k^2+\nu^2\right)+4 d^2 z+4 c d\, i(2k-\nu)\sqrt{z}}{4d}} + 2\sqrt{d}\, e^{\frac{b^2+2\left(2\sqrt{z}\, d+c\, i(2k+\nu)\right) b-c^2\left(4k^2+\nu^2\right)+4 d^2 z+4 c d\, i(\nu-2k)\sqrt{z}}{4d}} - e^{\frac{i c k(2b+i c \nu)}{d}} \sqrt{\pi}\,(b+c\, i\,(\nu-2k)) \operatorname{erfi}\left(\frac{b+c\, i\,(\nu-2k)+2 d\sqrt{z}}{2\sqrt{d}}\right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{d z} \cos^{\nu}\left(c z^r + g\right)$

01.07.21.1720.01

$$\int e^{d z} \cos^{\nu}\left(c z^2+g\right) dz = \frac{2^{-\nu} e^{d z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{d} + 2^{-\nu-1}\sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\frac{i d^2}{4c(\nu-2k)}+g\, i(\nu-2k)} \operatorname{erfi}\left(\frac{d-4 i c k z+2 i c \nu z}{2\sqrt{i c \nu-2 i c k}}\right)}{\sqrt{i c \nu-2 i c k}} - \frac{e^{\frac{1}{4}\left(-\frac{d^2}{2 i c k-i c \nu}+8 i g k-4 i g \nu\right)} \operatorname{erf}\left(\frac{d+4 i c k z-2 i c \nu z}{2\sqrt{i c \nu-2 i c k}}\right)}{\sqrt{i c \nu-2 i c k}} \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1721.01

$$\int e^{d z} \cos^{\nu}\left(\sqrt{z}\; c+g\right) dz = \frac{2^{-\nu} e^{d z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{d} + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{2 e^{d z} \cos\left((2k-\nu)\left(\sqrt{z}\; c+g\right)\right)}{d} - \frac{e^{\frac{c^2 (2k-\nu)^2}{4d}+2 i g k - i g \nu} \sqrt{\pi}\; (2 i c k - i c \nu) \operatorname{erfi}\left(\frac{2\sqrt{z}\; d + c i (2k-\nu)}{2\sqrt{d}}\right)}{2 d^{3/2}} - \frac{i c e^{\frac{c^2 (\nu-2k)^2}{4d}-2 i g k + i g \nu} \sqrt{\pi}\; (\nu-2k) \operatorname{erfi}\left(\frac{2\sqrt{z}\; d + c i (\nu-2k)}{2\sqrt{d}}\right)}{2 d^{3/2}} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{d z+e} \cos^{\nu}(c z^r + g)$

01.07.21.1722.01

$$\int e^{d z+e} \cos^{\nu}\left(c z^2+g\right) dz = \frac{2^{-\nu} e^{e+d z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{d} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\frac{i d^2}{4 c (\nu-2k)}+e+g i (\nu-2k)} \operatorname{erfi}\left(\frac{d-4 i c k z+2 i c \nu z}{2\sqrt{i c \nu - 2 i c k}}\right)}{\sqrt{i c \nu - 2 i c k}} - \frac{e^{\frac{1}{4}\left(-\frac{d^2}{2 i c k - i c \nu}+4 e+8 i g k-4 i g \nu\right)} \operatorname{erf}\left(\frac{d+4 i c k z-2 i c \nu z}{2\sqrt{i c \nu - 2 i c k}}\right)}{\sqrt{i c \nu - 2 i c k}} \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1723.01

$$\int e^{d z+e} \cos^{\nu}\left(\sqrt{z}\; c+g\right) dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{2 e^{e+d z} \cos\left((2k-\nu)\left(\sqrt{z}\; c+g\right)\right)}{d} - \frac{e^{\frac{c^2 (2k-\nu)^2}{4d}+e+2 i g k - i g \nu} \sqrt{\pi}\; (2 i c k - i c \nu) \operatorname{erfi}\left(\frac{2\sqrt{z}\; d + c i (2k-\nu)}{2\sqrt{d}}\right)}{2 d^{3/2}} - \frac{i c e^{\frac{c^2 (\nu-2k)^2}{4d}+e-2 i g k + i g \nu} \sqrt{\pi}\; (\nu-2k) \operatorname{erfi}\left(\frac{2\sqrt{z}\; d + c i (\nu-2k)}{2\sqrt{d}}\right)}{2 d^{3/2}} \right) + \frac{2^{-\nu} e^{e+d z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{d} /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r} \cos^{\nu}(c z^r + g)$

01.07.21.1724.01

$$\int e^{b z^r} \cos^\nu(c z^r + g)\, dz = -\frac{2^{-\nu} z (-b z^r)^{-1/r} (1 - \nu \bmod 2)}{r} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right) - \frac{2^{-\nu} z}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-2 i g k - i g \nu} \binom{\nu}{k} \left(e^{4 i g k} \Gamma\left(\frac{1}{r}, (-b - 2 i c k + i c \nu) z^r\right) ((-b - 2 i c k + i c \nu) z^r)^{-1/r} + e^{2 i g \nu} ((-b - i c (\nu - 2k)) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b - i c (\nu - 2k)) z^r\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1725.01

$$\int e^{b z^2} \cos^\nu(c z^2 + g)\, dz = \frac{2^{-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) (1 - \nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{g i (\nu - 2k)} \operatorname{erfi}\left(\frac{2 b z - 4 i c k z + 2 i c \nu z}{2 \sqrt{b - 2 i c k + i c \nu}}\right)}{\sqrt{b - 2 i c k + i c \nu}} - \frac{e^{2 i g k - i g \nu} \operatorname{erf}\left(\frac{2 b z + 4 i c k z - 2 i c \nu z}{2 \sqrt{-b - 2 i c k + i c \nu}}\right)}{\sqrt{-b - 2 i c k + i c \nu}}\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1726.01

$$\int e^{\sqrt{z}\, b} \cos^\nu\left(\sqrt{z}\, c + g\right) dz = \frac{2^{1-\nu} e^{\sqrt{z}\, b} \left(b \sqrt{z} - 1\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{b^2} + 2^{2-\nu} e^{\sqrt{z}\, b} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\left(b^2 + c^2 (2k - \nu)^2\right)^2} \left(\binom{\nu}{k} \left(\left(\sqrt{z}\, b^3 - b^2 + c^2 (2k - \nu)^2 \sqrt{z}\, b + c^2 (2k - \nu)^2\right) \cos\left(c \sqrt{z}\, (2k - \nu) - g (\nu - 2k)\right) + c (2k - \nu) \left(\sqrt{z}\, b^2 - 2b + c^2 (2k - \nu)^2 \sqrt{z}\right) \sin\left(c \sqrt{z}\, (2k - \nu) - g (\nu - 2k)\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \cos^\nu(c z^r + g)$

01.07.21.1727.01

$$\int e^{b z^r + e} \cos^\nu(c z^r + g)\, dz = -\frac{2^{-\nu} e^e z (-b z^r)^{-1/r} (1 - \nu \bmod 2)}{r} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right) - \frac{2^{-\nu} z}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{e - 2 i g k - i g \nu} \binom{\nu}{k} \left(e^{4 i g k} \Gamma\left(\frac{1}{r}, (-b - 2 i c k + i c \nu) z^r\right) ((-b - 2 i c k + i c \nu) z^r)^{-1/r} + e^{2 i g \nu} ((-b - i c (\nu - 2k)) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b - i c (\nu - 2k)) z^r\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1728.01

$$\int e^{b z^2+e} \cos^\nu(c z^2+g)\, dz = \frac{2^{-\nu-1} e^e \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) (1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{e+g i(\nu-2k)} \operatorname{erfi}\left(\frac{2bz-4ickz+2icvz}{2\sqrt{b-2ick+icv}}\right)}{\sqrt{b-2ick+icv}} - \frac{e^{e+2igk-igv} \operatorname{erf}\left(\frac{2bz+4ickz-2icvz}{2\sqrt{-b-2ick+icv}}\right)}{\sqrt{-b-2ick+icv}} \right) /; \nu \in \mathbb{N}^+$$

01.07.21.1729.01

$$\int e^{\sqrt{z}\, b+e} \cos^\nu\left(\sqrt{z}\, c+g\right) dz = \frac{2^{1-\nu} e^{\sqrt{z}\, b+e} \left(b\sqrt{z}-1\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{b^2} + 2^{2-\nu} e^{\sqrt{z}\, b+e} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\left(b^2+c^2(2k-\nu)^2\right)^2} \left(\binom{\nu}{k} \left(\left(\sqrt{z}\, b^3 - b^2 + c^2 (2k-\nu)^2 \sqrt{z}\, b + c^2 (2k-\nu)^2\right) \cos\left(c\sqrt{z}\,(2k-\nu) - g(\nu-2k)\right) + c(2k-\nu)\left(\sqrt{z}\, b^2 - 2b + c^2(2k-\nu)^2 \sqrt{z}\right) \sin\left(c\sqrt{z}\,(2k-\nu) - g(\nu-2k)\right) \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z} \cos^\nu(c z^r + g)$

01.07.21.1730.01

$$\int e^{b z^2+d z} \cos^\nu(c z^2+g)\, dz = \frac{2^{-\nu-1} e^{-\frac{d^2}{4b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d+2bz}{2\sqrt{b}}\right) (1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{-\frac{d^2}{4(b+ci(\nu-2k))}+gi(\nu-2k)} \operatorname{erfi}\left(\frac{d+2bz-4ickz+2icvz}{2\sqrt{b-2ick+icv}}\right)}{\sqrt{b-2ick+icv}} - \frac{e^{\frac{1}{4}\left(-\frac{d^2}{b+2ick-icv}+8igk-4igv\right)} \operatorname{erf}\left(\frac{d+2bz+4ickz-2icvz}{2\sqrt{-b-2ick+icv}}\right)}{\sqrt{-b-2ick+icv}} \right) /; \nu \in \mathbb{N}^+$$

01.07.21.1731.01

$$\int e^{\sqrt{z}\, b+d\, z} \cos^\nu\left(\sqrt{z}\, c+g\right) dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\sqrt{z}\,(b-2\,i\,c\,k+i\,c\,\nu)+\frac{1}{2}(-4\,i\,g\,k+2\,i\,g\,\nu)+d\,z}}{d} + \frac{e^{\sqrt{z}\,(b+2\,i\,c\,k-i\,c\,\nu)+\frac{1}{2}(4\,i\,g\,k-2\,i\,g\,\nu)+d\,z}}{d} - \frac{1}{2\,d^{3/2}} \left(e^{-\frac{(b+c\,i\,(2\,k-\nu))^2}{4\,d}+2\,i\,g\,k-i\,g\,\nu} \sqrt{\pi}\, (b+2\,i\,c\,k-i\,c\,\nu)\, \mathrm{erfi}\left(\frac{b+c\,i\,(2\,k-\nu)+2\,d\,\sqrt{z}}{2\,\sqrt{d}} \right) \right) - \frac{e^{-\frac{(b+c\,i\,(\nu-2\,k))^2}{4\,d}-2\,i\,g\,k+i\,g\,\nu} \sqrt{\pi}\, (b+c\,i\,(\nu-2\,k))\, \mathrm{erfi}\left(\frac{b+c\,i\,(\nu-2\,k)+2\,d\,\sqrt{z}}{2\,\sqrt{d}} \right)}{2\,d^{3/2}} \right) + 2^{-\nu} \left(\frac{e^{\sqrt{z}\, b+d\, z}}{d} - \frac{b\, e^{-\frac{b^2}{4\,d}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\,d\,\sqrt{z}}{2\,\sqrt{d}} \right)}{2\,d^{3/2}} \right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \;/;\; \nu \in \mathbb{N}^+$$

Involving $e^{b\,z^r+d\,z+e} \cos^\nu\left(c\,z^r+g\right)$

01.07.21.1732.01

$$\int e^{b\,z^2+d\,z+e} \cos^\nu\left(c\,z^2+g\right) dz = \frac{2^{-\nu-1}\, e^{e-\frac{d^2}{4\,b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \mathrm{erfi}\left(\frac{d+2\,b\,z}{2\,\sqrt{b}} \right) (1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{-\frac{d^2}{4\,(b+c\,i\,(\nu-2\,k))}+e+g\,i\,(\nu-2\,k)}\, \mathrm{erfi}\left(\frac{d+2\,b\,z-4\,i\,c\,k\,z+2\,i\,c\,\nu\,z}{2\,\sqrt{b-2\,i\,c\,k+i\,c\,\nu}} \right)}{\sqrt{b-2\,i\,c\,k+i\,c\,\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{d^2}{b+2\,i\,c\,k-i\,c\,\nu}+4\,e+8\,i\,g\,k-4\,i\,g\,\nu\right)}\, \mathrm{erf}\left(\frac{d+2\,b\,z+4\,i\,c\,k\,z-2\,i\,c\,\nu\,z}{2\,\sqrt{-b-2\,i\,c\,k+i\,c\,\nu}} \right)}{\sqrt{-b-2\,i\,c\,k+i\,c\,\nu}} \right) \;/;\; \nu \in \mathbb{N}^+$$

01.07.21.1733.01

$$\int e^{\sqrt{z}\, b+d\,z+e} \cos^{\nu}\!\left(\sqrt{z}\, c+g\right) dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\sqrt{z}\,(b-2\,i\,c\,k+i\,c\,\nu)+\frac{1}{2}(2\,e-4\,i\,g\,k+2\,i\,g\,\nu)+d\,z}}{d} + \frac{e^{\sqrt{z}\,(b+2\,i\,c\,k-i\,c\,\nu)+\frac{1}{2}(2\,e+4\,i\,g\,k-2\,i\,g\,\nu)+d\,z}}{d} - \frac{1}{2\,d^{3/2}} \left(e^{-\frac{(b+c\,i\,(2\,k-\nu))^2}{4\,d}+e+2\,i\,g\,k-i\,g\,\nu} \sqrt{\pi}\, (b+2\,i\,c\,k-i\,c\,\nu) \operatorname{erfi}\!\left(\frac{b+c\,i\,(2\,k-\nu)+2\,d\,\sqrt{z}}{2\,\sqrt{d}} \right) \right) - \frac{e^{-\frac{(b+c\,i\,(\nu-2\,k))^2}{4\,d}+e-2\,i\,g\,k+i\,g\,\nu} \sqrt{\pi}\, (b+c\,i\,(\nu-2\,k)) \operatorname{erfi}\!\left(\frac{b+c\,i\,(\nu-2\,k)+2\,d\,\sqrt{z}}{2\,\sqrt{d}} \right)}{2\,d^{3/2}} \right) + 2^{-\nu} \left(\frac{e^{\sqrt{z}\,b+e+d\,z}}{d} - \frac{b\,e^{e-\frac{b^2}{4\,d}} \sqrt{\pi}\, \operatorname{erfi}\!\left(\frac{b+2\,d\,\sqrt{z}}{2\,\sqrt{d}} \right)}{2\,d^{3/2}} \right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \;/;\; \nu \in \mathbb{N}^+$$

Involving $e^{d\,z} \cos^{\nu}\!\left(c\,z^r+f\,z\right)$

01.07.21.1734.01

$$\int e^{d\,z} \cos^{\nu}\!\left(c\,z^2+f\,z\right) dz = \frac{2^{-\nu}\, e^{d\,z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{d} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\frac{i\,(d+f\,i\,(\nu-2\,k))^2}{4\,c\,(\nu-2\,k)}} \operatorname{erfi}\!\left(\frac{d-2\,i\,f\,k+i\,f\,\nu-4\,i\,c\,k\,z+2\,i\,c\,\nu\,z}{2\,\sqrt{i\,c\,\nu-2\,i\,c\,k}} \right)}{\sqrt{i\,c\,\nu-2\,i\,c\,k}} - \frac{e^{-\frac{(d+2\,i\,f\,k-i\,f\,\nu)^2}{4\,(2\,i\,c\,k-i\,c\,\nu)}} \operatorname{erf}\!\left(\frac{d+2\,i\,f\,k-i\,f\,\nu+4\,i\,c\,k\,z-2\,i\,c\,\nu\,z}{2\,\sqrt{i\,c\,\nu-2\,i\,c\,k}} \right)}{\sqrt{i\,c\,\nu-2\,i\,c\,k}} \right) /;\; \nu \in \mathbb{N}^+$$

01.07.21.1735.01

$$\int e^{d z} \cos^{\nu}\left(\sqrt{z}\, c + f z\right) dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{(d-2 i f k + i f \nu) z + (i c \nu - 2 i c k)\sqrt{z}}}{d - 2 i f k + i f \nu} - \frac{i c\, e^{\frac{c^2 (\nu-2k)^2}{4 (d + f i (\nu - 2k))}} \sqrt{\pi}\, (\nu - 2k) \operatorname{erfi}\left(\frac{c i (\nu - 2k) + 2 (d - 2 i f k + i f \nu) \sqrt{z}}{2 \sqrt{d + f i (\nu - 2k)}} \right)}{2 (d - 2 i f k + i f \nu)^{3/2}} + \frac{e^{(d + 2 i f k - i f \nu) z + (2 i c k - i c \nu)\sqrt{z}}}{d + 2 i f k - i f \nu} - \frac{e^{\frac{c^2 (2k-\nu)^2}{4 (d + f i (2k - \nu))}} \sqrt{\pi}\, (2 i c k - i c \nu) \operatorname{erfi}\left(\frac{c i (2k - \nu) + 2 (d + 2 i f k - i f \nu) \sqrt{z}}{2 \sqrt{d + 2 i f k - i f \nu}} \right)}{2 (d + 2 i f k - i f \nu)^{3/2}} \right) + \frac{2^{-\nu} e^{d z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{d} \;/;\; \nu \in \mathbb{N}^+$$

Involving $e^{d z + e} \cos^{\nu}\left(c z^r + f z\right)$

01.07.21.1736.01

$$\int e^{d z + e} \cos^{\nu}\left(c z^2 + f z\right) dz = \frac{2^{-\nu} e^{e + d z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{d} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\frac{i (d + f i (\nu - 2k))^2}{4 c (\nu - 2k)} + e} \operatorname{erfi}\left(\frac{d - 2 i f k + i f \nu - 4 i c k z + 2 i c \nu z}{2 \sqrt{i c \nu - 2 i c k}} \right)}{\sqrt{i c \nu - 2 i c k}} - \frac{e^{\frac{1}{4}\left(-\frac{(d + 2 i f k - i f \nu)^2}{2 i c k - i c \nu} + 4 e \right)} \operatorname{erf}\left(\frac{d + 2 i f k - i f \nu + 4 i c k z - 2 i c \nu z}{2 \sqrt{i c \nu - 2 i c k}} \right)}{\sqrt{i c \nu - 2 i c k}} \right) \;/;\; \nu \in \mathbb{N}^+$$

01.07.21.1737.01

$$\int e^{d z + e} \cos^{\nu}\left(\sqrt{z}\, c + f z\right) dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{e + (d - 2 i f k + i f \nu) z + (i c \nu - 2 i c k)\sqrt{z}}}{d - 2 i f k + i f \nu} - \frac{i c\, e^{\frac{c^2 (\nu-2k)^2}{4 (d + f i (\nu - 2k))} + e} \sqrt{\pi}\, (\nu - 2k) \operatorname{erfi}\left(\frac{c i (\nu - 2k) + 2 (d - 2 i f k + i f \nu) \sqrt{z}}{2 \sqrt{d + f i (\nu - 2k)}} \right)}{2 (d - 2 i f k + i f \nu)^{3/2}} + \frac{e^{e + (d + 2 i f k - i f \nu) z + (2 i c k - i c \nu)\sqrt{z}}}{d + 2 i f k - i f \nu} - \left(e^{\frac{c^2 (2k-\nu)^2}{4 (d + f i (2k - \nu))} + e} \sqrt{\pi}\, (2 i c k - i c \nu) \operatorname{erfi}\left(\frac{c i (2k - \nu) + 2 (d + 2 i f k - i f \nu) \sqrt{z}}{2 \sqrt{d + 2 i f k - i f \nu}} \right) \right) \Big/ \left(2 (d + 2 i f k - i f \nu)^{3/2} \right) \right) + \frac{2^{-\nu} e^{e + d z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{d} \;/;\; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r} \cos^\nu(c z^r + f z)$

01.07.21.1738.01

$$\int e^{b z^2} \cos^\nu(c z^2 + f z)\, dz = \frac{2^{-\nu-1}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}\operatorname{erfi}\left(\sqrt{b}\, z\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1}\sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{e^{\frac{f^2(\nu-2k)^2}{4(b+c i(\nu-2k))}}\operatorname{erfi}\left(\frac{-2 f i k-4 i c z k+i f \nu+2 b z+2 i c \nu z}{2\sqrt{b-2 i c k+i c \nu}}\right)}{\sqrt{b-2 i c k+i c \nu}} - \frac{e^{-\frac{(2 i f k-i f \nu)^2}{4(b+2 i c k-i c \nu)}}\operatorname{erf}\left(\frac{2 i f k+4 i c z k-i f \nu+2 b z-2 i c \nu z}{2\sqrt{-b-2 i c k+i c \nu}}\right)}{\sqrt{-b-2 i c k+i c \nu}}\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1739.01

$$\int e^{\sqrt{z}\, b}\cos^\nu\left(\sqrt{z}\, c + f z\right) dz = 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{e^{(i f \nu-2 i f k) z+(b-2 i c k+i c \nu)\sqrt{z}}}{i f \nu-2 i f k} - \frac{e^{\frac{i(b+c i(\nu-2k))^2}{4 f(\nu-2k)}}\sqrt{\pi}\,(b+c i(\nu-2k))\operatorname{erfi}\left(\frac{b+c i(\nu-2k)+2(i f \nu-2 i f k)\sqrt{z}}{2\sqrt{i f(\nu-2k)}}\right)}{2(i f \nu-2 i f k)^{3/2}} + \frac{e^{(2 i f k-i f \nu) z+(b+2 i c k-i c \nu)\sqrt{z}}}{2 i f k-i f \nu} - \left(e^{\frac{i(b+c i(2k-\nu))^2}{4 f(2k-\nu)}}\sqrt{\pi}\,(b+2 i c k-i c \nu)\operatorname{erfi}\left(\frac{b+c i(2k-\nu)+2(2 i f k-i f \nu)\sqrt{z}}{2\sqrt{2 i f k-i f \nu}}\right)\right)\Big/\left(2(2 i f k-i f \nu)^{3/2}\right)\right) + \frac{2^{1-\nu} e^{\sqrt{z}\, b}\left(b\sqrt{z}-1\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b^2} /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \cos^\nu(c z^r + f z)$

01.07.21.1740.01

$$\int e^{b z^2+e}\cos^\nu(c z^2 + f z)\, dz = \frac{2^{-\nu-1} e^{e}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}\operatorname{erfi}\left(\sqrt{b}\, z\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{e^{\frac{f^2(\nu-2k)^2}{4(b+c i(\nu-2k))}+e}\operatorname{erfi}\left(\frac{-2 f i k-4 i c z k+i f \nu+2 b z+2 i c \nu z}{2\sqrt{b-2 i c k+i c \nu}}\right)}{\sqrt{b-2 i c k+i c \nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(2 i f k-i f \nu)^2}{b+2 i c k-i c \nu}+4 e\right)}\operatorname{erf}\left(\frac{2 i f k+4 i c z k-i f \nu+2 b z-2 i c \nu z}{2\sqrt{-b-2 i c k+i c \nu}}\right)}{\sqrt{-b-2 i c k+i c \nu}}\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1741.01

$$\int e^{\sqrt{z}\, b+e} \cos^{\nu}\left(\sqrt{z}\, c + f\, z\right) dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{e+(i f \nu - 2 i f k) z + (b - 2 i c k + i c \nu)\sqrt{z}}}{i f \nu - 2 i f k} - \frac{e^{\frac{i (b + c i (\nu - 2k))^2}{4 f (\nu - 2k)} + e} \sqrt{\pi}\, (b + c\, i\, (\nu - 2k))\, \mathrm{erfi}\left(\frac{b + c\, i\, (\nu - 2k) + 2 (i f \nu - 2 i f k)\sqrt{z}}{2 \sqrt{i f (\nu - 2k)}} \right)}{2 (i f \nu - 2 i f k)^{3/2}} + \frac{e^{e+(2 i f k - i f \nu) z + (b + 2 i c k - i c \nu)\sqrt{z}}}{2 i f k - i f \nu} - \left(e^{\frac{i (b + c i (2k - \nu))^2}{4 f (2k - \nu)} + e} \sqrt{\pi}\, (b + 2 i c k - i c \nu)\, \mathrm{erfi}\left(\frac{b + c\, i\, (2k - \nu) + 2 (2 i f k - i f \nu)\sqrt{z}}{2 \sqrt{2 i f k - i f \nu}} \right) \right) \Big/ \left(2 (2 i f k - i f \nu)^{3/2} \right) \right) + \frac{2^{1-\nu} e^{\sqrt{z}\, b+e} \left(b \sqrt{z} - 1 \right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{b^2} /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z} \cos^{\nu}\left(c z^r + f z\right)$

01.07.21.1742.01

$$\int e^{b z^2 + d z} \cos^{\nu}\left(c z^2 + f z\right) dz = \frac{2^{-\nu-1} e^{-\frac{d^2}{4b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \mathrm{erfi}\left(\frac{d + 2 b z}{2 \sqrt{b}} \right) (1 - \nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{-\frac{(d + f i (\nu - 2k))^2}{4 (b + c i (\nu - 2k))}}\, \mathrm{erfi}\left(\frac{d - 2 i f k + i f \nu + 2 b z - 4 i c k z + 2 i c \nu z}{2 \sqrt{b - 2 i c k + i c \nu}} \right)}{\sqrt{b - 2 i c k + i c \nu}} - \frac{e^{-\frac{(d + 2 i f k - i f \nu)^2}{4 (b + 2 i c k - i c \nu)}}\, \mathrm{erf}\left(\frac{d + 2 i f k - i f \nu + 2 b z + 4 i c k z - 2 i c \nu z}{2 \sqrt{-b - 2 i c k + i c \nu}} \right)}{\sqrt{-b - 2 i c k + i c \nu}} \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1743.01

$$\int e^{\sqrt{z}\, b+d z} \cos^{\nu}\left(\sqrt{z}\, c+f z\right) dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\sqrt{z}\,(b-2 i c k+i c \nu)+(d-2 i f k+i f \nu) z}}{d-2 i f k+i f \nu} - \frac{e^{-\frac{(b+c i (\nu-2k))^2}{4 (d+f i (\nu-2k))}} \sqrt{\pi}\, (b+c i (\nu-2k)) \operatorname{erfi}\left(\frac{b+c i (\nu-2k)+2 (d-2 i f k+i f \nu) \sqrt{z}}{2 \sqrt{d+f i (\nu-2k)}}\right)}{2 (d-2 i f k+i f \nu)^{3/2}} + \frac{e^{\sqrt{z}\,(b+2 i c k-i c \nu)+(d+2 i f k-i f \nu) z}}{d+2 i f k-i f \nu} - \left(e^{-\frac{(b+c i (2k-\nu))^2}{4 (d+f i (2k-\nu))}} \sqrt{\pi}\, (b+2 i c k-i c \nu) \operatorname{erfi}\left(\frac{b+c i (2k-\nu)+2 (d+2 i f k-i f \nu) \sqrt{z}}{2 \sqrt{d+2 i f k-i f \nu}}\right)\right) \Big/ \left(2 (d+2 i f k-i f \nu)^{3/2}\right) \right) + 2^{-\nu} \left(\frac{e^{\sqrt{z}\, b+d z}}{d} - \frac{b\, e^{-\frac{b^2}{4 d}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+2 d \sqrt{z}}{2 \sqrt{d}}\right)}{2 d^{3/2}} \right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \;/;\; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \cos^{\nu}\left(c z^r+f z\right)$

01.07.21.1744.01

$$\int e^{b z^2+d z+e} \cos^{\nu}\left(c z^2+f z\right) dz = \frac{2^{-\nu-1} e^{e-\frac{d^2}{4 b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d+2 b z}{2 \sqrt{b}}\right) (1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{e-\frac{(d+f i (\nu-2k))^2}{4 (b+c i (\nu-2k))}} \operatorname{erfi}\left(\frac{d-2 i f k+i f \nu+2 b z-4 i c k z+2 i c \nu z}{2 \sqrt{b-2 i c k+i c \nu}}\right)}{\sqrt{b-2 i c k+i c \nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(d+2 i f k-i f \nu)^2}{b+2 i c k-i c \nu}+4 e\right)} \operatorname{erf}\left(\frac{d+2 i f k-i f \nu+2 b z+4 i c k z-2 i c \nu z}{2 \sqrt{-b-2 i c k+i c \nu}}\right)}{\sqrt{-b-2 i c k+i c \nu}} \right) \;/;\; \nu \in \mathbb{N}^+$$

01.07.21.1745.01

$$\int e^{\sqrt{z}\, b+d z+e} \cos^{\nu}\left(\sqrt{z}\, c+f z\right) dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{e+(d-2 i f k+i f \nu) z+(b-2 i c k+i c \nu)\sqrt{z}}}{d-2 i f k+i f \nu} - \frac{e^{e-\frac{(b+c i(\nu-2k))^2}{4(d+f i(\nu-2k))}} \sqrt{\pi}\,(b+c i(\nu-2k))\, \mathrm{erfi}\left(\frac{b+c i(\nu-2k)+2(d-2 i f k+i f \nu)\sqrt{z}}{2\sqrt{d+f i(\nu-2k)}}\right)}{2(d-2 i f k+i f \nu)^{3/2}} + \frac{e^{e+(d+2 i f k-i f \nu) z+(b+2 i c k-i c \nu)\sqrt{z}}}{d+2 i f k-i f \nu} - \left(e^{e-\frac{(b+c i(2k-\nu))^2}{4(d+f i(2k-\nu))}} \sqrt{\pi}\,(b+2 i c k-i c \nu)\, \mathrm{erfi}\left(\frac{b+c i(2k-\nu)+2(d+2 i f k-i f \nu)\sqrt{z}}{2\sqrt{d+2 i f k-i f \nu}}\right)\right) \Big/ \left(2(d+2 i f k-i f \nu)^{3/2}\right) \right) + 2^{-\nu} \left(\frac{e^{\sqrt{z}\, b+e+d z}}{d} - \frac{b\, e^{e-\frac{b^2}{4d}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2 d\sqrt{z}}{2\sqrt{d}}\right)}{2 d^{3/2}} \right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \;/;\; \nu \in \mathbb{N}^+$$

Involving $e^{d z} \cos^{\nu}\left(c z^r + f z + g\right)$

01.07.21.1746.01

$$\int e^{d z} \cos^{\nu}\left(c z^2 + f z + g\right) dz = \frac{2^{-\nu} e^{d z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{d} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\frac{i(d+f i(\nu-2k))^2}{4c(\nu-2k)}+g i(\nu-2k)}\, \mathrm{erfi}\left(\frac{d-2 i f k+i f \nu-4 i c k z+2 i c \nu z}{2\sqrt{i c \nu-2 i c k}}\right)}{\sqrt{i c \nu-2 i c k}} - \frac{e^{\frac{1}{4}\left(-\frac{(d+2 i f k-i f \nu)^2}{2 i c k-i c \nu}+8 i g k-4 i g \nu\right)}\, \mathrm{erf}\left(\frac{d+2 i f k-i f \nu+4 i c k z-2 i c \nu z}{2\sqrt{i c \nu-2 i c k}}\right)}{\sqrt{i c \nu-2 i c k}} \right) \;/;\; \nu \in \mathbb{N}^+$$

01.07.21.1747.01

$$\int e^{d z} \cos^{\nu}\left(\sqrt{z}\, c + f z + g\right) dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\sqrt{z}\, (i c \nu - 2 i c k) + \frac{1}{2}(-4 i g k + 2 i g \nu) + (d - 2 i f k + i f \nu) z}}{d - 2 i f k + i f \nu} - \frac{i c\, e^{\frac{c^2 (\nu - 2k)^2}{4 (d + f i (\nu - 2k))} - 2 i g k + i g \nu} \sqrt{\pi}\, (\nu - 2k) \operatorname{erfi}\left(\frac{c\, i (\nu - 2k) + 2 (d - 2 i f k + i f \nu) \sqrt{z}}{2 \sqrt{d + f i (\nu - 2k)}} \right)}{2 (d - 2 i f k + i f \nu)^{3/2}} + \frac{e^{\sqrt{z}\, (2 i c k - i c \nu) + \frac{1}{2}(4 i g k - 2 i g \nu) + (d + 2 i f k - i f \nu) z}}{d + 2 i f k - i f \nu} - \left(e^{\frac{c^2 (2k - \nu)^2}{4 (d + f i (2k - \nu))} + 2 i g k - i g \nu} \sqrt{\pi}\, (2 i c k - i c \nu) \operatorname{erfi}\left(\frac{c\, i (2k - \nu) + 2 (d + 2 i f k - i f \nu) \sqrt{z}}{2 \sqrt{d + 2 i f k - i f \nu}} \right) \right) \Big/ \left(2 (d + 2 i f k - i f \nu)^{3/2} \right) \right) + \frac{2^{-\nu} e^{d z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{d} /;\ \nu \in \mathbb{N}^+$$

Involving $e^{d z + e} \cos^{\nu}\left(c z^r + f z + g\right)$

01.07.21.1748.01

$$\int e^{d z + e} \cos^{\nu}\left(c z^2 + f z + g\right) dz = \frac{2^{-\nu} e^{e + d z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{d} + 2^{-\nu - 1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\frac{i (d + f i (\nu - 2k))^2}{4 c (\nu - 2k)} + e + g i (\nu - 2k)} \operatorname{erfi}\left(\frac{d - 2 i f k + i f \nu - 4 i c k z + 2 i c \nu z}{2 \sqrt{i c \nu - 2 i c k}} \right)}{\sqrt{i c \nu - 2 i c k}} - \frac{e^{\frac{1}{4}\left(-\frac{(d + 2 i f k - i f \nu)^2}{2 i c k - i c \nu} + 4 e + 8 i g k - 4 i g \nu \right)} \operatorname{erf}\left(\frac{d + 2 i f k - i f \nu + 4 i c k z - 2 i c \nu z}{2 \sqrt{i c \nu - 2 i c k}} \right)}{\sqrt{i c \nu - 2 i c k}} \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1749.01

$$\int e^{d z+e} \cos^{v}\left(\sqrt{z}\, c + f z + g\right) dz = 2^{-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(\frac{e^{\sqrt{z}\,(i c v - 2 i c k) + \frac{1}{2}(2 e - 4 i g k + 2 i g v) + (d - 2 i f k + i f v) z}}{d - 2 i f k + i f v} - \left(i c\, e^{\frac{c^2 (v-2k)^2}{4 (d + f i (v-2k))} + e - 2 i g k + i g v} \sqrt{\pi}\, (v - 2k) \operatorname{erfi}\left(\frac{c i (v - 2k) + 2 (d - 2 i f k + i f v) \sqrt{z}}{2 \sqrt{d + f i (v - 2k)}} \right) \right) \Big/ \left(2 (d - 2 i f k + i f v)^{3/2} \right) + \frac{e^{\sqrt{z}\,(2 i c k - i c v) + \frac{1}{2}(2 e + 4 i g k - 2 i g v) + (d + 2 i f k - i f v) z}}{d + 2 i f k - i f v} - \left(e^{\frac{c^2 (2k - v)^2}{4 (d + f i (2k - v))} + e + 2 i g k - i g v} \sqrt{\pi}\, (2 i c k - i c v) \operatorname{erfi}\left(\frac{c i (2k - v) + 2 (d + 2 i f k - i f v) \sqrt{z}}{2 \sqrt{d + 2 i f k - i f v}} \right) \right) \Big/ \left(2 (d + 2 i f k - i f v)^{3/2} \right) \right) + \frac{2^{-v} e^{e + d z} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)}{d} \;/;\; v \in \mathbb{N}^{+}$$

Involving $e^{b z^r} \cos^{v}\left(c z^r + f z + g\right)$

01.07.21.1750.01

$$\int e^{b z^2} \cos^{v}\left(c z^2 + f z + g\right) dz = \frac{2^{-v-1} \sqrt{\pi} \binom{v}{\frac{v}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) (1 - v \bmod 2)}{\sqrt{b}} + 2^{-v-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(\frac{e^{\frac{f^2 (v-2k)^2}{4 (b + c i (v - 2k))} + g i (v - 2k)} \operatorname{erfi}\left(\frac{-2 f i k - 4 i c z k + i f v + 2 b z + 2 i c v z}{2 \sqrt{b - 2 i c k + i c v}} \right)}{\sqrt{b - 2 i c k + i c v}} - \frac{e^{\frac{1}{4}\left(-\frac{(2 i f k - i f v)^2}{b + 2 i c k - i c v} + 8 i g k - 4 i g v \right)} \operatorname{erf}\left(\frac{2 i f k + 4 i c z k - i f v + 2 b z - 2 i c v z}{2 \sqrt{-b - 2 i c k + i c v}} \right)}{\sqrt{-b - 2 i c k + i c v}} \right) \;/;\; v \in \mathbb{N}^{+}$$

01.07.21.1751.01

$$\int e^{b\sqrt{z}} \cos^{\nu}\left(\sqrt{z}\, c + f z + g\right) dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\sqrt{z}\,(b-2 i c k + i c \nu) + \frac{1}{2}(2 i g \nu - 4 i g k) + (i f \nu - 2 i f k) z}}{i f \nu - 2 i f k} - \left(e^{\frac{i (b + c i (\nu - 2k))^2}{4 f (\nu - 2k)} - 2 i g k + i g \nu} \sqrt{\pi}\, (b + c i (\nu - 2k)) \operatorname{erfi}\left(\frac{b + c i (\nu - 2k) + 2 (i f \nu - 2 i f k) \sqrt{z}}{2 \sqrt{i f (\nu - 2k)}} \right) \right) \Big/ \left(2 (i f \nu - 2 i f k)^{3/2} \right) + \frac{e^{\sqrt{z}\,(b + 2 i c k - i c \nu) + \frac{1}{2}(4 i g k - 2 i g \nu) + (2 i f k - i f \nu) z}}{2 i f k - i f \nu} - \left(e^{\frac{i (b + c i (2k - \nu))^2}{4 f (2k - \nu)} + 2 i g k - i g \nu} \sqrt{\pi}\, (b + 2 i c k - i c \nu) \operatorname{erfi}\left(\frac{b + c i (2k - \nu) + 2 (2 i f k - i f \nu) \sqrt{z}}{2 \sqrt{2 i f k - i f \nu}} \right) \right) \Big/ \left(2 (2 i f k - i f \nu)^{3/2} \right) \right) + \frac{2^{1-\nu} e^{b\sqrt{z}} \left(b \sqrt{z} - 1 \right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{b^2} \;/;\; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \cos^{\nu}\left(c z^r + f z + g\right)$

01.07.21.1752.01

$$\int e^{b z^2 + e} \cos^{\nu}\left(c z^2 + f z + g\right) dz = \frac{2^{-\nu-1} e^{e} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) (1 - \nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\frac{f^2 (\nu-2k)^2}{4 (b + c i (\nu - 2k))} + g i (\nu - 2k) + e} \operatorname{erfi}\left(\frac{-2 f i k - 4 i c z k + i f \nu + 2 b z + 2 i c \nu z}{2 \sqrt{b - 2 i c k + i c \nu}} \right)}{\sqrt{b - 2 i c k + i c \nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(2 i f k - i f \nu)^2}{b + 2 i c k - i c \nu} + 4 e + 8 i g k - 4 i g \nu \right)} \operatorname{erf}\left(\frac{2 i f k + 4 i c z k - i f \nu + 2 b z - 2 i c \nu z}{2 \sqrt{-b - 2 i c k + i c \nu}} \right)}{\sqrt{-b - 2 i c k + i c \nu}} \right) \;/;\; \nu \in \mathbb{N}^+$$

01.07.21.1753.01

$$\int e^{\sqrt{z}\, b+e} \cos^{\nu}\left(\sqrt{z}\, c + f z + g\right) dz = 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{\sqrt{z}\, (b-2 i c k+i c \nu)+\frac{1}{2}(2 e-4 i g k+2 i g \nu)+(i f \nu-2 i f k) z}}{i f \nu - 2 i f k} - \left(e^{\frac{i (b+c i (\nu-2k))^2}{4 f (\nu-2k)}+e-2 i g k+i g \nu} \sqrt{\pi}\, (b + c i (\nu - 2k)) \operatorname{erfi}\left(\frac{b + c i (\nu - 2k) + 2 (i f \nu - 2 i f k) \sqrt{z}}{2 \sqrt{i f (\nu - 2k)}} \right) \right) \Big/ \left(2 (i f \nu - 2 i f k)^{3/2}\right) + \frac{e^{\sqrt{z}\, (b+2 i c k-i c \nu)+\frac{1}{2}(2 e+4 i g k-2 i g \nu)+(2 i f k-i f \nu) z}}{2 i f k - i f \nu} - \left(e^{\frac{i (b+c i (2k-\nu))^2}{4 f (2k-\nu)}+e+2 i g k-i g \nu} \sqrt{\pi}\, (b + 2 i c k - i c \nu) \operatorname{erfi}\left(\frac{b + c i (2k - \nu) + 2 (2 i f k - i f \nu) \sqrt{z}}{2 \sqrt{2 i f k - i f \nu}} \right) \right) \Big/ \left(2 (2 i f k - i f \nu)^{3/2}\right) \right) + \frac{2^{1-\nu} e^{\sqrt{z}\, b+e} \left(b \sqrt{z} - 1\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{b^2} \;/;\; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z} \cos^{\nu}\left(c z^r + f z + g\right)$

01.07.21.1754.01

$$\int e^{b z^2 + d z} \cos^{\nu}\left(c z^2 + f z + g\right) dz = \frac{2^{-\nu-1} e^{-\frac{d^2}{4 b}} \sqrt{\pi}\, (1 - \nu \bmod 2)}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d + 2 b z}{2 \sqrt{b}} \right) + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{e^{-\frac{(d+f i (\nu-2k))^2}{4 (b+c i (\nu-2k))}+g i (\nu-2k)} \operatorname{erfi}\left(\frac{d-2 i f k+i f \nu+2 b z-4 i c k z+2 i c \nu z}{2 \sqrt{b-2 i c k+i c \nu}} \right)}{\sqrt{b - 2 i c k + i c \nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(d+2 i f k-i f \nu)^2}{b+2 i c k-i c \nu}+8 i g k-4 i g \nu\right)} \operatorname{erf}\left(\frac{d+2 i f k-i f \nu+2 b z+4 i c k z-2 i c \nu z}{2 \sqrt{-b-2 i c k+i c \nu}} \right)}{\sqrt{-b - 2 i c k + i c \nu}} \right) \;/;\; \nu \in \mathbb{N}^+$$

01.07.21.1755.01

$$\int e^{\sqrt{z}\, b+d z} \cos^{v}\left(\sqrt{z}\, c+f z+g\right) dz = 2^{-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(\frac{e^{\sqrt{z}\,(b-2 i c k+i c v)+\frac{1}{2}(-4 i g k+2 i g v)+(d-2 i f k+i f v) z}}{d-2 i f k+i f v} - \left(e^{-\frac{(b+c i (v-2 k))^2}{4 (d+f i (v-2 k))}-2 i g k+i g v} \sqrt{\pi}\, (b+c i (v-2 k)) \operatorname{erfi}\left(\frac{b+c i (v-2 k)+2 (d-2 i f k+i f v) \sqrt{z}}{2 \sqrt{d+f i (v-2 k)}} \right) \right) \Big/ \left(2 (d-2 i f k+i f v)^{3/2}\right) + \frac{e^{\sqrt{z}\,(b+2 i c k-i c v)+\frac{1}{2}(4 i g k-2 i g v)+(d+2 i f k-i f v) z}}{d+2 i f k-i f v} - \frac{1}{2 (d+2 i f k-i f v)^{3/2}} \left(e^{-\frac{(b+c i (2 k-v))^2}{4 (d+f i (2 k-v))}+2 i g k-i g v} \sqrt{\pi}\, (b+2 i c k-i c v) \operatorname{erfi}\left(\frac{b+c i (2 k-v)+2 (d+2 i f k-i f v) \sqrt{z}}{2 \sqrt{d+2 i f k-i f v}} \right) \right) \right) + 2^{-v} \left(\frac{e^{\sqrt{z}\, b+d z}}{d} - \frac{b\, e^{-\frac{b^2}{4 d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2 d \sqrt{z}}{2 \sqrt{d}} \right)}{2 d^{3/2}} \right) \binom{v}{\frac{v}{2}} (1-v \bmod 2) \;/;\; v \in \mathbb{N}^{+}$$

Involving $e^{b z^{r}+d z+e} \cos^{v}\left(c z^{r}+f z+g\right)$

01.07.21.1756.01

$$\int e^{b z^2+d z+e} \cos^{v}\left(c z^2+f z+g\right) dz = \frac{2^{-v-1} e^{-\frac{d^2-4 b e}{4 b}} \sqrt{\pi}\, (1-v \bmod 2)}{\sqrt{b}} \binom{v}{\frac{v}{2}} \operatorname{erfi}\left(\frac{d+2 b z}{2 \sqrt{b}} \right) + 2^{-v-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left(\binom{v}{k} \left(e^{-\frac{(d-2 i f k+i f v)^2-4 (b-2 i c k+i c v)(e-2 i g k+i g v)}{4 (b-2 i c k+i c v)}} \sqrt{b-2 i c k+i c v}\, (b+2 i c k-i c v) \operatorname{erfi}\left(\frac{d-2 i f k+i f v+2 b z-2 (2 i c k-i c v) z}{2 \sqrt{b-2 i c k+i c v}} \right) + e^{-\frac{(d+2 i f k-i f v)^2-4 (b+2 i c k-i c v)(e+2 i g k-i g v)}{4 (b+2 i c k-i c v)}} (b-2 i c k+i c v) \sqrt{b+2 i c k-i c v}\, \operatorname{erfi}\left(\frac{d+2 i f k-i f v+2 (b+2 i c k-i c v) z}{2 \sqrt{b+2 i c k-i c v}} \right) \right) \right) \Big/ \left((b+2 i c k-i c v)(b-2 i c k+i c v)\right) \;/;\; v \in \mathbb{N}^{+}$$

01.07.21.1757.01

$$\int e^{\sqrt{z}\, b+d z+e} \cos^{\nu}\left(\sqrt{z}\, c+f z+g\right) dz = 2^{-\nu-2}\left(\frac{4 e^{\sqrt{z}\, b+d z}}{d}-\frac{2 b e^{-\frac{b^2}{4 d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2 d \sqrt{z}}{2 \sqrt{d}}\right)}{d^{3/2}}\right) e^e \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)+$$

$$2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(2 e^{e-2 i g k-i g \nu} \left(\frac{2 e^{4 i g k+(d+2 i f k-i f \nu) z+(b+2 i c k-i c \nu) \sqrt{z}}}{d+2 i f k-i f \nu}+\frac{2 e^{2 i g \nu+(d-2 i f k+i f \nu) z+(b-2 i c k+i c \nu) \sqrt{z}}}{d-2 i f k+i f \nu}\right)-\right.$$

$$\left(e^{-\frac{(b-2 i c k+i c \nu)^2}{4 (d-2 i f k+i f \nu)}+e-2 i g k+i g \nu} \sqrt{\pi}\, (b-2 i c k+i c \nu) \operatorname{erfi}\left(\frac{b-2 i c k+i c \nu+2 (d-2 i f k+i f \nu) \sqrt{z}}{2 \sqrt{d-2 i f k+i f \nu}}\right)\right) \Big/$$

$$(d-2 i f k+i f \nu)^{3/2}-\left(2 e^{-\frac{(b+2 i c k-i c \nu)^2}{4 (d+2 i f k-i f \nu)}+e+2 i g k-i g \nu} \sqrt{\pi}\, (b+2 i c k-i c \nu)\right.$$

$$\left.\operatorname{erfi}\left(\frac{b+2 i c k-i c \nu+2 (d+2 i f k-i f \nu) \sqrt{z}}{2 \sqrt{d+2 i f k-i f \nu}}\right)\right) \Big/ (d+2 i f k-i f \nu)^{3/2}-\frac{1}{(d+f i (\nu-2 k))^{3/2}}$$

$$\left.\left(e^{-\frac{(b+c i (\nu-2 k))^2}{4 (d+f i (\nu-2 k))}+e-2 i g k+i g \nu} \sqrt{\pi}\, (b+c i (\nu-2 k)) \operatorname{erfi}\left(\frac{b-2 i c k+i c \nu+2 (d+f i (\nu-2 k)) \sqrt{z}}{2 \sqrt{d+f i (\nu-2 k)}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving powers of direct function and rational functions of exp

Involving $\cos^{\nu}(c z) \left(a+b e^{d z}\right)^{-n}$

01.07.21.1758.01

$$\int \frac{\cos^{\nu}(c z)}{\left(a+b e^{d z}\right)^n} dz = \frac{2^{-\nu} e^{-d n z} (\nu \bmod 2-1)}{d n b^n} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(n, n; n+1; -\frac{a e^{-d z}}{b}\right)-$$

$$\frac{i\, 2^{-\nu} a^{-n}}{c} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\nu-2 s} \binom{\nu}{s} \left(e^{i c (\nu-2 s) z} {}_2F_1\left(\frac{i c (\nu-2 s)}{d}, n; \frac{d+c i (\nu-2 s)}{d}; -\frac{b e^{d z}}{a}\right)-\right.$$

$$\left.e^{-i c (\nu-2 s) z} {}_2F_1\left(-\frac{i c (\nu-2 s)}{d}, n; \frac{d-i c (\nu-2 s)}{d}; -\frac{b e^{d z}}{a}\right)\right) /;\ n \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos^{\nu}(c z) \left(a+b e^{d z}\right)^{-n}$

01.07.21.1759.01

$$\int \frac{e^{p z} \cos^{\nu}(c z)}{\left(a+b e^{d z}\right)^{n}} \, dz = 2^{-\nu} a^{-n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\binom{\nu}{s} \left(e^{(p+c i (\nu-2 s)) z} (i c (\nu-2 s)-p) \, {}_2F_1\left(\frac{p+c i (\nu-2 s)}{d}, n; \frac{d+p+c i (\nu-2 s)}{d}; -\frac{b e^{d z}}{a}\right) - e^{(p-i c (\nu-2 s)) z} (p+c i (\nu-2 s)) \, {}_2F_1\left(\frac{p-i c (\nu-2 s)}{d}, n; \frac{d+p-i c (\nu-2 s)}{d}; -\frac{b e^{d z}}{a}\right)\right)\right) \Big/ ((i c (\nu-2 s)-p)(p+c i (\nu-2 s))) + \frac{2^{-\nu} a^{-n} e^{p z} (1-\nu \bmod 2)}{p} \binom{\nu}{\frac{\nu}{2}} \, {}_2F_1\left(\frac{p}{d}, n; \frac{d+p}{d}; -\frac{b e^{d z}}{a}\right) /; n \in \mathbb{N}^{+} \bigwedge \nu \in \mathbb{N}^{+}$$

Involving powers of direct function and algebraic functions of exp

Involving $\left(a+b e^{d z}\right)^{\beta} \cos^{\nu}(c z)$

01.07.21.1760.01

$$\int \left(a+b e^{d z}\right)^{\beta} \cos^{\nu}(c z) \, dz = -\frac{2^{-\nu} (\nu \bmod 2-1)}{d \beta} \left(\frac{e^{-d z} a}{b}+1\right)^{-\beta} \left(a+b e^{d z}\right)^{\beta} \binom{\nu}{\frac{\nu}{2}} \, {}_2F_1\left(-\beta, -\beta; 1-\beta; -\frac{a e^{-d z}}{b}\right) - \frac{i 2^{-\nu}}{c} \left(a+b e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a}+1\right)^{-\beta} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\nu-2 s} \binom{\nu}{s} \left(e^{i c (\nu-2 s) z} \, {}_2F_1\left(\frac{i c (\nu-2 s)}{d}, -\beta; \frac{d+c i (\nu-2 s)}{d}; -\frac{b e^{d z}}{a}\right) - e^{-i c (\nu-2 s) z} \, {}_2F_1\left(-\frac{i c (\nu-2 s)}{d}, -\beta; \frac{d-i c (\nu-2 s)}{d}; -\frac{b e^{d z}}{a}\right)\right) /; \nu \in \mathbb{N}^{+}$$

Involving $e^{p z}\left(a+b e^{d z}\right)^{\beta} \cos^{\nu}(c z)$

01.07.21.1761.01

$$\int e^{p z} \left(a+b e^{d z}\right)^{\beta} \cos^{\nu}(c z) \, dz = 2^{-\nu} \left(a+b e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a}+1\right)^{-\beta} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\binom{\nu}{s} \left(e^{(p+c i (\nu-2 s)) z} (i c (\nu-2 s)-p) \, {}_2F_1\left(\frac{p+c i (\nu-2 s)}{d}, -\beta; \frac{d+p+c i (\nu-2 s)}{d}; -\frac{b e^{d z}}{a}\right) - e^{(p-i c (\nu-2 s)) z} (p+c i (\nu-2 s)) \, {}_2F_1\left(\frac{p-i c (\nu-2 s)}{d}, -\beta; \frac{d+p-i c (\nu-2 s)}{d}; -\frac{b e^{d z}}{a}\right)\right)\right) \Big/ ((i c (\nu-2 s)-p)(p+c i (\nu-2 s))) + \frac{2^{-\nu} e^{p z} (1-\nu \bmod 2)}{p} \left(a+b e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a}+1\right)^{-\beta} \binom{\nu}{\frac{\nu}{2}} \, {}_2F_1\left(\frac{p}{d}, -\beta; \frac{d+p}{d}; -\frac{b e^{d z}}{a}\right) /; \nu \in \mathbb{N}^{+}$$

Involving products of the direct function and exponential function

Involving products of two direct functions and exponential function

Involving $e^{b z} \cos(c z) \cos(a z)$

01.07.21.1762.01

$$\int e^{b z} \cos(c z) \cos(a z)\, dz = \left(e^{b z} \left(a \sin(a z) \left(\left(a^2 + b^2 - c^2\right) \cos(c z) + 2 b c \sin(c z)\right) + \cos(a z) \left(b \left(a^2 + b^2 + c^2\right) \cos(c z) + c \left(-a^2 + b^2 + c^2\right) \sin(c z)\right)\right)\right) \Big/ \left(a^4 + 2 \left(b^2 - c^2\right) a^2 + \left(b^2 + c^2\right)^2\right)$$

Involving $e^{p z} \cos(c z) \cos(a z + b)$

01.07.21.1763.01

$$\int e^{p z} \cos(c z) \cos(b + a z)\, dz = \frac{1}{2} e^{p z} \left(\frac{\cos((a-c) z) (p \cos(b) + (a-c) \sin(b))}{a^2 - 2 c a + c^2 + p^2} + \frac{\cos((a+c) z) (p \cos(b) + (a+c) \sin(b))}{a^2 + 2 c a + c^2 + p^2} + \frac{((a-c) \cos(b) - p \sin(b)) \sin((a-c) z)}{a^2 - 2 c a + c^2 + p^2} + \frac{((a+c) \cos(b) - p \sin(b)) \sin((a+c) z)}{a^2 + 2 c a + c^2 + p^2}\right)$$

Involving $e^{p z} \cos(c z + d) \cos(a z + b)$

01.07.21.1764.01

$$\int e^{p z} \cos(d + c z) \cos(b + a z)\, dz = \frac{1}{2} e^{p z} \left(\frac{\cos((a-c) z) (p \cos(b-d) + (a-c) \sin(b-d))}{a^2 - 2 c a + c^2 + p^2} + \frac{\cos((a+c) z) (p \cos(b+d) + (a+c) \sin(b+d))}{a^2 + 2 c a + c^2 + p^2} + \frac{((a-c) \cos(b-d) - p \sin(b-d)) \sin((a-c) z)}{a^2 - 2 c a + c^2 + p^2} + \frac{((a+c) \cos(b+d) - p \sin(b+d)) \sin((a+c) z)}{a^2 + 2 c a + c^2 + p^2}\right)$$

Involving $e^{p z^r} \cos(b z) \cos(c z)$

01.07.21.1765.01

$$\int e^{p z^2} \cos(b z) \cos(c z)\, dz = \frac{1}{8 \sqrt{p}} \left(i\, e^{\frac{b^2 + c^2}{2 p}} \sqrt{\pi} \left(-e^{-\frac{(b+c)^2}{4 p}} \operatorname{erf}\left(\frac{b - c + 2 i p z}{2 \sqrt{p}}\right) - e^{-\frac{(b-c)^2}{4 p}} \operatorname{erf}\left(\frac{b + c + 2 i p z}{2 \sqrt{p}}\right) + e^{-\frac{(b+c)^2}{4 p}} \operatorname{erf}\left(\frac{b - c - 2 i p z}{2 \sqrt{p}}\right) + e^{-\frac{(b-c)^2}{4 p}} \operatorname{erf}\left(\frac{b + c - 2 i p z}{2 \sqrt{p}}\right)\right)\right)$$

01.07.21.1766.01

$$\int e^{p\sqrt{z}}\cos(b\,z)\cos(c\,z)\,dz = \frac{1}{8}\left(-\frac{e^{\frac{i\,p^2}{4c-4b}}\,p\,\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-2\,i\,(b-c)\sqrt{z}}{2\sqrt{-i\,(b-c)}}\right)}{(-i\,(b-c))^{3/2}}+\frac{4\,e^{p\sqrt{z}}\sin((b-c)\,z)}{b-c}+\frac{4\,e^{p\sqrt{z}}\sin((b+c)\,z)}{b+c}-\frac{e^{\frac{i\,p^2}{4b-4c}}\,p\,\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+2\,i\,(b-c)\sqrt{z}}{2\sqrt{i\,(b-c)}}\right)}{(i\,(b-c))^{3/2}}-\frac{e^{-\frac{i\,p^2}{4(b+c)}}\,p\,\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-2\,i\,(b+c)\sqrt{z}}{2\sqrt{-i\,(b+c)}}\right)}{(-i\,(b+c))^{3/2}}-\frac{e^{\frac{i\,p^2}{4(b+c)}}\,p\,\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+2\,i\,(b+c)\sqrt{z}}{2\sqrt{i\,(b+c)}}\right)}{(i\,(b+c))^{3/2}}\right)$$

Involving $e^{p\,z}\cos(b\,z^r)\cos(c\,z)$

01.07.21.1767.01

$$\int e^{p\,z}\cos(b\,z^2)\cos(c\,z)\,dz = \frac{1}{8\,b}\left(i\sqrt{\pi}\left(\sqrt{-i\,b}\;e^{\frac{i\,(c+i\,p)^2}{4b}}\operatorname{erfi}\left(\frac{\sqrt{-i\,b}\,(c+i\,p+2\,b\,z)}{2\,b}\right)+\sqrt{-i\,b}\;e^{\frac{i\,(i\,p-c)^2}{4b}}\operatorname{erfi}\left(\frac{i\,c+p-2\,i\,b\,z}{2\sqrt{-i\,b}}\right)-\sqrt{i\,b}\;e^{\frac{i\,(-i\,c+p)^2}{4b}}\operatorname{erfi}\left(\frac{-i\,c+p+2\,i\,b\,z}{2\sqrt{i\,b}}\right)-\sqrt{i\,b}\;e^{\frac{i\,(i\,c+p)^2}{4b}}\operatorname{erfi}\left(\frac{i\,c+p+2\,i\,b\,z}{2\sqrt{i\,b}}\right)\right)\right)$$

01.07.21.1768.01

$$\int e^{p\,z}\cos\left(b\sqrt{z}\right)\cos(c\,z)\,dz = \frac{1}{8}\left(\frac{4\,e^{(-i\,c+p)\,z}\cos\left(b\sqrt{z}\right)}{-i\,c+p}+\frac{4\,e^{(i\,c+p)\,z}\cos\left(b\sqrt{z}\right)}{i\,c+p}+\frac{b\,e^{\frac{i\,b^2}{4c+4i\,p}}\sqrt{\pi}\operatorname{erf}\left(\frac{b+2\,(c+i\,p)\sqrt{z}}{2\sqrt{-i\,c+p}}\right)}{(-i\,c+p)^{3/2}}+\frac{b\,e^{\frac{i\,b^2}{4i\,p-4c}}\sqrt{\pi}\operatorname{erf}\left(\frac{b+2\,(i\,p-c)\sqrt{z}}{2\sqrt{i\,c+p}}\right)}{(i\,c+p)^{3/2}}-\frac{i\,b\,e^{\frac{i\,b^2}{4c+4i\,p}}\sqrt{\pi}\operatorname{erfi}\left(\frac{i\,b+2\,(-i\,c+p)\sqrt{z}}{2\sqrt{-i\,c+p}}\right)}{(-i\,c+p)^{3/2}}-\frac{i\,b\,e^{\frac{i\,b^2}{4i\,p-4c}}\sqrt{\pi}\operatorname{erfi}\left(\frac{i\,b+2\,(i\,c+p)\sqrt{z}}{2\sqrt{i\,c+p}}\right)}{(i\,c+p)^{3/2}}\right)$$

Involving $e^{p\,z^r}\cos(b\,z^r)\cos(c\,z)$

01.07.21.1769.01

$$\int e^{p z^2} \cos(b z^2) \cos(c z)\, dz = \frac{1}{8(b^2+p^2)} \left(e^{-\frac{i c^2}{4(b-i p)}} \sqrt{\pi} \left(e^{\frac{i b c^2}{2(b^2+p^2)}} \sqrt{-i b + p}\, (b - i p) \operatorname{erf}\left(\frac{c + 2(b + i p) z}{2\sqrt{-i b + p}} \right) + e^{\frac{i b c^2}{2(b^2+p^2)}} \sqrt{-i b + p}\, (i b + p) \operatorname{erfi}\left(\frac{i c - 2 i b z + 2 p z}{2\sqrt{-i b + p}} \right) + (-i b + p) \sqrt{i b + p} \left(\operatorname{erfi}\left(\frac{-i c + 2 i b z + 2 p z}{2\sqrt{i b + p}} \right) + \operatorname{erfi}\left(\frac{i c + 2 i b z + 2 p z}{2\sqrt{i b + p}} \right) \right) \right) \right)$$

01.07.21.1770.01

$$\int e^{p\sqrt{z}} \cos(b\sqrt{z}) \cos(c z)\, dz = \frac{1}{8} \left(-\frac{i e^{-\frac{i(b+i p)^2}{4c}} (b + i p) \sqrt{\pi} \operatorname{erf}\left(\frac{b + i p - 2 c\sqrt{z}}{2\sqrt{i c}} \right)}{\sqrt{i c}\, c} + \frac{8 e^{p\sqrt{z}} \cos(b\sqrt{z}) \sin(c z)}{c} - \frac{e^{\frac{i(i b+p)^2}{4c}} (b - i p) \sqrt{\pi} \operatorname{erfi}\left(\frac{i b + p + 2 i c\sqrt{z}}{2\sqrt{i c}} \right)}{\sqrt{i c}\, c} - \frac{e^{-\frac{i(-i b+p)^2}{4c}} (-i b + p) \sqrt{\pi} \operatorname{erfi}\left(\frac{-i b + p - 2 i c\sqrt{z}}{2\sqrt{-i c}} \right)}{(-i c)^{3/2}} - \frac{e^{-\frac{i(i b+p)^2}{4c}} (i b + p) \sqrt{\pi} \operatorname{erfi}\left(\frac{i b + p - 2 i c\sqrt{z}}{2\sqrt{-i c}} \right)}{(-i c)^{3/2}} \right)$$

Involving $e^{p z} \cos(b z^r) \cos(c z^r)$

01.07.21.1771.01

$$\int e^{p z} \cos(b z^2) \cos(c z^2)\, dz = \frac{1}{8} (-1)^{3/4} \sqrt{\pi} \left(\frac{e^{\frac{i p^2}{4b-4c}} \left(\operatorname{erfi}\left(\frac{(-1)^{3/4} (p + 2(b-c) i z)}{2\sqrt{b-c}} \right) - i e^{\frac{i p^2}{2c-2b}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (p - 2 i (b-c) z)}{2\sqrt{b-c}} \right) \right)}{\sqrt{b-c}} + \frac{e^{-\frac{i p^2}{4(b+c)}} \left(e^{\frac{i p^2}{2(b+c)}} \operatorname{erfi}\left(\frac{(-1)^{3/4} (p + 2(b+c) i z)}{2\sqrt{b+c}} \right) - i \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (p - 2 i (b+c) z)}{2\sqrt{b+c}} \right) \right)}{\sqrt{b+c}} \right)$$

01.07.21.1772.01

$$\int e^{pz}\cos\left(b\sqrt{z}\right)\cos\left(c\sqrt{z}\right)dz = \frac{1}{8}\left(\frac{8e^{pz}\cos\left(b\sqrt{z}\right)\cos\left(c\sqrt{z}\right)}{p} + \frac{(b-c)e^{\frac{(b-c)^2}{4p}}\sqrt{\pi}\,\operatorname{erf}\left(\frac{b-c+2ip\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} + \frac{(b-c)e^{\frac{(c-b)^2}{4p}}\sqrt{\pi}\,\operatorname{erf}\left(\frac{b-c-2ip\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} - \frac{(b+c)e^{\frac{(b+c)^2}{4p}}\sqrt{\pi}\,\operatorname{erf}\left(\frac{-b-c-2ip\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} - \frac{i(b+c)e^{\frac{(b+c)^2}{4p}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{ib+ic+2p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}\right)$$

Involving $e^{pz^r}\cos(bz^r)\cos(cz^r)$

01.07.21.1773.01

$$\int e^{pz^r}\cos(bz^r)\cos(cz^r)\,dz = \frac{1}{4r}\left(z\left(-\Gamma\left(\frac{1}{r}, -(i(b-c)+p)z^r\right)(-(i(b-c)+p)z^r)^{-1/r} - (-(i(b+c)+p)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, -(i(b+c)+p)z^r\right) - (i(b-c+ip)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i(b-c+ip)z^r\right) - (i(b+c+ip)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i(b+c+ip)z^r\right)\right)\right)$$

01.07.21.1774.01

$$\int e^{pz^2}\cos\left(bz^2\right)\cos\left(cz^2\right)dz = \frac{1}{8}\sqrt{\pi}\left(\left((ib-ic-p)\sqrt{ib-ic+p}\,\operatorname{erfi}\left(\sqrt{ib-ic+p}\;z\right) - (ib-ic+p)\sqrt{-ib+ic+p}\,\operatorname{erfi}\left(\sqrt{-ib+ic+p}\;z\right)\right)\Big/ ((ib-ic-p)(ib-ic+p)) + \left((ib+ic-p)\sqrt{ib+ic+p}\,\operatorname{erfi}\left(\sqrt{ib+ic+p}\;z\right) - \sqrt{-ib-ic+p}\,(ib+ic+p)\operatorname{erfi}\left(\sqrt{-ib-ic+p}\;z\right)\right)\Big/((ib+ic-p)(ib+ic+p))\right)$$

01.07.21.1775.01

$$\int e^{p\sqrt{z}}\cos\left(b\sqrt{z}\right)\cos\left(c\sqrt{z}\right)dz = \frac{1}{2}\left(-\frac{e^{(-ib-ic+p)\sqrt{z}}\left(\sqrt{z}\,(ib+ic-p)+1\right)}{(ib+ic-p)^2} + \frac{e^{(-ib+ic+p)\sqrt{z}}\left((-ib+ic+p)\sqrt{z}-1\right)}{(-ib+ic+p)^2} + \frac{e^{(ib+ic+p)\sqrt{z}}\left((ib+ic+p)\sqrt{z}-1\right)}{(ib+ic+p)^2} + \frac{e^{(ib-ic+p)\sqrt{z}}\left((ib-ic+p)\sqrt{z}-1\right)}{(ib-ic+p)^2}\right)$$

Involving $e^{bz^r+e}\cos(az^r+q)\cos(cz^r+g)$

01.07.21.1776.01

$$\int e^{b z^r+e} \cos(a z^r+q)\cos(c z^r+g)\,dz = -\frac{1}{4r}\left(z\left(e^{e-i g+i q}\,\Gamma\!\left(\frac{1}{r}, (-b-i a+i c) z^r\right)((-b-i a+i c) z^r)^{-1/r} + e^{e-i g-i q}\,((-b+i a+i c) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, (-b+i a+i c) z^r\right) + e^{e+i g+i q}\,((-b-i c-i a) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, (-b-i c-i a) z^r\right) + e^{e+i g-i q}\,((-b-i c+i a) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, (-b-i c+i a) z^r\right)\right)\right)$$

01.07.21.1777.01

$$\int e^{b z^2+e} \cos(a z^2+q)\cos(c z^2+g)\,dz = \frac{1}{8}\sqrt{\pi}\left(e^{e+i g-i q}\left(\frac{\operatorname{erfi}\left(\sqrt{b-i a+i c}\; z\right)}{\sqrt{b-i a+i c}} + \frac{e^{2(-i g+i q)}\operatorname{erfi}\left(\sqrt{b-i c+i a}\; z\right)}{\sqrt{b-i c+i a}}\right) + \left(\frac{\operatorname{erfi}\left(\sqrt{b+i a+i c}\; z\right)}{\sqrt{b+i a+i c}} + \frac{e^{2(-i g-i q)}\operatorname{erfi}\left(\sqrt{b-i c-i a}\; z\right)}{\sqrt{b-i c-i a}}\right) e^{e+i g+i q}\right)$$

01.07.21.1778.01

$$\int e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, a+q\right)\cos\left(\sqrt{z}\, c+g\right)dz = \frac{1}{2}\left(\frac{e^{\sqrt{z}\,(b-i c-i a)+e-i g-i q}\left(\sqrt{z}\, b+(-i a-i c)\sqrt{z}-1\right)}{(b-i c-i a)^2} + \frac{e^{\sqrt{z}\,(b-i c+i a)+e-i g+i q}\left(\sqrt{z}\, b+(i a-i c)\sqrt{z}-1\right)}{(b-i c+i a)^2} + \frac{e^{\sqrt{z}\,(b+i a+i c)+e+i g+i q}\left(\sqrt{z}\, b-(-i a-i c)\sqrt{z}-1\right)}{(-b-i c-i a)^2} + \frac{e^{\sqrt{z}\,(b-i a+i c)+e+i g-i q}\left(\sqrt{z}\, b-(i a-i c)\sqrt{z}-1\right)}{(-b-i c+i a)^2}\right)$$

Involving $e^{b z^r+d z+e}\cos\left(a z^r+p z+q\right)\cos\left(c z^r+f z+g\right)$

01.07.21.1779.01

$$\int e^{b z^2+d z+e} \cos\left(a z^2+p z+q\right)\cos\left(c z^2+f z+g\right)dz = \frac{1}{8}\sqrt{\pi}\left(\frac{e^{\frac{(-d+i f+i p)^2+4(-b+i a+i c)(e-i g-i q)}{4(-b+i a+i c)}}\operatorname{erf}\left(\frac{-d+i f+i p-2 b z+2 i a z+2 i c z}{2\sqrt{-b+i a+i c}}\right)}{\sqrt{-b+i a+i c}} + \frac{e^{\frac{(d+i f-i p)^2+4(-b-i c+i a)(e+i g-i q)}{4(-b-i c+i a)}}\operatorname{erf}\left(\frac{-d-i f+i p-2 b z-2 i c z+2 i a z}{2\sqrt{-b-i c+i a}}\right)}{\sqrt{-b-i c+i a}} + \frac{e^{-\frac{(d+i f+i p)^2-4(b+i a+i c)(e+i g+i q)}{4(b+i a+i c)}}\operatorname{erfi}\left(\frac{d+i f+i p+2 b z+2 i a z+2 i c z}{2\sqrt{b+i a+i c}}\right)}{\sqrt{b+i a+i c}} + \frac{e^{-\frac{(d-i f+i p)^2-4(b-i c+i a)(e-i g+i q)}{4(b-i c+i a)}}\operatorname{erfi}\left(\frac{d-i f+i p+2 b z-2 i c z+2 i a z}{2\sqrt{b-i c+i a}}\right)}{\sqrt{b-i c+i a}}\right)$$

01.07.21.1780.01

$$\int e^{\sqrt{z}\, b+d\, z+e} \cos\left(\sqrt{z}\, a+p\, z+q\right) \cos\left(\sqrt{z}\, c+f\, z+g\right) dz = \frac{1}{8}\left(\frac{2\, e^{\sqrt{z}\,(b+i\,a+i\,c)+e+i\,g+i\,q+(d+i\,f+i\,p)\,z}}{d+i\,f+i\,p} - \frac{(b+i\,a+i\,c)\, e^{-\frac{(b+i\,a+i\,c)^2}{4\,(d+i\,f+i\,p)}+e+i\,g+i\,q} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+i\,a+i\,c+2\,(d+i\,f+i\,p)\sqrt{z}}{2\sqrt{d+i\,f+i\,p}}\right)}{(d+i\,f+i\,p)^{3/2}} + \frac{2\, e^{\sqrt{z}\,(b-i\,c+i\,a)+e-i\,g+i\,q+(d-i\,f+i\,p)\,z}}{d-i\,f+i\,p} - \frac{(b-i\,c+i\,a)\, e^{-\frac{(b-i\,c+i\,a)^2}{4\,(d-i\,f+i\,p)}+e-i\,g+i\,q} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-i\,c+i\,a+2\,(d-i\,f+i\,p)\sqrt{z}}{2\sqrt{d-i\,f+i\,p}}\right)}{(d-i\,f+i\,p)^{3/2}} + \frac{2\, e^{\sqrt{z}\,(b-i\,a+i\,c)+e+i\,g-i\,q+(d+i\,f-i\,p)\,z}}{d+i\,f-i\,p} - \frac{(b-i\,a+i\,c)\, e^{-\frac{(b-i\,a+i\,c)^2}{4\,(d+i\,f-i\,p)}+e+i\,g-i\,q} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-i\,a+i\,c+2\,(d+i\,f-i\,p)\sqrt{z}}{2\sqrt{d+i\,f-i\,p}}\right)}{(d+i\,f-i\,p)^{3/2}} + \frac{2\, e^{\sqrt{z}\,(b-i\,c-i\,a)+e-i\,g-i\,q+(d-i\,f-i\,p)\,z}}{d-i\,f-i\,p} - \frac{(b-i\,c-i\,a)\, e^{-\frac{(b-i\,c-i\,a)^2}{4\,(d-i\,f-i\,p)}+e-i\,g-i\,q} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-i\,c-i\,a+2\,(d-i\,f-i\,p)\sqrt{z}}{2\sqrt{d-i\,f-i\,p}}\right)}{(d-i\,f-i\,p)^{3/2}}\right)$$

Involving products of two direct functions and rational functions of exp

Involving $\cos(e\, z) \cos(c\, z) \left(a+b\, e^{d\, z}\right)^{-n}$

01.07.21.1781.01

$$\int \frac{\cos(e\, z) \cos(c\, z)}{\left(a+b\, e^{d\, z}\right)^n}\, dz = \frac{1}{4}\, a^{-n} \left(\frac{1}{i\, c-i\, e}\left(e^{(i\, c-i\, e)\, z}\, {}_2F_1\left(\frac{i\, c-i\, e}{d}, n; \frac{d-i\, e+i\, c}{d}; -\frac{b\, e^{d\, z}}{a}\right) - e^{(-i\, c+i\, e)\, z}\, {}_2F_1\left(\frac{-i\, c+i\, e}{d}, n; \frac{d-i\, c+i\, e}{d}; -\frac{b\, e^{d\, z}}{a}\right)\right) + \frac{e^{(i\, c+i\, e)\, z}}{i\, c+i\, e}\left({}_2F_1\left(\frac{i\, c+i\, e}{d}, n; \frac{d+i\, c+i\, e}{d}; -\frac{b\, e^{d\, z}}{a}\right) - e^{-2\,(i\, c+i\, e)\, z}\, {}_2F_1\left(-\frac{i\, c+i\, e}{d}, n; -\frac{-d+i\, c+i\, e}{d}; -\frac{b\, e^{d\, z}}{a}\right)\right)\right) /; n \in \mathbb{N}^+$$

Involving $e^{p\, z} \cos(e\, z) \cos(c\, z) \left(a+b\, e^{d\, z}\right)^{-n}$

01.07.21.1782.01

$$\int \frac{e^{p z} \cos(e z) \cos(c z)}{\left(a + b e^{d z}\right)^n} \, dz = \frac{1}{4} a^{-n} \left(\frac{1}{(i c - i e - p)(i c - i e + p)} \left(e^{(i c - i e + p) z} (i c - i e - p) \, {}_2F_1\left(\frac{i c - i e + p}{d}, n; \frac{d - i e + i c + p}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-i c + i e + p) z} (i c - i e + p) \, {}_2F_1\left(\frac{-i c + i e + p}{d}, n; \frac{d - i c + i e + p}{d}; -\frac{b e^{d z}}{a} \right) \right) + \frac{1}{(i c + i e - p)(i c + i e + p)} \left(e^{(i c + i e + p) z} (i c + i e - p) \, {}_2F_1\left(\frac{i c + i e + p}{d}, n; \frac{d + i c + i e + p}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-i c - i e + p) z} (i c + i e + p) \, {}_2F_1\left(-\frac{i c + i e - p}{d}, n; \frac{d - i e - i c + p}{d}; -\frac{b e^{d z}}{a} \right) \right) \right) /; n \in \mathbb{N}^+$$

Involving products of two direct functions and algebraic functions of exp

Involving $\left(a + b e^{d z}\right)^{\beta} \cos(e z) \cos(c z)$

01.07.21.1783.01

$$\int \left(a + b e^{d z}\right)^{\beta} \cos(e z) \cos(c z) \, dz = \frac{1}{4} \left(a + b e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1 \right)^{-\beta} \left(\frac{1}{i c - i e} \left(e^{(i c - i e) z} \, {}_2F_1\left(\frac{i c - i e}{d}, -\beta; \frac{d - i e + i c}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-i c + i e) z} \, {}_2F_1\left(\frac{-i c + i e}{d}, -\beta; \frac{d - i c + i e}{d}; -\frac{b e^{d z}}{a} \right) \right) + \frac{e^{(i c + i e) z}}{i c + i e} \left({}_2F_1\left(\frac{i c + i e}{d}, -\beta; \frac{d + i c + i e}{d}; -\frac{b e^{d z}}{a} \right) - e^{-2 (i c + i e) z} \, {}_2F_1\left(-\frac{i c + i e}{d}, -\beta; -\frac{-d + i c + i e}{d}; -\frac{b e^{d z}}{a} \right) \right) \right)$$

Involving $e^{p z} \left(a + b e^{d z}\right)^{\beta} \cos(e z) \cos(c z)$

01.07.21.1784.01

$$\int e^{p z} \left(a + b e^{d z}\right)^{\beta} \cos(e z) \cos(c z) \, dz = \frac{1}{4} \left(a + b e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1 \right)^{-\beta} \left(\frac{1}{(i c - i e - p)(i c - i e + p)} \left(e^{(i c - i e + p) z} (i c - i e - p) \, {}_2F_1\left(\frac{i c - i e + p}{d}, -\beta; \frac{d - i e + i c + p}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-i c + i e + p) z} (i c - i e + p) \, {}_2F_1\left(\frac{-i c + i e + p}{d}, -\beta; \frac{d - i c + i e + p}{d}; -\frac{b e^{d z}}{a} \right) \right) + \frac{1}{(i c + i e - p)(i c + i e + p)} \left(e^{(i c + i e + p) z} (i c + i e - p) \, {}_2F_1\left(\frac{i c + i e + p}{d}, -\beta; \frac{d + i c + i e + p}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-i c - i e + p) z} (i c + i e + p) \, {}_2F_1\left(-\frac{i c + i e - p}{d}, -\beta; \frac{d - i e - i c + p}{d}; -\frac{b e^{d z}}{a} \right) \right) \right)$$

Involving products of several direct functions and exponential function

Involving $e^{p z} \cos(a z) \cos(b z) \cos(c z)$

01.07.21.1785.01

$$\int e^{p z} \cos(a z) \cos(b z) \cos(c z)\, dz = \frac{1}{4} e^{p z} \left(\frac{p \cos((a-b-c) z) + (a-b-c) \sin((a-b-c) z)}{a^2 - 2(b+c) a + b^2 + c^2 + p^2 + 2 b c} + \frac{p \cos((a+b-c) z) + (a+b-c) \sin((a+b-c) z)}{(a+b-c-i p)(a+b-c+i p)} + \frac{p \cos((a-b+c) z) + (a-b+c) \sin((a-b+c) z)}{(a-b+c-i p)(a-b+c+i p)} + \frac{p \cos((a+b+c) z) + (a+b+c) \sin((a+b+c) z)}{(a+b+c-i p)(a+b+c+i p)} \right)$$

Involving $e^{p z} \prod_{k=1}^{n} \cos(a_k z)$

01.07.21.1786.01

$$\int e^{p z} \prod_{k=1}^{n} \cos(a_k z)\, dz = 2^{-n} e^{p z} \sum_{\substack{k_1=-1 \\ \Delta k_1=2}}^{1} \sum_{\substack{k_2=-1 \\ \Delta k_2=2}}^{1} \cdots \sum_{\substack{k_n=-1 \\ \Delta k_n=2}}^{1} \left(\frac{p \cos\left(z \sum_{j=1}^{n} k_j a_j\right) + \sum_{j=1}^{n} k_j a_j \sin\left(z \sum_{j=1}^{n} k_j a_j\right)}{p^2 + \left(\sum_{j=1}^{n} k_j a_j\right)^2} \right)$$

Involving products of powers of two direct functions and exponential function

Involving product of power of the direct function, the direct function and exponential function

Involving $e^{b z} \cos(c z) \cos^{\nu}(a z)$

01.07.21.1787.01

$$\int e^{p z} \cos(c z) \cos^{\nu}(a z)\, dz = \frac{1}{2} i \left(1 + e^{-2 i a z}\right)^{-\nu} \cos^{\nu}(a z) \left(\frac{e^{(-i c + p) z}}{c + i p - a \nu} \, {}_2F_1\!\left(\frac{c + i p - a \nu}{2 a}, -\nu; \frac{-\nu a + 2 a + c + i p}{2 a}; -e^{-2 i a z} \right) - \frac{e^{(i c + p) z}}{c - i p + a \nu} \, {}_2F_1\!\left(-\frac{c - i p + a \nu}{2 a}, -\nu; -\frac{c - i p + a(\nu - 2)}{2 a}; -e^{-2 i a z} \right) \right)$$

01.07.21.1788.01

$$\int e^{b z} \cos(c z) \cos^{\nu}(a z)\, dz = 2^{-\nu-1} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\frac{e^{(b - i c - 2 i a s + i a \nu) z}}{b - i c - 2 i a s + i a \nu} + \frac{e^{(b + i c + 2 i a s - i a \nu) z}}{b + i c + 2 i a s - i a \nu} + \frac{e^{(b - i c + 2 i a s - i a \nu) z}}{b - i c + 2 i a s - i a \nu} + \frac{e^{(b + i c - 2 i a s + i a \nu) z}}{b + i c - 2 i a s + i a \nu} \right) \binom{\nu}{s} - \left(\frac{e^{(b - i c) z}}{b - i c} + \frac{e^{(b + i c) z}}{b + i c} \right) \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \right) /; \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos(c z + d) \cos^{\nu}(a z)$

01.07.21.1789.01

$$\int e^{p z}\cos(d+c z)\cos^{\nu}(a z)\,dz = \frac{1}{2}\,i\,e^{i d}\left(1+e^{2 i a z}\right)^{-\nu}\cos^{\nu}(a z)\left(\frac{e^{-2 i d-i c z+p z}}{c+i p+a\nu}\,{}_2F_1\!\left(-\frac{c+i p+a\nu}{2a},-\nu;-\frac{c+i p+a(\nu-2)}{2a};-e^{2 i a z}\right)-\frac{e^{(i c+p)z}}{c-i p-a\nu}\,{}_2F_1\!\left(\frac{c-i p-a\nu}{2a},-\nu;\frac{-\nu a+2a+c-i p}{2a};-e^{2 i a z}\right)\right)$$

01.07.21.1790.01

$$\int e^{p z}\cos(d+c z)\cos^{\nu}(a z)\,dz = -2^{-\nu-1}\left(e^{-i d}\left(\frac{e^{(-i c+p)z}}{i c-p}-\frac{e^{2 i d+(i c+p)z}}{i c+p}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)+ i\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i d}\left(\frac{e^{i(2d+(c-i p-2 a s+a\nu)z)}}{c-i p-2 a s+a\nu}-\frac{e^{-i(c+i p+2 a s-a\nu)z}}{c+i p+2 a s-a\nu}+\frac{e^{i(2d+(c-i p+2 a s-a\nu)z)}}{c-i p+2 a s-a\nu}-\frac{e^{-i(c+i p-2 a s+a\nu)z}}{c+i p-2 a s+a\nu}\right)\binom{\nu}{s}\right)\;/;\;\nu\in\mathbb{N}^{+}$$

Involving $e^{p z}\cos(c z)\cos^{\nu}(a z+b)$

01.07.21.1791.01

$$\int e^{p z}\cos(c z)\cos^{\nu}(b+a z)\,dz = \frac{1}{2}\,i\left(1+e^{2 i(b+a z)}\right)^{-\nu}\cos^{\nu}(b+a z)\left(\frac{e^{p z-i c z}}{c+i p+a\nu}\,{}_2F_1\!\left(-\frac{c+i p+a\nu}{2a},-\nu;-\frac{c+i p+a(\nu-2)}{2a};-e^{2 i(b+a z)}\right)-\frac{e^{(i c+p)z}}{c-i p-a\nu}\,{}_2F_1\!\left(\frac{c-i p-a\nu}{2a},-\nu;\frac{-\nu a+2a+c-i p}{2a};-e^{2 i(b+a z)}\right)\right)$$

01.07.21.1792.01

$$\int e^{p z}\cos(c z)\cos^{\nu}(b+a z)\,dz = -2^{-\nu-1}\left(\left(\frac{e^{(-i c+p)z}}{i c-p}-\frac{e^{(i c+p)z}}{i c+p}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)+ i\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i b(2s+\nu)}\left(\frac{e^{i(2 b\nu+(c-i p-2 a s+a\nu)z)}}{c-i p-2 a s+a\nu}-\frac{e^{2 i b\nu-i(c+i p+2 a s-a\nu)z}}{c+i p+2 a s-a\nu}+\frac{e^{i(4 b s+(c-i p+2 a s-a\nu)z)}}{c-i p+2 a s-a\nu}-\frac{e^{4 i b s-i(c+i p-2 a s+a\nu)z}}{c+i p-2 a s+a\nu}\right)\binom{\nu}{s}\right)\;/;\;\nu\in\mathbb{N}^{+}$$

Involving $e^{p z}\cos(c z+d)\cos^{\nu}(a z+b)$

01.07.21.1793.01

$$\int e^{p z}\cos(d+c z)\cos^{\nu}(b+a z)\,dz = \frac{1}{2}\,i\,e^{i d}\left(1+e^{2 i(b+a z)}\right)^{-\nu}\cos^{\nu}(b+a z)\left(\frac{e^{-2 i d-i c z+p z}\,{}_2F_1\!\left(-\frac{c+i p+a\nu}{2a},-\nu;-\frac{c+i p+a(\nu-2)}{2a};-e^{2 i(b+a z)}\right)}{c+i p+a\nu}-\frac{e^{(i c+p)z}\,{}_2F_1\!\left(\frac{c-i p-a\nu}{2a},-\nu;\frac{-\nu a+2a+c-i p}{2a};-e^{2 i(b+a z)}\right)}{c-i p-a\nu}\right)$$

01.07.21.1794.01

$$\int e^{p z} \cos(c z + d) \cos^{\nu}(a z + b) \, dz = -2^{-\nu-1} \left(e^{-i d} \left(\frac{e^{(-i c + p) z}}{i c - p} - \frac{e^{2 i d + (i c + p) z}}{i c + p} \right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} e^{-i (d + b (2 s + \nu))} \left(\frac{e^{i (2 d + 4 b s + (c - i p + 2 a s - a \nu) z)}}{c - i p + 2 a s - a \nu} - \frac{e^{2 i b \nu - i (c + i p + 2 a s - a \nu) z}}{c + i p + 2 a s - a \nu} + \frac{e^{i (2 d + 2 b \nu + (c - i p - 2 a s + a \nu) z)}}{c - i p - 2 a s + a \nu} - \frac{e^{4 i b s - i (c + i p - 2 a s + a \nu) z}}{c + i p - 2 a s + a \nu} \right) \right) /; \nu \in \mathbb{N}^{+}$$

Involving $e^{p z^r} \cos(b z) \cos^{\nu}(c z)$

01.07.21.1795.01

$$\int e^{p z^2} \cos(b z) \cos^{\nu}(c z) \, dz = \frac{2^{-\nu-2} \sqrt{\pi}}{\sqrt{p}} \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} i \, e^{\frac{b^2 + c^2 (\nu - 2 k)^2}{2 p}} \binom{\nu}{k} \left(-e^{-\frac{(b + 2 c k - c \nu)^2}{4 p}} \operatorname{erf}\left(\frac{b - 2 c k + c \nu + 2 i p z}{2 \sqrt{p}} \right) - e^{-\frac{(b - 2 c k + c \nu)^2}{4 p}} \operatorname{erf}\left(\frac{b + 2 c k - c \nu + 2 i p z}{2 \sqrt{p}} \right) + e^{-\frac{(b + 2 c k - c \nu)^2}{4 p}} \operatorname{erf}\left(\frac{b - 2 c k + c \nu - 2 i p z}{2 \sqrt{p}} \right) + e^{-\frac{(b + c (\nu - 2 k))^2}{4 p}} \operatorname{erf}\left(\frac{b + 2 c k - c \nu - 2 i p z}{2 \sqrt{p}} \right) \right) - e^{\frac{b^2}{4 p}} \binom{\nu}{\frac{\nu}{2}} \left(\operatorname{erfi}\left(\frac{-i b + 2 p z}{2 \sqrt{p}} \right) + \operatorname{erfi}\left(\frac{i b + 2 p z}{2 \sqrt{p}} \right) \right) (\nu \bmod 2 - 1) \right) /; \nu \in \mathbb{N}^{+}$$

01.07.21.1796.01

$$\int e^{p\sqrt{z}}\cos(b\,z)\cos^{\nu}(c\,z)\,dz = 2^{-\nu-2}\left(\frac{1}{b^2}\left(\left(\binom{\nu}{\frac{\nu}{2}}\left(\sqrt{-i\,b}\;e^{-\frac{i\,p^2}{4\,b}}\,p\,\sqrt{\pi}\;\operatorname{erfi}\left(\frac{p-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)+\right.\right.\right.\right.$$

$$\left.\left.\left.e^{-i\,b\,z}\left(-2\,i\,b\,e^{p\sqrt{z}}\left(-1+e^{2\,i\,b\,z}\right)+\sqrt{i\,b}\;e^{\frac{i\,p^2}{4\,b}+i\,b\,z}\,p\,\sqrt{\pi}\;\operatorname{erfi}\left(\frac{p+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)\right)\right)\right)(1-\nu\bmod 2)\right)+$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{2\,i\,e^{p\sqrt{z}-i\,(b+2\,c\,k-c\,\nu)\,z}}{b+2\,c\,k-c\,\nu}-\frac{2\,i\,e^{\sqrt{z}\,p+i\,(b+2\,c\,k-c\,\nu)\,z}}{b+2\,c\,k-c\,\nu}+\frac{2\,i\,e^{p\sqrt{z}-i\,(b+c\,(\nu-2\,k))\,z}}{b+c\,(\nu-2\,k)}-\frac{2\,i\,e^{\sqrt{z}\,p+i\,(b+c\,(\nu-2\,k))\,z}}{b+c\,(\nu-2\,k)}-\right.$$

$$\frac{e^{\frac{i\,p^2}{-4\,b-8\,c\,k+4\,c\,\nu}}\,p\,\sqrt{\pi}\;\operatorname{erfi}\left(\frac{p-2\,i\,(b+2\,c\,k-c\,\nu)\sqrt{z}}{2\sqrt{-i\,(b+2\,c\,k-c\,\nu)}}\right)}{(-i\,(b+2\,c\,k-c\,\nu))^{3/2}}-\frac{e^{\frac{i\,p^2}{4\,b+8\,c\,k-4\,c\,\nu}}\,p\,\sqrt{\pi}\;\operatorname{erfi}\left(\frac{p+2\,i\,(b+2\,c\,k-c\,\nu)\sqrt{z}}{2\sqrt{i\,(b+2\,c\,k-c\,\nu)}}\right)}{(i\,(b+2\,c\,k-c\,\nu))^{3/2}}-$$

$$\left.\left.\frac{e^{-\frac{i\,p^2}{4\,(b+c\,(\nu-2\,k))}}\,p\,\sqrt{\pi}\;\operatorname{erfi}\left(\frac{p-2\,i\,(b+c\,(\nu-2\,k))\sqrt{z}}{2\sqrt{-i\,(b+c\,(\nu-2\,k))}}\right)}{(-i\,(b+c\,(\nu-2\,k)))^{3/2}}-\frac{e^{\frac{i\,p^2}{4\,(b+c\,(\nu-2\,k))}}\,p\,\sqrt{\pi}\;\operatorname{erfi}\left(\frac{p+2\,i\,(b+c\,(\nu-2\,k))\sqrt{z}}{2\sqrt{i\,(b+c\,(\nu-2\,k))}}\right)}{(i\,(b+c\,(\nu-2\,k)))^{3/2}}\right)\right)\,/;\;\nu\in\mathbb{N}^+$$

Involving $e^{p\,z}\cos\left(b\,z^r\right)\cos^{\nu}(c\,z)$

01.07.21.1797.01

$$\int e^{p\,z}\cos\left(b\,z^2\right)\cos^{\nu}(c\,z)\,dz = 2^{-\nu-2}\sqrt{\pi}\left(\frac{e^{-\frac{i\,p^2}{4\,b}}\,i\,(\nu\bmod 2-1)}{b}\binom{\nu}{\frac{\nu}{2}}\left(\sqrt{i\,b}\;e^{\frac{i\,p^2}{2\,b}}\operatorname{erfi}\left(\frac{p+2\,i\,b\,z}{2\sqrt{i\,b}}\right)-\sqrt{-i\,b}\;\operatorname{erfi}\left(\frac{p-2\,i\,b\,z}{2\sqrt{-i\,b}}\right)\right)+\right.$$

$$\frac{i}{b}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\sqrt{-i\,b}\;e^{\frac{i\,(i\,p+c\,(\nu-2\,k))^2}{4\,b}}\operatorname{erfi}\left(\frac{\sqrt{-i\,b}\;(i\,p+c\,(\nu-2\,k)+2\,b\,z)}{2\,b}\right)+\right.$$

$$\sqrt{-i\,b}\;e^{\frac{i\,(2\,c\,k+i\,p-c\,\nu)^2}{4\,b}}\operatorname{erfi}\left(\frac{-2\,c\,i\,k+p+i\,c\,\nu-2\,i\,b\,z}{2\sqrt{-i\,b}}\right)-\sqrt{i\,b}\;e^{\frac{i\,(p+c\,i\,(2\,k-\nu))^2}{4\,b}}\operatorname{erfi}\left(\frac{p+c\,i\,(2\,k-\nu)+2\,i\,b\,z}{2\sqrt{i\,b}}\right)-$$

$$\left.\left.\sqrt{i\,b}\;e^{\frac{i\,(-2\,c\,i\,k+p+i\,c\,\nu)^2}{4\,b}}\operatorname{erfi}\left(\frac{-2\,c\,i\,k+p+i\,c\,\nu+2\,i\,b\,z}{2\sqrt{i\,b}}\right)\right)\right)\,/;\;\nu\in\mathbb{N}^+$$

01.07.21.1798.01

$$\int e^{p z} \cos\left(b \sqrt{z}\right) \cos^{\nu}(c z)\, dz = 2^{-\nu-2} \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{4 e^{(2 i c k+p-i c \nu) z} \cos\left(b \sqrt{z}\right)}{2 i c k+p-i c \nu} + \frac{4 e^{(p+c i (\nu-2 k)) z} \cos\left(b \sqrt{z}\right)}{p+c i (\nu-2 k)} + \frac{b\, e^{\frac{i b^2}{8 c k+4 i p-4 c \nu}} \sqrt{\pi}\, \operatorname{erf}\left(\frac{b+2 (2 c k+i p-c \nu) \sqrt{z}}{2 \sqrt{-2 c i k+p+i c \nu}}\right)}{(-2 c i k+p+i c \nu)^{3/2}} + \frac{b\, e^{\frac{i b^2}{-8 c k+4 i p+4 c \nu}} \sqrt{\pi}\, \operatorname{erf}\left(\frac{b+2 (-2 c k+i p+c \nu) \sqrt{z}}{2 \sqrt{2 i c k+p-i c \nu}}\right)}{(2 i c k+p-i c \nu)^{3/2}} - \frac{i b\, e^{\frac{i b^2}{-8 c k+4 i p+4 c \nu}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i b+2 (2 i c k+p-i c \nu) \sqrt{z}}{2 \sqrt{2 i c k+p-i c \nu}}\right)}{(2 i c k+p-i c \nu)^{3/2}} - \frac{i b\, e^{\frac{i b^2}{8 c k+4 i p-4 c \nu}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i b+2 (p+c i (\nu-2 k)) \sqrt{z}}{2 \sqrt{p+c i (\nu-2 k)}}\right)}{(p+c i (\nu-2 k))^{3/2}} \right) - \frac{1}{p^{3/2}} \left(\binom{\nu}{\frac{\nu}{2}} \left(4 e^{p z} \sqrt{p} \cos\left(b \sqrt{z}\right) + b\, e^{\frac{b^2}{4 p}} \sqrt{\pi}\, \operatorname{erf}\left(\frac{b+2 i p \sqrt{z}}{2 \sqrt{p}}\right) + b\, e^{\frac{b^2}{4 p}} \sqrt{\pi}\, \operatorname{erf}\left(\frac{b-2 i p \sqrt{z}}{2 \sqrt{p}}\right) \right) (\nu \bmod 2-1) \right) \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos(b z) \cos^{\nu}(c z^r)$

01.07.21.1799.01

$$\int e^{p z} \cos(b z) \cos^{\nu}\left(c z^2\right) dz = 2^{-\nu-1} \left(\left(\frac{e^{(i b+p) z}}{i b+p} + \frac{e^{(-i b+p) z}}{-i b+p} \right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) + \frac{i \sqrt{\pi}}{2 c} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{2 k-\nu} \left(e^{\frac{b p}{2 c k-c \nu}} \binom{\nu}{k} \left(e^{\frac{i (b+i p)^2}{c (8 k-4 \nu)}} \left(\sqrt{-i c (2 k-\nu)} \left(e^{\frac{b p}{c \nu-2 c k}} \operatorname{erfi}\left(\frac{-i b+p-4 i c k z+2 i c \nu z}{2 \sqrt{-i c (2 k-\nu)}}\right) + \operatorname{erfi}\left(\frac{i b+p-4 i c k z+2 i c \nu z}{2 \sqrt{-i c (2 k-\nu)}}\right) \right) \right) - e^{-\frac{i (b-i p)^2}{4 c k-2 c \nu}} \sqrt{i c (2 k-\nu)}\, \operatorname{erfi}\left(\frac{i b+p+2 i c (2 k-\nu) z}{2 \sqrt{i c (2 k-\nu)}}\right) \right) - e^{-\frac{i (b-i p)^2}{4 (2 c k-c \nu)}} \sqrt{i c (2 k-\nu)}\, \operatorname{erfi}\left(\frac{-i b+p+2 i c (2 k-\nu) z}{2 \sqrt{i c (2 k-\nu)}}\right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1800.01

$$\int e^{p z}\cos(b z)\cos^{\nu}\left(c\sqrt{z}\right)dz = \frac{(-1)^{\nu}\,2^{-\nu-1}\left(e^{(-i b+p)z}\left(-b+i p+e^{2 i b z}(b+i p)\right)\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{(b+i p)(i b+p)}+2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{4 e^{(-i b+p)z}\cos\left(c(\nu-2s)\sqrt{z}\right)}{-i b+p}+\frac{4 e^{(i b+p)z}\cos\left(c(\nu-2s)\sqrt{z}\right)}{i b+p}+\frac{c\, e^{\frac{c^2(\nu-2s)^2}{4(-i b+p)}}\, i\sqrt{\pi}\,(\nu-2s)\operatorname{erfi}\left(\frac{2(i b-p)\sqrt{z}-i c(\nu-2s)}{2\sqrt{-i b+p}}\right)}{(-i b+p)^{3/2}}+\frac{i c\, e^{\frac{c^2(\nu-2s)^2}{4(-i b+p)}}\sqrt{\pi}\,(\nu-2s)\operatorname{erfi}\left(\frac{2(-i b+p)\sqrt{z}-i c(\nu-2s)}{2\sqrt{-i b+p}}\right)}{(-i b+p)^{3/2}}+\frac{i c\, e^{\frac{c^2(\nu-2s)^2}{4(i b+p)}}\sqrt{\pi}\,(\nu-2s)\operatorname{erfi}\left(\frac{2(-i b-p)\sqrt{z}-i c(\nu-2s)}{2\sqrt{i b+p}}\right)}{(i b+p)^{3/2}}+\frac{c\, e^{\frac{c^2(\nu-2s)^2}{4(i b+p)}}\, i\sqrt{\pi}\,(\nu-2s)\operatorname{erfi}\left(\frac{2(i b+p)\sqrt{z}-i c(\nu-2s)}{2\sqrt{i b+p}}\right)}{(i b+p)^{3/2}}\right)/;\ \nu\in\mathbb{N}^{+}$$

Involving $e^{p z}\cos\left(b z^{r}\right)\cos^{\nu}\left(c z^{r}\right)$

01.07.21.1801.01

$$\int e^{p z}\cos\left(b z^2\right)\cos^{\nu}\left(c z^2\right)dz = \frac{1}{\sqrt{b^2}}\,2^{-\nu-2}\,e^{-\frac{i p^2}{4 b}}\sqrt{\pi}\left(\binom{\nu}{\frac{\nu}{2}}\left(\sqrt{i b}\operatorname{erfi}\left(\frac{p-2 i b z}{2\sqrt{-i b}}\right)+\sqrt{-i b}\, e^{\frac{i p^2}{2 b}}\operatorname{erfi}\left(\frac{p+2 i b z}{2\sqrt{i b}}\right)\right)-\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2)\left(\sqrt{i b}\operatorname{erfi}\left(\frac{p-2 i b z}{2\sqrt{-i b}}\right)+\sqrt{-i b}\, e^{\frac{i p^2}{2 b}}\operatorname{erfi}\left(\frac{p+2 i b z}{2\sqrt{i b}}\right)\right)+\sqrt{b^2}\, e^{\frac{i p^2}{4 b}}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{e^{-\frac{i p^2}{4(b-2 c k+c\nu)}}\operatorname{erfi}\left(\frac{p-2 i(b-2 c k+c\nu)z}{2\sqrt{-i(b-2 c k+c\nu)}}\right)}{\sqrt{-i(b-2 c k+c\nu)}}+\frac{e^{\frac{i p^2}{4(b-2 c k+c\nu)}}\operatorname{erfi}\left(\frac{p+2 i(b-2 c k+c\nu)z}{2\sqrt{i(b-2 c k+c\nu)}}\right)}{\sqrt{i(b-2 c k+c\nu)}}+\frac{e^{\frac{i p^2}{-4 b-8 c k+4 c\nu}}\operatorname{erfi}\left(\frac{p-2 i(b+2 c k-c\nu)z}{2\sqrt{-i(b+2 c k-c\nu)}}\right)}{\sqrt{-i(b+2 c k-c\nu)}}+\frac{e^{\frac{i p^2}{4 b+8 c k-4 c\nu}}\operatorname{erfi}\left(\frac{p+2 i(b+2 c k-c\nu)z}{2\sqrt{i(b+2 c k-c\nu)}}\right)}{\sqrt{i(b+2 c k-c\nu)}}\right)\right)/;\ \nu\in\mathbb{N}^{+}$$

01.07.21.1802.01

$$\int e^{p z} \cos\left(b \sqrt{z}\right) \cos^{\nu}\left(c \sqrt{z}\right) dz = 2^{-\nu-2} \left(\frac{4 e^{p z} \cos\left(b \sqrt{z}\right)}{p} + \frac{b\, e^{\frac{b^2}{4 p}} \sqrt{\pi} \left(\operatorname{erf}\left(\frac{b+2 i p \sqrt{z}}{2 \sqrt{p}}\right) + \operatorname{erf}\left(\frac{b-2 i p \sqrt{z}}{2 \sqrt{p}}\right)\right)}{p^{3/2}} \right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{4 e^{p z} \left(\cos\left((b + 2 c k - c \nu) \sqrt{z}\right) + \cos\left((b + c (\nu - 2 k)) \sqrt{z}\right)\right)}{p} + \frac{e^{\frac{(b+2 c k-c \nu)^2}{4 p}} \sqrt{\pi}\, (b + 2 c k - c \nu) \operatorname{erf}\left(\frac{b+c (2 k-\nu)+2 i p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}} + \frac{e^{\frac{(-b-2 c k+c \nu)^2}{4 p}} \sqrt{\pi}\, (b + 2 c k - c \nu) \operatorname{erf}\left(\frac{b+c (2 k-\nu)-2 i p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}} - \frac{e^{\frac{(b+c (\nu-2 k))^2}{4 p}} \sqrt{\pi}\, (b + c (\nu - 2 k)) \operatorname{erf}\left(\frac{-b+c (2 k-\nu)-2 i p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}} - \frac{i\, e^{\frac{(b+c (\nu-2 k))^2}{4 p}} \sqrt{\pi}\, (b + c (\nu - 2 k)) \operatorname{erfi}\left(\frac{i b+i c (\nu-2 k)+2 p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos(b z) \cos^{\nu}\left(c z^r\right)$

01.07.21.1803.01

$$\int e^{p z^2} \cos(b z) \cos^\nu(c z^2) \, dz = \frac{1}{\sqrt{p}} \left(2^{-\nu-2} \sqrt{\pi} \left(e^{\frac{b^2}{4p}} \binom{\nu}{\frac{\nu}{2}} \left(\operatorname{erfi}\left(\frac{-i b + 2 p z}{2 \sqrt{p}} \right) + \operatorname{erfi}\left(\frac{i b + 2 p z}{2 \sqrt{p}} \right) \right) - \right.\right.$$

$$e^{\frac{b^2}{4p}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2) \left(\operatorname{erfi}\left(\frac{-i b + 2 p z}{2 \sqrt{p}} \right) + \operatorname{erfi}\left(\frac{i b + 2 p z}{2 \sqrt{p}} \right) \right) + \sqrt{p} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{p^2 + c^2 (\nu - 2k)^2}$$

$$\left(\binom{\nu}{k} \left(-e^{\frac{i b^2}{8 c k + 4 i p - 4 c \nu}} (2 c k - i p - c \nu) \sqrt{-2 c i k + p + i c \nu} \, \operatorname{erf}\left(\frac{b - 4 c k z - 2 i p z + 2 c \nu z}{2 \sqrt{-2 c i k + p + i c \nu}} \right) + \right.\right.$$

$$e^{\frac{i b^2}{8 c k + 4 i p - 4 c \nu}} \sqrt{-2 c i k + p + i c \nu} \, (2 c k - i p - c \nu) \operatorname{erf}\left(\frac{b + 4 c k z + 2 i p z - 2 c \nu z}{2 \sqrt{-2 c i k + p + i c \nu}} \right) +$$

$$e^{\frac{i b^2}{-8 c k + 4 i p + 4 c \nu}} (-2 c k - i p + c \nu) \sqrt{2 i c k + p - i c \nu} \, \operatorname{erf}\left(\frac{b - 4 c k z + 2 i p z + 2 c \nu z}{2 \sqrt{2 i c k + p - i c \nu}} \right) +$$

$$\left.\left.\left.\left. e^{\frac{i b^2}{-8 c k + 4 i p + 4 c \nu}} (2 c k + i p - c \nu) \sqrt{2 i c k + p - i c \nu} \, \operatorname{erf}\left(\frac{b + 4 c k z - 2 i p z - 2 c \nu z}{2 \sqrt{2 i c k + p - i c \nu}} \right) \right) \right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.07.21.1804.01

$$\int e^{p\sqrt{z}}\cos(b\,z)\cos^{\nu}\left(c\sqrt{z}\right)dz = 2^{-\nu-2}\left(-\frac{e^{-\frac{i p^2}{4 b}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{(-i\,b)^{3/2}}+\frac{4\,e^{p\sqrt{z}}\sin(b\,z)}{b}-\frac{e^{\frac{i p^2}{4 b}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{(i\,b)^{3/2}}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)+$$

$$2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(-\frac{2\,i\,e^{-i\,b\,z}\left(e^{(p-i\,c\,(\nu-2\,s))\sqrt{z}}+e^{(p+c\,i\,(\nu-2\,s))\sqrt{z}}\right)\left(-1+e^{2\,i\,b\,z}\right)}{b}-\right.$$

$$\frac{e^{-\frac{i\,(p-i\,c\,(\nu-2\,s))^2}{4 b}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-i\,c\,(\nu-2\,s)-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{(-i\,b)^{3/2}}-\frac{i\,c\,e^{\frac{i\,(p-i\,c\,(\nu-2\,s))^2}{4 b}}\sqrt{\pi}\,(\nu-2\,s)\operatorname{erfi}\left(\frac{-p+i\,c\,(\nu-2\,s)-2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{(i\,b)^{3/2}}-$$

$$\frac{e^{-\frac{i\,(p+c\,i\,(\nu-2\,s))^2}{4 b}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+i\,c\,(\nu-2\,s)-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{(-i\,b)^{3/2}}-\frac{i\,c\,e^{-\frac{i\,(p+c\,i\,(\nu-2\,s))^2}{4 b}}\sqrt{\pi}\,(\nu-2\,s)\operatorname{erfi}\left(\frac{p+i\,c\,(\nu-2\,s)-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{(-i\,b)^{3/2}}-$$

$$\frac{e^{\frac{i\,(p-i\,c\,(\nu-2\,s))^2}{4 b}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-i\,c\,(\nu-2\,s)+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{(i\,b)^{3/2}}-\frac{i\,c\,e^{-\frac{i\,(p-i\,c\,(\nu-2\,s))^2}{4 b}}\sqrt{\pi}\,(\nu-2\,s)\operatorname{erfi}\left(\frac{-p+i\,c\,(\nu-2\,s)+2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{(-i\,b)^{3/2}}-$$

$$\left.\frac{e^{\frac{i\,(p+c\,i\,(\nu-2\,s))^2}{4 b}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+i\,c\,(\nu-2\,s)+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{(i\,b)^{3/2}}-\frac{i\,c\,e^{\frac{i\,(p+c\,i\,(\nu-2\,s))^2}{4 b}}\sqrt{\pi}\,(\nu-2\,s)\operatorname{erfi}\left(\frac{p+i\,c\,(\nu-2\,s)+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{(i\,b)^{3/2}}\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $e^{p\,z^r}\cos\left(b\,z^r\right)\cos^{\nu}(c\,z)$

01.07.21.1805.01

$$\int e^{p z^2} \cos(b z^2) \cos^\nu(c z)\, dz = 2^{-\nu-2} \sqrt{\pi} \left(\frac{i}{b^2+p^2} \binom{\nu}{\frac{\nu}{2}} \left((b+i p) \sqrt{i b + p}\, \operatorname{erfi}\left(\sqrt{i b+p}\, z\right) - (b - i p) \sqrt{-i b + p}\, \operatorname{erfi}\left(\sqrt{-i b + p}\, z\right) \right) (\nu \bmod 2 - 1) + \frac{1}{b^2+p^2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-\frac{i c^2 (\nu-2k)^2}{4(b - i p)}} \binom{\nu}{k} \left(e^{\frac{i b c^2 (\nu-2k)^2}{2(b^2+p^2)}} \sqrt{-i b + p}\, (b - i p) \operatorname{erf}\left(\frac{c(\nu-2k) + 2(b+ip)z}{2\sqrt{-i b+p}} \right) + e^{\frac{i b c^2 (\nu-2k)^2}{2(b^2+p^2)}} \sqrt{-i b + p}\, (i b + p) \operatorname{erfi}\left(\frac{-2 c i k + i c \nu - 2 i b z + 2 p z}{2 \sqrt{-i b + p}} \right) + (-i b + p) \sqrt{i b + p} \left(\operatorname{erfi}\left(\frac{-2 c i k + i c \nu + 2 i b z + 2 p z}{2\sqrt{i b + p}} \right) + \operatorname{erfi}\left(\frac{2 i c k - i c \nu + 2 i b z + 2 p z}{2 \sqrt{i b+p}} \right) \right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.07.21.1806.01

$$\int e^{p\sqrt{z}} \cos(b\sqrt{z}) \cos^\nu(c z)\, dz = 2^{-\nu-2} \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{2 i e^{(-i b + p)\sqrt{z} - i c (2k-\nu) z}}{c(2k-\nu)} + \frac{2 i e^{(i b + p)\sqrt{z} - i c(2k-\nu) z}}{c(2k-\nu)} - \frac{2 i e^{\sqrt{z}(-i b + p) + c i (2k-\nu) z}}{c(2k-\nu)} - \frac{2 i e^{\sqrt{z}(i b + p) + c i (2k-\nu) z}}{c(2k-\nu)} + \frac{i e^{\frac{i(b+ip)^2}{c(8k-4\nu)}} (b + i p)\sqrt{\pi}\, \operatorname{erf}\left(\frac{b + i p + 2 c (2k-\nu)\sqrt{z}}{2\sqrt{i c(\nu-2k)}} \right)}{c(2k-\nu)\sqrt{i c(\nu-2k)}} - \frac{e^{\frac{i(-i b+p)^2}{c(8k-4\nu)}} (-i b + p)\sqrt{\pi}\, \operatorname{erfi}\left(\frac{-i b + p + 2 i c (2k-\nu)\sqrt{z}}{2\sqrt{i c(2k-\nu)}} \right)}{(i c(2k-\nu))^{3/2}} - \frac{e^{\frac{i(i b+p)^2}{c(8k-4\nu)}} (i b + p)\sqrt{\pi}\, \operatorname{erfi}\left(\frac{i b + p + 2 i c (2k-\nu)\sqrt{z}}{2\sqrt{i c(2k-\nu)}} \right)}{(i c(2k-\nu))^{3/2}} + \frac{e^{-\frac{i(i b+p)^2}{c(8k-4\nu)}} (b - i p)\sqrt{\pi}\, \operatorname{erfi}\left(\frac{i b + p + 2 i c (\nu-2k)\sqrt{z}}{2\sqrt{i c(\nu-2k)}} \right)}{c(2k-\nu)\sqrt{i c(\nu-2k)}} \right) - \frac{1}{(b^2+p^2)^2} \left(8 e^{p\sqrt{z}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\left(\left(\sqrt{z}\, p + 1 \right) b^2 + p^2 \left(p\sqrt{z} - 1 \right) \right) \cos(b\sqrt{z}) + b \left(\sqrt{z}\, b^2 - 2p + p^2 \sqrt{z} \right) \sin(b\sqrt{z}) \right) \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos(b z^r) \cos^\nu(c z^r)$

01.07.21.1807.01

$$\int e^{p z^r} \cos(b z^r) \cos^\nu(c z^r)\, dz = -\frac{2^{-\nu-1} z}{r} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma\left(\frac{1}{r}, i(b+ip-2cs+cv) z^r\right) (i(b+ip-2cs+cv) z^r)^{-1/r} + (-i(b-ip-2cs+cv) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -i(b-ip-2cs+cv) z^r\right) + (i(b+ip+2cs-cv) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i(b+ip+2cs-cv) z^r\right) + (-i(b-ip+2cs-cv) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -i(b-ip+2cs-cv) z^r\right) \right) - \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{1}{r}, (-ib-p) z^r\right) ((-ib-p) z^r)^{-1/r} + (i(b+ip) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i(b+ip) z^r\right) \right) (\nu \bmod 2 - 1) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.1808.01

$$\int e^{p z^2} \cos(b z^2) \cos^\nu(c z^2)\, dz = \frac{1}{(-ib+p)(ib+p)} \left(2^{-\nu-2} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\sqrt{-ib+p}\, (ib+p) \operatorname{erfi}\left(\sqrt{-ib+p}\, z\right) + (-ib+p) \sqrt{ib+p}\, \operatorname{erfi}\left(\sqrt{ib+p}\, z\right) \right) (1 - \nu \bmod 2) + 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\left(\sqrt{ib+p+ic(2k-\nu)}\, (-ib+p-ic(2k-\nu)) \operatorname{erfi}\left(\sqrt{ib+p+ic(2k-\nu)}\, z\right) + (ib+p+ic(2k-\nu)) \sqrt{-ib+p-ic(2k-\nu)}\, \operatorname{erfi}\left(\sqrt{-ib+p-ic(2k-\nu)}\, z\right) \right) \Big/ ((-ib+p-ic(2k-\nu))(ib+p+ic(2k-\nu))) + \left(\sqrt{ib+p+ic(\nu-2k)}\, (-ib+p-ic(\nu-2k)) \operatorname{erfi}\left(\sqrt{ib+p+ic(\nu-2k)}\, z\right) + (ib+p+ic(\nu-2k)) \sqrt{-ib+p-ic(\nu-2k)}\, \operatorname{erfi}\left(\sqrt{-ib+p-ic(\nu-2k)}\, z\right) \right) \Big/ ((-ib+p-ic(\nu-2k))(ib+p+ic(\nu-2k))) \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1809.01

$$\int e^{p\sqrt{z}} \cos\left(b\sqrt{z}\right) \cos^\nu\left(c\sqrt{z}\right) dz = 2^{-\nu} e^{(-ib+p)\sqrt{z}} \left(\frac{e^{2ib\sqrt{z}} \left(-1 + ib\sqrt{z} + p\sqrt{z}\right)}{(ib+p)^2} + \frac{\sqrt{z}}{-ib+p} - \frac{1}{(ib-p)^2} \right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(e^{(-ib+p-ic(2k-\nu))\sqrt{z}} \left(\frac{e^{2(ib+ic(2k-\nu))\sqrt{z}} \left(\sqrt{z}\, p + (ib+ic(2k-\nu))\sqrt{z} - 1\right)}{(ib+p+ic(2k-\nu))^2} + \frac{\sqrt{z}}{-ib+p-ic(2k-\nu)} - \frac{1}{(ib-p+ic(2k-\nu))^2} \right) + e^{(-ib+p-ic(\nu-2k))\sqrt{z}} \left(\frac{e^{2(ib+ic(\nu-2k))\sqrt{z}} \left(\sqrt{z}\, p + (ib+ic(\nu-2k))\sqrt{z} - 1\right)}{(ib+p+ic(\nu-2k))^2} + \frac{\sqrt{z}}{-ib+p-ic(\nu-2k)} - \frac{1}{(ib-p+ic(\nu-2k))^2} \right) \right) \binom{\nu}{k} /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+e} \cos(a z^r+q) \cos^v(c z^r+g)$

01.07.21.1810.01

$$\int e^{b z^r+e} \cos(a z^r+q) \cos^v(c z^r+g)\, dz = -\frac{1}{r} 2^{-v-1} z \left(e^{e-i q} \binom{v}{\frac{v}{2}} \left(e^{2 i q}\, \Gamma\!\left(\frac{1}{r}, (-b-i a) z^r\right) ((-b-i a) z^r)^{-1/r} + (i (a+i b) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, i (a+i b) z^r\right)\right) (1-v \bmod 2) + \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{e-i (q+g(2 s+v))} \binom{v}{s} \left(e^{4 i g s}\, \Gamma\!\left(\frac{1}{r}, i (a+i b-2 c s+c v) z^r\right) (i (a+i b-2 c s+c v) z^r)^{-1/r} + e^{2 i (q+g v)} (-i (a-i b-2 c s+c v) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, -i (a-i b-2 c s+c v) z^r\right) + e^{2 i g v} (i (a+i b+2 c s-c v) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, i (a+i b+2 c s-c v) z^r\right) + e^{2 i (q+2 g s)} (-i (a-i b+2 c s-c v) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, -i (a-i b+2 c s-c v) z^r\right)\right)\right) /;\; v \in \mathbb{N}^+$$

01.07.21.1811.01

$$\int e^{b z^2+e} \cos(a z^2+q) \cos^v(c z^2+g)\, dz = 2^{-v-2} \left(\frac{e^{-2 i q} \operatorname{erfi}\left(\sqrt{b-i a}\, z\right)}{\sqrt{b-i a}} + \frac{\operatorname{erfi}\left(\sqrt{b+i a}\, z\right)}{\sqrt{b+i a}} \right) e^{e+i q} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1-v \bmod 2) + 2^{-v-2} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{e-i q+g i (v-2 s)} \left(\frac{\operatorname{erfi}\left(\sqrt{b-i a+c i (v-2 s)}\, z\right)}{\sqrt{b-i a+c i (v-2 s)}} + \frac{e^{2 (i q-i g (v-2 s))} \operatorname{erfi}\left(\sqrt{b+i a-i c (v-2 s)}\, z\right)}{\sqrt{b+i a-i c (v-2 s)}} \right) + e^{e+i q+g i (v-2 s)} \left(\frac{\operatorname{erfi}\left(\sqrt{b+i a+c i (v-2 s)}\, z\right)}{\sqrt{b+i a+c i (v-2 s)}} + \frac{e^{2 (-i q-i g (v-2 s))} \operatorname{erfi}\left(\sqrt{b-i a-i c (v-2 s)}\, z\right)}{\sqrt{b-i a-i c (v-2 s)}} \right) \right) /;\; v \in \mathbb{N}^+$$

01.07.21.1812.01

$$\int e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, a+q\right) \cos^{v}\left(\sqrt{z}\, c+g\right) dz = 2^{-v} \left(\frac{e^{\sqrt{z}\,(b+i a)+e+i q} \left(\sqrt{z}\, b+i a \sqrt{z}-1\right)}{(-b-i a)^2} + \frac{e^{\sqrt{z}\,(b-i a)+e-i q} \left(\sqrt{z}\, b-i a \sqrt{z}-1\right)}{(b-i a)^2} \right) \binom{v}{\frac{v}{2}} (1-v \bmod 2) + 2^{-v} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left(\frac{e^{e-i q-i g (v-2 s)+(b-i a-i c (v-2 s)) \sqrt{z}} \left(\sqrt{z}\, b+(-i a-i c (v-2 s)) \sqrt{z}-1\right)}{(b-i a-i c (v-2 s))^2} + \frac{e^{e+i q-i g (v-2 s)+(b+i a-i c (v-2 s)) \sqrt{z}} \left(\sqrt{z}\, b+(i a-i c (v-2 s)) \sqrt{z}-1\right)}{(b+i a-i c (v-2 s))^2} + \frac{e^{e+i q+g i (v-2 s)+(b+i a+c i (v-2 s)) \sqrt{z}} \left(\sqrt{z}\, b-(-i a-i c (v-2 s)) \sqrt{z}-1\right)}{(-b-i a-i c (v-2 s))^2} + \frac{e^{e-i q+g i (v-2 s)+(b-i a+c i (v-2 s)) \sqrt{z}} \left(\sqrt{z}\, b-(i a-i c (v-2 s)) \sqrt{z}-1\right)}{(-b+i a-i c (v-2 s))^2} \right) \binom{v}{s} /; v \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \cos\left(a z^r+p z+q\right) \cos^{v}\left(c z^r+f z+g\right)$

01.07.21.1813.01

$$
\begin{aligned}
&\int e^{b z^2+d z+e} \cos\left(a z^2+p z+q\right) \cos^{v}\left(c z^2+f z+g\right) dz = \\
&2^{-v-2} \sqrt{\pi} \Biggl(\frac{1}{a^2+b^2} \Biggl(\binom{v}{\frac{v}{2}} \Biggl(\sqrt{b-i a}\, (b+i a)\, e^{-\frac{(d-i p)^2}{4(b-i a)}+e-i q} \operatorname{erfi}\left(\frac{d-i(p+2 a z+2 i b z)}{2\sqrt{b-i a}}\right) + \\
&\quad (b-i a)\sqrt{b+i a}\; e^{-\frac{(d+i p)^2}{4(b+i a)}+e+i q} \operatorname{erfi}\left(\frac{d+i p+2 b z+2 i a z}{2\sqrt{b+i a}}\right)\Biggr)\Biggr) (1-v \bmod 2) \Biggr) + \\
&\quad \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \Biggl(\Biggl(e^{-\frac{i(-i d+2 f k+p-f v)^2}{4(a-i b+2 c k-c v)}+e+2 i g k+i q-i g v} \sqrt{b+i a+c i(2k-v)}\, (a+i b+2 c k-c v) \\
&\qquad \operatorname{erf}\left(\frac{-i d+2 f k+p-f v+2 a z-2 i b z+4 c k z-2 c v z}{2\sqrt{b+i a+c i(2k-v)}}\right) + \\
&\qquad e^{\frac{i(i d+2 f k+p-f v)^2}{4(a+i b+2 c k-c v)}+e-2 i g k-i q+i g v} \sqrt{b-i a-2 i c k+i c v}\, (a-i b+2 c k-c v) \\
&\qquad \operatorname{erf}\left(\frac{i d+2 f k+p-f v+2 a z+2 i b z+4 c k z-2 c v z}{2\sqrt{b-i a-2 i c k+i c v}}\right)\Biggr) \Bigg/ \\
&\quad ((a-i b+2 c k-c v)(a+i b+2 c k-c v)) + \Biggl(e^{-\frac{i(-i d+p+f(v-2k))^2}{4(a-i b+c(v-2k))}+e-2 i g k+i q+i g v} \sqrt{b+i a-2 i c k+i c v} \\
&\qquad (a+i b+c(v-2k)) \operatorname{erf}\left(\frac{-i d+p+f(v-2k)+2 a z-2 i b z-4 c k z+2 c v z}{2\sqrt{b+i a-2 i c k+i c v}}\right) + \\
&\qquad e^{\frac{i(i d+p+f(v-2k))^2}{4(a+i b+c(v-2k))}+e+2 i g k-i q-i g v} \sqrt{-i(a+i b+c(v-2k))}\, (a-i b+c(v-2k)) \\
&\qquad \operatorname{erf}\left(\frac{i d+p+f(v-2k)+2 a z+2 i b z-4 c k z+2 c v z}{2\sqrt{-i(a+i b+c(v-2k))}}\right)\Biggr) \Bigg/ \\
&\quad ((a-i b+c(v-2k))(a+i b+c(v-2k))) \Biggr) \Biggr) \;/;\; v \in \mathbb{N}^{+}
\end{aligned}
$$

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$$\int e^{\sqrt{z}\, b+d z+e} \cos\left(\sqrt{z}\, a+p z+q\right) \cos^{v}\left(\sqrt{z}\, c+f z+g\right) dz = 2^{-v-2}\, e^{e-i q} \left(-\frac{(b+i a)\, e^{2 i q-\frac{(b+i a)^2}{4 (d+i p)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+i a+2 (d+i p) \sqrt{z}}{2 \sqrt{d+i p}}\right)}{(d+i p)^{3/2}}+\frac{(i a-b)\, e^{-\frac{(b-i a)^2}{4 (d-i p)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-i a+2 (d-i p) \sqrt{z}}{2 \sqrt{d-i p}}\right)}{(d-i p)^{3/2}}+\frac{2\, e^{\sqrt{z}\, (b+i a)+2 i q+(d+i p) z}}{d+i p}+\frac{2\, e^{\sqrt{z}\, (b-i a)+(d-i p) z}}{d-i p}\right) \binom{v}{\frac{v}{2}} (1-v \bmod 2)+2^{-v-2} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(2\, e^{e-2 i g k-i q-i g v} \left(\frac{e^{2 i g v+(d-2 i f k-i p+i f v) z+(b-i a-2 i c k+i c v) \sqrt{z}}}{d-2 i f k-i p+i f v}+\frac{e^{4 i g k+2 i q+(d+2 i f k+i p-i f v) z+(b+i a+2 i c k-i c v) \sqrt{z}}}{d+2 i f k+i p-i f v}+\frac{e^{4 i g k+(d+2 i f k-i p-i f v) z+(b-i a+2 i c k-i c v) \sqrt{z}}}{d+2 i f k-i p-i f v}+\frac{e^{2 i q+2 i g v+(d-2 i f k+i p+i f v) z+(b+i a-2 i c k+i c v) \sqrt{z}}}{d-2 i f k+i p+i f v}\right)-\left(e^{-\frac{(b-i a-2 i c k+i c v)^2}{4 (d-2 i f k-i p+i f v)}+e-2 i g k-i q+i g v} \sqrt{\pi}\, (b-i a-2 i c k+i c v)\, \operatorname{erfi}\left(\frac{b-i a-2 i c k+i c v+2 (d-2 i f k-i p+i f v) \sqrt{z}}{2 \sqrt{d-2 i f k-i p+i f v}}\right)\right) \Big/ (d-2 i f k-i p+i f v)^{3/2}-\left(e^{-\frac{(b+i a+2 i c k-i c v)^2}{4 (d+2 i f k+i p-i f v)}+e+2 i g k+i q-i g v} \sqrt{\pi}\, (b+i a+2 i c k-i c v)\, \operatorname{erfi}\left(\frac{b+i a+2 i c k-i c v+2 (d+2 i f k+i p-i f v) \sqrt{z}}{2 \sqrt{d+2 i f k+i p-i f v}}\right)\right) \Big/ (d+2 i f k+i p-i f v)^{3/2}-\left(e^{-\frac{(b-i a+2 i c k-i c v)^2}{4 (d+2 i f k-i p-i f v)}+e+2 i g k-i q-i g v} \sqrt{\pi}\, (b-i a+2 i c k-i c v)\, \operatorname{erfi}\left(\frac{b-i a+2 i c k-i c v+2 (d+2 i f k-i p-i f v) \sqrt{z}}{2 \sqrt{d+2 i f k-i p-i f v}}\right)\right) \Big/ (d+2 i f k-i p-i f v)^{3/2}-\left(e^{-\frac{(b+i a+c i (v-2 k))^2}{4 (d+i p+f i (v-2 k))}+e-2 i g k+i q+i g v} \sqrt{\pi}\, (b+i a+c i (v-2 k))\, \operatorname{erfi}\left(\frac{b+i a-2 i c k+i c v+2 (d+i p+f i (v-2 k)) \sqrt{z}}{2 \sqrt{d+i p+f i (v-2 k)}}\right)\right) \Big/ (d+i p+f i (v-2 k))^{3/2}\right) /;\, v \in \mathbb{N}^+$$

Involving product of power of the direct function, the direct function and rational functions of exp

Involving $\cos(e\, z) \cos^{\nu}(c\, z) \left(a + b\, e^{d\, z}\right)^{-n}$

01.07.21.1815.01

$$\int \frac{\cos(e\, z) \cos^{\nu}(c\, z)}{\left(a + b\, e^{d\, z}\right)^{n}}\, dz = 2^{-\nu-1} a^{-n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{-i\, e - 2\, i\, c\, s + i\, c\, \nu} \left(e^{(-i\, e - 2\, i\, c\, s + i\, c\, \nu)\, z} \, {}_2F_1\!\left(\frac{-i\, e - 2\, i\, c\, s + i\, c\, \nu}{d}, n; \frac{d - i\, e - 2\, i\, c\, s + i\, c\, \nu}{d}; -\frac{b\, e^{d\, z}}{a} \right) - e^{(i\, e + 2\, i\, c\, s - i\, c\, \nu)\, z} \, {}_2F_1\!\left(\frac{i\, e + 2\, i\, c\, s - i\, c\, \nu}{d}, n; \frac{d + i\, e + 2\, i\, c\, s - i\, c\, \nu}{d}; -\frac{b\, e^{d\, z}}{a} \right) \right) + \frac{1}{-i\, e + 2\, i\, c\, s - i\, c\, \nu} \left(e^{(-i\, e + 2\, i\, c\, s - i\, c\, \nu)\, z} \, {}_2F_1\!\left(\frac{-i\, e + 2\, i\, c\, s - i\, c\, \nu}{d}, n; \frac{d - i\, e + 2\, i\, c\, s - i\, c\, \nu}{d}; -\frac{b\, e^{d\, z}}{a} \right) - e^{(i\, e - 2\, i\, c\, s + i\, c\, \nu)\, z} \, {}_2F_1\!\left(\frac{i\, e - 2\, i\, c\, s + i\, c\, \nu}{d}, n; \frac{d + i\, e - 2\, i\, c\, s + i\, c\, \nu}{d}; -\frac{b\, e^{d\, z}}{a} \right) \right) \right) - \frac{i\, 2^{-\nu-1} a^{-n} \, (1 - \nu \bmod 2)}{e} \binom{\nu}{\frac{\nu}{2}} \left(e^{i\, e\, z} \, {}_2F_1\!\left(\frac{i\, e}{d}, n; \frac{d + i\, e}{d}; -\frac{b\, e^{d\, z}}{a} \right) - e^{-i\, e\, z} \, {}_2F_1\!\left(-\frac{i\, e}{d}, n; \frac{d - i\, e}{d}; -\frac{b\, e^{d\, z}}{a} \right) \right) /; n \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving $e^{p\, z} \cos(e\, z) \cos^{\nu}(c\, z) \left(a + b\, e^{d\, z}\right)^{-n}$

01.07.21.1816.01

$$\int \frac{e^{p z} \cos(e z) \cos^{\nu}(c z)}{\left(a + b e^{d z}\right)^{n}} \, dz = 2^{-\nu-1} a^{-n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(e^{(-i e + p - 2 i c s + i c \nu) z} (-i e - p - 2 i c s + i c \nu) \, {}_2F_1\!\left(\frac{-i e + p - 2 i c s + i c \nu}{d}, n; \frac{d - i e + p - 2 i c s + i c \nu}{d}; -\frac{b e^{d z}}{a} \right) - e^{(i e + p + 2 i c s - i c \nu) z} (-i e + p - 2 i c s + i c \nu) \, {}_2F_1\!\left(\frac{i e + p + 2 i c s - i c \nu}{d}, n; \frac{d + i e + p + 2 i c s - i c \nu}{d}; -\frac{b e^{d z}}{a} \right) \right) \Big/ ((-i e - p - 2 i c s + i c \nu)(-i e + p - 2 i c s + i c \nu)) + \left(e^{(-i e + p + 2 i c s - i c \nu) z} (-i e - p + 2 i c s - i c \nu) \, {}_2F_1\!\left(\frac{-i e + p + 2 i c s - i c \nu}{d}, n; \frac{d - i e + p + 2 i c s - i c \nu}{d}; -\frac{b e^{d z}}{a} \right) - e^{(i e + p - 2 i c s + i c \nu) z} (-i e + p + 2 i c s - i c \nu) \, {}_2F_1\!\left(\frac{i e + p - 2 i c s + i c \nu}{d}, n; \frac{d + i e + p - 2 i c s + i c \nu}{d}; -\frac{b e^{d z}}{a} \right) \right) \Big/ ((-i e - p + 2 i c s - i c \nu)(-i e + p + 2 i c s - i c \nu)) \right) + \frac{2^{-\nu-1} a^{-n}}{(i e - p)(i e + p)} \binom{\nu}{\frac{\nu}{2}} \left(e^{(i e + p) z} (i e - p) \, {}_2F_1\!\left(\frac{i e + p}{d}, n; \frac{d + i e + p}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-i e + p) z} (i e + p) \, {}_2F_1\!\left(\frac{-i e + p}{d}, n; \frac{d - i e + p}{d}; -\frac{b e^{d z}}{a} \right) \right) (1 - \nu \bmod 2) \;/;\; n \in \mathbb{N}^{+} \bigwedge \nu \in \mathbb{N}^{+}$$

Involving product of power of the direct function, the direct function and algebraic functions of exp

Involving $\left(a + b e^{d z}\right)^{\beta} \cos(e z) \cos^{\nu}(c z)$

01.07.21.1817.01

$$\int \left(a+b\,e^{d z}\right)^{\beta} \cos(e\,z) \cos^{\nu}(c\,z)\,dz = 2^{-\nu-1}\left(a+b\,e^{d z}\right)^{\beta}\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{-i\,e-2\,i\,c\,s+i\,c\,\nu}\left(e^{(-i\,e-2\,i\,c\,s+i\,c\,\nu)\,z}\,{}_2F_1\left(\frac{-i\,e-2\,i\,c\,s+i\,c\,\nu}{d}, -\beta; \frac{d-i\,e-2\,i\,c\,s+i\,c\,\nu}{d}; -\frac{b\,e^{d z}}{a}\right)-\right.\right.$$

$$\left. e^{(i\,e+2\,i\,c\,s-i\,c\,\nu)\,z}\,{}_2F_1\left(\frac{i\,e+2\,i\,c\,s-i\,c\,\nu}{d}, -\beta; \frac{d+i\,e+2\,i\,c\,s-i\,c\,\nu}{d}; -\frac{b\,e^{d z}}{a}\right)\right)+$$

$$\frac{1}{-i\,e+2\,i\,c\,s-i\,c\,\nu}\left(e^{(-i\,e+2\,i\,c\,s-i\,c\,\nu)\,z}\,{}_2F_1\left(\frac{-i\,e+2\,i\,c\,s-i\,c\,\nu}{d}, -\beta; \frac{d-i\,e+2\,i\,c\,s-i\,c\,\nu}{d}; -\frac{b\,e^{d z}}{a}\right)-\right.$$

$$\left.\left. e^{(i\,e-2\,i\,c\,s+i\,c\,\nu)\,z}\,{}_2F_1\left(\frac{i\,e-2\,i\,c\,s+i\,c\,\nu}{d}, -\beta; \frac{d+i\,e-2\,i\,c\,s+i\,c\,\nu}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right)-$$

$$\frac{i\,2^{-\nu-1}}{e}\left(a+b\,e^{d z}\right)^{\beta}\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}\binom{\nu}{\frac{\nu}{2}}\left(e^{i\,e\,z}\,{}_2F_1\left(\frac{i\,e}{d}, -\beta; \frac{d+i\,e}{d}; -\frac{b\,e^{d z}}{a}\right)-e^{-i\,e\,z}\,{}_2F_1\left(-\frac{i\,e}{d}, -\beta; \frac{d-i\,e}{d}; -\frac{b\,e^{d z}}{a}\right)\right)$$

$$(1-\nu \bmod 2)\ /;\ \nu\in\mathbb{N}^{+}$$

Involving $e^{p z}\left(a+b\,e^{d z}\right)^{\beta}\cos(e\,z)\cos^{\nu}(c\,z)$

01.07.21.1818.01

$$\int e^{p z}\left(a+b e^{d z}\right)^{\beta}\cos(e z)\cos^{\nu}(c z)\,dz = 2^{-\nu-1}\left(a+b e^{d z}\right)^{\beta}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(e^{(-i e+p-2 i c s+i c \nu) z}(-i e-p-2 i c s+i c \nu)\,{}_2F_1\left(\frac{-i e+p-2 i c s+i c \nu}{d},-\beta;\frac{d-i e+p-2 i c s+i c \nu}{d};-\frac{b e^{d z}}{a}\right)-e^{(i e+p+2 i c s-i c \nu) z}(-i e+p-2 i c s+i c \nu)\,{}_2F_1\left(\frac{i e+p+2 i c s-i c \nu}{d},-\beta;\frac{d+i e+p+2 i c s-i c \nu}{d};-\frac{b e^{d z}}{a}\right)\right)\Big/((-i e-p-2 i c s+i c \nu)(-i e+p-2 i c s+i c \nu))+\left(e^{(-i e+p+2 i c s-i c \nu) z}(-i e-p+2 i c s-i c \nu)\,{}_2F_1\left(\frac{-i e+p+2 i c s-i c \nu}{d},-\beta;\frac{d-i e+p+2 i c s-i c \nu}{d};-\frac{b e^{d z}}{a}\right)-e^{(i e+p-2 i c s+i c \nu) z}(-i e+p+2 i c s-i c \nu)\,{}_2F_1\left(\frac{i e+p-2 i c s+i c \nu}{d},-\beta;\frac{d+i e+p-2 i c s+i c \nu}{d};-\frac{b e^{d z}}{a}\right)\right)\Big/((-i e-p+2 i c s-i c \nu)(-i e+p+2 i c s-i c \nu))\right)+\frac{2^{-\nu-1}}{(i e-p)(i e+p)}\left(a+b e^{d z}\right)^{\beta}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta}\binom{\nu}{\frac{\nu}{2}}\left(e^{(i e+p) z}(i e-p)\,{}_2F_1\left(\frac{i e+p}{d},-\beta;\frac{d+i e+p}{d};-\frac{b e^{d z}}{a}\right)-e^{(-i e+p) z}(i e+p)\,{}_2F_1\left(\frac{-i e+p}{d},-\beta;\frac{d-i e+p}{d};-\frac{b e^{d z}}{a}\right)\right)(1-\nu \bmod 2)\;/;\;\nu\in\mathbb{N}^+$$

Involving product of powers of two direct functions and exponential function

Involving $e^{b z}\cos^{\mu}(c z)\cos^{\nu}(a z)$

01.07.21.1819.01

$$\int e^{b z}\cos^{\mu}(c z)\cos^{\nu}(a z)\,dz = 2^{-\nu}\left(1+e^{2 i c z}\right)^{-\mu}\cos^{\mu}(c z)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{e^{(b-i a(\nu-2k)) z}}{b+i(2 a k-a\nu-c\mu)}\,{}_2F_1\left(-\frac{i b-2 a k+a\nu+c\mu}{2c},-\mu;-\frac{i b+a(\nu-2k)+c(\mu-2)}{2c};-e^{2 i c z}\right)+\frac{e^{(b+a i(\nu-2k)) z}}{b-i(2 a k-a\nu+c\mu)}\,{}_2F_1\left(-\frac{i b+2 a k-a\nu+c\mu}{2c},-\mu;-\frac{\mu c-2c+i b+2 a k-a\nu}{2c};-e^{2 i c z}\right)\right)-\frac{1}{b-i c\mu}\left(2^{-\nu} e^{b z}\left(1+e^{2 i c z}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\left(-\frac{i b+c\mu}{2c},-\mu;\frac{1}{2}\left(2-\frac{i b}{c}-\mu\right);-e^{2 i c z}\right)(\nu \bmod 2-1)\cos^{\mu}(c z)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1820.01

$$\int e^{b z} \cos^m(c z) \cos^\nu(a z)\, dz = 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\frac{e^{(b+2 i c k - i c m) z}}{b + 2 i c k - i c m} + \frac{e^{(b-2 i c k + i c m) z}}{b - 2 i c k + i c m} \right) \binom{m}{k} \right) (1 - \nu \bmod 2) +$$

$$\frac{2^{-m-\nu} e^{b z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{b} +$$

$$2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\frac{e^{(b+2 i a k - i a \nu) z}}{b + 2 i a k - i a \nu} + \frac{e^{(b-2 i a k + i a \nu) z}}{b - 2 i a k + i a \nu} \right) \binom{\nu}{k} +$$

$$2^{-m-\nu} e^{b z} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{(2 i c k - i c m + 2 i a s - i a \nu) z} \left(-\frac{1}{-b + c i (m - 2k) - 2 i a s + i a \nu} + \frac{e^{2 i (c (m-2k) + a(\nu - 2s)) z}}{b + c i (m - 2k) - 2 i a s + i a \nu} + \right.$$

$$\left. \frac{e^{2 i c (m-2k) z}}{b + c i (m - 2k) + 2 i a s - i a \nu} + \frac{e^{-2 i a (2s - \nu) z}}{b + 2 i c k - i c m - 2 i a s + i a \nu} \right) \binom{\nu}{s} /;\ m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos^m(c z) \cos^\nu(a z + b)$

01.07.21.1821.01

$$\int e^{p z} \cos^\mu(c z) \cos^\nu(b + a z)\, dz = 2^{-\nu} i \cos^\mu(c z) \left(1 + e^{2 i c z}\right)^{-\mu}$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{i b (\nu - 2k)} \binom{\nu}{k} \left(\frac{e^{(p + a i (\nu - 2k)) z}}{2 a k + i p - a \nu + c \mu} {}_2F_1\left(-\frac{2 a k + i p - a \nu + c \mu}{2 c}, -\mu; -\frac{2 a k + i p - a \nu + c(\mu - 2)}{2 c}; -e^{2 i c z} \right) + \right.$$

$$\left. \frac{e^{(p - i a (\nu - 2k)) z - 2 i b (\nu - 2k)}}{i p + a(\nu - 2k) + c \mu} {}_2F_1\left(-\frac{i p + a(\nu - 2k) + c \mu}{2 c}, -\mu; -\frac{-2 a k + i p + a \nu + c(\mu - 2)}{2 c}; -e^{2 i c z} \right) \right) +$$

$$\frac{1}{p - i c \mu} \left(2^{-\nu} e^{p z} \left(1 + e^{2 i c z}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{i p + c \mu}{2 c}, -\mu; \frac{1}{2} \left(-\frac{i p}{c} - \mu + 2 \right); -e^{2 i c z} \right) (1 - \nu \bmod 2) \cos^\mu(c z) \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1822.01

$$\int e^{p z} \cos^m(c z) \cos^\nu(b + a z)\, dz = 2^{-m} i \cos^\nu(b + a z) \left(1 + e^{2 i (b + a z)}\right)^{-\nu}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{e^{(c i (m - 2k) + p) z}}{2 c k - c m + i p + a \nu} {}_2F_1\left(-\frac{2 c k - c m + i p + a \nu}{2 a}, -\nu; -\frac{2 c k - c m + i p + a(\nu - 2)}{2 a}; -e^{2 i (b + a z)} \right) + \right.$$

$$\left. \frac{e^{(p - i c (m - 2k)) z}}{c(m - 2k) + i p + a \nu} {}_2F_1\left(-\frac{c(m - 2k) + i p + a \nu}{2 a}, -\nu; -\frac{-2 c k + c m + i p + a(\nu - 2)}{2 a}; -e^{2 i (b + a z)} \right) \right) + \frac{1}{p - i a \nu}$$

$$\left(2^{-m} e^{p z} \left(1 + e^{2 i (b + a z)}\right)^{-\nu} \binom{m}{\frac{m}{2}} \cos^\nu(b + a z)\, {}_2F_1\left(-\frac{i p + a \nu}{2 a}, -\nu; \frac{1}{2} \left(-\frac{i p}{a} - \nu + 2 \right); -e^{2 i (b + a z)} \right) (1 - m \bmod 2) \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.1823.01

$$\int e^{p z} \cos^m(c z) \cos^v(b + a z)\, dz = 2^{-m-v} \binom{v}{\frac{v}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\frac{e^{-i(2 c k z - c m z + i p z)}}{-2 c i k + i c m + p} + \frac{e^{i(2 c k z - c m z - i p z)}}{c i (2 k - m) + p} \right) \binom{m}{k} \right) (1 - v \bmod 2) +$$

$$\frac{2^{-m-v} e^{p z} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{p} +$$

$$2^{-m-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left(\frac{e^{-\frac{1}{2} i (4 b k + 4 a z k - 2 b v + 2 i p z - 2 a v z)}}{-2 a i k + p + i a v} + \frac{e^{\frac{1}{2} i (4 b k + 4 a z k - 2 b v - 2 i p z - 2 a v z)}}{p + a i (2 k - v)} \right) \binom{v}{k} +$$

$$2^{-m-v} e^{p z} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{i (c (2 k - m) z + (2 s - v)(b + a z))} \left(\frac{i e^{-2 i (2 s - v)(b + a z)}}{c (m - 2 k) + i p + 2 a s - a v} + \frac{e^{-2 i (2 b s + 2 a z s - b v + 2 c k z - c m z - a v z)}}{c i (m - 2 k) + p - 2 i a s + i a v} + \right.$$

$$\left. \frac{i e^{2 i c (m - 2 k) z}}{2 c k - c m + i p - 2 a s + a v} + \frac{i}{c (m - 2 k) + i p + a (v - 2 s)} \right) \binom{v}{s} /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $e^{p z} \cos^{\mu}(c z + d) \cos^{v}(a z + b)$

01.07.21.1824.01

$$\int e^{p z} \cos^{\mu}(d + c z) \cos^v(b + a z)\, dz =$$

$$\frac{1}{p - i c \mu} \left(2^{-v} e^{p z} \binom{v}{\frac{v}{2}} \cos^{\mu}(d + c z)\, {}_2F_1\!\left(-\frac{i p + c \mu}{2 c}, -\mu; \frac{1}{2} \left(-\frac{i p}{c} - \mu + 2 \right); -e^{2 i (d + c z)} \right) (1 - v \bmod 2) \left(1 + e^{2 i (d + c z)}\right)^{-\mu} + \right.$$

$$2^{-v} i \cos^{\mu}(d + c z) \left(1 + e^{2 i (d + c z)}\right)^{-\mu}$$

$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{i b (v - 2 k)} \binom{v}{k} \left(\frac{e^{(p + a i (v - 2 k)) z}}{2 a k + i p - a v + c \mu}\, {}_2F_1\!\left(-\frac{2 a k + i p - a v + c \mu}{2 c}, -\mu; -\frac{2 a k + i p - a v + c (\mu - 2)}{2 c}; -e^{2 i (d + c z)} \right) + \right.$$

$$\left. \left. \frac{e^{(p - i a (v - 2 k)) z - 2 i b (v - 2 k)}}{i p + a (v - 2 k) + c \mu}\, {}_2F_1\!\left(-\frac{i p + a (v - 2 k) + c \mu}{2 c}, -\mu; -\frac{-2 a k + i p + a v + c (\mu - 2)}{2 c}; -e^{2 i (d + c z)} \right) \right) \right) /;\ v \in \mathbb{N}^+$$

01.07.21.1825.01

$$\int e^{p z} \cos^m(d+c z) \cos^v(b+a z)\, dz = 2^{-m-v} \binom{v}{\frac{v}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\frac{e^{-\frac{1}{2} i (4 d k+4 c z k-2 d m-2 c m z+2 i p z)}}{-2 c i k+i c m+p} + \frac{e^{\frac{1}{2} i (4 d k+4 c z k-2 d m-2 c m z-2 i p z)}}{c i (2 k-m)+p} \right) \binom{m}{k} \right) (1-v \bmod 2) + \frac{2^{-m-v} e^{p z} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2)}{p} + 2^{-m-v} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left(\frac{e^{-\frac{1}{2} i (4 b k+4 a z k-2 b v+2 i p z-2 a v z)}}{-2 a i k+p+i a v} + \frac{e^{\frac{1}{2} i (4 b k+4 a z k-2 b v-2 i p z-2 a v z)}}{p+a i (2 k-v)} \right) \binom{v}{k} + 2^{-m-v} e^{p z} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{i((2 s-v)(b+a z)+(2 k-m)(d+c z))} \left(\frac{i e^{-i 2 (2 s-v)(b+a z)}}{c(m-2 k)+i p+2 a s-a v} + \frac{e^{-2 i (2 d k+2 c z k-d m+2 b s-b v-c m z+2 a s z-a v z)}}{c i (m-2 k)+p-2 i a s+i a v} + \frac{i e^{i(2 d (m-2 k)+2 c z (m-2 k))}}{2 c k-c m+i p-2 a s+a v} + \frac{i}{c(m-2 k)+i p+a(v-2 s)} \right) \binom{v}{s} /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos^m(b z) \cos^v(c z)$

01.07.21.1826.01

$$\int e^{p z^2} \cos^m(b z) \cos^v(c z)\, dz = \frac{2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \operatorname{erfi}\left(\sqrt{p}\, z\right) (1-m \bmod 2)(1-v \bmod 2)}{\sqrt{p}} + \frac{1}{\sqrt{p}} \left(2^{-m-v-1} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} e^{\frac{b^2 (m-2 s)^2}{4 p}} \left(\operatorname{erfi}\left(\frac{2 p z - i b (m-2 s)}{2 \sqrt{p}} \right) + \operatorname{erfi}\left(\frac{b i (m-2 s) + 2 p z}{2 \sqrt{p}} \right) \right) \right) + \frac{1}{\sqrt{p}} \left(2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} e^{\frac{c^2 (v-2 k)^2}{4 p}} \left(\operatorname{erfi}\left(\frac{2 p z - i c (v-2 k)}{2 \sqrt{p}} \right) + \operatorname{erfi}\left(\frac{c i (v-2 k) + 2 p z}{2 \sqrt{p}} \right) \right) \right) + \frac{1}{\sqrt{p}} \left(2^{-m-v-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(e^{-\frac{(b i (m-2 s)+c i (2 k-v))^2}{4 p}} \operatorname{erfi}\left(\frac{b i (m-2 s) + c i (2 k-v) + 2 p z}{2 \sqrt{p}} \right) + e^{-\frac{(-i b (m-2 s)-i c (2 k-v))^2}{4 p}} \operatorname{erfi}\left(\frac{-i b (m-2 s) - i c (2 k-v) + 2 p z}{2 \sqrt{p}} \right) + e^{-\frac{(b i (m-2 s)+c i (v-2 k))^2}{4 p}} \operatorname{erfi}\left(\frac{b i (m-2 s) + c i (v-2 k) + 2 p z}{2 \sqrt{p}} \right) + e^{-\frac{(-i b (m-2 s)-i c (v-2 k))^2}{4 p}} \operatorname{erfi}\left(\frac{-i b (m-2 s) - i c (v-2 k) + 2 p z}{2 \sqrt{p}} \right) \right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1827.01

$$\int e^{p\sqrt{z}} \cos^m(b z) \cos^\nu(c z)\, dz = 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-\frac{e^{-\frac{i p^2}{4 b (m-2 s)}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p-2 i b (m-2 s) \sqrt{z}}{2 \sqrt{-i b (m-2 s)}} \right)}{(-i b (m-2 s))^{3/2}} + \frac{4 e^{p\sqrt{z}} \sin(b (m-2 s) z)}{b (m-2 s)} - \frac{e^{\frac{i p^2}{4 b (m-2 s)}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p+2 b i (m-2 s) \sqrt{z}}{2 \sqrt{i b (m-2 s)}} \right)}{(i b (m-2 s))^{3/2}} \right) \right)$$

$$(1-\nu \bmod 2) + \frac{2^{-m-\nu+1} e^{p\sqrt{z}} \left(p\sqrt{z}-1\right) \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{p^2} + 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k}$$

$$\left(-\frac{e^{-\frac{i p^2}{4 c (\nu-2 k)}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p-2 i c (\nu-2 k) \sqrt{z}}{2 \sqrt{-i c (\nu-2 k)}} \right)}{(-i c (\nu-2 k))^{3/2}} - \frac{4 e^{p\sqrt{z}} \sin(c (\nu-2 k) z)}{c (2 k-\nu)} - \frac{e^{\frac{i p^2}{4 c (\nu-2 k)}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p+2 c i (\nu-2 k) \sqrt{z}}{2 \sqrt{i c (\nu-2 k)}} \right)}{(i c (\nu-2 k))^{3/2}} \right) + 2^{-m-\nu-1}$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\left(\frac{4 e^{p\sqrt{z}} \sin((2 c k + b m - 2 b s - c \nu) z)}{2 c k + b m - 2 b s - c \nu} - \frac{e^{-\frac{p^2}{4 (b i (m-2 s)+c i (2 k-\nu))}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p+2 (b i (m-2 s)+c i (2 k-\nu)) \sqrt{z}}{2 \sqrt{b i (m-2 s)+c i (2 k-\nu)}} \right)}{(b i (m-2 s) + c i (2 k-\nu))^{3/2}} - \right.\right.$$

$$\left. \frac{e^{-\frac{p^2}{4 (-i b (m-2 s)-i c (2 k-\nu))}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p+2 (-i b (m-2 s)-i c (2 k-\nu)) \sqrt{z}}{2 \sqrt{-i b (m-2 s)-i c (2 k-\nu)}} \right)}{(-i b (m-2 s) - i c (2 k-\nu))^{3/2}} \right) +$$

$$\left(\frac{4 e^{p\sqrt{z}} \sin((b (m-2 s) + c (\nu-2 k)) z)}{b (m-2 s) + c (\nu-2 k)} - \frac{e^{-\frac{p^2}{4 (b i (m-2 s)+c i (\nu-2 k))}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p+2 (b i (m-2 s)+c i (\nu-2 k)) \sqrt{z}}{2 \sqrt{b i (m-2 s)+c i (\nu-2 k)}} \right)}{(b i (m-2 s) + c i (\nu-2 k))^{3/2}} - \right.$$

$$\left.\left.\left. \frac{e^{-\frac{p^2}{4 (-i b (m-2 s)-i c (\nu-2 k))}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p+2 (-i b (m-2 s)-i c (\nu-2 k)) \sqrt{z}}{2 \sqrt{-i b (m-2 s)-i c (\nu-2 k)}} \right)}{(-i b (m-2 s) - i c (\nu-2 k))^{3/2}} \right) \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos^m(b z^r) \cos^\nu(c z)$

01.07.21.1828.01

$$\int e^{p z} \cos^m\left(b z^2\right) \cos^v(c z)\, dz = \frac{2^{-m-v} e^{p z} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{p} +$$

$$2^{-m-v+1} e^{p z} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{\binom{v}{k} (\cos(c (v - 2 k) z)\, p - c (2 k - v) \sin(c (v - 2 k) z))}{(2 i c k + p - i c v)(p + c i (v - 2 k))} +$$

$$\frac{1}{b} \left(i\, 2^{-m-v-1} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{m - 2 s} \left(\binom{m}{s} \left(e^{-\frac{i p^2}{4 b (m-2 s)}} \sqrt{-i b (m - 2 s)}\, \operatorname{erfi}\left(\frac{p - 2 i b (m - 2 s) z}{2 \sqrt{-i b (m - 2 s)}} \right) - \right.\right.\right.$$

$$\left.\left.\left. e^{\frac{i p^2}{4 b (m-2 s)}} \sqrt{i b (m - 2 s)}\, \operatorname{erfi}\left(\frac{p + 2 b i (m - 2 s) z}{2 \sqrt{i b (m - 2 s)}} \right) \right) \right) \right) +$$

$$\frac{1}{b} \left(i\, 2^{-m-v-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{m - 2 s} \left(\binom{v}{k} \left(e^{-\frac{i (p - i c (2 k - v))^2}{4 b (m-2 s)}} \sqrt{-i b (m - 2 s)}\, \operatorname{erfi}\left(\frac{p - i c (2 k - v) - 2 i b (m - 2 s) z}{2 \sqrt{-i b (m - 2 s)}} \right) + \right.\right.\right.$$

$$e^{-\frac{i (p - i c (v - 2 k))^2}{4 b (m-2 s)}} \sqrt{-i b (m - 2 s)}\, \operatorname{erfi}\left(\frac{p - i c (v - 2 k) - 2 i b (m - 2 s) z}{2 \sqrt{-i b (m - 2 s)}} \right) -$$

$$e^{\frac{i (p + c i (2 k - v))^2}{4 b (m-2 s)}} \sqrt{i b (m - 2 s)}\, \operatorname{erfi}\left(\frac{p + c i (2 k - v) + 2 b i (m - 2 s) z}{2 \sqrt{i b (m - 2 s)}} \right) -$$

$$\left.\left.\left. e^{\frac{i (p + c i (v - 2 k))^2}{4 b (m-2 s)}} \sqrt{i b (m - 2 s)}\, \operatorname{erfi}\left(\frac{p + c i (v - 2 k) + 2 b i (m - 2 s) z}{2 \sqrt{i b (m - 2 s)}} \right) \right) \right) \right) /;\ m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.07.21.1829.01

$$\int e^{p z} \cos^m\left(b \sqrt{z}\right) \cos^\nu(c z)\, dz = 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{4 e^{p z} \cos\left(b (m-2 s) \sqrt{z}\right)}{p} + \frac{1}{p^{3/2}} \left(e^{\frac{b^2 (m-2 s)^2}{4 p}} \left(i b \sqrt{\pi}\, (m-2 s)\right) \left(\operatorname{erfi}\left(\frac{2 p \sqrt{z} - i b (m-2 s)}{2 \sqrt{p}}\right) + \operatorname{erfi}\left(\frac{-2 \sqrt{z}\, p - i b (m-2 s)}{2 \sqrt{p}}\right)\right)\right)\right)\right) (1 - \nu \bmod 2) + \frac{(-1)^m 2^{-m-\nu} e^{p z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} + (-1)^m 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\frac{e^{(p - i c (\nu - 2 k)) z}}{p - i c (\nu - 2 k)} + \frac{e^{(p + c i (\nu - 2 k)) z}}{p + c i (\nu - 2 k)}\right) \binom{\nu}{k} + 2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\left(\frac{i b\, e^{\frac{b^2 (m-2 s)^2}{4 (p + c i (2 k - \nu))}} \sqrt{\pi}\, (m-2 s) \operatorname{erfi}\left(\frac{2 (p + c i (2 k - \nu)) \sqrt{z} - i b (m-2 s)}{2 \sqrt{p + c i (2 k - \nu)}}\right)}{(p + c i (2 k - \nu))^{3/2}} + \frac{i b\, e^{\frac{b^2 (m-2 s)^2}{4 (p - i c (2 k - \nu))}} \sqrt{\pi}\, (m-2 s) \operatorname{erfi}\left(\frac{2 (i c (2 k - \nu) - p) \sqrt{z} - i b (m-2 s)}{2 \sqrt{p - i c (2 k - \nu)}}\right)}{(p - i c (2 k - \nu))^{3/2}} + \frac{2 e^{(p + c i (2 k - \nu)) z - i b (m-2 s) \sqrt{z}}}{p + c i (2 k - \nu)} + \frac{2 e^{b i \sqrt{z}\, (m-2 s) + (p - i c (2 k - \nu)) z}}{p - i c (2 k - \nu)}\right) + \left(\frac{i b\, e^{\frac{b^2 (m-2 s)^2}{4 (p + c i (\nu - 2 k))}} \sqrt{\pi}\, (m-2 s) \operatorname{erfi}\left(\frac{2 (p + c i (\nu - 2 k)) \sqrt{z} - i b (m-2 s)}{2 \sqrt{p + c i (\nu - 2 k)}}\right)}{(p + c i (\nu - 2 k))^{3/2}} + \frac{i b\, e^{\frac{b^2 (m-2 s)^2}{4 (p - i c (\nu - 2 k))}} \sqrt{\pi}\, (m-2 s) \operatorname{erfi}\left(\frac{2 (i c (\nu - 2 k) - p) \sqrt{z} - i b (m-2 s)}{2 \sqrt{p - i c (\nu - 2 k)}}\right)}{(p - i c (\nu - 2 k))^{3/2}} + \frac{2 e^{(p + c i (\nu - 2 k)) z - i b (m-2 s) \sqrt{z}}}{p + c i (\nu - 2 k)} + \frac{2 e^{b i \sqrt{z}\, (m-2 s) + (p - i c (\nu - 2 k)) z}}{p - i c (\nu - 2 k)}\right)\right) /;\, m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos^m\left(b z^r\right) \cos^\nu(c z)$

01.07.21.1830.01

$$\int e^{p z^2} \cos^m(b z^2) \cos^\nu(c z)\, dz = 2^{-m-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\binom{m}{k} \left(\sqrt{p - i b (m - 2k)}\, (b i (m-2k) + p) \operatorname{erfi}\left(\frac{2 p z - 2 i b (m - 2k) z}{2 \sqrt{p - i b (m-2k)}} \right) + (p - i b (m-2k)) \sqrt{b i (m-2k) + p}\, \operatorname{erfi}\left(\sqrt{b i (m-2k) + p}\, z \right) \right) \right) \Big/ ((p - i b (m-2k)) (b i (m-2k) + p)) \right) (1 - \nu \bmod 2) + \frac{2^{-m-\nu-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}(\sqrt{p}\, z) (1 - m \bmod 2) (1 - \nu \bmod 2)}{\sqrt{p}} + \frac{1}{\sqrt{p}} \left(2^{-m-\nu-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} e^{\frac{c^2 (\nu - 2s)^2}{4p}} \left(\operatorname{erfi}\left(\frac{2 p z - i c (\nu - 2s)}{2 \sqrt{p}} \right) + \operatorname{erfi}\left(\frac{c i (\nu - 2s) + 2 p z}{2 \sqrt{p}} \right) \right) \right) + 2^{-m-\nu-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\left(e^{\frac{c^2 (\nu-2s)^2}{4 (p - i b (2k - m))}} \sqrt{p - i b (2k - m)}\, (b i (2k - m) + p) \operatorname{erfi}\left(\frac{-i c (\nu - 2s) - 2 i b (2k - m) z + 2 p z}{2 \sqrt{p - i b (2k - m)}} \right) + e^{\frac{c^2 (\nu-2s)^2}{4 (b i (2k-m) + p)}} (p - i b (2k - m)) \sqrt{b i (2k - m) + p}\, \operatorname{erfi}\left(\frac{c i (\nu - 2s) + 2 (b i (2k - m) + p) z}{2 \sqrt{b i (2k - m) + p}} \right) \right) \Big/ ((p - i b (2k - m)) (b i (2k - m) + p)) + \left(e^{\frac{c^2 (\nu-2s)^2}{4 (p - i b (m - 2k))}} \sqrt{p - i b (m - 2k)}\, (b i (m - 2k) + p) \operatorname{erfi}\left(\frac{-i c (\nu - 2s) - 2 i b (m - 2k) z + 2 p z}{2 \sqrt{p - i b (m - 2k)}} \right) + e^{\frac{c^2 (\nu-2s)^2}{4 (b i (m-2k) + p)}} (p - i b (m - 2k)) \sqrt{b i (m - 2k) + p}\, \operatorname{erfi}\left(\frac{c i (\nu - 2s) + 2 (b i (m - 2k) + p) z}{2 \sqrt{b i (m - 2k) + p}} \right) \right) \Big/ ((p - i b (m - 2k)) (b i (m - 2k) + p)) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.1831.01

$$\int e^{p \sqrt{z}} \cos^m(b \sqrt{z}) \cos^\nu(c z)\, dz = 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{(p - i b (m - 2s)) \sqrt{z}} \left(\frac{e^{2 i b (m - 2s) \sqrt{z}} \left(\sqrt{z}\, p + b i (m - 2s) \sqrt{z} - 1 \right)}{(p + b i (m - 2s))^2} + \frac{\sqrt{z}}{p - i b (m - 2s)} - \frac{1}{(i b (m - 2s) - p)^2} \right) \binom{m}{s} \right) (1 - \nu \bmod 2) + \frac{2^{-m-\nu+1} e^{p \sqrt{z}} \left(p \sqrt{z} - 1 \right) \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2) (1 - \nu \bmod 2)}{p^2} +$$

$$2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(\frac{2\,i\,e^{p\sqrt{z}-i\,c\,(v-2k)\,z}}{c\,(v-2k)}-\frac{2\,i\,e^{\sqrt{z}\,p+c\,i\,(v-2k)\,z}}{c\,(v-2k)}-\right.$$

$$\left.\frac{e^{-\frac{i\,p^2}{4\,c\,(v-2k)}}\,p\,\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-2\,i\,c\,(v-2k)\sqrt{z}}{2\sqrt{-i\,c\,(v-2k)}}\right)}{(-i\,c\,(v-2k))^{3/2}}-\frac{e^{\frac{i\,p^2}{4\,c\,(v-2k)}}\,p\,\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+2\,c\,i\,(v-2k)\sqrt{z}}{2\sqrt{i\,c\,(v-2k)}}\right)}{(i\,c\,(v-2k))^{3/2}}\right)+$$

$$2^{-m-v-1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(\left(\frac{2\,i\,e^{(p-i\,b\,(m-2s))\sqrt{z}-i\,c\,(2k-v)\,z}}{c\,(2k-v)}-\frac{2\,i\,e^{\sqrt{z}\,(p+b\,i\,(m-2s))+c\,i\,(2k-v)\,z}}{c\,(2k-v)}-\right.\right.$$

$$\frac{e^{-\frac{i\,(p-i\,b\,(m-2s))^2}{4\,c\,(2k-v)}}\,p\,\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-i\,b\,(m-2s)-2\,i\,c\,(2k-v)\sqrt{z}}{2\sqrt{-i\,c\,(2k-v)}}\right)}{(-i\,c\,(2k-v))^{3/2}}-$$

$$\frac{i\,b\,e^{-\frac{i\,(p-i\,b\,(m-2s))^2}{4\,c\,(2k-v)}}\,\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{-p+b\,i\,(m-2s)+2\,c\,i\,(2k-v)\sqrt{z}}{2\sqrt{-i\,c\,(2k-v)}}\right)}{(-i\,c\,(2k-v))^{3/2}}-$$

$$\frac{e^{\frac{i\,(p+b\,i\,(m-2s))^2}{4\,c\,(2k-v)}}\,p\,\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+b\,i\,(m-2s)+2\,c\,i\,(2k-v)\sqrt{z}}{2\sqrt{i\,c\,(2k-v)}}\right)}{(i\,c\,(2k-v))^{3/2}}-$$

$$\left.\frac{i\,b\,e^{\frac{i\,(p+b\,i\,(m-2s))^2}{4\,c\,(2k-v)}}\,\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{p+b\,i\,(m-2s)+2\,c\,i\,(2k-v)\sqrt{z}}{2\sqrt{i\,c\,(2k-v)}}\right)}{(i\,c\,(2k-v))^{3/2}}\right)+\left(\frac{2\,i\,e^{(p-i\,b\,(m-2s))\sqrt{z}-i\,c\,(v-2k)\,z}}{c\,(v-2k)}-\right.$$

$$\frac{2\,i\,e^{\sqrt{z}\,(p+b\,i\,(m-2s))+c\,i\,(v-2k)\,z}}{c\,(v-2k)}-\frac{e^{-\frac{i\,(p-i\,b\,(m-2s))^2}{4\,c\,(v-2k)}}\,p\,\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-i\,b\,(m-2s)-2\,i\,c\,(v-2k)\sqrt{z}}{2\sqrt{-i\,c\,(v-2k)}}\right)}{(-i\,c\,(v-2k))^{3/2}}-$$

$$\frac{i\,b\,e^{-\frac{i\,(p-i\,b\,(m-2s))^2}{4\,c\,(v-2k)}}\,\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{-p+b\,i\,(m-2s)+2\,c\,i\,(v-2k)\sqrt{z}}{2\sqrt{-i\,c\,(v-2k)}}\right)}{(-i\,c\,(v-2k))^{3/2}}-$$

$$\frac{e^{\frac{i\,(p+b\,i\,(m-2s))^2}{4\,c\,(v-2k)}}\,p\,\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+b\,i\,(m-2s)+2\,c\,i\,(v-2k)\sqrt{z}}{2\sqrt{i\,c\,(v-2k)}}\right)}{(i\,c\,(v-2k))^{3/2}}-$$

$$\left.\left.i\,b\,e^{\frac{i\,(p+b\,i\,(m-2s))^2}{4\,c\,(v-2k)}}\,\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{p+b\,i\,(m-2s)+2\,c\,i\,(v-2k)\sqrt{z}}{2\sqrt{i\,c\,(v-2k)}}\right)\right)\right)$$

Involving $e^{p z} \cos^m\left(b z^r\right) \cos^v\left(c z^r\right)$

01.07.21.1832.01

$$\int e^{p z} \cos^m\left(b z^2\right) \cos^v\left(c z^2\right) dz = \frac{2^{-m-v} (1 - m \bmod 2)(1 - v \bmod 2)}{p} e^{p z} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} +$$

$$\frac{1}{b} \Bigg(i\, 2^{-m-v-1} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{m - 2 s} \Bigg(\binom{m}{s} \Bigg(e^{-\frac{i p^2}{4 b (m - 2 s)}} \sqrt{-i b (m - 2 s)}\, \mathrm{erfi}\left(\frac{p - 2 i b (m - 2 s) z}{2 \sqrt{-i b (m - 2 s)}} \right) -$$

$$e^{\frac{i p^2}{4 b (m - 2 s)}} \sqrt{i b (m - 2 s)}\, \mathrm{erfi}\left(\frac{p + 2 b i (m - 2 s) z}{2 \sqrt{i b (m - 2 s)}} \right) \Bigg) \Bigg) \Bigg) + \frac{1}{c} i\, 2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{v - 2 s} \binom{v}{s} \Bigg(e^{-\frac{i p^2}{4 c (v - 2 s)}} \sqrt{-i c (v - 2 s)}\, \mathrm{erfi}\left(\frac{p - 2 i c (v - 2 s) z}{2 \sqrt{-i c (v - 2 s)}} \right) - e^{\frac{i p^2}{4 c (v - 2 s)}} \sqrt{i c (v - 2 s)}\, \mathrm{erfi}\left(\frac{p + 2 c i (v - 2 s) z}{2 \sqrt{i c (v - 2 s)}} \right) \Bigg) +$$

$$2^{-m-v-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \Bigg(\Bigg(e^{-\frac{p^2}{4 (-2 c i k + i b m - 2 i b s + i c v)}} \sqrt{-2 c i k + i b m - 2 i b s + i c v}\, (2 i c k - i b m + 2 i b s - i c v)$$

$$\mathrm{erfi}\left(\frac{p - 2 (2 i c k - i b m + 2 i b s - i c v) z}{2 \sqrt{-2 c i k + i b m - 2 i b s + i c v}} \right) + e^{-\frac{p^2}{4 (2 i c k - i b m + 2 i b s - i c v)}} (-2 c i k + i b m - 2 i b s + i c v)$$

$$\sqrt{2 i c k - i b m + 2 i b s - i c v}\, \mathrm{erfi}\left(\frac{p + 2 (2 i c k - i b m + 2 i b s - i c v) z}{2 \sqrt{2 i c k - i b m + 2 i b s - i c v}} \right) \Bigg) \Big/$$

$$((2 i c k - i b m + 2 i b s - i c v)(-2 c i k + i b m - 2 i b s + i c v)) +$$

$$\Bigg(e^{-\frac{p^2}{4 (-2 c i k - i b m + 2 i b s + i c v)}} \sqrt{-2 c i k - i b m + 2 i b s + i c v}\, (2 i c k + i b m - 2 i b s - i c v)$$

$$\mathrm{erfi}\left(\frac{p - 2 (2 i c k + i b m - 2 i b s - i c v) z}{2 \sqrt{-2 c i k - i b m + 2 i b s + i c v}} \right) + e^{-\frac{p^2}{4 (2 i c k + i b m - 2 i b s - i c v)}} (-2 c i k - i b m + 2 i b s + i c v)$$

$$\sqrt{2 i c k + i b m - 2 i b s - i c v}\, \mathrm{erfi}\left(\frac{p + 2 (2 i c k + i b m - 2 i b s - i c v) z}{2 \sqrt{2 i c k + i b m - 2 i b s - i c v}} \right) \Bigg) \Big/$$

$$((2 i c k + i b m - 2 i b s - i c v)(-2 c i k - i b m + 2 i b s + i c v)) \Bigg) \;/;\; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1833.01

$$\int e^{p z} \cos^m\left(b \sqrt{z}\right) \cos^v\left(c \sqrt{z}\right) dz = 2^{-m-v-1} \binom{v}{\frac{v}{2}} \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{4 e^{p z} \cos\left(b (m-2 s) \sqrt{z}\right)}{p} + \frac{b e^{-\frac{(2 i b s - i b m)^2}{4 p}} i \sqrt{\pi} (m-2 s) \operatorname{erfi}\left(\frac{2 p \sqrt{z} - i b (m-2 s)}{2 \sqrt{p}}\right)}{p^{3/2}} - \frac{i b e^{\frac{b^2 (m-2 s)^2}{4 p}} \sqrt{\pi} (m-2 s) \operatorname{erfi}\left(\frac{2 \sqrt{z} p + b i (m-2 s)}{2 \sqrt{p}}\right)}{p^{3/2}} \right) \right) (1 - v \bmod 2) +$$

$$\frac{2^{-m-v} e^{p z} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2) (1 - v \bmod 2)}{p} + 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(\frac{4 e^{p z} \cos\left(c (2 k - v) \sqrt{z}\right)}{p} - \frac{e^{-\frac{(2 i c k - i c v)^2}{4 p}} \sqrt{\pi} (2 i c k - i c v) \operatorname{erfi}\left(\frac{2 \sqrt{z} p + c i (2 k - v)}{2 \sqrt{p}}\right)}{p^{3/2}} - \frac{i c e^{\frac{c^2 (v-2 k)^2}{4 p}} \sqrt{\pi} (v - 2 k) \operatorname{erfi}\left(\frac{2 \sqrt{z} p + c i (v - 2 k)}{2 \sqrt{p}}\right)}{p^{3/2}} \right) +$$

$$2^{-m-v-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(\left(\frac{4 e^{p z} \cos\left((2 c k + b m - 2 b s - c v) \sqrt{z}\right)}{p} + \frac{1}{p^{3/2}} \left(e^{\frac{(2 c k + b m - 2 b s - c v)^2}{4 p}} \sqrt{\pi} (2 c k + b m - 2 b s - c v) \operatorname{erf}\left(\frac{2 i \sqrt{z} p + b (m - 2 s) + c (2 k - v)}{2 \sqrt{p}}\right) \right) + \frac{1}{p^{3/2}} \left(e^{\frac{(-2 c k - b m + 2 b s + c v)^2}{4 p}} \sqrt{\pi} (2 c k + b m - 2 b s - c v) \operatorname{erf}\left(\frac{-2 i \sqrt{z} p + b (m - 2 s) + c (2 k - v)}{2 \sqrt{p}}\right) \right) \right) + \left(\frac{4 e^{p z} \cos\left((2 c k - b m + 2 b s - c v) \sqrt{z}\right)}{p} - \frac{1}{p^{3/2}} \left(e^{\frac{(b (m-2 s) + c (v - 2 k))^2}{4 p}} \sqrt{\pi} (b (m - 2 s) + c (v - 2 k)) \operatorname{erf}\left(\frac{-2 i \sqrt{z} p - b (m - 2 s) + c (2 k - v)}{2 \sqrt{p}}\right) \right) - \frac{1}{p^{3/2}} \left(i e^{\frac{(b (m-2 s) + c (v - 2 k))^2}{4 p}} \sqrt{\pi} (b (m - 2 s) + c (v - 2 k)) \operatorname{erfi}\left(\frac{2 \sqrt{z} p + b i (m - 2 s) + c i (v - 2 k)}{2 \sqrt{p}}\right) \right) \right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos^m\left(b z^r\right) \cos^v\left(c z^r\right)$

01.07.21.1834.01

$$\int e^{p z^r} \cos^m(b z^r) \cos^v(c z^r)\, dz = -\frac{1}{r}\Bigg(2^{-m-v} z \Bigg(\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} \Gamma\left(\frac{1}{r}, -p z^r\right)(m \bmod 2 - 1)(v \bmod 2 - 1)(-p z^r)^{-1/r} - \binom{v}{\frac{v}{2}}(v \bmod 2 - 1)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\Bigg(\Gamma\left(\frac{1}{r}, (-2 b i k + i b m - p) z^r\right)((-2 b i k + i b m - p) z^r)^{-1/r} +$$

$$((2 i b k - i b m - p) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (2 i b k - i b m - p) z^r\right)\Bigg) -$$

$$\binom{m}{\frac{m}{2}}(m \bmod 2 - 1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\Gamma\left(\frac{1}{r}, (-p - 2 i c s + i c v) z^r\right)((-p - 2 i c s + i c v) z^r)^{-1/r} +$$

$$((-p - i c (v - 2 s)) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-p - i c (v - 2 s)) z^r\right)\Bigg) +$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\Gamma\left(\frac{1}{r}, (-2 b i k + i b m - p - 2 i c s + i c v) z^r\right)((-2 b i k + i b m - p - 2 i c s + i c v) z^r)^{-1/r} +$$

$$((2 i b k - i b m - p - 2 i c s + i c v) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (2 i b k - i b m - p - 2 i c s + i c v) z^r\right) +$$

$$((-2 b i k + i b m - p + 2 i c s - i c v) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-2 b i k + i b m - p + 2 i c s - i c v) z^r\right) +$$

$$((2 i b k - i b m - p + 2 i c s - i c v) z^r)^{-1/r}$$

$$\Gamma\left(\frac{1}{r}, (2 i b k - i b m - p + 2 i c s - i c v) z^r\right)\Bigg)\Bigg)\Bigg) /;\, m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1835.01

$$\int e^{p z^2} \cos^m(b z^2) \cos^v(c z^2)\, dz = 2^{-m-v-1} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\binom{m}{s} \left(\sqrt{p + b\, i\, (m - 2 s)}\, (p - i\, b\, (m - 2 s))\, \mathrm{erfi}\left(\sqrt{p + b\, i\, (m - 2 s)}\, z \right) + (p + b\, i\, (m - 2 s)) \sqrt{p - i\, b\, (m - 2 s)}\, \mathrm{erfi}\left(\sqrt{p - i\, b\, (m - 2 s)}\, z \right) \right) \right) \Big/ ((p - i\, b\, (m - 2 s))\, (p + b\, i\, (m - 2 s))) + \frac{2^{-m-v-1} \sqrt{\pi}\, (1 - m \bmod 2)\, (1 - v \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \mathrm{erfi}\left(\sqrt{p}\, z \right) + 2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left(\binom{v}{k} \left(\sqrt{p + c\, i\, (v - 2 k)}\, (p - i\, c\, (v - 2 k))\, \mathrm{erfi}\left(\sqrt{p + c\, i\, (v - 2 k)}\, z \right) + (p + c\, i\, (v - 2 k)) \sqrt{p - i\, c\, (v - 2 k)}\, \mathrm{erfi}\left(\sqrt{p - i\, c\, (v - 2 k)}\, z \right) \right) \right) \Big/ ((p - i\, c\, (v - 2 k))\, (p + c\, i\, (v - 2 k))) + 2^{-m-v-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{k} \left(\left(\sqrt{p + b\, i\, (m - 2 s) + c\, i\, (2 k - v)}\, (p - i\, b\, (m - 2 s) - i\, c\, (2 k - v))\, \mathrm{erfi}\left(\sqrt{p + b\, i\, (m - 2 s) + c\, i\, (2 k - v)}\, z \right) + (p + b\, i\, (m - 2 s) + c\, i\, (2 k - v)) \sqrt{p - i\, b\, (m - 2 s) - i\, c\, (2 k - v)}\, \mathrm{erfi}\left(\sqrt{p - i\, b\, (m - 2 s) - i\, c\, (2 k - v)}\, z \right) \right) \Big/ ((p - i\, b\, (m - 2 s) - i\, c\, (2 k - v))\, (p + b\, i\, (m - 2 s) + c\, i\, (2 k - v))) + \left(\sqrt{p + b\, i\, (m - 2 s) + c\, i\, (v - 2 k)}\, (p - i\, b\, (m - 2 s) - i\, c\, (v - 2 k))\, \mathrm{erfi}\left(\sqrt{p + b\, i\, (m - 2 s) + c\, i\, (v - 2 k)}\, z \right) + (p + b\, i\, (m - 2 s) + c\, i\, (v - 2 k)) \sqrt{p - i\, b\, (m - 2 s) - i\, c\, (v - 2 k)}\, \mathrm{erfi}\left(\sqrt{p - i\, b\, (m - 2 s) - i\, c\, (v - 2 k)}\, z \right) \right) \Big/ ((p - i\, b\, (m - 2 s) - i\, c\, (v - 2 k))\, (p + b\, i\, (m - 2 s) + c\, i\, (v - 2 k))) \right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1836.01

$$\int e^{p\sqrt{z}}\cos^m\left(b\sqrt{z}\right)\cos^v\left(c\sqrt{z}\right)dz = \frac{2^{-m-v+1}e^{p\sqrt{z}}\left(p\sqrt{z}-1\right)(1-m\bmod 2)(1-v\bmod 2)}{p^2}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} + 2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$
$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}e^{(p-i\,b\,(m-2s))\sqrt{z}}\left(\frac{e^{2\,i\,b\,(m-2s)\sqrt{z}}\left(\sqrt{z}\;p+b\,i\,(m-2s)\sqrt{z}-1\right)}{(p+b\,i\,(m-2s))^2}+\frac{\sqrt{z}}{p-i\,b\,(m-2s)}-\frac{1}{(i\,b\,(m-2s)-p)^2}\right)+$$
$$2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}e^{(p-i\,c\,(v-2k))\sqrt{z}}$$
$$\left(\frac{e^{2\,i\,c\,(v-2k)\sqrt{z}}\left(\sqrt{z}\;p+c\,i\,(v-2k)\sqrt{z}-1\right)}{(p+c\,i\,(v-2k))^2}+\frac{\sqrt{z}}{p-i\,c\,(v-2k)}-\frac{1}{(i\,c\,(v-2k)-p)^2}\right)+2^{-m-v+1}$$
$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(e^{(p-i\,b\,(m-2s)-i\,c\,(2k-v))\sqrt{z}}\left(\left(e^{2\sqrt{z}\,(b\,i\,(m-2s)+c\,i\,(2k-v))}\left(\sqrt{z}\;p+(b\,i\,(m-2s)+c\,i\,(2k-v))\sqrt{z}-1\right)\right)\Big/\right.\right.$$
$$(p+b\,i\,(m-2s)+c\,i\,(2k-v))^2+\frac{\sqrt{z}}{p-i\,b\,(m-2s)-i\,c\,(2k-v)}-$$
$$\left.\frac{1}{(-p+b\,i\,(m-2s)+c\,i\,(2k-v))^2}\right)+e^{(p-i\,b\,(m-2s)-i\,c\,(v-2k))\sqrt{z}}\left(\left(e^{2\,(b\,i\,(m-2s)+c\,i\,(v-2k))\sqrt{z}}\right.\right.$$
$$\left.\left(\sqrt{z}\;p+(b\,i\,(m-2s)+c\,i\,(v-2k))\sqrt{z}-1\right)\right)\Big/(p+b\,i\,(m-2s)+c\,i\,(v-2k))^2+$$
$$\left.\left.\frac{\sqrt{z}}{p-i\,b\,(m-2s)-i\,c\,(v-2k)}-\frac{1}{(-p+b\,i\,(m-2s)+c\,i\,(v-2k))^2}\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $e^{b\,z^r+e}\cos^m\left(a\,z^r+q\right)\cos^v\left(c\,z^r+g\right)$

01.07.21.1837.01

$$\int e^{b z^r+e} \cos^m(a z^r+q) \cos^v(c z^r+g)\, dz = -\frac{1}{r} 2^{-m-v} z \left(e^e \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right) (1-m \bmod 2)(1-v \bmod 2)(-b z^r)^{-1/r} + \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{e+2 i k q - i m q} \Gamma\left(\frac{1}{r}, (-b-2 i a k+i a m) z^r\right) ((-b-2 i a k+i a m) z^r)^{-1/r} + e^{e-2 i k q+i m q} ((-b+2 i a k-i a m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 i a k-i a m) z^r\right) \right) + \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{e+2 i g s-i g v} \Gamma\left(\frac{1}{r}, (-b-2 i c s+i c v) z^r\right) ((-b-2 i c s+i c v) z^r)^{-1/r} + e^{e-2 i g s+i g v} ((-b+2 i c s-i c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 i c s-i c v) z^r\right) \right) + \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{e+2 i k q-i m q+2 i g s-i g v} \Gamma\left(\frac{1}{r}, (-b-2 i a k+i a m-2 i c s+i c v) z^r\right) ((-b-2 i a k+i a m-2 i c s+i c v) z^r)^{-1/r} + e^{e-2 i k q+i m q+2 i g s-i g v} ((-b+2 i a k-i a m-2 i c s+i c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 i a k-i a m-2 i c s+i c v) z^r\right) + e^{e+2 i k q-i m q-2 i g s+i g v} ((-b-2 i a k+i a m+2 i c s-i c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b-2 i a k+i a m+2 i c s-i c v) z^r\right) + e^{e-2 i k q+i m q-2 i g s+i g v} ((-b+2 i a k-i a m+2 i c s-i c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 i a k-i a m+2 i c s-i c v) z^r\right) \right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.1838.01

$$\int e^{b z^2+e} \cos^m(a z^2+q) \cos^\nu(c z^2+g)\, dz ==$$

$$2^{-m-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{e+i(m-2k)q} \binom{m}{k} \left(\frac{\operatorname{erfi}\left(\sqrt{b+a\,i\,(m-2k)}\; z\right)}{\sqrt{b+a\,i\,(m-2k)}} + \frac{e^{-2\,i\,(m-2k)\,q} \operatorname{erfi}\left(\sqrt{b-i\,a\,(m-2k)}\; z\right)}{\sqrt{b-i\,a\,(m-2k)}} \right) \right)$$

$$(1-\nu \bmod 2) + \frac{2^{-m-\nu-1} e^e \sqrt{\pi} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\; z\right)(1-m \bmod 2)(1-\nu \bmod 2)}{\sqrt{b}} +$$

$$2^{-m-\nu-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{e+g\,i\,(\nu-2k)} \binom{\nu}{k} \left(\frac{\operatorname{erfi}\left(\sqrt{b+c\,i\,(\nu-2k)}\; z\right)}{\sqrt{b+c\,i\,(\nu-2k)}} + \frac{e^{-2\,i\,g\,(\nu-2k)} \operatorname{erfi}\left(\sqrt{b-i\,c\,(\nu-2k)}\; z\right)}{\sqrt{b-i\,c\,(\nu-2k)}} \right) +$$

$$2^{-m-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \Bigg(e^{e+i\,(m-2k)\,q+g\,i\,(\nu-2s)}$$

$$\left(\frac{\operatorname{erfi}\left(\sqrt{b+a\,i\,(m-2k)+c\,i\,(\nu-2s)}\; z\right)}{\sqrt{b+a\,i\,(m-2k)+c\,i\,(\nu-2s)}} + \frac{e^{2\,(-i\,(m-2k)\,q-i\,g\,(\nu-2s))} \operatorname{erfi}\left(\sqrt{b-i\,a\,(m-2k)-i\,c\,(\nu-2s)}\; z\right)}{\sqrt{b-i\,a\,(m-2k)-i\,c\,(\nu-2s)}} \right) +$$

$$e^{e-i\,(m-2k)\,q+g\,i\,(\nu-2s)} \left(\frac{\operatorname{erfi}\left(\sqrt{b-i\,a\,(m-2k)+c\,i\,(\nu-2s)}\; z\right)}{\sqrt{b-i\,a\,(m-2k)+c\,i\,(\nu-2s)}} + \right.$$

$$\left. \left. \frac{e^{2\,(i\,(m-2k)\,q-i\,g\,(\nu-2s))} \operatorname{erfi}\left(\sqrt{b+a\,i\,(m-2k)-i\,c\,(\nu-2s)}\; z\right)}{\sqrt{b+a\,i\,(m-2k)-i\,c\,(\nu-2s)}} \right) \right) /;\; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

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$$\int e^{\sqrt{z}\, b+e} \cos^m\left(\sqrt{z}\, a+q\right) \cos^\nu\left(\sqrt{z}\, c+g\right) dz = 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\frac{e^{e+i(m-2k)q+(b+a\,i(m-2k))\sqrt{z}} \left(\sqrt{z}\, b+a\,i(m-2k)\sqrt{z}-1\right)}{(-b-i\,a(m-2k))^2} + \frac{e^{e-i(m-2k)q+(b-i\,a(m-2k))\sqrt{z}} \left(\sqrt{z}\, b-i\,a(m-2k)\sqrt{z}-1\right)}{(b-i\,a(m-2k))^2} \right) \binom{m}{k} \right) (1-\nu \bmod 2) + \frac{2^{-m-\nu+1} e^{\sqrt{z}\, b+e} \left(b\sqrt{z}-1\right) \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{b^2} + 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\frac{e^{e+g\,i(\nu-2k)+(b+c\,i(\nu-2k))\sqrt{z}} \left(\sqrt{z}\, b+c\,i(\nu-2k)\sqrt{z}-1\right)}{(-b-i\,c(\nu-2k))^2} + \frac{e^{e-i\,g(\nu-2k)+(b-i\,c(\nu-2k))\sqrt{z}} \left(\sqrt{z}\, b-i\,c(\nu-2k)\sqrt{z}-1\right)}{(b-i\,c(\nu-2k))^2} \right) \binom{\nu}{k} + 2^{-m-\nu+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\left(e^{e-i(m-2k)q-i\,g(\nu-2s)+(b-i\,a(m-2k)-i\,c(\nu-2s))\sqrt{z}} \left(\sqrt{z}\, b+(-i\,a(m-2k)-i\,c(\nu-2s))\sqrt{z}-1\right)\right) \Big/ (b-i\,a(m-2k)-i\,c(\nu-2s))^2 + \left(e^{e+i(m-2k)q-i\,g(\nu-2s)+(b+a\,i(m-2k)-i\,c(\nu-2s))\sqrt{z}} \left(\sqrt{z}\, b+(i\,a(m-2k)-i\,c(\nu-2s))\sqrt{z}-1\right)\right) \Big/ (b+a\,i(m-2k)-i\,c(\nu-2s))^2 + \left(e^{e+i(m-2k)q+g\,i(\nu-2s)+(b+a\,i(m-2k)+c\,i(\nu-2s))\sqrt{z}} \left(\sqrt{z}\, b-(-i\,a(m-2k)-i\,c(\nu-2s))\sqrt{z}-1\right)\right) \Big/ (-b-i\,a(m-2k)-i\,c(\nu-2s))^2 + \left(e^{e-i(m-2k)q+g\,i(\nu-2s)+(b-i\,a(m-2k)+c\,i(\nu-2s))\sqrt{z}} \left(\sqrt{z}\, b-(i\,a(m-2k)-i\,c(\nu-2s))\sqrt{z}-1\right)\right) \Big/ (-b+a\,i(m-2k)-i\,c(\nu-2s))^2 \right) \binom{\nu}{s} \;/;\; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z + e} \cos^m\left(a z^r + p z + q\right) \cos^\nu\left(c z^r + f z + g\right)$

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$$\int e^{b z^2+d z+e} \cos^m\left(a z^2+p z+q\right) \cos^\nu\left(c z^2+f z+g\right) dz = 2^{-m-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\binom{m}{s} \left(e^{-\frac{(d+i\,p(m-2s))^2-4(b+a\,i(m-2s))(e+i\,q(m-2s))}{4(b+a\,i(m-2s))}} \sqrt{b+a\,i(m-2s)}\, (b-i\,a(m-2s)) \operatorname{erfi}\left(\frac{d+i\,p(m-2s)+2(b+a\,i(m-2s))z}{2\sqrt{b+a\,i(m-2s)}}\right) + e^{-\frac{(d-i\,p(m-2s))^2-4(b-i\,a(m-2s))(e-i\,q(m-2s))}{4(b-i\,a(m-2s))}} (b+a\,i(m-2s)) \sqrt{b-i\,a(m-2s)}\, \operatorname{erfi}\left(\frac{d-i\,p(m-2s)+2\,b\,z-2\,i\,a(m-2s)z}{2\sqrt{b-i\,a(m-2s)}}\right) \right) \right) \right) \Big/$$

$$\left.((b-i\,a\,(m-2\,s))\,(b+a\,i\,(m-2\,s)))\right)(1-v \bmod 2)+\frac{2^{-m-v-1}\sqrt{\pi}\;(1-m \bmod 2)\,(1-v \bmod 2)}{\sqrt{b}}$$

$$\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}e^{-\frac{d^2-4be}{4b}}\operatorname{erfi}\left(\frac{d+2\,b\,z}{2\sqrt{b}}\right)+2^{-m-v-1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(\binom{v}{s}\right.$$

$$\left(e^{-\frac{(d+f\,i\,(v-2\,s))^2-4\,(b+c\,i\,(v-2\,s))\,(e+g\,i\,(v-2\,s))}{4\,(b+c\,i\,(v-2\,s))}}\sqrt{b+c\,i\,(v-2\,s)}\;(b-i\,c\,(v-2\,s))\operatorname{erfi}\left(\frac{d+f\,i\,(v-2\,s)+2\,(b+c\,i\,(v-2\,s))\,z}{2\sqrt{b+c\,i\,(v-2\,s)}}\right)+\right.$$

$$e^{-\frac{(d-i\,f\,(v-2\,s))^2-4\,(b-i\,c\,(v-2\,s))\,(e-i\,g\,(v-2\,s))}{4\,(b-i\,c\,(v-2\,s))}}\,(b+c\,i\,(v-2\,s))\sqrt{b-i\,c\,(v-2\,s)}$$

$$\left.\left.\operatorname{erfi}\left(\frac{d-i\,f\,(v-2\,s)+2\,b\,z-2\,i\,c\,(v-2\,s)\,z}{2\sqrt{b-i\,c\,(v-2\,s)}}\right)\right)\right)\Big/((b-i\,c\,(v-2\,s))\,(b+c\,i\,(v-2\,s)))+2^{-m-v-1}\sqrt{\pi}$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(\left(e^{-\frac{(d-2\,i\,f\,k+i\,m\,p-2\,i\,p\,s+i\,f\,v)^2-4\,(b-2\,i\,c\,k+i\,a\,m-2\,i\,a\,s+i\,c\,v)\,(e-2\,i\,g\,k+i\,m\,q-2\,i\,q\,s+i\,g\,v)}{4\,(b-2\,i\,c\,k+i\,a\,m-2\,i\,a\,s+i\,c\,v)}}\sqrt{b-2\,i\,c\,k+i\,a\,m-2\,i\,a\,s+i\,c\,v}\right.\right.$$

$$(b+2\,i\,c\,k-i\,a\,m+2\,i\,a\,s-i\,c\,v)\operatorname{erfi}\Big((d-2\,i\,f\,k+i\,m\,p-2\,i\,p\,s+i\,f\,v+2\,b\,z-$$

$$2\,(2\,i\,c\,k-i\,a\,m+2\,i\,a\,s-i\,c\,v)\,z)\Big/\left(2\sqrt{b-2\,i\,c\,k+i\,a\,m-2\,i\,a\,s+i\,c\,v}\right)\Big)+$$

$$e^{-\frac{(d+2\,i\,f\,k-i\,m\,p+2\,i\,p\,s-i\,f\,v)^2-4\,(b+2\,i\,c\,k-i\,a\,m+2\,i\,a\,s-i\,c\,v)\,(e+2\,i\,g\,k-i\,m\,q+2\,i\,q\,s-i\,g\,v)}{4\,(b+2\,i\,c\,k-i\,a\,m+2\,i\,a\,s-i\,c\,v)}}\,(b-2\,i\,c\,k+i\,a\,m-2\,i\,a\,s+i\,c\,v)$$

$$\sqrt{b+2\,i\,c\,k-i\,a\,m+2\,i\,a\,s-i\,c\,v}\;\operatorname{erfi}\Big((d+2\,i\,f\,k-i\,m\,p+2\,i\,p\,s-i\,f\,v+$$

$$\left.2\,(b+2\,i\,c\,k-i\,a\,m+2\,i\,a\,s-i\,c\,v)\,z)\Big/\left(2\sqrt{b+2\,i\,c\,k-i\,a\,m+2\,i\,a\,s-i\,c\,v}\right)\Big)\right)\Big/$$

$$((b+2\,i\,c\,k-i\,a\,m+2\,i\,a\,s-i\,c\,v)\,(b-2\,i\,c\,k+i\,a\,m-2\,i\,a\,s+i\,c\,v))+$$

$$\left(e^{-\frac{(d-2\,i\,f\,k-i\,m\,p+2\,i\,p\,s+i\,f\,v)^2-4\,(b-2\,i\,c\,k-i\,a\,m+2\,i\,a\,s+i\,c\,v)\,(e-2\,i\,g\,k-i\,m\,q+2\,i\,q\,s+i\,g\,v)}{4\,(b-2\,i\,c\,k-i\,a\,m+2\,i\,a\,s+i\,c\,v)}}\sqrt{b-2\,i\,c\,k-i\,a\,m+2\,i\,a\,s+i\,c\,v}\right.$$

$$(b+2\,i\,c\,k+i\,a\,m-2\,i\,a\,s-i\,c\,v)\operatorname{erfi}\Big((d-2\,i\,f\,k-i\,m\,p+2\,i\,p\,s+i\,f\,v+2\,b\,z-$$

$$2\,(2\,i\,c\,k+i\,a\,m-2\,i\,a\,s-i\,c\,v)\,z)\Big/\left(2\sqrt{b-2\,i\,c\,k-i\,a\,m+2\,i\,a\,s+i\,c\,v}\right)\Big)+$$

$$e^{-\frac{(d+2\,i\,f\,k+i\,m\,p-2\,i\,p\,s-i\,f\,v)^2-4\,(b+2\,i\,c\,k+i\,a\,m-2\,i\,a\,s-i\,c\,v)\,(e+2\,i\,g\,k+i\,m\,q-2\,i\,q\,s-i\,g\,v)}{4\,(b+2\,i\,c\,k+i\,a\,m-2\,i\,a\,s-i\,c\,v)}}\,(b-2\,i\,c\,k-i\,a\,m+2\,i\,a\,s+i\,c\,v)$$

$$\sqrt{b+2\,i\,c\,k+i\,a\,m-2\,i\,a\,s-i\,c\,v}\;\operatorname{erfi}\Big((d+2\,i\,f\,k+i\,m\,p-2\,i\,p\,s-i\,f\,v+$$

$$\left.2\,(b+2\,i\,c\,k+i\,a\,m-2\,i\,a\,s-i\,c\,v)\,z)\Big/\left(2\sqrt{b+2\,i\,c\,k+i\,a\,m-2\,i\,a\,s-i\,c\,v}\right)\Big)\right)\Big/$$

$$\left.((b+2\,i\,c\,k+i\,a\,m-2\,i\,a\,s-i\,c\,v)\,(b-2\,i\,c\,k-i\,a\,m+2\,i\,a\,s+i\,c\,v))\right)\,/;\,m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int e^{\sqrt{z}\,b+d\,z+e}\cos^m\left(\sqrt{z}\,a+p\,z+q\right)\cos^v\left(\sqrt{z}\,c+f\,z+g\right)dz=$$

$$2^{-m-v-2}\left(\frac{4\,e^{\sqrt{z}\,b+d\,z}}{d}-\frac{2\,b\sqrt{\pi}}{d^{3/2}}\,e^{-\frac{b^2}{4d}}\operatorname{erfi}\left(\frac{b+2\,d\sqrt{z}}{2\sqrt{d}}\right)\right)e^e\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)+$$

$$2^{-m-v-1}\binom{v}{\frac{v}{2}}\left(\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} e^{e-i q (m-2 s)}\binom{m}{s}\left(\frac{e^{-\frac{(b-i a m+2 i a s)^2}{4 (d-i m p+2 i p s)}} \sqrt{\pi}\,(i a (m-2 s)-b) \operatorname{erfi}\left(\frac{b-i a (m-2 s)+2 (d-i m p+2 i p s) \sqrt{z}}{2 \sqrt{d-i m p+2 i p s}}\right)}{(d-i m p+2 i p s)^{3/2}}+\right.\right.$$

$$\frac{2 e^{2 i q (m-2 s)+(d+i p (m-2 s)) z+(b+a i (m-2 s)) \sqrt{z}}}{d+i p (m-2 s)}-\frac{1}{(d+i p (m-2 s))^{3/2}}\left(e^{2 i q (m-2 s)-\frac{(b+a i (m-2 s))^2}{4 (d+i p (m-2 s))}} \sqrt{\pi}\,(b+a i (m-2 s))\right.$$

$$\left.\left.\left.\operatorname{erfi}\left(\frac{b+a i (m-2 s)+2 (d+i m p-2 i p s) \sqrt{z}}{2 \sqrt{d+i p (m-2 s)}}\right)\right)+\frac{2 e^{\sqrt{z}\,(b-i a (m-2 s))+(d-i p (m-2 s)) z}}{d-i p (m-2 s)}\right)\right)(1-v \bmod 2)+$$

$$2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{e-i g (v-2 s)}\binom{v}{s}\left(-\frac{e^{-\frac{(b+2 i c s-i c v)^2}{4 (d+2 i f s-i f v)}} \sqrt{\pi}\,(b+2 i c s-i c v) \operatorname{erfi}\left(\frac{b+c i (2 s-v)+2 (d+2 i f s-i f v) \sqrt{z}}{2 \sqrt{d+2 i f s-i f v}}\right)}{(d+2 i f s-i f v)^{3/2}}+\right.$$

$$\frac{2 e^{2 g i (v-2 s)+(d+f i (v-2 s)) z+(b+c i (v-2 s)) \sqrt{z}}}{d+f i (v-2 s)}-\frac{1}{(d+f i (v-2 s))^{3/2}}\left(e^{2 i g (v-2 s)-\frac{(b+c i (v-2 s))^2}{4 (d+f i (v-2 s))}} \sqrt{\pi}\,(b+c i (v-2 s))\right.$$

$$\left.\left.\operatorname{erfi}\left(\frac{b+c i (v-2 s)+2 (d-2 i f s+i f v) \sqrt{z}}{2 \sqrt{d+f i (v-2 s)}}\right)\right)+\frac{2 e^{\sqrt{z}\,(b-i c (v-2 s))+(d-i f (v-2 s)) z}}{d-i f (v-2 s)}\right)+$$

$$2^{-m-v-1} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s} \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(2 e^{e-2 i g k-i m q-2 i q s-i g v}\left(\frac{e^{2 i m q+2 i g v+(d-2 i f k+i m p-2 i p s+i f v) z+(b-2 i c k+i a m-2 i a s+i c v) \sqrt{z}}}{d-2 i f k+i m p-2 i p s+i f v}+\right.\right.$$

$$\frac{e^{4 i g k+4 i q s+(d+2 i f k-i m p+2 i p s-i f v) z+(b+2 i c k-i a m+2 i a s-i c v) \sqrt{z}}}{d+2 i f k-i m p+2 i p s-i f v}+$$

$$\frac{e^{4 i g k+2 i m q+(d+2 i f k+i m p-2 i p s-i f v) z+(b+2 i c k+i a m-2 i a s-i c v) \sqrt{z}}}{d+2 i f k+i m p-2 i p s-i f v}+$$

$$\left.\frac{e^{4 i q s+2 i g v+(d-2 i f k-i m p+2 i p s+i f v) z+(b-2 i c k-i a m+2 i a s+i c v) \sqrt{z}}}{d-2 i f k-i m p+2 i p s+i f v}\right)-$$

$$\left(e^{-\frac{(b-2 i c k-i a m+2 i a s+i c v)^2}{4 (d-2 i f k-i m p+2 i p s+i f v)}+e-2 i g k-i m q+2 i q s+i g v} \sqrt{\pi}\,(b-2 i c k-i a m+2 i a s+i c v)\right.$$

$$\operatorname{erfi}\left(\left(b-2 i c k-i a m+2 i a s+i c v+2 (d-2 i f k-i m p+2 i p s+i f v) \sqrt{z}\right)\right/$$

$$\left.\left.\left(2 \sqrt{d-2 i f k-i m p+2 i p s+i f v}\right)\right)\right) \Big/ (d-2 i f k-i m p+2 i p s+i f v)^{3/2}-$$

$$\left(e^{-\frac{(b+2 \mathbb{i} c k-\mathbb{i} a m+2 \mathbb{i} a s-\mathbb{i} c v)^2}{4 (d+2 \mathbb{i} f k-\mathbb{i} m p+2 \mathbb{i} p s-\mathbb{i} f v)}+e+2 \mathbb{i} g k-\mathbb{i} m q+2 \mathbb{i} q s-\mathbb{i} g v} \sqrt{\pi}\, (b+2 \mathbb{i} c k-\mathbb{i} a m+2 \mathbb{i} a s-\mathbb{i} c v)\right.$$
$$\operatorname{erfi}\left(\left(b+2 \mathbb{i} c k-\mathbb{i} a m+2 \mathbb{i} a s-\mathbb{i} c v+2 (d+2 \mathbb{i} f k-\mathbb{i} m p+2 \mathbb{i} p s-\mathbb{i} f v) \sqrt{z}\right) \Big/\right.$$
$$\left.\left.\left(2 \sqrt{d+2 \mathbb{i} f k-\mathbb{i} m p+2 \mathbb{i} p s-\mathbb{i} f v}\right)\right)\right) \Big/ (d+2 \mathbb{i} f k-\mathbb{i} m p+2 \mathbb{i} p s-\mathbb{i} f v)^{3/2} -$$
$$\left(e^{-\frac{(b+2 \mathbb{i} c k+\mathbb{i} a m-2 \mathbb{i} a s-\mathbb{i} c v)^2}{4 (d+2 \mathbb{i} f k+\mathbb{i} m p-2 \mathbb{i} p s-\mathbb{i} f v)}+e+2 \mathbb{i} g k+\mathbb{i} m q-2 \mathbb{i} q s-\mathbb{i} g v} \sqrt{\pi}\, (b+2 \mathbb{i} c k+\mathbb{i} a m-2 \mathbb{i} a s-\mathbb{i} c v)\right.$$
$$\operatorname{erfi}\left(\left(b+2 \mathbb{i} c k+\mathbb{i} a m-2 \mathbb{i} a s-\mathbb{i} c v+2 (d+2 \mathbb{i} f k+\mathbb{i} m p-2 \mathbb{i} p s-\mathbb{i} f v) \sqrt{z}\right) \Big/\right.$$
$$\left.\left.\left(2 \sqrt{d+2 \mathbb{i} f k+\mathbb{i} m p-2 \mathbb{i} p s-\mathbb{i} f v}\right)\right)\right) \Big/ (d+2 \mathbb{i} f k+\mathbb{i} m p-2 \mathbb{i} p s-\mathbb{i} f v)^{3/2} -$$
$$\left(e^{-\frac{(b+a \mathbb{i} (m-2 s)+c \mathbb{i} (v-2 k))^2}{4 (d+\mathbb{i} p (m-2 s)+f \mathbb{i} (v-2 k))}+e-2 \mathbb{i} g k+\mathbb{i} m q-2 \mathbb{i} q s+\mathbb{i} g v} \sqrt{\pi}\, (b+a \mathbb{i} (m-2 s)+c \mathbb{i} (v-2 k))\right.$$
$$\operatorname{erfi}\left(\left(b-2 \mathbb{i} c k+\mathbb{i} a m-2 \mathbb{i} a s+\mathbb{i} c v+2 (d+\mathbb{i} p (m-2 s)+f \mathbb{i} (v-2 k)) \sqrt{z}\right) \Big/\right.$$
$$\left.\left.\left.\left(2 \sqrt{d+\mathbb{i} p (m-2 s)+f \mathbb{i} (v-2 k)}\right)\right)\right) \Big/ (d+\mathbb{i} p (m-2 s)+f \mathbb{i} (v-2 k))^{3/2}\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving product of powers of two direct functions and rational functions of exp

Involving $\cos^m(e\, z) \cos^v(c\, z) \left(a + b\, e^{d\, z}\right)^{-n}$

01.07.21.1842.01

$$\int \frac{\cos^m(e z)\cos^\nu(c z)}{\left(a+b\,e^{d z}\right)^n}\,dz = 2^{-m-\nu}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(e^{(2 i e k - i e m + 2 i c s - i c \nu) z}\,{}_2F_1\left(\frac{2 i e k - i e m + 2 i c s - i c \nu}{d}, n; \frac{d + 2 i e k - i e m + 2 i c s - i c \nu}{d}; -\frac{b\,e^{d z}}{a}\right) - e^{(-2 e i k + i e m - 2 i c s + i c \nu) z}\,{}_2F_1\left(\frac{-2 e i k + i e m - 2 i c s + i c \nu}{d}, n; \frac{d - 2 i e k + i e m - 2 i c s + i c \nu}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\Big/(2 i e k - i e m + 2 i c s - i c \nu) + \left(e^{(2 i e k - i e m - 2 i c s + i c \nu) z}\,{}_2F_1\left(\frac{2 i e k - i e m - 2 i c s + i c \nu}{d}, n; \frac{d + 2 i e k - i e m - 2 i c s + i c \nu}{d}; -\frac{b\,e^{d z}}{a}\right) - e^{(-2 e i k + i e m + 2 i c s - i c \nu) z}\,{}_2F_1\left(\frac{-2 e i k + i e m + 2 i c s - i c \nu}{d}, n; \frac{d - 2 i e k + i e m + 2 i c s - i c \nu}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\Big/(2 i e k - i e m - 2 i c s + i c \nu)\right)\right) a^{-n} - \frac{2^{-m-\nu} b^{-n} e^{-d n z}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\left(n, n; n+1; -\frac{a\,e^{-d z}}{b}\right)(1 - m \bmod 2)(1 - \nu \bmod 2)}{d\,n} - \frac{1}{e}\left(i\,2^{-m-\nu} a^{-n}\binom{\nu}{\frac{\nu}{2}}(1 - \nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{m-2k}\left(\binom{m}{k}\left(e^{i e (m-2k) z}\,{}_2F_1\left(\frac{i e (m-2k)}{d}, n; \frac{d + e i (m-2k)}{d}; -\frac{b\,e^{d z}}{a}\right) - e^{-i e (m-2k) z}\,{}_2F_1\left(-\frac{i e (m-2k)}{d}, n; \frac{d - i e (m-2k)}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right)\right) - \frac{1}{c}\left(i\,2^{-m-\nu} a^{-n}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\nu-2s}\left(\binom{\nu}{s}\left(e^{i c (\nu-2s) z}\,{}_2F_1\left(\frac{i c (\nu-2s)}{d}, n; \frac{d + c i (\nu-2s)}{d}; -\frac{b\,e^{d z}}{a}\right) - e^{-i c (\nu-2s) z}\,{}_2F_1\left(-\frac{i c (\nu-2s)}{d}, n; \frac{d - i c (\nu-2s)}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right)\right) /;\ n \in \mathbb{N}^+ \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos^m(e z) \cos^\nu(c z) \left(a + b\,e^{d z}\right)^{-n}$

01.07.21.1843.01

$$\int \frac{e^{p z} \cos^m(e z) \cos^v(c z)}{\left(a + b e^{d z}\right)^n} \, dz = 2^{-m-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \, a^{-n} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\binom{m}{k} \left(e^{(e i (m-2k)+p) z} (i e (m-2k) - p) \, {}_2F_1\left(\frac{e i (m-2k)+p}{d}, n; \frac{d + e i (m-2k) + p}{d}; -\frac{b e^{d z}}{a} \right) - e^{(p - i e (m-2k)) z} (e i (m-2k) + p) \, {}_2F_1\left(\frac{p - i e (m-2k)}{d}, n; \frac{d - i e (m-2k) + p}{d}; -\frac{b e^{d z}}{a} \right) \right) \right) \Big/ ((i e (m-2k) - p)(e i (m-2k) + p)) + 2^{-m-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \, a^{-n} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left(\binom{v}{s} \left(e^{(p + c i (v-2s)) z} (i c (v-2s) - p) \, {}_2F_1\left(\frac{p + c i (v-2s)}{d}, n; \frac{d + p + c i (v-2s)}{d}; -\frac{b e^{d z}}{a} \right) - e^{(p - i c (v-2s)) z} (p + c i (v-2s)) \, {}_2F_1\left(\frac{p - i c (v-2s)}{d}, n; \frac{d + p - i c (v-2s)}{d}; -\frac{b e^{d z}}{a} \right) \right) \right) \Big/ ((i c (v-2s) - p)(p + c i (v-2s))) + 2^{-m-v} a^{-n} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\left(e^{(2 i e k - i e m + p + 2 i c s - i c v) z} (2 i e k - i e m - p + 2 i c s - i c v) \, {}_2F_1\left(\frac{2 i e k - i e m + p + 2 i c s - i c v}{d}, n; \frac{d + 2 i e k - i e m + p + 2 i c s - i c v}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-2 e i k + i e m + p - 2 i c s + i c v) z} (2 i e k - i e m + p + 2 i c s - i c v) \, {}_2F_1\left(\frac{-2 e i k + i e m + p - 2 i c s + i c v}{d}, n; \frac{d - 2 i e k + i e m + p - 2 i c s + i c v}{d}; -\frac{b e^{d z}}{a} \right) \right) \Big/ ((2 i e k - i e m - p + 2 i c s - i c v)(2 i e k - i e m + p + 2 i c s - i c v)) + \left(e^{(2 i e k - i e m + p - 2 i c s + i c v) z} (2 i e k - i e m - p - 2 i c s + i c v) \, {}_2F_1\left(\frac{2 i e k - i e m + p - 2 i c s + i c v}{d}, n; \frac{d + 2 i e k - i e m + p - 2 i c s + i c v}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-2 e i k + i e m + p + 2 i c s - i c v) z} (2 i e k - i e m + p - 2 i c s + i c v) \, {}_2F_1\left(\frac{-2 e i k + i e m + p + 2 i c s - i c v}{d}, n; \frac{d - 2 i e k + i e m + p + 2 i c s - i c v}{d}; -\frac{b e^{d z}}{a} \right) \right) \Big/ ((2 i e k - i e m - p - 2 i c s + i c v)(2 i e k - i e m + p - 2 i c s + i c v)) \right) + \frac{2^{-m-v} a^{-n} e^{p z} (1 - m \bmod 2)(1 - v \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \, {}_2F_1\left(\frac{p}{d}, n; \frac{d+p}{d}; -\frac{b e^{d z}}{a} \right) /; n \in \mathbb{N}^+ \land m \in \mathbb{N}^+ \land v \in$$

Involving product of powers of two direct functions and algebraic functions of exp

Involving $\left(a + b\, e^{d\, z}\right)^{\beta} \cos^{m}(e\, z) \cos^{v}(c\, z)$

01.07.21.1844.01

$$
\begin{aligned}
&\int \left(a+b\,e^{d z}\right)^{\beta} \cos^{m}(e z) \cos^{v}(c z)\, dz = 2^{-m-v} \left(a+b\,e^{d z}\right)^{\beta} \\
&\quad \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\left(e^{(2 i e k - i e m + 2 i c s - i c v) z}\, {}_2F_1\!\left(\frac{2 i e k - i e m + 2 i c s - i c v}{d}, -\beta; \frac{d + 2 i e k - i e m + 2 i c s - i c v}{d}; \right.\right.\right.\right. \\
&\qquad \left. -\frac{b\,e^{d z}}{a}\right) - e^{(-2 e i k + i e m - 2 i c s + i c v) z}\, {}_2F_1\!\left(\frac{-2 e i k + i e m - 2 i c s + i c v}{d}, -\beta; \right. \\
&\qquad \left.\left. \frac{d - 2 i e k + i e m - 2 i c s + i c v}{d}; -\frac{b\,e^{d z}}{a}\right)\right) \Big/ (2 i e k - i e m + 2 i c s - i c v) + \\
&\qquad \left(e^{(2 i e k - i e m - 2 i c s + i c v) z}\, {}_2F_1\!\left(\frac{2 i e k - i e m - 2 i c s + i c v}{d}, -\beta; \frac{d + 2 i e k - i e m - 2 i c s + i c v}{d}; -\frac{b\,e^{d z}}{a}\right) - \right. \\
&\qquad e^{(-2 e i k + i e m + 2 i c s - i c v) z}\, {}_2F_1\!\left(\frac{-2 e i k + i e m + 2 i c s - i c v}{d}, -\beta; \right. \\
&\qquad \left.\left.\left.\left. \frac{d - 2 i e k + i e m + 2 i c s - i c v}{d}; -\frac{b\,e^{d z}}{a}\right)\right) \Big/ (2 i e k - i e m - 2 i c s + i c v)\right)\right) \\
&\quad \left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} + \frac{1}{d\,\beta}\left(2^{-m-v}\left(\frac{e^{-d z} a}{b} + 1\right)^{-\beta} \left(a+b\,e^{d z}\right)^{\beta} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}}\, {}_2F_1\!\left(-\beta, -\beta; 1-\beta; -\frac{a\,e^{-d z}}{b}\right)\right. \\
&\qquad (1 - m \bmod 2) \\
&\qquad \left.(1 - v \bmod 2)\right) - \\
&\quad \frac{1}{e}\left(i\, 2^{-m-v} \left(a+b\,e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\right. \\
&\qquad \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{m - 2 k} \left(\binom{m}{k} \left(e^{i e (m - 2 k) z}\, {}_2F_1\!\left(\frac{i e (m - 2 k)}{d}, -\beta; \frac{d + e i (m - 2 k)}{d}; -\frac{b\,e^{d z}}{a}\right) - \right.\right. \\
&\qquad \left.\left.\left. e^{-i e (m - 2 k) z}\, {}_2F_1\!\left(-\frac{i e (m - 2 k)}{d}, -\beta; \frac{d - i e (m - 2 k)}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right)\right) - \\
&\quad \frac{1}{c}\left(i\, 2^{-m-v} \left(a+b\,e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{v - 2 s}\right. \\
&\qquad \left(\binom{v}{s} \left(e^{i c (v - 2 s) z}\, {}_2F_1\!\left(\frac{i c (v - 2 s)}{d}, -\beta; \frac{d + c i (v - 2 s)}{d}; -\frac{b\,e^{d z}}{a}\right) - \right.\right. \\
&\qquad \left.\left.\left. e^{-i c (v - 2 s) z}\, {}_2F_1\!\left(-\frac{i c (v - 2 s)}{d}, -\beta; \frac{d - i c (v - 2 s)}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right)\right) /;\ m \in \mathbb{N}^{+} \land v \in \mathbb{N}^{+}
\end{aligned}
$$

Involving $e^{p z}\left(a+b\,e^{d z}\right)^{\beta}\cos^{m}(e\,z)\cos^{v}(c\,z)$

01.07.21.1845.01

$$\int e^{p z}\left(a+b\,e^{d z}\right)^{\beta}\cos^{m}(e\,z)\cos^{v}(c\,z)\,dz = 2^{-m-v}\left(a+b\,e^{d z}\right)^{\beta}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\left(\binom{m}{k}\left(e^{(e\,i\,(m-2k)+p)z}\,(i\,e\,(m-2k)-p)\,{}_2F_1\!\left(\frac{e\,i\,(m-2k)+p}{d},-\beta;\frac{d+e\,i\,(m-2k)+p}{d};-\frac{b\,e^{d z}}{a}\right)-\right.\right.$$
$$\left.\left.e^{(p-i\,e\,(m-2k))z}\,(e\,i\,(m-2k)+p)\,{}_2F_1\!\left(\frac{p-i\,e\,(m-2k)}{d},-\beta;\frac{d-i\,e\,(m-2k)+p}{d};-\frac{b\,e^{d z}}{a}\right)\right)\right)\Big/$$
$$((i\,e\,(m-2k)-p)\,(e\,i\,(m-2k)+p))+2^{-m-v}\left(a+b\,e^{d z}\right)^{\beta}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}$$
$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(\binom{v}{s}\left(e^{(p+c\,i\,(v-2s))z}\,(i\,c\,(v-2s)-p)\,{}_2F_1\!\left(\frac{p+c\,i\,(v-2s)}{d},-\beta;\frac{d+p+c\,i\,(v-2s)}{d};-\frac{b\,e^{d z}}{a}\right)-\right.\right.$$
$$\left.\left.e^{(p-i\,c\,(v-2s))z}\,(p+c\,i\,(v-2s))\,{}_2F_1\!\left(\frac{p-i\,c\,(v-2s)}{d},-\beta;\frac{d+p-i\,c\,(v-2s)}{d};-\frac{b\,e^{d z}}{a}\right)\right)\right)\Big/$$
$$((i\,c\,(v-2s)-p)\,(p+c\,i\,(v-2s)))+2^{-m-v}\left(a+b\,e^{d z}\right)^{\beta}\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left(e^{(2iek-iem+p+2ics-icv)z}\,(2\,i\,e\,k-i\,e\,m-p+2\,i\,c\,s-i\,c\,v)\,{}_2F_1\!\left(\frac{2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d},\right.\right.\right.$$
$$\left.-\beta;\frac{d+2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d};-\frac{b\,e^{d z}}{a}\right)-e^{(-2eik+iem+p-2ics+icv)z}\,(2\,i\,e\,k-i\,e\,m+p+$$
$$2\,i\,c\,s-i\,c\,v)\,{}_2F_1\!\left(\frac{-2\,e\,i\,k+i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d},-\beta;\frac{d-2\,i\,e\,k+i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d};\right.$$
$$\left.\left.-\frac{b\,e^{d z}}{a}\right)\right)\Big/((2\,i\,e\,k-i\,e\,m-p+2\,i\,c\,s-i\,c\,v)\,(2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v))+$$
$$\left(e^{(2iek-iem+p-2ics+icv)z}\,(2\,i\,e\,k-i\,e\,m-p-2\,i\,c\,s+i\,c\,v)\,{}_2F_1\!\left(\frac{2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d},\right.\right.$$
$$\left.-\beta;\frac{d+2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d};-\frac{b\,e^{d z}}{a}\right)-e^{(-2eik+iem+p+2ics-icv)z}\,(2\,i\,e\,k-i\,e\,m+p-$$
$$2\,i\,c\,s+i\,c\,v)\,{}_2F_1\!\left(\frac{-2\,e\,i\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d},-\beta;\frac{d-2\,i\,e\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d};\right.$$
$$\left.\left.\left.-\frac{b\,e^{d z}}{a}\right)\right)\Big/((2\,i\,e\,k-i\,e\,m-p-2\,i\,c\,s+i\,c\,v)\,(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v))\right)+$$
$$\frac{2^{-m-v}\,e^{p z}\,(1-m \bmod 2)\,(1-v \bmod 2)}{p}\left(a+b\,e^{d z}\right)^{\beta}\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}$$

$$\binom{m}{\frac{m}{2}}$$

$$\binom{\nu}{\frac{\nu}{2}}$$

$$_2F_1$$

$$\left(\frac{p}{d}, -\beta; \frac{d+p}{d}; -\frac{b\, e^{d z}}{a}\right) /; m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving rational functions of the direct function and exponential function

Involving exp

Involving $\frac{e^{p z}}{a+b\cos(c z)}$

01.07.21.1846.01

$$\int \frac{e^{p z}}{a+b\cos(c z)}\, dz = -\frac{1}{b\sqrt{a^2-b^2}\,(c-i\, p)}\left(i\, e^{(i c+p) z}\left(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(1-\frac{i\, p}{c}, 1; 2-\frac{i\, p}{c}; \frac{b\, e^{i c z}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(1-\frac{i\, p}{c}, 1; 2-\frac{i\, p}{c}; -\frac{b\, e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)$$

01.07.21.1847.01

$$\int \frac{e^{i c z}}{a+b\cos(c z)}\, dz = -\frac{i}{b\, c}\left(\log\left(2\, e^{i c z}\, a+b\, e^{2 i c z}+b\right)-\frac{2\, a}{\sqrt{b^2-a^2}}\tan^{-1}\left(\frac{a+b\, e^{i c z}}{\sqrt{b^2-a^2}}\right)\right)$$

Involving $e^{p z}(a+b\cos(c z))^{-n}$

01.07.21.1848.01

$$\int \frac{e^{p z}}{(a+b\cos(c z))^2}\,dz = \frac{1}{b\left(a^2-b^2\right)^{3/2}(i c+p)}\left(e^{(i c+p) z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i(i c+p)}{c}, 1; 2-\frac{i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)+a\left(\sqrt{a^2-b^2}-a\right)\right.\right.$$
$$ {}_2F_1\left(-\frac{i(i c+p)}{c}, 1; 2-\frac{i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)+\left(b^2-a^2\right)$$
$$\left({}_2F_1\left(-\frac{i(i c+p)}{c}, 2; 2-\frac{i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)-{}_2F_1\left(-\frac{i(i c+p)}{c}, 2; 2-\frac{i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)-$$
$$\left.\left.a\sqrt{a^2-b^2}\left({}_2F_1\left(-\frac{i(i c+p)}{c}, 2; 2-\frac{i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\left(-\frac{i(i c+p)}{c}, 2; 2-\frac{i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)$$

Involving $\frac{e^{p z}}{a+b\cos^2(c z)}$

01.07.21.1849.01

$$\int \frac{e^{p z}}{a+b\cos^2(c z)}\,dz = -\frac{1}{\sqrt{a}\, b\sqrt{a+b}\,(2 i c+p)}\left(e^{(2 i c+p) z}\left(\left(2a-2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(1-\frac{i p}{2c}, 1; 2-\frac{i p}{2c}; -\frac{b e^{2 i c z}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\right.\right.$$
$$\left.\left.\left(-2a-2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{i p}{2c}, 1; 2-\frac{i p}{2c}; -\frac{b e^{2 i c z}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)$$

Involving $e^{p z}\left(a+b\cos^2(c z)\right)^{-n}$

01.07.21.1850.01

$$\int \frac{e^{p z}}{\left(a+b\cos^2(c z)\right)^2}\,dz = -\frac{1}{2a^{3/2} b(a+b)^{3/2}(2 i c+p)}$$
$$\left(e^{(2 i c+p) z}\left(-(2a+b)\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{i p}{2c}, 1; 2-\frac{i p}{2c}; -\frac{b e^{2 i c z}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\right.\right.$$
$$(-2a-b)\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(1-\frac{i p}{2c}, 1; 2-\frac{i p}{2c}; -\frac{b e^{2 i c z}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(-2a^{3/2}+2\sqrt{a+b}\,a-2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(1-\frac{i p}{2c}, 2; 2-\frac{i p}{2c}; -\frac{b e^{2 i c z}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\right.$$
$$\left.\left.\left.\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(1-\frac{i p}{2c}, 2; 2-\frac{i p}{2c}; -\frac{b e^{2 i c z}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right)$$

Involving $\frac{e^{p z} \cos(d z)}{a+b \cos(c z)}$

01.07.21.1851.01

$$\int \frac{e^{p z} \cos(d z)}{a + b \cos(c z)} \, dz = -\frac{1}{2 b \sqrt{a^2 - b^2}} \left(i \left(\frac{1}{c - d - i p} \left(e^{(i c - i d + p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c - d - i p}{c}, 1; -\frac{-2 c + d + i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c - d - i p}{c}, 1; -\frac{-2 c + d + i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) + \frac{1}{c + d - i p} \left(e^{(i c + i d + p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c + d - i p}{c}, 1; \frac{2 c + d - i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c + d - i p}{c}, 1; \frac{2 c + d - i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \right) \right)$$

Involving $e^{p z} (a + b \cos(c z))^{-n} \cos(d z)$

01.07.21.1852.01

$$\int \frac{e^{p z} \cos(d z)}{(a + b \cos(c z))^2} \, dz = \frac{1}{2 b \left(a^2 - b^2\right)^{3/2}} \left(\frac{1}{i c - i d + p} \left(e^{(i c - i d + p) z} \left(a \left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c - d - i p}{c}, 1; -\frac{-2 c + d + i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + a \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c - d - i p}{c}, 1; -\frac{-2 c + d + i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) + \left(b^2 - a^2\right) \left({}_2F_1\left(\frac{c - d - i p}{c}, 2; -\frac{-2 c + d + i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) - {}_2F_1\left(\frac{c - d - i p}{c}, 2; -\frac{-2 c + d + i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) - a \sqrt{a^2 - b^2} \left({}_2F_1\left(\frac{c - d - i p}{c}, 2; -\frac{-2 c + d + i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + {}_2F_1\left(\frac{c - d - i p}{c}, 2; -\frac{-2 c + d + i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \right) + \frac{1}{i c + i d + p} \left(e^{(i c + i d + p) z} \left(a \left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c + d - i p}{c}, 1; \frac{2 c + d - i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + a \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c + d - i p}{c}, 1; \frac{2 c + d - i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) + \left(b^2 - a^2\right) \left({}_2F_1\left(\frac{c + d - i p}{c}, 2; \frac{2 c + d - i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) - {}_2F_1\left(\frac{c + d - i p}{c}, 2; \frac{2 c + d - i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) - a \sqrt{a^2 - b^2} \left({}_2F_1\left(\frac{c + d - i p}{c}, 2; \frac{2 c + d - i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + {}_2F_1\left(\frac{c + d - i p}{c}, 2; \frac{2 c + d - i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \right) \right)$$

Involving $\frac{e^{p z} \cos(d z)}{a + b \cos^2(c z)}$

01.07.21.1853.01

$$\begin{aligned}
&\int \frac{e^{p z} \cos(d z)}{a + b \cos^2(c z)} \, dz = \frac{1}{2 \sqrt{a} \, b \sqrt{a+b}} \\
&\left(-\frac{1}{2 i c + i d + p} \left(e^{(2 i c + i d + p) z} \left(\left(2 a - 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(\frac{2 c + d - i p}{2 c}, 1; \frac{4 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) - \right.\right.\right. \\
&\left.\left. \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(\frac{2 c + d - i p}{2 c}, 1; \frac{4 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right)\right)\right) - \\
&\frac{1}{2 i c - i d + p} \left(e^{(2 i c - i d + p) z} \left(\left(2 a - 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{d + i p}{2 c}, 1; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) - \right.\right. \\
&\left.\left.\left. \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{d + i p}{2 c}, 1; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right)\right)\right)\right)
\end{aligned}$$

Involving $e^{p z} \left(a + b \cos^2(c z)\right)^{-n} \cos(d z)$

01.07.21.1854.01

$$\begin{aligned}
&\int \frac{e^{p z} \cos(d z)}{\left(a + b \cos^2(c z)\right)^2} \, dz = \\
&\frac{1}{4 a^{3/2} b (a+b)^{3/2}} \left(-\frac{1}{2 i c + i d + p} \left(e^{(2 i c + i d + p) z} \left(-(2 a + b) \left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(\frac{2 c + d - i p}{2 c}, 1; \frac{4 c + d - i p}{2 c};\right.\right.\right.\right. \\
&\left. -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) - (2 a + b) \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(\frac{2 c + d - i p}{2 c}, 1;\right. \\
&\left. \frac{4 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right) + 2 \sqrt{a} \left(\left(-2 a^{3/2} + 2 \sqrt{a+b} \, a - 2 b \sqrt{a} + b \sqrt{a+b}\right)\right. \\
&{}_2F_1\left(\frac{2 c + d - i p}{2 c}, 2; \frac{4 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) + \left(2 a^{3/2} + 2 \sqrt{a+b} \, a + 2 b \sqrt{a} + \right. \\
&\left.\left.\left.\left. b \sqrt{a+b}\right) {}_2F_1\left(\frac{2 c + d - i p}{2 c}, 2; \frac{4 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right)\right)\right)\right) - \frac{1}{2 i c - i d + p} \\
&\left(e^{(2 i c - i d + p) z} \left(-(2 a + b) \left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{d + i p}{2 c}, 1; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) - \right.\right. \\
&(2 a + b) \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{d + i p}{2 c}, 1; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right) + \\
&2 \sqrt{a} \left(\left(-2 a^{3/2} + 2 \sqrt{a+b} \, a - 2 b \sqrt{a} + b \sqrt{a+b}\right)\right. \\
&{}_2F_1\left(1 - \frac{d + i p}{2 c}, 2; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) + \left(2 a^{3/2} + 2 \sqrt{a+b} \, a + 2 b \right. \\
&\left.\left.\left.\left.\left. \sqrt{a} + b \sqrt{a+b}\right) {}_2F_1\left(1 - \frac{d + i p}{2 c}, 2; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right)\right)\right)\right)\right)
\end{aligned}$$

Involving $\frac{e^{p z} \cos(e z) \cos(d z)}{a+b \cos(c z)}$

01.07.21.1855.01

$$\int \frac{e^{p z} \cos(e z) \cos(d z)}{a + b \cos(c z)} \, dz = -\frac{1}{4 b \sqrt{a^2-b^2}} \left(i \left(\frac{1}{c+d-e-i p} \left(e^{i (c+d-e-i p) z} \left(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(\frac{c+d-e-i p}{c}, 1; \frac{2 c+d-e-i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(\frac{c+d-e-i p}{c}, 1; \frac{2 c+d-e-i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right) + \frac{1}{c-d+e-i p} \left(e^{i (c-d+e-i p) z} \left(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(\frac{c-d+e-i p}{c}, 1; \frac{2 c-d+e-i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(\frac{c-d+e-i p}{c}, 1; \frac{2 c-d+e-i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right) + \frac{1}{c+d+e-i p} \left(e^{i (c+d+e-i p) z} \left(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(\frac{c+d+e-i p}{c}, 1; \frac{2 c+d+e-i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(\frac{c+d+e-i p}{c}, 1; \frac{2 c+d+e-i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right) - \frac{1}{-c+d+e+i p} \left(e^{(i c - i (d+e+i p)) z} \left(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(-\frac{-c+d+e+i p}{c}, 1; -\frac{-2 c+d+e+i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(-\frac{-c+d+e+i p}{c}, 1; -\frac{-2 c+d+e+i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)$$

Involving $e^{p z} \cos(e z) \cos(d z) (a + b \cos(c z))^{-n}$

01.07.21.1856.01

$$\int \frac{e^{p z} \cos(e z) \cos(d z)}{(a + b \cos(c z))^2} \, dz = \frac{1}{4} \left(\left(e^{(i c + i d + i e + p) z} \left(a \left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(-\frac{i (i c + i d + i e + p)}{c}, 1; 2 - \frac{i (i d + i e + p)}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + a \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(-\frac{i (i c + i d + i e + p)}{c}, 1; 2 - \frac{i (i d + i e + p)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right) + \right.\right.\right.$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d+i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)-\right.$$

$$\left.\left.{}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d+i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-$$

$$a\sqrt{a^2-b^2}\left({}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d+i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e+p)}{c},\right.\right.$$

$$\left.\left.\left.\left.\left.2;\,2-\frac{i\,(i\,d+i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)\Big/\left(b\left(a^2-b^2\right)^{3/2}(i\,c+i\,d+i\,e+p)\right)+$$

$$\left(e^{(i\,c-i\,d+i\,e+p)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.\right.$$

$$a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)-\right.$$

$$\left.\left.{}_2F_1\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-a\sqrt{a^2-b^2}$$

$$\left({}_2F_1\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\right.\right.$$

$$\left.\left.\left.\left.\left.2;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)\Big/\left(b\left(a^2-b^2\right)^{3/2}(i\,c-i\,d+i\,e+p)\right)+$$

$$\left(e^{(i\,c+i\,d-i\,e+p)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.\right.$$

$$a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)-\right.$$

$$\left.\left.{}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-$$

$$a\,\sqrt{a^2-b^2}\,\left({}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\right.\right.$$

$$\left.\left.\left.\left.\left.2;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)\Big/\left(b\left(a^2-b^2\right)^{3/2}(i\,c+i\,d-i\,e+p)\right)+$$

$$\left(e^{(i\,c-i\,d-i\,e+p)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.\right.$$

$$a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)-\right.$$

$$\left.\left.{}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-a\,\sqrt{a^2-b^2}$$

$$\left({}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\right.\right.$$

$$\left.\left.\left.\left.\left.2;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\Big/\left(b\left(a^2-b^2\right)^{3/2}(i\,c-i\,d-i\,e+p)\right)\right)$$

Involving $\frac{e^{p\,z}\cos(e\,z)\cos(d\,z)}{a+b\cos^2(c\,z)}$

01.07.21.1857.01

$$\int \frac{e^{pz}\cos(ez)\cos(dz)}{a+b\cos^2(cz)}\,dz = \frac{1}{4}\Bigg(-\Bigg(e^{(2ic+id+ie+p)z}\Bigg(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{i(id+ie+p)}{2c},1;2-\frac{i(id+ie+p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\left(-2a-2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1-\frac{i(id+ie+p)}{2c},1;2-\frac{i(id+ie+p)}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(2ic+id+ie+p)\right)-\Bigg(e^{(2ic-id+ie+p)z}\Bigg(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{i(-id+ie+p)}{2c},1;2-\frac{i(-id+ie+p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\left(-2a-2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1-\frac{i(-id+ie+p)}{2c},1;2-\frac{i(-id+ie+p)}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(2ic-id+ie+p)\right)-\Bigg(e^{(2ic+id-ie+p)z}\Bigg(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{i(id-ie+p)}{2c},1;2-\frac{i(id-ie+p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\left(-2a-2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1-\frac{i(id-ie+p)}{2c},1;2-\frac{i(id-ie+p)}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(2ic+id-ie+p)\right)-\Bigg(e^{(2ic-id-ie+p)z}\Bigg(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{i(-id-ie+p)}{2c},1;2-\frac{i(-id-ie+p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\left(-2a-2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1-\frac{i(-id-ie+p)}{2c},1;2-\frac{i(-id-ie+p)}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(2ic-id-ie+p)\right)\Bigg)$$

Involving $e^{pz}\cos(ez)\cos(dz)\left(a+b\cos^2(cz)\right)^{-n}$

01.07.21.1858.01

$$\int \frac{e^{pz}\cos(ez)\cos(dz)}{\left(a+b\cos^2(cz)\right)^2}\,dz = \frac{1}{4}\Bigg(-\Bigg(e^{(2ic+id+ie+p)z}\Bigg(-(2a+b)\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1-\frac{i(id+ie+p)}{2c},1;2-\frac{i(id+ie+p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+(-2a-b)\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)$$

$$ {}_2F_1\left(1-\frac{i\,(i\,d+i\,e+p)}{2\,c},\,1;\,2-\frac{i\,(i\,d+i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+ $$

$$ 2\,\sqrt{a}\,\left(\left(-2\,a^{3/2}+2\,\sqrt{a+b}\,a-2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right){}_2F_1\left(1-\frac{i\,(i\,d+i\,e+p)}{2\,c},\,2;\,2-\frac{i\,(i\,d+i\,e+p)}{2\,c};\right.\right. $$

$$ \left.-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+\left(2\,a^{3/2}+2\,\sqrt{a+b}\,a+2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right) $$

$$ \left.\left.\left.\left.{}_2F_1\left(1-\frac{i\,(i\,d+i\,e+p)}{2\,c},\,2;\,2-\frac{i\,(i\,d+i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)\right)\right)\right)\right)\Big/ $$

$$ \left(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(2\,i\,c+i\,d+i\,e+p)\right)-\left(e^{(2\,i\,c-i\,d+i\,e+p)\,z}\left(-(2\,a+b)\left(-2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,-b\right)\right.\right. $$

$$ {}_2F_1\left(1-\frac{i\,(-i\,d+i\,e+p)}{2\,c},\,1;\,2-\frac{i\,(-i\,d+i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+(-2\,a-b) $$

$$ \left(2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b\right){}_2F_1\left(1-\frac{i\,(-i\,d+i\,e+p)}{2\,c},\,1;\,2-\frac{i\,(-i\,d+i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+ $$

$$ 2\,\sqrt{a}\,\left(\left(-2\,a^{3/2}+2\,\sqrt{a+b}\,a-2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right){}_2F_1\left(1-\frac{i\,(-i\,d+i\,e+p)}{2\,c},\,2;\,2-\right.\right. $$

$$ \left.\frac{i\,(-i\,d+i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+\left(2\,a^{3/2}+2\,\sqrt{a+b}\,a+2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right) $$

$$ \left.\left.\left.\left.{}_2F_1\left(1-\frac{i\,(-i\,d+i\,e+p)}{2\,c},\,2;\,2-\frac{i\,(-i\,d+i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)\right)\right)\right)\right)\Big/ $$

$$ \left(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(2\,i\,c-i\,d+i\,e+p)\right)-\left(e^{(2\,i\,c+i\,d-i\,e+p)\,z}\left(-(2\,a+b)\left(-2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,-b\right)\right.\right. $$

$$ {}_2F_1\left(1-\frac{i\,(i\,d-i\,e+p)}{2\,c},\,1;\,2-\frac{i\,(i\,d-i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+(-2\,a-b) $$

$$ \left(2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b\right){}_2F_1\left(1-\frac{i\,(i\,d-i\,e+p)}{2\,c},\,1;\,2-\frac{i\,(i\,d-i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+ $$

$$ 2\,\sqrt{a}\,\left(\left(-2\,a^{3/2}+2\,\sqrt{a+b}\,a-2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right){}_2F_1\left(1-\frac{i\,(i\,d-i\,e+p)}{2\,c},\,2;\,2-\right.\right. $$

$$ \left.\frac{i\,(i\,d-i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+\left(2\,a^{3/2}+2\,\sqrt{a+b}\,a+2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right) $$

$$ \left.\left.\left.\left.{}_2F_1\left(1-\frac{i\,(i\,d-i\,e+p)}{2\,c},\,2;\,2-\frac{i\,(i\,d-i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)\right)\right)\right)\right)\Big/ $$

$$ \left(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(2\,i\,c+i\,d-i\,e+p)\right)-\left(e^{(2\,i\,c-i\,d-i\,e+p)\,z}\left(-(2\,a+b)\left(-2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,-b\right)\right.\right. $$

$$ {}_2F_1\left(1-\frac{i\,(-i\,d-i\,e+p)}{2\,c},\,1;\,2-\frac{i\,(-i\,d-i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+(-2\,a-b) $$

$$\left(2a+2\sqrt{a+b}\sqrt{a}+b\right) {}_2F_1\left(1-\frac{i(-i d-i e+p)}{2c}, 1; 2-\frac{i(-i d-i e+p)}{2c}; -\frac{b e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(-2a^{3/2}+2\sqrt{a+b}\,a-2b\sqrt{a}+b\sqrt{a+b}\right)\right.$$

$$ {}_2F_1\left(1-\frac{i(-i d-i e+p)}{2c}, 2; 2-\frac{i(-i d-i e+p)}{2c}; -\frac{b e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+$$

$$\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right) {}_2F_1\left(1-\frac{i(-i d-i e+p)}{2c}, 2; 2-\right.$$

$$\left.\left.\left.\left.\frac{i(-i d-i e+p)}{2c}; -\frac{b e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right) \Big/ \left(2a^{3/2}\,b\,(a+b)^{3/2}\,(2ic-i d-i e+p)\right)$$

Involving algebraic functions of the direct function and exponential function

Involving exp

Involving $e^{pz}\,(a+b\cos(cz))^{\beta}$

01.07.21.1859.01

$$\int e^{pz}\,(a+b\cos(cz))^{\beta}\,dz = \frac{1}{p-ic\beta}\left(e^{pz}\left(\frac{e^{icz}\,b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(\frac{e^{icz}\,b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta}\right.$$

$$\left.\left(a+\frac{1}{2}\,b\,e^{-icz}\left(1+e^{2icz}\right)\right)^{\beta} F_1\left(-\frac{ip}{c}-\beta; -\beta, -\beta; -\frac{ip}{c}-\beta+1; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}, \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)\right)$$

Involving $e^{pz}\,\left(a+b\cos^2(cz)\right)^{\beta}$

01.07.21.1860.01

$$\int e^{pz}\left(a+b\cos^2(cz)\right)^{\beta}dz =$$

$$\frac{1}{p-2ic\beta}\left(e^{pz}\left(\frac{e^{2icz}\,b}{2a+b-2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{e^{2icz}\,b}{2a+b+2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{1}{4}\,b\,e^{-2icz}\left(1+e^{2icz}\right)^2+a\right)^{\beta}\right.$$

$$\left.F_1\left(-\frac{ip}{2c}-\beta; -\beta, -\beta; -\frac{ip}{2c}-\beta+1; -\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}}, -\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)\right)$$

Involving $e^{pz}(a+b\cos(dz))^{\beta}\cos(cz)$

01.07.21.1861.01

$$\int e^{p z} (a + b \cos(d z))^{\beta} \cos(c z)\, dz = -\frac{1}{2 (c - i p - d \beta)(c + i p + d \beta)} \left(\left(\frac{e^{i d z} b}{a - \sqrt{a^2 - b^2}} + 1 \right)^{-\beta} \left(\frac{e^{i d z} b}{a + \sqrt{a^2 - b^2}} + 1 \right)^{-\beta} \left(a + \frac{1}{2} b e^{-i d z} \left(1 + e^{2 i d z}\right) \right)^{\beta} \left(i e^{(i c + p) z} (c + i p + d \beta) F_1\left(\frac{c - i p - d \beta}{d}; -\beta, -\beta; \frac{c + d - i p - d \beta}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}}, \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) - e^{(-i c + p) z} (i c + p - i d \beta) F_1\left(-\frac{c + i p + d \beta}{d}; -\beta, -\beta; -\frac{c + i p + d (\beta - 1)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}}, \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) \right) \right)$$

Involving $e^{p z} \left(a + b \cos^2(d z)\right)^{\beta} \cos(c z)$

01.07.21.1862.01

$$\int e^{p z} \left(a + b \cos^2(d z)\right)^{\beta} \cos(c z)\, dz = -\frac{1}{2 \left(c^2 + (p - 2 i d \beta)^2\right)} \left(\left(\frac{e^{2 i d z} b}{2 a + b - 2 \sqrt{a (a + b)}} + 1 \right)^{-\beta} \left(\frac{e^{2 i d z} b}{2 a + b + 2 \sqrt{a (a + b)}} + 1 \right)^{-\beta} \left(\frac{1}{4} b e^{-2 i d z} \left(1 + e^{2 i d z}\right)^2 + a \right)^{\beta} \left(i e^{(i c + p) z} (c + i p + 2 d \beta) F_1\left(\frac{c - i p - 2 d \beta}{2 d}; -\beta, -\beta; \frac{c + 2 d - i p - 2 d \beta}{2 d}; -\frac{b e^{2 i d z}}{2 a + b + 2 \sqrt{a (a + b)}}, -\frac{b e^{2 i d z}}{2 a + b - 2 \sqrt{a (a + b)}} \right) - e^{(-i c + p) z} (i c + p - 2 i d \beta) F_1\left(-\frac{c + i p + 2 d \beta}{2 d}; -\beta, -\beta; -\frac{c + i p + 2 d (\beta - 1)}{2 d}; -\frac{b e^{2 i d z}}{2 a + b + 2 \sqrt{a (a + b)}}, -\frac{b e^{2 i d z}}{2 a + b - 2 \sqrt{a (a + b)}} \right) \right) \right)$$

Involving $e^{p z} \cos(e z) \cos(d z) (a + b \cos(c z))^{\beta}$

01.07.21.1863.01

$$\int e^{p z}\cos(e z)\cos(d z)\,(a+b\cos(c z))^{\beta}\,dz = -\frac{1}{4}\,i\left(\frac{e^{i c z}\,b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(\frac{e^{i c z}\,b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta}$$
$$\left(a+\frac{1}{2}\,b\,e^{-i c z}\left(1+e^{2 i c z}\right)\right)^{\beta}\left(\frac{e^{(i d+i e+p) z}\,F_1\!\left(\frac{d+e-i p-c\beta}{c};-\beta,-\beta;\frac{-\beta c+c+d+e-i p}{c};-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{d+e-i p-c\beta}-\right.$$
$$\frac{e^{(-i d+i e+p) z}\,F_1\!\left(-\frac{d-e+i p+c\beta}{c};-\beta,-\beta;\frac{-\beta c+c-d+e-i p}{c};-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{d-e+i p+c\beta}+$$
$$\frac{e^{(i d-i e+p) z}\,F_1\!\left(-\frac{-d+e+i p+c\beta}{c};-\beta,-\beta;\frac{-\beta c+c+d-e-i p}{c};-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{d-e-i p-c\beta}-$$
$$\left.\frac{e^{-i (d+e+i p) z}\,F_1\!\left(-\frac{d+e+i p+c\beta}{c};-\beta,-\beta;-\frac{d+e+i p+c(\beta-1)}{c};-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{d+e+i p+c\beta}\right)$$

Involving $e^{p z}\cos(e z)\cos(d z)\left(a+b\cos^2(c z)\right)^{\beta}$

01.07.21.1864.01

$$\int e^{p z}\cos(e z)\cos(d z)\left(a+b\cos^2(c z)\right)^{\beta}dz ==$$
$$-\frac{1}{4}\,i\left(\frac{e^{2 i c z}\,b}{2a+b-2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{e^{2 i c z}\,b}{2a+b+2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{1}{4}\,b\,e^{-2 i c z}\left(1+e^{2 i c z}\right)^2+a\right)^{\beta}$$
$$\left(\frac{1}{d+e-i p-2c\beta}\left(e^{(i d+i e+p) z}\,F_1\!\left(\frac{d+e-i p-2c\beta}{2c};-\beta,-\beta;\frac{-2\beta c+2c+d+e-i p}{2c};-\frac{b\,e^{2 i c z}}{2a+b+2\sqrt{a(a+b)}},\right.\right.\right.$$
$$\left.\left.-\frac{b\,e^{2 i c z}}{2a+b-2\sqrt{a(a+b)}}\right)\right)+\frac{1}{d-e-i p-2c\beta}\left(e^{(i d-i e+p) z}\,F_1\!\left(-\frac{-d+e+i p+2c\beta}{2c};-\beta,\right.\right.$$
$$\left.\left.-\beta;-\frac{-d+e+i p+2c(\beta-1)}{2c};-\frac{b\,e^{2 i c z}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2 i c z}}{2a+b-2\sqrt{a(a+b)}}\right)\right)-$$
$$\frac{1}{d-e+i p+2c\beta}\left(e^{(-i d+i e+p) z}\,F_1\!\left(-\frac{d-e+i p+2c\beta}{2c};-\beta,-\beta;-\frac{d-e+i p+2c(\beta-1)}{2c};\right.\right.$$
$$\left.\left.-\frac{b\,e^{2 i c z}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2 i c z}}{2a+b-2\sqrt{a(a+b)}}\right)\right)-\frac{1}{d+e+i p+2c\beta}\left(e^{-i (d+e+i p) z}\,F_1\!\left(\right.\right.$$
$$\left.\left.\left.-\frac{d+e+i p+2c\beta}{2c};-\beta,-\beta;-\frac{d+e+i p+2c(\beta-1)}{2c};-\frac{b\,e^{2 i c z}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2 i c z}}{2a+b-2\sqrt{a(a+b)}}\right)\right)\right)$$

Involving functions of the direct function, exponential and a power functions

Involving powers of the direct function, exponential and a power functions

Involving powers of cos, exp and power

Involving $z^{\alpha-1}\, e^{b z} \cos^{\nu}(a z)$

01.07.21.1865.01

$$\int z^n\, e^{b z} \cos^{\nu}(a z)\, dz = n!\, e^{b z} \cos^{\nu}(a z) \left(1 + e^{2 i a z}\right)^{-\nu} \sum_{p=0}^{n} \frac{(-1)^p z^{n-p}}{(n-p)!\,(b - i a \nu)^{p+1}}\; {}_{p+2}F_{p+1}\left(-\frac{i b + a \nu}{2 a}, \ldots, -\frac{i b + a \nu}{2 a}, -\nu; 1 - \frac{i b + a \nu}{2 a}, \ldots, 1 - \frac{i b + a \nu}{2 a}; -e^{2 i a z}\right) /; n \in \mathbb{N}$$

01.07.21.1866.01

$$\int z^{\alpha-1}\, e^{b z} \cos^{\nu}(a z)\, dz = -2^{-\nu} \binom{\nu}{\frac{\nu}{2}} E_{1-\alpha}(-b z)\,(1 - \nu \bmod 2)\, z^{\alpha} - 2^{-\nu} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(E_{1-\alpha}(-(b + a i (\nu - 2k))\, z) + E_{1-\alpha}(-(b - i a (\nu - 2k))\, z)\right) /; \nu \in \mathbb{N}$$

01.07.21.1867.01

$$\int z^n\, e^{p z} \cos^{\nu}(a z)\, dz = -2^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} E_{-n}(-p z)\,(1 - \nu \bmod 2) - 2^{-\nu} z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(E_{-n}((i a (\nu - 2s) - p)\, z) + E_{-n}((-p - i a (\nu - 2s))\, z)\right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1868.01

$$\int z^n\, e^{p z} \cos^{\nu}(a z)\, dz = -2^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\,(-p)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}(p z)}{(-n-1)!} + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^k}{(n+1)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^k}{(n+1)_{k-n}}\right) - 2^{-\nu} z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\frac{(-1)^{-n} \operatorname{Ei}(-(i a (\nu - 2s) - p)\, z)}{(-n-1)!} + e^{-(i a (\nu - 2s) - p) z} \sum_{k=0}^{n} \frac{((i a (\nu - 2s) - p)\, z)^k}{(n+1)_{k-n}} - e^{-(i a (\nu - 2s) - p) z} \sum_{k=n+1}^{-1} \frac{((i a (\nu - 2s) - p)\, z)^k}{(n+1)_{k-n}}\right) ((i a (\nu - 2s) - p)\, z)^{-n-1} + ((-p - i a (\nu - 2s))\, z)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}(-(-p - i a (\nu - 2s))\, z)}{(-n-1)!} + e^{-(-p - i a (\nu - 2s))\, z} \sum_{k=0}^{n} \frac{((-p - i a (\nu - 2s))\, z)^k}{(n+1)_{k-n}} - e^{-(-p - i a (\nu - 2s))\, z} \sum_{k=n+1}^{-1} \frac{((-p - i a (\nu - 2s))\, z)^k}{(n+1)_{k-n}}\right)\right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1869.01

$$\int z^{n+\frac{1}{2}} e^{p z} \cos^{\nu}(a z)\, dz = -2^{-\nu} \binom{\nu}{\frac{\nu}{2}} E_{-n-\frac{1}{2}}(-p z)\,(1-\nu \bmod 2)\, z^{n+\frac{3}{2}} - 2^{-\nu} z^{n+\frac{3}{2}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(E_{-n-\frac{1}{2}}((i a (\nu - 2 s) - p) z) + E_{-n-\frac{1}{2}}((-p - i a (\nu - 2 s)) z) \right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1870.01

$$\int z^{n+\frac{1}{2}} e^{p z} \cos^{\nu}(a z)\, dz = -2^{-\nu} (-p)^{-n-2} z^{-\frac{1}{2}} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sqrt{-p z} \left(\text{erfc}\left(\sqrt{-p z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) - 2^{-\nu} z^{n+\frac{3}{2}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\text{erfc}\left(\sqrt{(i a (\nu-2 s)-p) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{-(i a (\nu-2 s)-p) z} \sum_{k=0}^{n} \frac{((i a (\nu-2 s)-p) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{-(i a (\nu-2 s)-p) z} \sum_{k=n+1}^{-1} \frac{((i a (\nu-2 s)-p) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) ((i a (\nu-2 s)-p) z)^{-n-\frac{3}{2}} + ((-p - i a (\nu-2 s)) z)^{-n-\frac{3}{2}} \left(\text{erfc}\left(\sqrt{(-p-i a (\nu-2 s)) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{-(-p-i a (\nu-2 s)) z} \sum_{k=0}^{n} \frac{((-p-i a (\nu-2 s)) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{-(-p-i a (\nu-2 s)) z} \sum_{k=n+1}^{-1} \frac{((-p-i a (\nu-2 s)) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) \right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z+e} \cos^{\nu}(a z)$

01.07.21.1871.01

$$\int z^n e^{b z+e} \cos^{\nu}(a z)\, dz = n!\, e^{b z+e} \cos^{\nu}(a z) \left(1 + e^{2 i a z}\right)^{-\nu} \sum_{p=0}^{n} \frac{(-1)^p z^{n-p}}{(n-p)!\,(b - i a \nu)^{p+1}} \, {}_{p+2}F_{p+1}\left(-\frac{i b + a \nu}{2 a}, \ldots, -\frac{i b + a \nu}{2 a}, -\nu; 1 - \frac{i b + a \nu}{2 a}, \ldots, 1 - \frac{i b + a \nu}{2 a}; -e^{2 i a z}\right) /; n \in \mathbb{N}$$

01.07.21.1872.01

$$\int z^{\alpha-1} e^{e+b z} \cos^{\nu}(a z)\, dz = -2^{-\nu} e^{e} \binom{\nu}{\frac{\nu}{2}} E_{1-\alpha}(-b z)\,(1-\nu \bmod 2)\, z^{\alpha} - 2^{-\nu} z^{\alpha} e^{e} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(E_{1-\alpha}(-(b + a i (\nu - 2 k)) z) + E_{1-\alpha}(-(b - i a (\nu - 2 k)) z) \right) /; \nu \in \mathbb{N}$$

01.07.21.1873.01

$$\int z^n e^{p z+e} \cos^\nu(a z)\, dz = -2^{-\nu} e^e z^{n+1} \binom{\nu}{\frac{\nu}{2}} E_{-n}(-p z)\,(1-\nu \bmod 2) - 2^{-\nu} z^{n+1} e^e \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} (E_{-n}((i a(\nu-2s)-p) z) + E_{-n}((-p-i a(\nu-2s)) z)) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1874.01

$$\int z^n e^{e+p z} \cos^\nu(a z)\, dz = -2^{-\nu} e^e \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{(-1)^{-n} \operatorname{Ei}(p z)}{(-n-1)!} + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^k}{(n+1)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^k}{(n+1)_{k-n}} \right) (-p)^{-n-1} - 2^{-\nu} z^{n+1} e^e \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\frac{(-1)^n \operatorname{Ei}(-(i a(\nu-2s)-p) z)}{(-n-1)!} + e^{-(i a(\nu-2s)-p) z} \sum_{k=0}^{n} \frac{((i a(\nu-2s)-p) z)^k}{(n+1)_{k-n}} - e^{-(i a(\nu-2s)-p) z} \sum_{k=n+1}^{-1} \frac{((i a(\nu-2s)-p) z)^k}{(n+1)_{k-n}} \right) ((i a(\nu-2s)-p) z)^{-n-1} + ((-p-i a(\nu-2s)) z)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}(-(-p-i a(\nu-2s)) z)}{(-n-1)!} + e^{-(-p-i a(\nu-2s)) z} \sum_{k=0}^{n} \frac{((-p-i a(\nu-2s)) z)^k}{(n+1)_{k-n}} - e^{-(-p-i a(\nu-2s)) z} \sum_{k=n+1}^{-1} \frac{((-p-i a(\nu-2s)) z)^k}{(n+1)_{k-n}} \right) \right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1875.01

$$\int z^{n+\frac{1}{2}} e^{p z+e} \cos^\nu(a z)\, dz = -2^{-\nu} e^e \binom{\nu}{\frac{\nu}{2}} E_{-n-\frac{1}{2}}(-p z)\,(1-\nu \bmod 2)\, z^{n+\frac{3}{2}} - 2^{-\nu} z^{n+\frac{3}{2}} e^e \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(E_{-n-\frac{1}{2}}((i a(\nu-2s)-p) z) + E_{-n-\frac{1}{2}}((-p-i a(\nu-2s)) z) \right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1876.01

$$\int z^{n+\frac{1}{2}}\, e^{e+p z} \cos^{\nu}(a z)\, dz = -2^{-\nu} e^{e} (-p)^{-n-2} z^{-\frac{1}{2}} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\operatorname{erfc}\left(\sqrt{-p z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right) \sqrt{-p z} - 2^{-\nu} z^{n+\frac{3}{2}} e^{e} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\operatorname{erfc}\left(\sqrt{(i a (\nu-2 s)-p) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{-(i a (\nu-2 s)-p) z} \sum_{k=0}^{n} \frac{((i a (\nu-2 s)-p) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{-(i a (\nu-2 s)-p) z} \sum_{k=n+1}^{-1} \frac{((i a (\nu-2 s)-p) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right) ((i a (\nu-2 s)-p) z)^{-n-\frac{3}{2}} + ((-p-i a (\nu-2 s)) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(-p-i a (\nu-2 s)) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{-(-p-i a (\nu-2 s)) z} \sum_{k=0}^{n} \frac{((-p-i a (\nu-2 s)) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{-(-p-i a (\nu-2 s)) z} \sum_{k=n+1}^{-1} \frac{((-p-i a (\nu-2 s)) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right)\right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \cos^{\nu}(a z+b)$

01.07.21.1877.01

$$\int z^{n} e^{p z} \cos^{\nu}(a z+b)\, dz = n!\, e^{p z} \cos^{\nu}(b+a z) \left(1+e^{2 i (b+a z)}\right)^{-\nu} \sum_{j=0}^{n} \frac{(-1)^{j} z^{n-j}}{(n-j)!\, (p-i a \nu)^{j+1}} \, {}_{j+2}F_{j+1}\left(-\frac{i p+a \nu}{2 a}, \ldots, -\frac{i p+a \nu}{2 a}, -\nu; 1-\frac{i p+a \nu}{2 a}, \ldots, 1-\frac{i p+a \nu}{2 a}; -e^{2 i (b+a z)}\right) /; n \in \mathbb{N}^{+}$$

01.07.21.1878.01

$$\int z^{\alpha-1} e^{p z} \cos^{\nu}(b+a z)\, dz = -2^{-\nu} \binom{\nu}{\frac{\nu}{2}} E_{1-\alpha}(-p z) (1-\nu \bmod 2) z^{\alpha} - 2^{-\nu} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} e^{-i b (2 k+\nu)} \left(e^{2 i b \nu} E_{1-\alpha}(-(p+a i (\nu-2 k)) z) + e^{4 i b k} E_{1-\alpha}(-(p-i a (\nu-2 k)) z)\right) /; \nu \in \mathbb{N}$$

01.07.21.1879.01

$$\int z^{n} e^{p z} \cos^{\nu}(a z+b)\, dz = -2^{-\nu} \binom{\nu}{\frac{\nu}{2}} E_{-n}(-p z) (1-\nu \bmod 2) z^{n+1} - 2^{-\nu} z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i b (2 s+\nu)} \binom{\nu}{s} \left(e^{4 i b s} E_{-n}((i a (\nu-2 s)-p) z) + e^{2 i b \nu} E_{-n}((-p-i a (\nu-2 s)) z)\right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1880.01

$$\int z^n e^{p z} \cos^{\nu}(b + a z)\, dz = -2^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{(-1)^{-n} \operatorname{Ei}(p z)}{(-n-1)!} + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^k}{(n+1)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^k}{(n+1)_{k-n}} \right) (-p)^{-n-1} - 2^{-\nu} z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i b (2 s+\nu)} \binom{\nu}{s} \Bigg(e^{i 4 b s} \left(\frac{(-1)^{-n} \operatorname{Ei}(-(i a (\nu - 2 s) - p) z)}{(-n-1)!} + e^{-(i a (\nu-2 s)-p) z} \sum_{k=0}^{n} \frac{((i a (\nu - 2 s) - p) z)^k}{(n+1)_{k-n}} - e^{-(i a (\nu-2 s)-p) z} \sum_{k=n+1}^{-1} \frac{((i a (\nu - 2 s) - p) z)^k}{(n+1)_{k-n}} \right) ((i a (\nu - 2 s) - p) z)^{-n-1} + e^{2 i b \nu} ((-p - i a (\nu - 2 s)) z)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}(-(-p - i a (\nu - 2 s)) z)}{(-n-1)!} + e^{-(-p-i a (\nu-2 s)) z} \sum_{k=0}^{n} \frac{((-p - i a (\nu - 2 s)) z)^k}{(n+1)_{k-n}} - e^{-(-p-i a (\nu-2 s)) z} \sum_{k=n+1}^{-1} \frac{((-p - i a (\nu - 2 s)) z)^k}{(n+1)_{k-n}} \right) \Bigg) /;\ n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1881.01

$$\int z^{n+\frac{1}{2}} e^{p z} \cos^{\nu}(a z + b)\, dz = -2^{-\nu} \binom{\nu}{\frac{\nu}{2}} E_{-n-\frac{1}{2}}(-p z) (1 - \nu \bmod 2) z^{n+\frac{3}{2}} - 2^{-\nu} z^{n+\frac{3}{2}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i b (2 s+\nu)} \binom{\nu}{s} \left(e^{4 i\, b s} E_{-n-\frac{1}{2}}((i a (\nu - 2 s) - p) z) + e^{2 i b \nu} E_{-n-\frac{1}{2}}((-p - i a (\nu - 2 s)) z) \right) /;\ n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1882.01

$$\int z^{n+\frac{1}{2}} e^{p z} \cos^{\nu}(a z + b)\, dz = -2^{-\nu} (-p)^{-n-2} z^{-\frac{1}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\operatorname{erfc}\left(\sqrt{-p z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) \sqrt{-p z} - 2^{-\nu} z^{n+\frac{3}{2}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i b (2 s+\nu)} \binom{\nu}{s} \Bigg(e^{4 i\, b s} \left(\operatorname{erfc}\left(\sqrt{(i a (\nu - 2 s) - p) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{-(i a (\nu-2 s)-p) z} \sum_{k=0}^{n} \frac{((i a (\nu - 2 s) - p) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{-(i a (\nu-2 s)-p) z} \sum_{k=n+1}^{-1} \frac{((i a (\nu - 2 s) - p) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) ((i a (\nu - 2 s) - p) z)^{-n-\frac{3}{2}} + e^{2 i b \nu} ((-p - i a (\nu - 2 s)) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(-p - i a (\nu - 2 s)) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{-(-p-i a (\nu-2 s)) z} \sum_{k=0}^{n} \frac{((-p - i a (\nu - 2 s)) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{-(-p-i a (\nu-2 s)) z} \sum_{k=n+1}^{-1} \frac{((-p - i a (\nu - 2 s)) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) \Bigg) /;\ n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z+e} \cos^{\nu}(a z + b)$

01.07.21.1883.01

$$\int z^n e^{p z+e} \cos^\nu(a z+b)\, dz == n!\, e^{p z+e} \cos^\nu(b+a z) \left(1+e^{2 i (b+a z)}\right)^{-\nu} \sum_{j=0}^n \frac{(-1)^j z^{n-j}}{(n-j)!\, (p-i a \nu)^{j+1}}\, {}_{j+2}F_{j+1}\left(-\frac{i p+a \nu}{2 a}, \ldots, -\frac{i p+a \nu}{2 a}, -\nu; 1-\frac{i p+a \nu}{2 a}, \ldots, 1-\frac{i p+a \nu}{2 a}; -e^{2 i (b+a z)}\right) /; n \in \mathbb{N}^+$$

01.07.21.1884.01

$$\int z^{\alpha-1} e^{p z+e} \cos^\nu(b+a z)\, dz == -2^{-\nu} e^e \binom{\nu}{\frac{\nu}{2}} E_{1-\alpha}(-p z)\, (1-\nu \bmod 2)\, z^\alpha - 2^{-\nu} z^\alpha \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{k} e^{e-i b (2 k+\nu)} \left(e^{2 i b \nu} E_{1-\alpha}(-(p+a i (\nu-2 k)) z) + e^{4 i\ b k} E_{1-\alpha}(-(p-i a (\nu-2 k)) z)\right) /; \nu \in \mathbb{N}$$

01.07.21.1885.01

$$\int z^n e^{e+p z} \cos^\nu(b+a z)\, dz == -2^{-\nu} e^e \binom{\nu}{\frac{\nu}{2}} E_{-n}(-p z)\, (1-\nu \bmod 2)\, z^{n+1} - 2^{-\nu} \left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{e-i b (2 s+\nu)} \binom{\nu}{s} \left(e^{4 i b s} E_{-n}((i a (\nu-2 s)-p) z) + e^{2 i b \nu} E_{-n}((-p-i a (\nu-2 s)) z)\right)\right) z^{n+1} /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1886.01

$$\int z^n e^{e+p z} \cos^\nu(b+a z)\, dz == -2^{-\nu} e^e \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{(-1)^{-n} \operatorname{Ei}(p z)}{(-n-1)!} + e^{p z} \sum_{k=0}^n \frac{(-p z)^k}{(n+1)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^k}{(n+1)_{k-n}}\right) (-p)^{-n-1} - 2^{-\nu} z^{n+1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{e-i b (2 s+\nu)} \binom{\nu}{s} \Bigg(e^{4 i b s} \left(\frac{(-1)^n \operatorname{Ei}(-(i a (\nu-2 s)-p) z)}{(-n-1)!} + e^{-(i a (\nu-2 s)-p) z} \sum_{k=0}^n \frac{((i a (\nu-2 s)-p) z)^k}{(n+1)_{k-n}} - e^{-(i a (\nu-2 s)-p) z} \sum_{k=n+1}^{-1} \frac{((i a (\nu-2 s)-p) z)^k}{(n+1)_{k-n}}\right) ((i a (\nu-2 s)-p) z)^{-n-1} + e^{2 i b \nu} ((-p-i a (\nu-2 s)) z)^{-n-1} \left(\frac{(-1)^n \operatorname{Ei}(-(-p-i a (\nu-2 s)) z)}{(-n-1)!} + e^{-(-p-i a (\nu-2 s)) z} \sum_{k=0}^n \frac{((-p-i a (\nu-2 s)) z)^k}{(n+1)_{k-n}} - e^{-(-p-i a (\nu-2 s)) z} \sum_{k=n+1}^{-1} \frac{((-p-i a (\nu-2 s)) z)^k}{(n+1)_{k-n}}\right)\Bigg) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1887.01

$$\int z^{n+\frac{1}{2}} e^{p z+e} \cos^\nu(a z+b)\, dz == -2^{-\nu} e^e \binom{\nu}{\frac{\nu}{2}} E_{-n-\frac{1}{2}}(-p z)\, (1-\nu \bmod 2)\, z^{n+\frac{3}{2}} - 2^{-\nu} z^{n+\frac{3}{2}} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{e-i b (2 s+\nu)} \binom{\nu}{s} \left(e^{4 i\ b s} E_{-n-\frac{1}{2}}((i a (\nu-2 s)-p) z) + e^{2 i b \nu} E_{-n-\frac{1}{2}}((-p-i a (\nu-2 s)) z)\right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.07.21.1888.01

$$\int z^{n+\frac{1}{2}} e^{p z+e} \cos^{v}(a z+b) \, dz = -2^{-v} (-p)^{-n-2} z^{-\frac{1}{2}} e^{e} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\operatorname{erfc}\left(\sqrt{-p z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) \sqrt{-p z} - 2^{-v} z^{n+\frac{3}{2}} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{e-i b (2 s+v)} \binom{v}{s} \left(e^{4 i b s} \left(\operatorname{erfc}\left(\sqrt{(i a (v-2 s)-p) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{-(i a (v-2 s)-p) z} \sum_{k=0}^{n} \frac{((i a (v-2 s)-p) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{-(i a (v-2 s)-p) z} \sum_{k=n+1}^{-1} \frac{((i a (v-2 s)-p) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) ((i a (v-2 s)-p) z)^{-n-\frac{3}{2}} + e^{2 i b v} ((-p-i a (v-2 s)) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(-p-i a (v-2 s)) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{-(-p-i a (v-2 s)) z} \sum_{k=0}^{n} \frac{((-p-i a (v-2 s)) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{-(-p-i a (v-2 s)) z} \sum_{k=n+1}^{-1} \frac{((-p-i a (v-2 s)) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) \right) /; n \in \mathbb{Z} \land v \in \mathbb{N}$$

Involving $z^n e^{b z^r} \cos^v(c z)$

01.07.21.1889.01

$$\int z^n e^{b z^2} \cos^v(c z) \, dz = 2^{-v-1} \left(z^{n+1} \left(-b z^2\right)^{\frac{1}{2}(-n-1)} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (v \bmod 2 - 1) - b^{-n-1} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{\frac{c^2 (v-2k)^2}{4 b}} \binom{v}{k} \left(\sum_{q=0}^{n} \left(i c \left(k - \frac{v}{2}\right) \right)^{n-q} \left(\frac{(2 c k - c v + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} (c i (v-2k) + 2 b z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(2 c k - c v + 2 i b z)^2}{4 b}\right) + \sum_{q=0}^{n} 2^{q-n} (i c (v-2k))^{n-q} \left(\frac{(c (v-2k) + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} (c i (2k - v) + 2 b z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(c (v-2k) + 2 i b z)^2}{4 b}\right) \right) \right) /; n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

01.07.21.1890.01

$$\int z^n e^{b\sqrt{z}} \cos^v(c\,z)\,dz = 2^{-v-1}\left(4\binom{v}{\frac{v}{2}}\Gamma\left(2(n+1),\,-b\sqrt{z}\right)(v \bmod 2-1)\,b^{-2(n+1)} + 4^{-n}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{\frac{i b^2}{8cs-4cv}}\left(-c^2(v-2s)^2\right)^{-2n-1}\binom{v}{s}\left(e^{\frac{i b^2}{2cv-4cs}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k b^{-h-k+2n}\left(b+2\,c\,i\,(v-2s)\sqrt{z}\right)^{h+k}\left(\frac{i\left(b+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2\,c\,i\,(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)+2\,c\,i\sqrt{-\frac{i\left(b+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(2s-v)}}\,(v-2s)\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)\right)\right)\right.\right.$$

$$\left.\left.(i\,c\,(2s-v))^{2n}+(i\,c\,(v-2s))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k b^{-h-k+2n}\left(b-2\,i\,c\,(v-2s)\sqrt{z}\right)^{h+k}\left(-\frac{i\left(b-2\,i\,c\,(v-2s)\sqrt{z}\right)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b-2\,i\,c\,(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b-2\,i\,c\,(v-2s)\sqrt{z}\right)^2}{4\,c\,(v-2s)}\right)-2\,i\,c\,(v-2s)\sqrt{-\frac{i\left(b-2\,i\,c\,(v-2s)\sqrt{z}\right)^2}{c\,(v-2s)}}\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b-2\,i\,c\,(v-2s)\sqrt{z}\right)^2}{4\,c\,(v-2s)}\right)\right)\right)\right)\right) /;\ n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\, e^{b\,z^r+e} \cos^v(c\,z)$

01.07.21.1891.01

$$\int z^n e^{b z^2+e} \cos^v(c z)\, dz = -2^{-v-1} e^e z^{n+1} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1 - v \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{e-\frac{(2 i c s - i c v)^2}{4 b}} \left(\sum_{q=0}^{n} 2^{q-n} (i c v - 2 i c s)^{n-q} (2 i c s - i c v + 2 b z)^{q+1} \left(-\frac{(2 i c s - i c v + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 i c s - i c v + 2 b z)^2}{4 b}\right) \right) b^{-n-1} + e^{e-\frac{(i c v - 2 i c s)^2}{4 b}} \left(\sum_{q=0}^{n} 2^{q-n} (2 i c s - i c v)^{n-q} (c i (v - 2 s) + 2 b z)^{q+1} \left(-\frac{(c i (v - 2 s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c i (v - 2 s) + 2 b z)^2}{4 b}\right) \right) b^{-n-1} \right) /;\ n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

01.07.21.1892.01

$$\int z^n e^{\sqrt{z}\, b+e} \cos^\nu(c\, z)\, dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i b^2}{4 c (2s-\nu)}+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2 c\, i\, (2s-\nu) \sqrt{z}\right)^{h+k} \left(\frac{i \left(b + 2 c\, i\, (2s-\nu)\sqrt{z}\right)^2}{c\,(2s-\nu)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 c\, i\, (2s-\nu)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+2 c\, i\,(2s-\nu)\sqrt{z}\right)^2}{4 c\,(2s-\nu)}\right) + 2 c\, i\, (2s-\nu) \sqrt{\frac{i\left(b+2 c\, i\,(2s-\nu)\sqrt{z}\right)^2}{c\,(2s-\nu)}}\ \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+2 c\, i\,(2s-\nu)\sqrt{z}\right)^2}{4 c\,(2s-\nu)}\right) \right) \right) (i\, c\,(2s-\nu))^{-2n-2} + e^{\frac{i b^2}{4 c (\nu-2s)}+e} (i\, c\,(\nu-2s))^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2 c\, i\, (\nu-2s)\sqrt{z}\right)^{h+k} \left(\frac{i\left(b+2 c\, i\,(\nu-2s)\sqrt{z}\right)^2}{c\,(\nu-2s)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 c\, i\, (\nu-2s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+2 c\, i\,(\nu-2s)\sqrt{z}\right)^2}{4 c\,(\nu-2s)}\right) + 2 c\, i\, (\nu-2s) \sqrt{\frac{i\left(b+2 c\, i\,(\nu-2s)\sqrt{z}\right)^2}{c\,(\nu-2s)}}\ \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+2 c\, i\,(\nu-2s)\sqrt{z}\right)^2}{4 c\,(\nu-2s)}\right) \right) \right) - 2^{1-\nu} b^{-2(n+1)} e^e \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1 - \nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + d z} \cos^\nu(c\, z)$

01.07.21.1893.01

$$\int z^n e^{b z^2+d z} \cos^\nu(c z)\, dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2 b z)^{q+1} \left(-\frac{(d+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2 b z)^2}{4 b}\right) - e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{(d+c i(\nu-2s))^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (-d+2 i c s - i c \nu)^{n-q} (d - 2 i c s + i c \nu + 2 b z)^{q+1} \left(-\frac{(d-2 i c s + i c \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-2 i c s+ i c \nu+2 b z)^2}{4 b}\right) + e^{-\frac{(d+2 i c s - i c \nu)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (i c (\nu-2s)-d)^{n-q} (d+2 i c s - i c \nu + 2 b z)^{q+1} \left(-\frac{(d+2 i c s - i c \nu+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2 i c s - i c \nu + 2 b z)^2}{4 b}\right) \right) \right) /; n \in \mathbb{N} \wedge \nu \in \mathbb{N}^+$$

01.07.21.1894.01

$$\int z^n e^{\sqrt{z}\, b + d z} \cos^\nu(c z)\, dz = 2^{-2n-\nu-1} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{b^2}{-4d-8 i c s+4 i c \nu}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d+2 i c s - i c \nu)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d+2 i c s - i c \nu)\sqrt{z}\right)^2}{d+2 i c s - i c \nu}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2(d+2 i c s - i c \nu)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d+2 i c s - i c \nu)\sqrt{z}\right)^2}{4(d+2 i c s - i c \nu)}\right) + 2 \sqrt{-\frac{\left(b+2(d+2 i c s - i c \nu)\sqrt{z}\right)^2}{d+2 i c s - i c \nu}}\, (d+2 i c s - i c \nu)\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d+2 i c s - i c \nu)\sqrt{z}\right)^2}{4(d+2 i c s - i c \nu)}\right) \right) \right) (d+2 i c s - i c \nu)^{-2(n+1)} + e^{-\frac{b^2}{4(d+c i(\nu-2s))}} (d+c i(\nu-2s))^{-2(n+1)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d-2 i c s + i c \nu)\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b+2\left(d-2\,i\,c\,s+i\,c\,v\right)\sqrt{z}\right)^2}{d+c\,i\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2\left(d-2\,i\,c\,s+i\,c\,v\right)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{\left(b+2\left(d-2\,i\,c\,s+i\,c\,v\right)\sqrt{z}\right)^2}{4\,(d+c\,i\,(v-2\,s))}\right)+2\sqrt{-\frac{\left(b+2\left(d-2\,i\,c\,s+i\,c\,v\right)\sqrt{z}\right)^2}{d+c\,i\,(v-2\,s)}}$$

$$\left.\left.(d+c\,i\,(v-2\,s))\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{\left(b+2\left(d-2\,i\,c\,s+i\,c\,v\right)\sqrt{z}\right)^2}{4\,(d+c\,i\,(v-2\,s))}\right)\right)\right)-$$

$$d^{-2(n+1)}\,e^{-\frac{b^2}{4d}}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,b^{-h-k+2n}\left(b+2\,d\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(b\left(b+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(b+2\,d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\, e^{b\,z^r+d\,z+e}\,\cos^v(c\,z)$

01.07.21.1895.01

$$\int z^n e^{b z^2+d z+e} \cos^\nu(c z)\, dz = 2^{-\nu-1} b^{-n-1} e^{e-\frac{d^2}{4b}} \left(\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) + e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(-e^{-\frac{(d-2ics+ic\nu)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (-d+2ics-ic\nu)^{n-q} (d-2ics+ic\nu+2bz)^{q+1} \left(-\frac{(d-2ics+ic\nu+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{(d-2ics+ic\nu+2bz)^2}{4b}\right) - e^{-\frac{(d+2ics-ic\nu)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (-d-2ics+ic\nu)^{n-q} (d+2ics-ic\nu+2bz)^{q+1} \left(-\frac{(d+2ics-ic\nu+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{(d+2ics-ic\nu+2bz)^2}{4b}\right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1896.01

$$\int z^n e^{\sqrt{z}\, b+d z+e} \cos^\nu(c z)\, dz = 2^{-2n-\nu-1} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{e-\frac{b^2}{4(d+ci(\nu-2s))}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d+ci(\nu-2s))\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d+ci(\nu-2s))\sqrt{z}\right)^2}{d+ci(\nu-2s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2(d+ci(\nu-2s))\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d+ci(\nu-2s))\sqrt{z}\right)^2}{4(d+ci(\nu-2s))}\right) + 2\sqrt{-\frac{\left(b+2(d+ci(\nu-2s))\sqrt{z}\right)^2}{d+ci(\nu-2s)}}\, (d+ci(\nu-2s))\, \Gamma\!\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d+ci(\nu-2s))\sqrt{z}\right)^2}{4(d+ci(\nu-2s))}\right) \right) \right) (d+ci(\nu-2s))^{-2(n+1)} + e^{\frac{b^2}{-4d-8ics+4ic\nu}+e} (d-ic(\nu-2s))^{-2(n+1)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d-ic(\nu-2s))\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b+2\,(d-i\,c\,(v-2\,s))\,\sqrt{z}\right)^2}{d-i\,c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2\,(d-i\,c\,(v-2\,s))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(b+2\,(d-i\,c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d-i\,c\,(v-2\,s))}\right)+2\,\sqrt{-\frac{\left(b+2\,(d-i\,c\,(v-2\,s))\,\sqrt{z}\right)^2}{d-i\,c\,(v-2\,s)}}$$

$$(d-i\,c\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(b+2\,(d-i\,c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d-i\,c\,(v-2\,s))}\right)\Bigg)\Bigg)-$$

$$d^{-2\,(n+1)}\,e^{e-\frac{b^2}{4\,d}}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,b^{-h-k+2\,n}\left(b+2\,d\,\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\,\sqrt{-\frac{\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\,e^{b\,z^r}\cos^v(f\,z+g)$

01.07.21.1897.01

$$\int z^n e^{b z^2} \cos^\nu(f z+g)\, dz = -2^{-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1-\nu \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{-\frac{(2 i f s - i f \nu)^2}{4 b} + g i (2 s - \nu)} \left(\sum_{q=0}^{n} 2^{q-n} (i f \nu - 2 i f s)^{n-q} (2 i f s - i f \nu + 2 b z)^{q+1} \left(-\frac{(2 i f s - i f \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 i f s - i f \nu + 2 b z)^2}{4 b}\right) \right) b^{-n-1} + e^{-\frac{(i f \nu - 2 i f s)^2}{4 b} + g i (\nu - 2 s)} \left(\sum_{q=0}^{n} 2^{q-n} (2 i f s - i f \nu)^{n-q} (f i (\nu - 2 s) + 2 b z)^{q+1} \left(-\frac{(f i (\nu - 2 s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f i (\nu - 2 s) + 2 b z)^2}{4 b}\right) \right) b^{-n-1} \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1898.01

$$\int z^n e^{\sqrt{z}\, b} \cos^v(f z + g)\, dz = 2^{-2n-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{\frac{i b^2}{4 f (2s-v)} + g i (2s-v)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2 f i (2s-v) \sqrt{z}\right)^{h+k} \left(\frac{i \left(b + 2 f i (2s-v) \sqrt{z}\right)^2}{f (2s-v)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 f i (2s-v) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b + 2 f i (2s-v) \sqrt{z}\right)^2}{4 f (2s-v)} \right) + 2 f i (2s-v) \sqrt{\frac{i \left(b + 2 f i (2s-v) \sqrt{z}\right)^2}{f (2s-v)}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b + 2 f i (2s-v) \sqrt{z}\right)^2}{4 f (2s-v)} \right) \right) \right) (i f (2s-v))^{-2n-2} + e^{\frac{i b^2}{4 f (v-2s)} + g i (v-2s)} (i f (v-2s))^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2 f i (v-2s) \sqrt{z}\right)^{h+k} \left(\frac{i \left(b + 2 f i (v-2s) \sqrt{z}\right)^2}{f (v-2s)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 f i (v-2s) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b + 2 f i (v-2s) \sqrt{z}\right)^2}{4 f (v-2s)} \right) + 2 f i (v-2s) \sqrt{\frac{i \left(b + 2 f i (v-2s) \sqrt{z}\right)^2}{f (v-2s)}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b + 2 f i (v-2s) \sqrt{z}\right)^2}{4 f (v-2s)} \right) \right) \right) - 2^{1-v} b^{-2(n+1)} \binom{v}{\frac{v}{2}} \Gamma\left(2(n+1), -b \sqrt{z}\right) (1 - v \bmod 2) \;/;\; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + e} \cos^v(f z + g)$

01.07.21.1899.01

$$\int z^n e^{b z^2+e} \cos^v(f z+g)\, dz = -2^{-v-1} e^e z^{n+1} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1-v \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-v-1} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} \left(e^{-\frac{(2 i f s-i f v)^2}{4 b}+e+g i (2 s-v)} \left(\sum_{q=0}^{n} 2^{q-n} (i f v-2 i f s)^{n-q} (2 i f s-i f v+2 b z)^{q+1} \left(-\frac{(2 i f s-i f v+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 i f s-i f v+2 b z)^2}{4 b}\right)\right) b^{-n-1} + e^{-\frac{(i f v-2 i f s)^2}{4 b}+e+g i (v-2 s)} \left(\sum_{q=0}^{n} 2^{q-n} (2 i f s-i f v)^{n-q} (f i (v-2 s)+2 b z)^{q+1} \left(-\frac{(f i (v-2 s)+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f i (v-2 s)+2 b z)^2}{4 b}\right)\right) b^{-n-1}\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.07.21.1900.01

$$\int z^n e^{\sqrt{z}\, b+e} \cos^\nu(f z+g)\, dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{\frac{i b^2}{4 f (2s-\nu)}+e+g i (2s-\nu)} \left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2 f i (2s-\nu)\sqrt{z}\right)^{h+k} \left(\frac{i \left(b+2 f i (2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(b\left(b+2 f i (2s-\nu)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+2 f i (2s-\nu)\sqrt{z}\right)^2}{4 f (2s-\nu)}\right) + 2 f i (2s-\nu) \sqrt{\frac{i\left(b+2 f i (2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)}}\ \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+2 f i (2s-\nu)\sqrt{z}\right)^2}{4 f (2s-\nu)}\right)\right)\right) (i f (2s-\nu))^{-2n-2} + e^{\frac{i b^2}{4 f (\nu-2s)}+e+g i (\nu-2s)} (i f (\nu-2s))^{-2n-2} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2 f i (\nu-2s)\sqrt{z}\right)^{h+k} \left(\frac{i\left(b+2 f i (\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(b\left(b+2 f i (\nu-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+2 f i (\nu-2s)\sqrt{z}\right)^2}{4 f (\nu-2s)}\right) + 2 f i (\nu-2s) \sqrt{\frac{i\left(b+2 f i (\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}}\ \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+2 f i (\nu-2s)\sqrt{z}\right)^2}{4 f (\nu-2s)}\right)\right)\right) - 2^{1-\nu} b^{-2(n+1)} e^e \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1-\nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + d z} \cos^\nu(f z+g)$

01.07.21.1901.01

$$\int z^n e^{b z^2+d z} \cos^{\nu}(f z+g)\, dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2-1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{(d+2 i f s-i f \nu)^2}{4b}+g i (2s-\nu)} \sum_{q=0}^{n} 2^{q-n} (-d-2 i f s+i f \nu)^{n-q} (d+2 i f s-i f \nu+2bz)^{q+1} \left(-\frac{(d+2 i f s-i f \nu+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2 i f s-i f \nu+2bz)^2}{4b}\right) + e^{-\frac{(d-2 i f s+i f \nu)^2}{4b}+g i (\nu-2s)} \sum_{q=0}^{n} 2^{q-n} (-d+2 i f s-i f \nu)^{n-q} (d+f i(\nu-2s)+2bz)^{q+1} \left(-\frac{(d+f i(\nu-2s)+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f i(\nu-2s)+2bz)^2}{4b}\right)\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1902.01

$$\int z^n e^{\sqrt{z}\, b+d z} \cos^{\nu}(f z+g)\, dz = 2^{-2n-\nu-1} e^{-\frac{b^2}{4d}} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} +$$

$$2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{b^2}{4(d+f i(2s-\nu))}+g i(2s-\nu)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d+f i(2s-\nu))\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d+f i(2s-\nu))\sqrt{z}\right)^2}{d+f i(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2(d+f i(2s-\nu))\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d+f i(2s-\nu))\sqrt{z}\right)^2}{4(d+f i(2s-\nu))}\right) + 2\sqrt{-\frac{\left(b+2(d+f i(2s-\nu))\sqrt{z}\right)^2}{d+f i(2s-\nu)}}\right.\right.\right.$$

$$(d+f\,i\,(2s-v))\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{\left(b+2\,(d+f\,i\,(2s-v))\sqrt{z}\right)^2}{4\,(d+f\,i\,(2s-v))}\right)\Bigg)\Bigg)(d+f\,i\,(2s-v))^{-2n-2}+$$

$$e^{-\frac{b^2}{4\,(d+f\,i\,(v-2s))}+g\,i\,(v-2s)}\,(d+f\,i\,(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,b^{-h-k+2n}\left(b+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+k+1),\,-\frac{\left(b+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\Bigg)+2\sqrt{-\frac{\left(b+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}}$$

$$(d+f\,i\,(v-2s))\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{\left(b+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\, e^{b\,z^r+d\,z+e}\cos^v(f\,z+g)$

01.07.21.1903.01

$$\int z^n e^{b z^2+d z+e} \cos^\nu(f z+g)\,dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(e^e \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{-\frac{(d+2ifs-if\nu)^2}{4b}+e+g i(2s-\nu)} \left(\sum_{q=0}^{n} 2^{q-n} (-d-2ifs+if\nu)^{n-q} (d+2ifs-if\nu+2bz)^{q+1} \left(-\frac{(d+2ifs-if\nu+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2ifs-if\nu+2bz)^2}{4b}\right) \right) b^{-n-1} + e^{-\frac{(d-2ifs+if\nu)^2}{4b}+e+g i(\nu-2s)} \left(\sum_{q=0}^{n} 2^{q-n} (-d+2ifs-if\nu)^{n-q} (d+fi(\nu-2s)+2bz)^{q+1} \left(-\frac{(d+fi(\nu-2s)+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+fi(\nu-2s)+2bz)^2}{4b}\right) \right) b^{-n-1} \right) \right) /;\ n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.1904.01

$$\int z^n e^{\sqrt{z}\, b+d z+e} \cos^\nu(f z+g)\,dz = 2^{-2n-\nu-1} e^{e-\frac{b^2}{4d}} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) \right) \right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{-\frac{b^2}{4(d+fi(2s-\nu))}+e+g i(2s-\nu)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d+fi(2s-\nu))\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d+fi(2s-\nu))\sqrt{z}\right)^2}{d+fi(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2(d+fi(2s-\nu))\sqrt{z}\right) \right.\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2\left(d+f\,i\,(2s-v)\right)\sqrt{z}\right)^2}{4\left(d+f\,i\,(2s-v)\right)}\right)+2\sqrt{-\frac{\left(b+2\left(d+f\,i\,(2s-v)\right)\sqrt{z}\right)^2}{d+f\,i\,(2s-v)}}$$

$$\left.\left.\left(d+f\,i\,(2s-v)\right)\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2\left(d+f\,i\,(2s-v)\right)\sqrt{z}\right)^2}{4\left(d+f\,i\,(2s-v)\right)}\right)\right)\right)\left(d+f\,i\,(2s-v)\right)^{-2n-2}+$$

$$e^{-\frac{b^2}{4(d+f\,i\,(v-2s))}+e+g\,i\,(v-2s)}\left(d+f\,i\,(v-2s)\right)^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,b^{-h-k+2n}\left(b+2\left(d+f\,i\,(v-2s)\right)\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b+2\left(d+f\,i\,(v-2s)\right)\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2\left(d+f\,i\,(v-2s)\right)\sqrt{z}\right)\Gamma\right($$

$$\left.\frac{1}{2}(h+k+1), -\frac{\left(b+2\left(d+f\,i\,(v-2s)\right)\sqrt{z}\right)^2}{4\left(d+f\,i\,(v-2s)\right)}\right)+2\sqrt{-\frac{\left(b+2\left(d+f\,i\,(v-2s)\right)\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}}$$

$$\left.\left.\left(d+f\,i\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2\left(d+f\,i\,(v-2s)\right)\sqrt{z}\right)^2}{4\left(d+f\,i\,(v-2s)\right)}\right)\right)\right)\,/;\, n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\, e^{b z} \cos^v(c\, z^r)$

01.07.21.1905.01

$$\int z^n\, e^{b z}\cos^v(c\,z^2)\,dz =$$

$$2^{-v}\left((-b)^{-n-1}\binom{v}{\frac{v}{2}}\Gamma(n+1,-b\,z)\,(v \bmod 2-1)-\frac{1}{2}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{\frac{i\,b^2}{8cs-4cv}}\left(\sum_{q=0}^{n}2^{q-n}(-b)^{n-q}\left(b+2\,c\,i\,(2s-v)\,z\right)^{q+1}\right.\right.\right.$$

$$\left.\left(-\frac{i\left(b+2\,c\,i\,(2s-v)\,z\right)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i\left(b+2\,c\,i\,(2s-v)\,z\right)^2}{c\,(8s-4v)}\right)\right)\left(i\,c\,(2s-v)\right)^{-n-1}+$$

$$e^{\frac{i\,b^2}{4cv-8cs}}\left(i\,c\,(v-2s)\right)^{-n-1}\sum_{q=0}^{n}2^{q-n}(-b)^{n-q}\left(b+2\,c\,i\,(v-2s)\,z\right)^{q+1}\left(\frac{i\left(b+2\,c\,i\,(v-2s)\,z\right)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i\left(b+2\,c\,i\,(v-2s)\,z\right)^2}{c\,(8s-4v)}\right)\right)\right)\right)\,/;\, n\in\mathbb{N}\land v\in\mathbb{N}^+$$

01.07.21.1906.01

$$\int z^n e^{b z} \cos^\nu\left(c \sqrt{z}\right) dz = -\frac{2^{-\nu-1}}{b^2} \left(4^{-n} b^{-2n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{\frac{c^2 (\nu-2s)^2}{4b}} \binom{\nu}{s} \right.$$

$$\left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c (\nu - 2s))^{-h-k+2n} \left(\frac{\left(2 c s - c \nu + 2 i b \sqrt{z}\right)^2}{b} \right)^{\frac{1}{2}(-h-k-1)} \left(2 \sqrt{z}\, b + c\, i (\nu - 2s)\right)^{h+k} \right.$$

$$\binom{k}{h} \binom{n}{k} \left(c (2s - \nu) \left(2 c s - c \nu + 2 i b \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(2 c s - c \nu + 2 i b \sqrt{z}\right)^2}{4b} \right) - 2 \right.$$

$$\left. \left. b \sqrt{\frac{\left(2 c s - c \nu + 2 i b \sqrt{z}\right)^2}{b}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(2 c s - c \nu + 2 i b \sqrt{z}\right)^2}{4b} \right) \right) \right) +$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c (\nu - 2s))^{-h-k+2n} \left(\frac{\left(c (\nu - 2s) + 2 i b \sqrt{z}\right)^2}{b} \right)^{\frac{1}{2}(-h-k-1)} \left(2 b \sqrt{z} - i c (\nu - 2s)\right)^{h+k}$$

$$\binom{k}{h} \binom{n}{k} \left(c (2s - \nu) \left(2 c s - c \nu - 2 i b \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(c (\nu - 2s) + 2 i b \sqrt{z}\right)^2}{4b} \right) - 2 \right.$$

$$\left. \left. \left. b \sqrt{\frac{\left(c (\nu - 2s) + 2 i b \sqrt{z}\right)^2}{b}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(c (\nu - 2s) + 2 i b \sqrt{z}\right)^2}{4b} \right) \right) \right) \right) +$$

$$\left. 2 (-b)^{-n} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -b z) (\nu \bmod 2 - 1)\, b \right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z + e} \cos^\nu(c z^r)$

01.07.21.1907.01

$$\int z^n e^{b z+e} \cos^\nu(c z^2)\, dz = -2^{-\nu} e^e \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -b z)\,(1-\nu \bmod 2)\,(-b)^{-n-1} - 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{1}{\sqrt{i c (\nu-2k)}} \left(e^{\frac{i b^2}{4 c (\nu-2k)}+e} \sum_{q=0}^{n} 2^{q-n} (-b)^{n-q} (i c (\nu-2k))^{-n-\frac{1}{2}} (b+2 c i (\nu-2k) z)^{q+1} \left(\frac{i (b+2 c i (\nu-2k) z)^2}{c (\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (b+2 c i (\nu-2k) z)^2}{4 c (\nu-2k)} \right) \right) + \frac{1}{\sqrt{-i c (\nu-2k)}} \left(e^{-\frac{i b^2}{4 c (\nu-2k)}+e} \sum_{q=0}^{n} 2^{q-n} (-b)^{n-q} (-i c (\nu-2k))^{-n-\frac{1}{2}} (b-2 i c (\nu-2k) z)^{q+1} \left(-\frac{i (b-2 i c (\nu-2k) z)^2}{c (\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (b-2 i c (\nu-2k) z)^2}{4 c (\nu-2k)} \right) \right) \right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1908.01

$$\int z^n e^{bz+e}\cos^\nu(c\sqrt{z})\,dz = 2^{-2n-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Bigg(e^{\frac{c^2(2s-\nu)^2}{4b}+e}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i\,c\,(2s-\nu))^{-h-k+2n}\left(2\sqrt{z}\,b+c\,i\,(2s-\nu)\right)^{h+k}\left(-\frac{\left(2\sqrt{z}\,b+c\,i\,(2s-\nu)\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(c\,i\,(2s-\nu)\left(2\sqrt{z}\,b+c\,i\,(2s-\nu)\right)\Gamma\!\left(\frac{1}{2}(h+k+1),-\frac{\left(2\sqrt{z}\,b+c\,i\,(2s-\nu)\right)^2}{4b}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,b+c\,i\,(2s-\nu)\right)^2}{b}}\,b\,\Gamma\!\left(\frac{1}{2}(h+k+2),-\frac{\left(2\sqrt{z}\,b+c\,i\,(2s-\nu)\right)^2}{4b}\right)\Bigg)\Bigg)b^{-2n-2}+e^{\frac{c^2(\nu-2s)^2}{4b}+e}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i\,c\,(\nu-2s))^{-h-k+2n}\left(2\sqrt{z}\,b+c\,i\,(\nu-2s)\right)^{h+k}\left(-\frac{\left(2\sqrt{z}\,b+c\,i\,(\nu-2s)\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(c\,i\,(\nu-2s)\left(2\sqrt{z}\,b+c\,i\,(\nu-2s)\right)\Gamma\!\left(\frac{1}{2}(h+k+1),-\frac{\left(2\sqrt{z}\,b+c\,i\,(\nu-2s)\right)^2}{4b}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,b+c\,i\,(\nu-2s)\right)^2}{b}}\,b\,\Gamma\!\left(\frac{1}{2}(h+k+2),-\frac{\left(2\sqrt{z}\,b+c\,i\,(\nu-2s)\right)^2}{4b}\right)\Bigg)\Bigg)b^{-2n-2}\Bigg)-2^{-\nu}(-b)^{-n-1}e^e\binom{\nu}{\frac{\nu}{2}}\Gamma(n+1,-b\,z)\,(1-\nu\bmod 2)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}e^{b z^r}\cos^\nu(c z^r)$

01.07.21.1909.01

$$\int z^{\alpha-1}e^{b z^r}\cos^\nu(c z^r)\,dz = -\frac{2^{-\nu}z^\alpha\,(1-\nu\bmod 2)\,(-b z^r)^{-\frac{\alpha}{r}}}{r}\binom{\nu}{\frac{\nu}{2}}\Gamma\!\left(\frac{\alpha}{r},-b z^r\right)-\frac{2^{-\nu}z^\alpha}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\Gamma\!\left(\frac{\alpha}{r},-(b+c\,i\,(\nu-2s))\,z^r\right)(-(b+c\,i\,(\nu-2s))\,z^r)^{-\frac{\alpha}{r}}+(-(b-i\,c\,(\nu-2s))\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},-(b-i\,c\,(\nu-2s))\,z^r\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.1910.01

$$\int z^n e^{b z^2} \cos^\nu(c z^2)\, dz = 2^{-\nu-1} z^{n+1} \left(\left(-b z^2\right)^{\frac{1}{2}(-n-1)} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (\nu \bmod 2 - 1) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma\left(\frac{n+1}{2}, -(b + c\, i\, (2 s - \nu))\, z^2\right) \left(-(b + c\, i\, (2 s - \nu))\, z^2\right)^{\frac{1}{2}(-n-1)} + \left(-(b - 2\, i\, c\, s + i\, c\, \nu)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -(b - 2\, i\, c\, s + i\, c\, \nu)\, z^2\right)\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1911.01

$$\int z^n e^{b \sqrt{z}} \cos^\nu(c \sqrt{z})\, dz = -2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2 (n+1), -b \sqrt{z}\right) (1 - \nu \bmod 2)\, b^{-2 (n+1)} - 2^{1-\nu} \sum_{i=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{i} \left(\Gamma\left(2 (n+1), (i\, c\, (\nu - 2 i) - b) \sqrt{z}\right) (i\, c\, (\nu - 2 i) - b)^{-2 (n+1)} + (-b - i\, c\, (\nu - 2 i))^{-2 (n+1)}\, \Gamma\left(2 (n+1), (-b - i\, c\, (\nu - 2 i)) \sqrt{z}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{b z^r + e} \cos^\nu(c z^r)$

01.07.21.1912.01

$$\int z^{\alpha-1} e^{b z^r + e} \cos^\nu(c z^r)\, dz = -\frac{2^{-\nu} e^e (1 - \nu \bmod 2)}{r} z^\alpha (-b z^r)^{-\frac{\alpha}{r}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right) - \frac{2^{-\nu} z^\alpha e^e}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\Gamma\left(\frac{\alpha}{r}, (i\, c\, (\nu - 2 k) - b)\, z^r\right) ((i\, c\, (\nu - 2 k) - b)\, z^r)^{-\frac{\alpha}{r}} + ((-b - i\, c\, (\nu - 2 k))\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (-b - i\, c\, (\nu - 2 k))\, z^r\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1913.01

$$\int z^n e^{b z^2 + e} \cos^\nu(c z^2)\, dz = -2^{-\nu-1} e^e z^{n+1} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1 - \nu \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-\nu-1} z^{n+1} e^e \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\Gamma\left(\frac{n+1}{2}, (i\, c\, (\nu - 2 k) - b)\, z^2\right) \left((i\, c\, (\nu - 2 k) - b)\, z^2\right)^{\frac{1}{2}(-n-1)} + \left((-b - i\, c\, (\nu - 2 k))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b - i\, c\, (\nu - 2 k))\, z^2\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1914.01

$$\int z^n e^{\sqrt{z}\, b + e} \cos^\nu(c \sqrt{z})\, dz = -2^{1-\nu} e^e \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2 (n+1), -b \sqrt{z}\right) (1 - \nu \bmod 2)\, b^{-2 (n+1)} - 2^{1-\nu} e^e \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\Gamma\left(2 (n+1), (i\, c\, (\nu - 2 k) - b) \sqrt{z}\right) (i\, c\, (\nu - 2 k) - b)^{-2 (n+1)} + (-b - i\, c\, (\nu - 2 k))^{-2 (n+1)}\, \Gamma\left(2 (n+1), (-b - i\, c\, (\nu - 2 k)) \sqrt{z}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + d z} \cos^v(c z^r)$

01.07.21.1915.01

$$\int z^n e^{b z^2+d z} \cos^v(c z^2)\, dz = -2^{-v-1} e^{-\frac{d^2}{4b}} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\, b^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) -$$
$$2^{-1-v} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{\sqrt{b+2icsh - icv}} \left(e^{\frac{d^2}{-4b-8ics+4icv}} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (b+2ics-icv)^{-n-\frac{1}{2}} (d+2(b+2ics-icv)z)^{q+1} \right.\right.$$
$$\left. \left(-\frac{(d+2(b+2ics-icv)z)^2}{b+2ics-icv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b+2ics-icv)z)^2}{4(b+2ics-icv)}\right)\right) +$$
$$\frac{1}{\sqrt{b+ci(v-2s)}} \left(e^{-\frac{d^2}{4(b+ci(v-2s))}} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (b+ci(v-2s))^{-n-\frac{1}{2}} (d+2(b-2ics+icv)z)^{q+1} \right.$$
$$\left(-\frac{(d+2(b-2ics+icv)z)^2}{b+ci(v-2s)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$
$$\left.\left.\Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b-2ics+icv)z)^2}{4(b+ci(v-2s))}\right)\right)\right) /;\, n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

01.07.21.1916.01

$$\int z^n e^{\sqrt{z}\, b+d z} \cos^\nu\left(c\sqrt{z}\right) dz = 2^{-2n-\nu-1} e^{-\frac{b^2}{4d}} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)\, d^{-2n-2} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right) + 2^{-2n-\nu-1} d^{-2n-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{-\frac{(b+c\, i\,(2s-\nu))^2}{4d}} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c\, i\,(2s-\nu))^{-h-k+2n} \left(b+c\, i\,(2s-\nu)+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c\, i\,(2s-\nu)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b+c\, i\,(2s-\nu))\left(b+c\, i\,(2s-\nu)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c\, i\,(2s-\nu)+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+c\, i\,(2s-\nu)+2d\sqrt{z}\right)^2}{d}}\, d\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c\, i\,(2s-\nu)+2d\sqrt{z}\right)^2}{4d}\right)\right) + e^{-\frac{(b+c\, i\,(\nu-2s))^2}{4d}} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c\, i\,(\nu-2s))^{-h-k+2n} \left(b+c\, i\,(\nu-2s)+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c\, i\,(\nu-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b+c\, i\,(\nu-2s))\left(b+c\, i\,(\nu-2s)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c\, i\,(\nu-2s)+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+c\, i\,(\nu-2s)+2d\sqrt{z}\right)^2}{d}}\, d\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c\, i\,(\nu-2s)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n\, e^{b z^r + d z + e} \cos^\nu(c z^r)$

01.07.21.1917.01

$$\int z^n e^{b z^2 + d z + e} \cos^\nu(c z^2)\, dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(e^e \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d + 2 b z)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{d^2}{-4b+8ics-4icv}+e} \left(\sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d + 2(b - 2ics + icv) z)^{q+1} \left(-\frac{(d+2(b-2ics+icv)z)^2}{b-2ics+icv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b-2ics+icv)z)^2}{4(b-2ics+icv)}\right)\right) (b-2ics+icv)^{-n-1} + e^{\frac{d^2}{-4b-8ics+4icv}+e} (b+2ics-icv)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2(b+2ics-icv)z)^{q+1} \left(-\frac{(d+2(b+2ics-icv)z)^2}{b+2ics-icv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b+2ics-icv)z)^2}{4(b+2ics-icv)}\right)\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1918.01

$$\int z^n e^{\sqrt{z}\, b + d z + e} \cos^\nu(c \sqrt{z})\, dz = 2^{-2n-\nu-1} d^{-2(n+1)} e^{-\frac{b^2}{4d}} \left(e^{\frac{b^2}{4d}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{e - \frac{(b+2ics-icv)^2}{4d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+2ics-icv)^{-h-k+2n} \left(b+2ics-icv+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2ics-icv+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+2ics-icv)\left(b+2ics-icv+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2ics-icv+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2ics-icv+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2ics-icv+2d\sqrt{z}\right)^2}{4d}\right)\right) + \right.\right.\right.$$

$$e^{e^{-\frac{(b+c\,i\,(v-2s))^2}{4d}}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b+c\,i\,(v-2s))^{-h-k+2n}\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((b+c\,i\,(v-2s))\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)\right)\Bigg)-$$

$$e^{e}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,b^{-h-k+2n}\left(b+2d\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\Bigg)\;/;\;n\in\mathbb{N}\wedge v\in\mathbb{N}^+$$

Involving $z^n\, e^{d\,z} \cos^v\left(c\, z^r + g\right)$

01.07.21.1919.01

$$\int z^n e^{d z} \cos^\nu(c z^2 + g)\, dz = -2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z)\,(1 - \nu \bmod 2)\,(-d)^{-n-1} - 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{1}{\sqrt{i\, c\, (\nu - 2k)}} \left(e^{\frac{i d^2}{4 c (\nu - 2k)} + g\, i\, (\nu - 2k)} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (i\, c\, (\nu - 2k))^{-n-\frac{1}{2}} (d + 2\, c\, i\, (\nu - 2k)\, z)^{q+1} \left(\frac{i\, (d + 2\, c\, i\, (\nu - 2k)\, z)^2}{c\, (\nu - 2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i\, (d + 2\, c\, i\, (\nu - 2k)\, z)^2}{4\, c\, (\nu - 2k)} \right) \right) + \frac{1}{\sqrt{-i\, c\, (\nu - 2k)}} \left(e^{-\frac{i d^2}{4 c (\nu - 2k)} - i\, g\, (\nu - 2k)} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (-i\, c\, (\nu - 2k))^{-n-\frac{1}{2}} (d - 2\, i\, c\, (\nu - 2k)\, z)^{q+1} \left(-\frac{i\, (d - 2\, i\, c\, (\nu - 2k)\, z)^2}{c\, (\nu - 2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{i\, (d - 2\, i\, c\, (\nu - 2k)\, z)^2}{4\, c\, (\nu - 2k)} \right) \right) \right) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1920.01

$$\int z^n e^{d z} \cos^\nu\left(\sqrt{z}\, c + g\right) dz = 2^{-2n-\nu-1} d^{-2n-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{c^2 (2s-\nu)^2}{4d} + g i (2s-\nu)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c (2s-\nu))^{-h-k+2n} \left(2\sqrt{z}\, d + c i (2s-\nu)\right)^{h+k} \left(-\frac{\left(2\sqrt{z}\, d + c i (2s-\nu)\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c i (2s-\nu) \left(2\sqrt{z}\, d + c i (2s-\nu)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2\sqrt{z}\, d + c i (2s-\nu)\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\, d + c i (2s-\nu)\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2\sqrt{z}\, d + c i (2s-\nu)\right)^2}{4d}\right)\right) + e^{\frac{c^2 (\nu-2s)^2}{4d} + g i (\nu-2s)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c (\nu-2s))^{-h-k+2n} \left(2\sqrt{z}\, d + c i (\nu-2s)\right)^{h+k} \left(-\frac{\left(2\sqrt{z}\, d + c i (\nu-2s)\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c i (\nu-2s) \left(2\sqrt{z}\, d + c i (\nu-2s)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2\sqrt{z}\, d + c i (\nu-2s)\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\, d + c i (\nu-2s)\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2\sqrt{z}\, d + c i (\nu-2s)\right)^2}{4d}\right)\right)\right) - 2^{-\nu} (-d)^{-n-1} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z) (1 - \nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{d z + e} \cos^\nu\left(c z^r + g\right)$

01.07.21.1921.01

$$\int z^n e^{d z+e} \cos^{\nu}\left(c z^2+g\right) dz = -2^{-\nu} e^e \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z) (1-\nu \bmod 2) (-d)^{-n-1} - 2^{-\nu-1} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{k} \left(\frac{1}{\sqrt{i c(\nu-2k)}} \left(e^{\frac{i d^2}{4 c(\nu-2k)}+e+g i(\nu-2k)} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (i c(\nu-2k))^{-n-\frac{1}{2}} (d+2 c i(\nu-2k) z)^{q+1} \left(\frac{i(d+2 c i(\nu-2k) z)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+2 c i(\nu-2k) z)^2}{4 c(\nu-2k)}\right)\right) + \frac{1}{\sqrt{-i c(\nu-2k)}} \left(e^{-\frac{i d^2}{4 c(\nu-2k)}+e-i g(\nu-2k)} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (-i c(\nu-2k))^{-n-\frac{1}{2}} (d-2 i c(\nu-2k) z)^{q+1} \left(-\frac{i(d-2 i c(\nu-2k) z)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d-2 i c(\nu-2k) z)^2}{4 c(\nu-2k)}\right)\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1922.01

$$\int z^n e^{d z+e} \cos^\nu\left(\sqrt{z}\, c+g\right) dz = 2^{-2n-\nu-1} d^{-2n-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{c^2 (2s-\nu)^2}{4d} + g i (2s-\nu)+e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c (2s-\nu))^{-h-k+2n} \left(2\sqrt{z}\, d + c i (2s-\nu)\right)^{h+k} \left(-\frac{\left(2\sqrt{z}\, d + c i (2s-\nu)\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c i (2s-\nu) \left(2\sqrt{z}\, d + c i (2s-\nu)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2\sqrt{z}\, d + c i (2s-\nu)\right)^2}{4d} \right) + 2\sqrt{-\frac{\left(2\sqrt{z}\, d + c i (2s-\nu)\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2\sqrt{z}\, d + c i (2s-\nu)\right)^2}{4d} \right) \right) + e^{\frac{c^2 (\nu-2s)^2}{4d} + g i (\nu-2s)+e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c (\nu-2s))^{-h-k+2n} \left(2\sqrt{z}\, d + c i (\nu-2s)\right)^{h+k} \left(-\frac{\left(2\sqrt{z}\, d + c i (\nu-2s)\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c i (\nu-2s) \left(2\sqrt{z}\, d + c i (\nu-2s)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2\sqrt{z}\, d + c i (\nu-2s)\right)^2}{4d} \right) + 2\sqrt{-\frac{\left(2\sqrt{z}\, d + c i (\nu-2s)\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2\sqrt{z}\, d + c i (\nu-2s)\right)^2}{4d} \right) \right) \right) - 2^{-\nu} (-d)^{-n-1} e^e \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z)\, (1-\nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{b z^r} \cos^\nu\left(c z^r + g\right)$

01.07.21.1923.01

$$\int z^{\alpha-1} e^{b z^r} \cos^\nu(c z^r + g)\, dz = -\frac{2^{-\nu}(1-\nu \bmod 2)}{r} z^\alpha (-b z^r)^{-\frac{\alpha}{r}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right) - \frac{2^{-\nu} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(e^{-i g(\nu-2k)} \Gamma\left(\frac{\alpha}{r}, (i c(\nu-2k)-b) z^r\right) ((i c(\nu-2k)-b) z^r)^{-\frac{\alpha}{r}} + e^{g i(\nu-2k)} ((-b-i c(\nu-2k)) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-i c(\nu-2k)) z^r\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1924.01

$$\int z^n e^{b z^2} \cos^\nu(c z^2 + g)\, dz = -2^{-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1-\nu \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(e^{-i g(\nu-2k)} \Gamma\left(\frac{n+1}{2}, (i c(\nu-2k)-b) z^2\right) \left((i c(\nu-2k)-b) z^2\right)^{\frac{1}{2}(-n-1)} + e^{g i(\nu-2k)} \left((-b-i c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-i c(\nu-2k)) z^2\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1925.01

$$\int z^n e^{\sqrt{z}\, b} \cos^\nu\left(\sqrt{z}\, c + g\right) dz = -2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1-\nu \bmod 2)\, b^{-2(n+1)} - 2^{1-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(e^{-i g(\nu-2k)} \Gamma\left(2(n+1), (i c(\nu-2k)-b)\sqrt{z}\right) (i c(\nu-2k)-b)^{-2(n+1)} + e^{i g(\nu-2k)} (-b-i c(\nu-2k))^{-2(n+1)} \Gamma\left(2(n+1), (-b-i c(\nu-2k))\sqrt{z}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{b z^r + e} \cos^\nu(c z^r + g)$

01.07.21.1926.01

$$\int z^{\alpha-1} e^{b z^r + e} \cos^\nu(c z^r + g)\, dz = -\frac{2^{-\nu} e^e (1-\nu \bmod 2)}{r} z^\alpha (-b z^r)^{-\frac{\alpha}{r}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right) - \frac{2^{-\nu} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(e^{e-i g(\nu-2k)} \Gamma\left(\frac{\alpha}{r}, (i c(\nu-2k)-b) z^r\right) ((i c(\nu-2k)-b) z^r)^{-\frac{\alpha}{r}} + e^{e+g i(\nu-2k)} ((-b-i c(\nu-2k)) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-i c(\nu-2k)) z^r\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.1927.01

$$\int z^n e^{b z^2 + e} \cos^\nu(c z^2 + g)\, dz = -2^{-\nu-1} e^e z^{n+1} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1-\nu \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(e^{e-i g(\nu-2k)} \Gamma\left(\frac{n+1}{2}, (i c(\nu-2k)-b) z^2\right) \left((i c(\nu-2k)-b) z^2\right)^{\frac{1}{2}(-n-1)} + e^{e+g i(\nu-2k)} \left((-b-i c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-i c(\nu-2k)) z^2\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1928.01

$$\int z^n e^{\sqrt{z}\, b+e} \cos^\nu\left(\sqrt{z}\, c+g\right) dz = -2^{1-\nu} e^e \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right)(1-\nu \bmod 2)\, b^{-2(n+1)} - 2^{1-\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{k} \left(e^{e-i g(\nu-2k)}\, \Gamma\left(2(n+1), (i c(\nu-2k)-b)\sqrt{z}\right)(i c(\nu-2k)-b)^{-2(n+1)} + e^{e+g i(\nu-2k)} (-b-i c(\nu-2k))^{-2(n+1)}\, \Gamma\left(2(n+1), (-b-i c(\nu-2k))\sqrt{z}\right)\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + d z} \cos^\nu(c z^r + g)$

01.07.21.1929.01

$$\int z^n e^{b z^2+d z} \cos^\nu\left(c z^2+g\right) dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{i g(\nu-2s)-\frac{d^2}{4(b-2ics+icv)}} \left(\sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2(b-2ics+icv)z)^{q+1} \left(-\frac{(d+2(b-2ics+icv)z)^2}{b-2ics+icv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b-2ics+icv)z)^2}{4(b-2ics+icv)}\right)\right) (b-2ics+icv)^{-n-1} + e^{i g(2s-\nu)-\frac{d^2}{4(b+2ics-icv)}} (b+2ics-icv)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz+4icsz-2icvz)^{q+1} \left(-\frac{(d+2bz+4icsz-2icvz)^2}{b+2ics-icv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz+4icsz-2icvz)^2}{4(b+2ics-icv)}\right)\right)\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1930.01

$$\int z^n e^{\sqrt{z}\, b+d z} \cos^\nu\left(\sqrt{z}\, c+g\right) dz = 2^{-2n-\nu-1} e^{-\frac{b^2}{4d}} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} +$$

$$2^{-2n-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{(b+c\,i\,(2s-v))^2}{4d} + g\,i\,(2s-v)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k \,(b+c\,i\,(2s-v))^{-h-k+2n} \left(b+c\,i\,(2s-v)+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c\,i\,(2s-v)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b+c\,i\,(2s-v)) \left(b+c\,i\,(2s-v)+2d\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c\,i\,(2s-v)+2d\sqrt{z}\right)^2}{4d}\right) + 2 \sqrt{-\frac{\left(b+c\,i\,(2s-v)+2d\sqrt{z}\right)^2}{d}}\; d\,\Gamma\!\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c\,i\,(2s-v)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + e^{-\frac{(b+c\,i\,(v-2s))^2}{4d} + g\,i\,(v-2s)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k \,(b+c\,i\,(v-2s))^{-h-k+2n} \left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b+c\,i\,(v-2s)) \left(b+c\,i\,(v-2s)+2d\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{4d}\right) + 2 \sqrt{-\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{d}}\; d\,\Gamma\!\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} \right) /;\; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n\, e^{b z^r + d z + e} \cos^v\left(c z^r + g\right)$

01.07.21.1931.01

$$\int z^n e^{b z^2+d z+e} \cos^\nu(c z^2+g)\, dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(e^e \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{d^2}{4(b-2ics+ic\nu)}+e+gi(\nu-2s)} \left(\sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2(b-2ics+ic\nu)z)^{q+1} \left(-\frac{(d+2(b-2ics+ic\nu)z)^2}{b-2ics+ic\nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b-2ics+ic\nu)z)^2}{4(b-2ics+ic\nu)}\right)\right) (b-2ics+ic\nu)^{-n-1} + e^{-\frac{d^2}{4(b+2ics-ic\nu)}+e+gi(2s-\nu)} (b+2ics-ic\nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz+4icsz-2ic\nu z)^{q+1} \left(-\frac{(d+2bz+4icsz-2ic\nu z)^2}{b+2ics-ic\nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz+4icsz-2ic\nu z)^2}{4(b+2ics-ic\nu)}\right)\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1932.01

$$\int z^n e^{\sqrt{z}\, b+d z+e} \cos^\nu(\sqrt{z}\, c+g)\, dz = 2^{-2n-\nu-1} e^{e-\frac{b^2}{4d}} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{(b+ci(2s-\nu))^2}{4d}+e+gi(2s-\nu)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+ci(2s-\nu))^{-h-k+2n} \left(b+ci(2s-\nu)+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+ci(2s-\nu)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \right.\right.$$

$$\left((b+c\,i\,(2s-v))\left(b+c\,i\,(2s-v)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(b+c\,i\,(2s-v)+2d\sqrt{z}\right)^2}{4d}\right)+2\right.$$

$$\left.\left.\sqrt{-\frac{\left(b+c\,i\,(2s-v)+2d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(b+c\,i\,(2s-v)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)d^{-2n-2}+$$

$$e^{-\frac{(b+c\,i\,(v-2s))^2}{4d}+e+g\,i\,(v-2s)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b+c\,i\,(v-2s))^{-h-k+2n}\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^{h+k}\right.$$

$$\left(-\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((b+c\,i\,(v-2s))\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)+2\sqrt{-\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{d}}$$

$$\left.\left.d\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(b+c\,i\,(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)\right)d^{-2n-2}\right)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\,e^{d\,z}\cos^v\left(c\,z^r+f\,z\right)$

01.07.21.1933.01

$$\int z^n e^{d z} \cos^{\nu}\left(c z^2 + f z\right) dz = -2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z) (1 - \nu \bmod 2) (-d)^{-n-1} - 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k}$$
$$\left(\frac{1}{\sqrt{i c (\nu - 2k)}} \left(e^{\frac{i (d + f i (\nu-2k))^2}{4 c (\nu-2k)}} \sum_{q=0}^{n} 2^{q-n} (i c (\nu - 2k))^{-n-\frac{1}{2}} (-d - i f (\nu - 2k))^{n-q} (d + f i (\nu - 2k) + 2 c i (\nu - 2k) z)^{q+1} \right.\right.$$
$$\left.\left. \left(\frac{i (d + f i (\nu - 2k) + 2 c i (\nu - 2k) z)^2}{c (\nu - 2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + f i (\nu - 2k) + 2 c i (\nu - 2k) z)^2}{4 c (\nu - 2k)} \right) \right) + \right.$$
$$\frac{1}{\sqrt{-i c (\nu - 2k)}} \left(e^{-\frac{i (d - i f (\nu-2k))^2}{4 c (\nu-2k)}} \sum_{q=0}^{n} 2^{q-n} (-i c (\nu - 2k))^{-n-\frac{1}{2}} (i f (\nu - 2k) - d)^{n-q} \right.$$
$$(d - i f (\nu - 2k) - 2 i c (\nu - 2k) z)^{q+1} \left(-\frac{i (d - i f (\nu - 2k) - 2 i c (\nu - 2k) z)^2}{c (\nu - 2k)} \right)^{\frac{1}{2}(-q-1)}$$
$$\left.\left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d - i f (\nu - 2k) - 2 i c (\nu - 2k) z)^2}{4 c (\nu - 2k)} \right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1934.01

$$\int z^n e^{d z} \cos^{\nu}\left(\sqrt{z}\, c + f z\right) dz =$$
$$2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{c^2 (2s-\nu)^2}{4 (d + f i (2s-\nu))}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c (2s - \nu))^{-h-k+2n} \left(2 \sqrt{z} (d + f i (2s - \nu)) + c i (2s - \nu) \right)^{h+k} \right.\right.$$
$$\left(-\frac{\left(2 \sqrt{z} (d + f i (2s - \nu)) + c i (2s - \nu) \right)^2}{d + f i (2s - \nu)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$
$$\left(c i (2s - \nu) \left(2 \sqrt{z} (d + f i (2s - \nu)) + c i (2s - \nu) \right) \Gamma\left(\frac{1}{2} (h + k + 1), \right.\right.$$
$$\left. -\frac{\left(2 \sqrt{z} (d + f i (2s - \nu)) + c i (2s - \nu) \right)^2}{4 (d + f i (2s - \nu))} \right) + 2 \sqrt{ -\frac{\left(2 \sqrt{z} (d + f i (2s - \nu)) + c i (2s - \nu) \right)^2}{d + f i (2s - \nu)} }$$
$$\left.\left.\left. (d + f i (2s - \nu)) \Gamma\left(\frac{1}{2} (h + k + 2), -\frac{\left(2 \sqrt{z} (d + f i (2s - \nu)) + c i (2s - \nu) \right)^2}{4 (d + f i (2s - \nu))} \right) \right) \right) \right)$$

$$(d+f\,i\,(2s-v))^{-2n-2}+e^{\frac{c^2(v-2s)^2}{4(d+f\,i\,(v-2s))}}(d+f\,i\,(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2s))^{-h-k+2n}$$

$$\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^{h+k}\left(-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(c\,i\,(v-2s)\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),$$

$$-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\Bigg)+2\sqrt{-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}}$$

$$(d+f\,i\,(v-2s))\,\Gamma\Bigg(\frac{1}{2}(h+k+2),-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\Bigg)\Bigg)\Bigg)-$$

$$2^{-v}\,(-d)^{-n-1}\binom{v}{\frac{v}{2}}\Gamma(n+1,-d\,z)\,(1-v\bmod 2)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\,e^{d\,z+e}\cos^v\left(c\,z^r+f\,z\right)$

01.07.21.1935.01

$$\int z^n e^{dz+e} \cos^\nu\left(c z^2 + f z\right) dz = -2^{-\nu} e^e \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z)(1 - \nu \bmod 2)(-d)^{-n-1} - 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(\frac{1}{\sqrt{i c (\nu - 2k)}} \left(e^{\frac{i(d+f i(\nu-2k))^2}{4c(\nu-2k)}+e} \sum_{q=0}^{n} 2^{q-n} (i c (\nu - 2k))^{-n-\frac{1}{2}} (-d - i f (\nu - 2k))^{n-q} (d + f i (\nu - 2k) + 2 c i (\nu - 2k) z)^{q+1} \left(\frac{i (d + f i (\nu - 2k) + 2 c i (\nu - 2k) z)^2}{c (\nu - 2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + f i (\nu - 2k) + 2 c i (\nu - 2k) z)^2}{4 c (\nu - 2k)} \right) \right) + \frac{1}{\sqrt{-i c (\nu - 2k)}} \left(e^{-\frac{i(d-i f(\nu-2k))^2}{4c(\nu-2k)}+e} \sum_{q=0}^{n} 2^{q-n} (-i c (\nu - 2k))^{-n-\frac{1}{2}} (i f (\nu - 2k) - d)^{n-q} (d - i f (\nu - 2k) - 2 i c (\nu - 2k) z)^{q+1} \left(-\frac{i (d - i f (\nu - 2k) - 2 i c (\nu - 2k) z)^2}{c (\nu - 2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d - i f (\nu - 2k) - 2 i c (\nu - 2k) z)^2}{4 c (\nu - 2k)} \right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1936.01

$$\int z^n e^{dz+e} \cos^\nu\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{c^2 (2s-\nu)^2}{4(d+f i(2s-\nu))}+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c (2s - \nu))^{-h-k+2n} \left(2\sqrt{z}\, (d + f i (2s - \nu)) + c i (2s - \nu)\right)^{h+k} \left(-\frac{\left(2\sqrt{z}\, (d + f i (2s - \nu)) + c i (2s - \nu)\right)^2}{d + f i (2s - \nu)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c i (2s - \nu) \left(2\sqrt{z}\, (d + f i (2s - \nu)) + c i (2s - \nu)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2\sqrt{z}\, (d + f i (2s - \nu)) + c i (2s - \nu)\right)^2}{4 (d + f i (2s - \nu))} \right) + 2 \sqrt{-\frac{\left(2\sqrt{z}\, (d + f i (2s - \nu)) + c i (2s - \nu)\right)^2}{d + f i (2s - \nu)}} (d + f i (2s - \nu)) \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2\sqrt{z}\, (d + f i (2s - \nu)) + c i (2s - \nu)\right)^2}{4 (d + f i (2s - \nu))} \right) \right) \right) \right)$$

$$(d + f\,i\,(2\,s - v))^{-2\,n-2} + e^{\frac{c^2\,(v-2\,s)^2}{4\,(d+f\,i\,(v-2\,s))}+e}\,(d + f\,i\,(v - 2\,s))^{-2\,n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v - 2\,s))^{-h-k+2\,n}$$

$$\left(c\,i\,(v - 2\,s) + 2\,(d + f\,i\,(v - 2\,s))\,\sqrt{z}\right)^{h+k}\left(-\frac{\left(c\,i\,(v - 2\,s) + 2\,(d + f\,i\,(v - 2\,s))\,\sqrt{z}\right)^2}{d + f\,i\,(v - 2\,s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(c\,i\,(v - 2\,s)\left(c\,i\,(v - 2\,s) + 2\,(d + f\,i\,(v - 2\,s))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h + k + 1),$$

$$-\frac{\left(c\,i\,(v - 2\,s) + 2\,(d + f\,i\,(v - 2\,s))\,\sqrt{z}\right)^2}{4\,(d + f\,i\,(v - 2\,s))}\Bigg) + 2\sqrt{-\frac{\left(c\,i\,(v - 2\,s) + 2\,(d + f\,i\,(v - 2\,s))\,\sqrt{z}\right)^2}{d + f\,i\,(v - 2\,s)}}$$

$$(d + f\,i\,(v - 2\,s))\,\Gamma\left(\frac{1}{2}\,(h + k + 2), -\frac{\left(c\,i\,(v - 2\,s) + 2\,(d + f\,i\,(v - 2\,s))\,\sqrt{z}\right)^2}{4\,(d + f\,i\,(v - 2\,s))}\right)\Bigg)\Bigg) -$$

$$2^{-v}\,(-d)^{-n-1}\,e^e\binom{v}{\frac{v}{2}}\Gamma(n + 1, -d\,z)\,(1 - v \bmod 2)\;/;\; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n\,e^{b\,z^r}\cos^v\left(c\,z^r + f\,z\right)$

01.07.21.1937.01

$$\int z^n e^{b z^2} \cos^\nu\left(c z^2 + f z\right) dz = -2^{-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1 - \nu \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{(i f \nu - 2 i f s)^2}{4 (b - 2 i c s + i c \nu)}} \left(\sum_{q=0}^{n} 2^{q-n} (2 i f s - i f \nu)^{n-q} (f i (\nu - 2 s) + 2 (b - 2 i c s + i c \nu) z)^{q+1} \left(-\frac{(f i (\nu - 2 s) + 2 (b - 2 i c s + i c \nu) z)^2}{b - 2 i c s + i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f i (\nu - 2 s) + 2 (b - 2 i c s + i c \nu) z)^2}{4 (b - 2 i c s + i c \nu)}\right) \right) (b - 2 i c s + i c \nu)^{-n-1} + e^{-\frac{(2 i f s - i f \nu)^2}{4 (b + 2 i c s - i c \nu)}} (b + 2 i c s - i c \nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i f \nu - 2 i f s)^{n-q} (2 i f s + 4 i c z s - i f \nu + 2 b z - 2 i c \nu z)^{q+1} \left(-\frac{(2 i f s + 4 i c z s - i f \nu + 2 b z - 2 i c \nu z)^2}{b + 2 i c s - i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 i f s + 4 i c z s - i f \nu + 2 b z - 2 i c \nu z)^2}{4 (b + 2 i c s - i c \nu)}\right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1938.01

$$\int z^n e^{\sqrt{z}\, b} \cos^\nu\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i (b + c i (2 s - \nu))^2}{4 f (2 s - \nu)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b + c i (2 s - \nu))^{-h-k+2n} \left(b + c i (2 s - \nu) + 2 f i (2 s - \nu) \sqrt{z}\right)^{h+k} \left(\frac{i \left(b + c i (2 s - \nu) + 2 f i (2 s - \nu) \sqrt{z}\right)^2}{f (2 s - \nu)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b + c i (2 s - \nu)) \left(b + c i (2 s - \nu) + 2 f i (2 s - \nu) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1), \frac{i \left(b + c i (2 s - \nu) + 2 f i (2 s - \nu) \sqrt{z}\right)^2}{4 f (2 s - \nu)}\right) + 2 f i (2 s - \nu) \sqrt{\frac{i \left(b + c i (2 s - \nu) + 2 f i (2 s - \nu) \sqrt{z}\right)^2}{f (2 s - \nu)}} \Gamma\left(\frac{1}{2}(h + k + 2), \frac{i \left(b + c i (2 s - \nu) + 2 f i (2 s - \nu) \sqrt{z}\right)^2}{4 f (2 s - \nu)}\right) \right) \right) (i f (2 s - \nu))^{-2n-2} + $$

$$e^{\frac{i(b+c\,i(v-2s))^2}{4f(v-2s)}}\,(i\,f\,(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b+c\,i\,(v-2s))^{-h-k+2n}\left(b+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(b+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((b+c\,i\,(v-2s))$$

$$\left(b+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)+$$

$$2\,f\,i\,(v-2s)\sqrt{\frac{i\left(b+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\;\Gamma\Bigg(\frac{1}{2}(h+k+2),$$

$$\frac{i\left(b+c\,i\,(v-2s)+2\,f\,i\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\Bigg)\Bigg)\Bigg)-$$

$$2^{1-v}\,b^{-2(n+1)}\binom{v}{\frac{v}{2}}\Gamma\left(2(n+1),\,-b\sqrt{z}\right)(1-v\bmod 2)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\,e^{b\,z^r+e}\cos^v\left(c\,z^r+f\,z\right)$

01.07.21.1939.01

$$\int z^n e^{b z^2+e} \cos^\nu(c z^2 + f z)\, dz = -2^{-\nu-1} e^e z^{n+1} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1-\nu \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{e-\frac{(i f \nu-2 i f s)^2}{4(b-2 i c s+i c \nu)}} \left(\sum_{q=0}^{n} 2^{q-n} (2 i f s - i f \nu)^{n-q} (f i(\nu-2s) + 2(b-2 i c s + i c \nu) z)^{q+1} \left(-\frac{(f i(\nu-2s)+2(b-2 i c s+i c \nu) z)^2}{b-2 i c s+i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f i(\nu-2s)+2(b-2 i c s+i c \nu)z)^2}{4(b-2 i c s+i c \nu)}\right)\right) (b-2 i c s+i c \nu)^{-n-1} + e^{e-\frac{(2 i f s-i f \nu)^2}{4(b+2 i c s-i c \nu)}} (b+2 i c s-i c \nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i f \nu - 2 i f s)^{n-q} (2 i f s + 4 i c z s - i f \nu + 2 b z - 2 i c \nu z)^{q+1} \left(-\frac{(2 i f s+4 i c z s-i f \nu+2 b z-2 i c \nu z)^2}{b+2 i c s-i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 i f s+4 i c z s-i f \nu+2 b z-2 i c \nu z)^2}{4(b+2 i c s-i c \nu)}\right)\right) /; n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.1940.01

$$\int z^n e^{\sqrt{z}\, b+e} \cos^\nu\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{\frac{i(b+c i(2s-\nu))^2}{4 f (2s-\nu)}+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b + c i(2s-\nu))^{-h-k+2n} \left(b + c i(2s-\nu) + 2 f i(2s-\nu)\sqrt{z}\right)^{h+k} \left(\frac{i\left(b+c i(2s-\nu)+2 f i(2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+c i(2s-\nu)) \left(b+c i(2s-\nu)+2 f i(2s-\nu)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+c i(2s-\nu)+2 f i(2s-\nu)\sqrt{z}\right)^2}{4 f(2s-\nu)}\right) + 2 f i(2s-\nu) \sqrt{\frac{i\left(b+c i(2s-\nu)+2 f i(2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+c i(2s-\nu)+2 f i(2s-\nu)\sqrt{z}\right)^2}{4 f(2s-\nu)}\right)\right)\right) (i f(2s-\nu))^{-2n-2} + e^{\frac{i(b+c i(\nu-2s))^2}{4 f(\nu-2s)}+e}$$

$$(i\, f\,(v-2\,s))^{-2\,n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (b+c\,i\,(v-2\,s))^{-h-k+2\,n} \left(b+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(b+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \Bigg((b+c\,i\,(v-2\,s))$$

$$\left(b+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\, \frac{i\left(b+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,i\,(v-2\,s)\sqrt{\frac{i\left(b+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.\left.\frac{i\left(b+c\,i\,(v-2\,s)+2\,f\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)-$$

$$2^{1-v}\,(-b)^{-2\,(n+1)}\,e^{e}\binom{v}{\frac{v}{2}}\Gamma\!\left(2\,(n+1),\,-b\,\sqrt{z}\right)(1-v \bmod 2)\;/;\; n\in \mathbb{N}\,\land\, v\in \mathbb{N}^{+}$$

Involving $z^n\, e^{b\,z^r+d\,z+e} \cos^v\!\left(c\,z^r+f\,z\right)$

01.07.21.1941.01

$$\int z^n e^{b z^2+d z} \cos^\nu(c z^2 + f z)\, dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{(d-2 i f s+i f \nu)^2}{4(b-2 i c s+i c \nu)}} \left(\sum_{q=0}^{n} 2^{q-n} (-d+2 i f s - i f \nu)^{n-q} (d + f i (\nu - 2s) + 2(b - 2 i c s + i c \nu) z)^{q+1} \left(-\frac{(d + f i (\nu-2s) + 2(b-2 i c s + i c \nu) z)^2}{b - 2 i c s + i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + f i (\nu-2s) + 2(b-2 i c s+ i c \nu) z)^2}{4(b-2 i c s + i c \nu)}\right) \right) (b - 2 i c s + i c \nu)^{-n-1} + e^{-\frac{(d+2 i f s - i f \nu)^2}{4(b+2 i c s - i c \nu)}} (b+2 i c s - i c \nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d - 2 i f s + i f \nu)^{n-q} (d + 2 i f s - i f \nu + 2bz + 4 i c s z - 2 i c \nu z)^{q+1} \left(-\frac{(d+2 i f s - i f \nu + 2bz + 4 i c s z - 2 i c \nu z)^2}{b + 2 i c s - i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + 2 i f s - i f \nu + 2bz + 4 i c s z - 2 i c \nu z)^2}{4(b+2 i c s - i c \nu)}\right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1942.01

$$\int z^n e^{\sqrt{z}\, b + d z} \cos^\nu(\sqrt{z}\, c + f z)\, dz = 2^{-2n-\nu-1} e^{-\frac{b^2}{4d}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) \right) \right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{(b+c i (2s-\nu))^2}{4(d+f i (2s-\nu))}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b + c i (2s-\nu))^{-h-k+2n} \left(b + c i (2s-\nu) + 2(d + f i (2s-\nu))\sqrt{z}\right)^{h+k} \right. \right.$$

$$\left(-\frac{\left(b+c\,i\,(2s-v)+2\,(d+f\,i\,(2s-v))\sqrt{z}\right)^2}{d+f\,i\,(2s-v)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg((b+c\,i\,(2s-v))\left(b+c\,i\,(2s-v)+\right.$$

$$\left.2\,(d+f\,i\,(2s-v))\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),-\frac{\left(b+c\,i\,(2s-v)+2\,(d+f\,i\,(2s-v))\sqrt{z}\right)^2}{4\,(d+f\,i\,(2s-v))}\right)+2$$

$$\sqrt{-\frac{\left(b+c\,i\,(2s-v)+2\,(d+f\,i\,(2s-v))\sqrt{z}\right)^2}{d+f\,i\,(2s-v)}}\;(d+f\,i\,(2s-v))\,\Gamma\!\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.\left.-\frac{\left(b+c\,i\,(2s-v)+2\,(d+f\,i\,(2s-v))\sqrt{z}\right)^2}{4\,(d+f\,i\,(2s-v))}\right)\right)\right)(d+f\,i\,(2s-v))^{-2n-2}+e^{-\frac{(b+c\,i\,(v-2s))^2}{4\,(d+f\,i\,(v-2s))}}$$

$$(d+f\,i\,(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b+c\,i\,(v-2s))^{-h-k+2n}\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg((b+c\,i\,(v-2s))\left(b+c\,i\,(v-2s)+\right.$$

$$\left.2\,(d+f\,i\,(v-2s))\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),-\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\right)+$$

$$2\sqrt{-\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}}\;(d+f\,i\,(v-2s))\,\Gamma\!\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.\left.-\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\,e^{b\,z^r+d\,z+e}\cos^v\!\left(c\,z^r+f\,z\right)$

01.07.21.1943.01

$$\int z^n e^{b z^2+d z+e} \cos^\nu(c z^2 + f z)\, dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(e^e \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{e-\frac{(d-2 i f s+i f \nu)^2}{4(b-2 i c s+i c \nu)}} \left(\sum_{q=0}^{n} 2^{q-n} (-d+2 i f s - i f \nu)^{n-q} (d + f i (\nu-2s) + 2(b-2 i c s + i c \nu) z)^{q+1} \left(-\frac{(d+f i(\nu-2s)+2(b-2 i c s+ i c \nu) z)^2}{b-2 i c s + i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f i(\nu-2s)+2(b-2 i c s+i c \nu) z)^2}{4(b-2 i c s+ i c \nu)}\right)\right) (b-2 i c s + i c \nu)^{-n-1} + e^{e-\frac{(d+2 i f s - i f \nu)^2}{4(b+2 i c s - i c \nu)}} (b+2 i c s - i c \nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d-2 i f s + i f \nu)^{n-q} (d+2 i f s - i f \nu + 2 b z + 4 i c s z - 2 i c \nu z)^{q+1} \left(-\frac{(d+2 i f s - i f \nu + 2bz + 4 i c s z - 2 i c \nu z)^2}{b+2 i c s - i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2 i f s - i f \nu + 2bz+4 i c s z - 2 i c \nu z)^2}{4(b+2 i c s - i c \nu)}\right)\right)\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1944.01

$$\int z^n e^{\sqrt{z}\, b + d z + e} \cos^\nu\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-\nu-1} e^{e-\frac{b^2}{4d}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2 \sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\; d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{e-\frac{(b+c i(2s-\nu))^2}{4(d+f i(2s-\nu))}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b + c i (2s-\nu))^{-h-k+2n} \left(b + c i(2s-\nu) + 2(d + f i(2s-\nu))\sqrt{z}\right)^{h+k} \right.\right.$$

$$\left(-\frac{\left(b+c\,i\,(2\,s-v)+2\,(d+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2}{d+f\,i\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg((b+c\,i\,(2\,s-v))\left(b+c\,i\,(2\,s-v)+\right.$$

$$\left.2\,(d+f\,i\,(2\,s-v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{\left(b+c\,i\,(2\,s-v)+2\,(d+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(d+f\,i\,(2\,s-v))}\right)+2$$

$$\sqrt{-\frac{\left(b+c\,i\,(2\,s-v)+2\,(d+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2}{d+f\,i\,(2\,s-v)}}\,(d+f\,i\,(2\,s-v))\,\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.\left.-\frac{\left(b+c\,i\,(2\,s-v)+2\,(d+f\,i\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(d+f\,i\,(2\,s-v))}\right)\right)\right)(d+f\,i\,(2\,s-v))^{-2\,n-2}+e^{e-\frac{(b+c\,i\,(v-2\,s))^2}{4\,(d+f\,i\,(v-2\,s))}}$$

$$(d+f\,i\,(v-2\,s))^{-2\,n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b+c\,i\,(v-2\,s))^{-h-k+2\,n}\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,i\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg((b+c\,i\,(v-2\,s))\left(b+c\,i\,(v-2\,s)+\right.$$

$$\left.2\,(d+f\,i\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2\,s))}\right)+$$

$$2\sqrt{-\frac{\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,i\,(v-2\,s)}}\,(d+f\,i\,(v-2\,s))\,\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.\left.-\frac{\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2\,s))}\right)\right)\right)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\,e^{d\,z}\cos^v\left(c\,z^r+f\,z+g\right)$

01.07.21.1945.01

$$\int z^n e^{dz}\cos^{\nu}(c z^2+f z+g)\,dz = -2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\Gamma(n+1,-d z)(1-\nu \bmod 2)(-d)^{-n-1} - 2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{1}{\sqrt{-i c(\nu-2k)}}\left(e^{-\frac{i(d-i f(\nu-2k))^2}{4c(\nu-2k)}-i g(\nu-2k)}\sum_{q=0}^{n}2^{q-n}(-i c(\nu-2k))^{-n-\frac{1}{2}}(i f(\nu-2k)-d)^{n-q} (d-i f(\nu-2k)-2 i c(\nu-2k)z)^{q+1}\left(-\frac{i(d-i f(\nu-2k)-2 i c(\nu-2k)z)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d-i f(\nu-2k)-2 i c(\nu-2k)z)^2}{4c(\nu-2k)}\right)\right)+ \frac{1}{\sqrt{i c(\nu-2k)}}\left(e^{\frac{i(d+f i(\nu-2k))^2}{4c(\nu-2k)}+g i(\nu-2k)}\sum_{q=0}^{n}2^{q-n}(i c(\nu-2k))^{-n-\frac{1}{2}}(-d-i f(\nu-2k))^{n-q} (d+f i(\nu-2k)+2 c i(\nu-2k)z)^{q+1}\left(\frac{i(d+f i(\nu-2k)+2 c i(\nu-2k)z)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(d+f i(\nu-2k)+2 c i(\nu-2k)z)^2}{4c(\nu-2k)}\right)\right)\right)\;/;\; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.07.21.1946.01

$$\int z^n e^{dz}\cos^{\nu}(\sqrt{z}\,c+f z+g)\,dz = 2^{-2n-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{c^2(2s-\nu)^2}{4(d+f i(2s-\nu))}+g i(2s-\nu)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i c(2s-\nu))^{-h-k+2n}\left(2\sqrt{z}\,(d+f i(2s-\nu))+c i(2s-\nu)\right)^{h+k} \left(-\frac{\left(2\sqrt{z}\,(d+f i(2s-\nu))+c i(2s-\nu)\right)^2}{d+f i(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k} \left(c i(2s-\nu)\left(2\sqrt{z}\,(d+f i(2s-\nu))+c i(2s-\nu)\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.\right.\right.$$

$$\left.-\frac{\left(2\sqrt{z}\,(d+f i(2s-\nu))+c i(2s-\nu)\right)^2}{4(d+f i(2s-\nu))}\right)+2(d+f i(2s-\nu))\,\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$-\frac{\left(2\sqrt{z}\,(d+f\,i\,(2s-v))+c\,i\,(2s-v)\right)^2}{4\,(d+f\,i\,(2s-v))}\Bigg)\sqrt{-\frac{\left(2\sqrt{z}\,(d+f\,i\,(2s-v))+c\,i\,(2s-v)\right)^2}{d+f\,i\,(2s-v)}}\Bigg)\Bigg)$$

$$(d+f\,i\,(2s-v))^{-2n-2}+e^{\frac{c^2(v-2s)^2}{4(d+f\,i\,(v-2s))}+g\,i\,(v-2s)}\,(d+f\,i\,(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2s))^{-h-k+2n}$$

$$\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^{h+k}\left(-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(c\,i\,(v-2s)\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+k+1),$$

$$-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\Bigg)+2\,(d+f\,i\,(v-2s))\,\Gamma\Bigg(\frac{1}{2}\,(h+k+2),$$

$$-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\Bigg)\sqrt{-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}}\Bigg)\Bigg)-$$

$$2^{-v}\,(-d)^{-n-1}\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-d\,z)\,(1-v\bmod 2)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\,e^{d\,z+e}\cos^v\left(c\,z^r+f\,z+g\right)$

01.07.21.1947.01

$$\int z^n e^{dz+e}\cos^\nu\left(cz^2+fz+g\right)dz = -2^{-\nu}e^e\binom{\nu}{\frac{\nu}{2}}\Gamma(n+1,-dz)(1-\nu \bmod 2)(-d)^{-n-1} - 2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{1}{\sqrt{-i c(\nu-2k)}}\left(e^{-\frac{i(d-i f(\nu-2k))^2}{4c(\nu-2k)}+e-i g(\nu-2k)}\sum_{q=0}^{n}2^{q-n}(-i c(\nu-2k))^{-n-\frac{1}{2}}(i f(\nu-2k)-d)^{n-q} (d-i f(\nu-2k)-2 i c(\nu-2k)z)^{q+1}\left(-\frac{i(d-i f(\nu-2k)-2 i c(\nu-2k)z)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d-i f(\nu-2k)-2 i c(\nu-2k)z)^2}{4c(\nu-2k)}\right)\right)+ \frac{1}{\sqrt{i c(\nu-2k)}}\left(e^{\frac{i(d+f i(\nu-2k))^2}{4c(\nu-2k)}+e+g i(\nu-2k)}\sum_{q=0}^{n}2^{q-n}(i c(\nu-2k))^{-n-\frac{1}{2}}(-d-i f(\nu-2k))^{n-q} (d+f i(\nu-2k)+2 c i(\nu-2k)z)^{q+1}\left(\frac{i(d+f i(\nu-2k)+2 c i(\nu-2k)z)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(d+f i(\nu-2k)+2 c i(\nu-2k)z)^2}{4c(\nu-2k)}\right)\right)\right)\; /;\; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.07.21.1948.01

$$\int z^n e^{dz+e}\cos^\nu\left(\sqrt{z}\,c+fz+g\right)dz = 2^{-2n-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{c^2(2s-\nu)^2}{4(d+f i(2s-\nu))}+g i(2s-\nu)+e}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i c(2s-\nu))^{-h-k+2n}\left(2\sqrt{z}\,(d+f i(2s-\nu))+c i(2s-\nu)\right)^{h+k} \left(-\frac{\left(2\sqrt{z}\,(d+f i(2s-\nu))+c i(2s-\nu)\right)^2}{d+f i(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c i(2s-\nu)\left(2\sqrt{z}\,(d+f i(2s-\nu))+ c i(2s-\nu)\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(2\sqrt{z}\,(d+f i(2s-\nu))+c i(2s-\nu)\right)^2}{4(d+f i(2s-\nu))}\right)+2 (d+f i(2s-\nu))\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(2\sqrt{z}\,(d+f i(2s-\nu))+c i(2s-\nu)\right)^2}{4(d+f i(2s-\nu))}\right)\right.\right.\right.$$

$$\sqrt{-\frac{\left(2\sqrt{z}\,(d+f\,i\,(2s-v))+c\,i\,(2s-v)\right)^2}{d+f\,i\,(2s-v)}}\Bigg)\Bigg)(d+f\,i\,(2s-v))^{-2n-2}+$$

$$e^{\frac{c^2(v-2s)^2}{4(d+f\,i\,(v-2s))}+g\,i\,(v-2s)+e}\,(d+f\,i\,(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2s))^{-h-k+2n}$$

$$\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^{h+k}\left(-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(c\,i\,(v-2s)\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),$$

$$-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\Bigg)+2\,(d+f\,i\,(v-2s))\,\Gamma\Bigg(\frac{1}{2}(h+k+2),$$

$$-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\Bigg)\sqrt{-\frac{\left(c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}}\Bigg)\Bigg)-$$

$$2^{-v}\,(-d)^{-n-1}\,e^e\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-d\,z)\,(1-v \bmod 2)\;/;\;n\in\mathbb{N}\wedge v\in\mathbb{N}^+$$

Involving $z^n\,e^{b\,z^r}\cos^v\!\left(c\,z^r+f\,z+g\right)$

01.07.21.1949.01

$$\int z^n e^{b z^2} \cos^v\left(c z^2 + f z + g\right) dz = -2^{-v-1} z^{n+1} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1 - v \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} -$$

$$2^{-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{(i f v - 2 i f s)^2}{4(b - 2 i c s + i c v)} + g i (v - 2s)} \left(\sum_{q=0}^{n} 2^{q-n} (2 i f s - i f v)^{n-q} (f i (v - 2s) + 2 (b - 2 i c s + i c v) z)^{q+1} \right.\right.$$

$$\left. \left(-\frac{(f i (v-2s) + 2 (b - 2 i c s + i c v) z)^2}{b - 2 i c s + i c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f i (v-2s) + 2 (b - 2 i c s + i c v) z)^2}{4 (b - 2 i c s + i c v)}\right) \right)$$

$$(b - 2 i c s + i c v)^{-n-1} + e^{-\frac{(2 i f s - i f v)^2}{4(b + 2 i c s - i c v)} + g i (2s - v)} (b + 2 i c s - i c v)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i f v - 2 i f s)^{n-q}$$

$$(2 i f s + 4 i c z s - i f v + 2 b z - 2 i c v z)^{q+1} \left(-\frac{(2 i f s + 4 i c z s - i f v + 2 b z - 2 i c v z)^2}{b + 2 i c s - i c v}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 i f s + 4 i c z s - i f v + 2 b z - 2 i c v z)^2}{4 (b + 2 i c s - i c v)}\right)\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.07.21.1950.01

$$\int z^n e^{\sqrt{z}\, b} \cos^v\left(\sqrt{z}\, c + f z + g\right) dz =$$

$$2^{-2n-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{\frac{i (b + c i (2s - v))^2}{4 f (2s - v)} + g i (2s - v)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b + c i (2s - v))^{-h-k+2n} \left(b + c i (2s - v) + 2 f i (2s - v) \sqrt{z}\right)^{h+k} \right.\right.$$

$$\left(\frac{i \left(b + c i (2s - v) + 2 f i (2s - v) \sqrt{z}\right)^2}{f (2s - v)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b + c i (2s - v)) \right.$$

$$\left(b + c i (2s - v) + 2 f i (2s - v) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1), \frac{i \left(b + c i (2s - v) + 2 f i (2s - v) \sqrt{z}\right)^2}{4 f (2s - v)}\right) +$$

$$2 f i (2s - v) \sqrt{\frac{i \left(b + c i (2s - v) + 2 f i (2s - v) \sqrt{z}\right)^2}{f (2s - v)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h + k + 2), \frac{i \left(b + c i (2s - v) + 2 f i (2s - v) \sqrt{z}\right)^2}{4 f (2s - v)}\right)\right)\right) (i f (2s - v))^{-2n-2} +$$

$$e^{\frac{i (b+c i (v-2 s))^2}{4 f (v-2 s)}+g i (v-2 s)} (i f (v-2 s))^{-2 n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c i (v-2 s))^{-h-k+2 n}$$

$$\left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right)^{h+k} \left(\frac{i \left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right)^2}{f (v-2 s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((b+c i (v-2 s)) \left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1),\right.\right.$$

$$\left.\frac{i \left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right)^2}{4 f (v-2 s)}\right)+2 f i (v-2 s) \Gamma\left(\frac{1}{2} (h+k+2),\right.$$

$$\left.\left.\frac{i \left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right)^2}{4 f (v-2 s)}\right) \sqrt{\frac{i \left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right)^2}{f (v-2 s)}}\right) -$$

$$2^{1-v} b^{-2 (n+1)} \binom{v}{\frac{v}{2}} \Gamma\left(2 (n+1), -b \sqrt{z}\right) (1-v \bmod 2) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n e^{b z^r+e} \cos^v\left(c z^r+f z+g\right)$

01.07.21.1951.01

$$\int z^n e^{b z^2+e} \cos^v\left(c z^2 + f z + g\right) dz = -2^{-v-1} e^e z^{n+1} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1 - v \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{(i f v - 2 i f s)^2}{4 (b - 2 i c s + i c v)} + e + g i (v - 2 s)} \left(\sum_{q=0}^{n} 2^{q-n} (2 i f s - i f v)^{n-q} (f i (v - 2 s) + 2 (b - 2 i c s + i c v) z)^{q+1} \left(-\frac{(f i (v-2s) + 2 (b - 2 i c s + i c v) z)^2}{b - 2 i c s + i c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f i (v - 2 s) + 2 (b - 2 i c s + i c v) z)^2}{4 (b - 2 i c s + i c v)}\right)\right) (b - 2 i c s + i c v)^{-n-1} + e^{-\frac{(2 i f s - i f v)^2}{4 (b + 2 i c s - i c v)} + e + g i (2 s - v)} (b + 2 i c s - i c v)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i f v - 2 i f s)^{n-q} (2 i f s + 4 i c z s - i f v + 2 b z - 2 i c v z)^{q+1} \left(-\frac{(2 i f s + 4 i c z s - i f v + 2 b z - 2 i c v z)^2}{b + 2 i c s - i c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 i f s + 4 i c z s - i f v + 2 b z - 2 i c v z)^2}{4 (b + 2 i c s - i c v)}\right)\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.07.21.1952.01

$$\int z^n e^{\sqrt{z}\, b+e} \cos^v\left(\sqrt{z}\, c + f z + g\right) dz = 2^{-2n-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{\frac{i (b + c i (2 s - v))^2}{4 f (2 s - v)} + e + g i (2 s - v)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b + c i (2 s - v))^{-h-k+2n} \left(b + c i (2 s - v) + 2 f i (2 s - v) \sqrt{z}\right)^{h+k} \left(\frac{i \left(b + c i (2 s - v) + 2 f i (2 s - v) \sqrt{z}\right)^2}{f (2 s - v)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b + c i (2 s - v)) \left(b + c i (2 s - v) + 2 f i (2 s - v) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1), \frac{i \left(b + c i (2 s - v) + 2 f i (2 s - v) \sqrt{z}\right)^2}{4 f (2 s - v)}\right) + 2 f i (2 s - v) \sqrt{\frac{i \left(b + c i (2 s - v) + 2 f i (2 s - v) \sqrt{z}\right)^2}{f (2 s - v)}} \Gamma\left(\frac{1}{2}(h + k + 2), \frac{i \left(b + c i (2 s - v) + 2 f i (2 s - v) \sqrt{z}\right)^2}{4 f (2 s - v)}\right)\right)\right) (i f (2 s - v))^{-2n-2} + \right.$$

$$e^{\frac{i (b+c i (v-2 s))^2}{4 f (v-2 s)}+e+g i (v-2 s)} (i f (v-2 s))^{-2 n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c i (v-2 s))^{-h-k+2 n}$$

$$\left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right)^{h+k} \left(\frac{i \left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right)^2}{f (v-2 s)}\right)^{\frac{1}{2} (-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left((b+c i (v-2 s)) \left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1),\right.\right.$$

$$\left.\frac{i \left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right)^2}{4 f (v-2 s)}\right)+2 f i (v-2 s) \Gamma\left(\frac{1}{2} (h+k+2),\right.$$

$$\left.\left.\frac{i \left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right)^2}{4 f (v-2 s)}\right) \sqrt{\frac{i \left(b+c i (v-2 s)+2 f i (v-2 s) \sqrt{z}\right)^2}{f (v-2 s)}}\right)\right) -$$

$$2^{1-v} b^{-2 (n+1)} e^{e} \binom{v}{\frac{v}{2}} \Gamma\left(2 (n+1), -b \sqrt{z}\right) (1 - v \bmod 2) \;/;\; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n e^{b z^r+d z} \cos^v\left(c z^r + f z + g\right)$

01.07.21.1953.01

$$\int z^n e^{b z^2+d z} \cos^\nu\left(c z^2 + f z+g\right) dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{\frac{(i d+2 f s - f \nu)^2}{4(b-2 i c s+i c \nu)}+g i(\nu-2s)} \left(\sum_{q=0}^{n} 2^{q-n} (-d+2 i f s - i f \nu)^{n-q} (d+f i(\nu-2s)+2(b-2 i c s+i c \nu) z)^{q+1} \left(-\frac{(d+f i(\nu-2s)+2(b-2 i c s+i c \nu) z)^2}{b-2 i c s+i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f i(\nu-2s)+2(b-2 i c s+i c \nu) z)^2}{4(b-2 i c s+i c \nu)}\right)\right) (b-2 i c s+i c \nu)^{-n-1} + e^{\frac{(i d-2 f s+f \nu)^2}{4(b+2 i c s-i c \nu)}-i g(\nu-2s)} (b+2 i c s-i c \nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d-2 i f s+i f \nu)^{n-q} (d+2 i f s-i f \nu+2bz+4 i c s z-2 i c \nu z)^{q+1} \left(-\frac{(d+2 i f s-i f \nu+2bz+4 i c s z-2 i c \nu z)^2}{b+2 i c s-i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2 i f s-i f \nu+2bz+4 i c s z-2 i c \nu z)^2}{4(b+2 i c s-i c \nu)}\right)\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1954.01

$$\int z^n e^{\sqrt{z}\, b+d z} \cos^\nu\left(\sqrt{z}\, c+g+f z\right) dz = 2^{-2n-\nu-1} \left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{-\frac{(b+c i(2s-\nu))^2}{4(d+f i(2s-\nu))}+g i(2s-\nu)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c i(2s-\nu))^{-h-k+2n} \left(b+c i(2s-\nu)+2(d+f i(2s-\nu))\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c i(2s-\nu)+2(d+f i(2s-\nu))\sqrt{z}\right)^2}{d+f i(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+c i(2s-\nu)) \left(b+c i(2s-\nu)+ 2(d+f i(2s-\nu))\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c i(2s-\nu)+2(d+f i(2s-\nu))\sqrt{z}\right)^2}{4(d+f i(2s-\nu))}\right) + 2\sqrt{-\frac{\left(b+c i(2s-\nu)+2(d+f i(2s-\nu))\sqrt{z}\right)^2}{d+f i(2s-\nu)}}\, (d+f i(2s-\nu))\right.\right.\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c\,i\,(2s-v)+2\,(d+f\,i\,(2s-v))\sqrt{z}\right)^2}{4\,(d+f\,i\,(2s-v))}\right)\Bigg)\Bigg)\Bigg)(d+f\,i\,(2s-v))^{-2(n+1)}+$$

$$e^{-\frac{(b+c\,i\,(v-2s))^2}{4\,(d+f\,i\,(v-2s))}+g\,i\,(v-2s)}\,(d+f\,i\,(v-2s))^{-2(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b+c\,i\,(v-2s))^{-h-k+2n}$$

$$\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((b+c\,i\,(v-2s))\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\right)+2$$

$$(d+f\,i\,(v-2s))\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\right)$$

$$\sqrt{-\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}}\Bigg)\Bigg)-$$

$$d^{-2(n+1)}\,e^{-\frac{b^2}{4d}}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,b^{-h-k+2n}\left(b+2\,d\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\sqrt{-\frac{\left(b+2\,d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\,e^{b\,z^r+d\,z+e}\cos^v\left(c\,z^r+f\,z+g\right)$

01.07.21.1955.01

$$\int z^n e^{b z^2+d z+e} \cos^\nu\left(c z^2+f z+g\right) dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4 b}} \left(e^e \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2-1) \sum_{q=0}^n 2^{q-n} (-d)^{n-q} (d+2 b z)^{q+1} \left(-\frac{(d+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2 b z)^2}{4 b}\right) - b^{n+1} e^{\frac{d^2}{4 b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{(i d+2 f s-f \nu)^2}{4 (b-2 i c s+i c \nu)}+e+g i (\nu-2 s)} \left(\sum_{q=0}^n 2^{q-n} (-d+2 i f s-i f \nu)^{n-q} (d+f i (\nu-2 s)+2 (b-2 i c s+i c \nu) z)^{q+1} \left(-\frac{(d+f i (\nu-2 s)+2 (b-2 i c s+i c \nu) z)^2}{b-2 i c s+i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f i (\nu-2 s)+2 (b-2 i c s+i c \nu) z)^2}{4 (b-2 i c s+i c \nu)}\right)\right) (b-2 i c s+i c \nu)^{-n-1} + e^{\frac{(i d-2 f s+f \nu)^2}{4 (b+2 i c s-i c \nu)}+e-i g (\nu-2 s)} (b+2 i c s-i c \nu)^{-n-1} \sum_{q=0}^n 2^{q-n} (-d-2 i f s+i f \nu)^{n-q} (d+2 i f s-i f \nu+2 b z+4 i c s z-2 i c \nu z)^{q+1} \left(-\frac{(d+2 i f s-i f \nu+2 b z+4 i c s z-2 i c \nu z)^2}{b+2 i c s-i c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2 i f s-i f \nu+2 b z+4 i c s z-2 i c \nu z)^2}{4 (b+2 i c s-i c \nu)}\right)\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.1956.01

$$\int z^n e^{\sqrt{z}\, b+e+d z} \cos^\nu\left(\sqrt{z}\, c+g+f z\right) dz = 2^{-2 n-\nu-1} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{(b+c i (2 s-\nu))^2}{4 (d+f i (2 s-\nu))}+e+g i (2 s-\nu)} \left(\sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (b+c i (2 s-\nu))^{-h-k+2 n} \left(b+c i (2 s-\nu)+2 (d+f i (2 s-\nu)) \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c i (2 s-\nu)+2 (d+f i (2 s-\nu)) \sqrt{z}\right)^2}{d+f i (2 s-\nu)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+c i (2 s-\nu)) \left(b+c i (2 s-\nu)+2 (d+f i (2 s-\nu)) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c i (2 s-\nu)+2 (d+f i (2 s-\nu)) \sqrt{z}\right)^2}{4 (d+f i (2 s-\nu))}\right) + 2 \sqrt{-\frac{\left(b+c i (2 s-\nu)+2 (d+f i (2 s-\nu)) \sqrt{z}\right)^2}{d+f i (2 s-\nu)}} (d+f i (2 s-\nu))\right.\right.\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c\,i\,(2s-v)+2\,(d+f\,i\,(2s-v))\sqrt{z}\right)^2}{4\,(d+f\,i\,(2s-v))}\right)\Bigg)\Bigg)(d+f\,i\,(2s-v))^{-2(n+1)} +$$

$$e^{-\frac{(b+c\,i\,(v-2s))^2}{4\,(d+f\,i\,(v-2s))}+e+g\,i\,(v-2s)}\,(d+f\,i\,(v-2s))^{-2(n+1)} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b+c\,i\,(v-2s))^{-h-k+2n}$$

$$\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((b+c\,i\,(v-2s))\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\right)+2$$

$$(d+f\,i\,(v-2s))\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2s))}\right)$$

$$\sqrt{-\frac{\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^2}{d+f\,i\,(v-2s)}}\Bigg)\Bigg) -$$

$$d^{-2(n+1)}\,e^{e-\frac{b^2}{4d}}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,b^{-h-k+2n}\left(b+2d\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)+$$

$$2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)\;/;\; n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving products of the direct functions, exponential and a power functions

Involving products of two direct functions, exponential and a power functions

Involving $z^{\alpha-1}\, e^{p\, z} \cos(c\, z) \cos(a\, z)$

01.07.21.1957.01

$$\int z^{\alpha-1}\, e^{b\, z} \cos(c\, z) \cos(a\, z)\, dz = -\frac{1}{4}\, z^{\alpha}\, (E_{1-\alpha}(i\, (a-c+i\, b\,)\, z) + E_{1-\alpha}(-i\, (a-i\, b-c)\, z) + E_{1-\alpha}(i\, (a+c+i\, b\,)\, z) + E_{1-\alpha}(-i\, (a-i\, b+c)\, z))$$

Involving $z^{\alpha-1}\, e^{p\, z} \cos(c\, z) \cos(a\, z+b)$

01.07.21.1958.01

$$\int z^{\alpha-1}\, e^{p\, z} \cos(c\, z) \cos(b+a\, z)\, dz = -\frac{1}{4}\, e^{-i\, b}\, z^{\alpha} \left(E_{1-\alpha}(i\, (a-c+i\, p)\, z) + E_{1-\alpha}(i\, (a+c+i\, p)\, z) + e^{2\, i\, b}\, E_{1-\alpha}(-i\, (a-c-i\, p)\, z) + e^{2\, i\, b}\, E_{1-\alpha}(-i\, (a+c-i\, p)\, z)\right)$$

Involving $z^{\alpha-1}\, e^{p\, z} \cos(c\, z+d) \cos(a\, z+b)$

01.07.21.1959.01

$$\int z^{\alpha-1}\, e^{p\, z} \cos(d+c\, z) \cos(b+a\, z)\, dz = -\frac{1}{4}\, e^{-i\, (b+d)}\, z^{\alpha} \left(e^{2\, i\, d}\, E_{1-\alpha}(i\, (a-c+i\, p)\, z) + E_{1-\alpha}(i\, (a+c+i\, p)\, z) + e^{2\, i\, b}\, E_{1-\alpha}(-i\, (a-c-i\, p)\, z) + e^{2\, i\, (b+d)}\, E_{1-\alpha}(-i\, (a+c-i\, p)\, z)\right)$$

Involving $z^{n}\, e^{p\, z^{r}} \cos(b\, z) \cos(c\, z)$

01.07.21.1960.01

$$\int z^{n}\, e^{p\, z^{2}} \cos(b\, z) \cos(c\, z)\, dz = -\frac{1}{8}\, p^{-n-1} \left(e^{\frac{(b-c)^2}{4\, p}} \sum_{q=0}^{n} 2^{q-n}\, (i\, (b-c))^{n-q} \left(\frac{(b-c+2\, i\, p\, z)^2}{p}\right)^{\frac{1}{2}(-q-1)} (-i\, b+i\, c+2\, p\, z)^{q+1} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{(b-c+2\, i\, p\, z)^2}{4\, p}\right) + \right.$$
$$e^{\frac{(b-c)^2}{4\, p}} \sum_{q=0}^{n} 2^{q-n}\, (-i\, (b-c))^{n-q} \left(\frac{(-b+c+2\, i\, p\, z)^2}{p}\right)^{\frac{1}{2}(-q-1)} (i\, b-i\, c+2\, p\, z)^{q+1} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{(-b+c+2\, i\, p\, z)^2}{4\, p}\right) +$$
$$e^{\frac{(b+c)^2}{4\, p}} \sum_{q=0}^{n} 2^{q-n}\, (i\, (b+c))^{n-q}\, (-i\, (b+c+2\, i\, p\, z))^{q+1} \left(\frac{(b+c+2\, i\, p\, z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{(b+c+2\, i\, p\, z)^2}{4\, p}\right) +$$
$$\left. e^{\frac{(b+c)^2}{4\, p}} \sum_{q=0}^{n} 2^{q-n}\, (-i\, (b+c))^{n-q}\, (i\, (b+c-2\, i\, p\, z))^{q+1} \left(\frac{(b+c-2\, i\, p\, z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{(b+c-2\, i\, p\, z)^2}{4\, p}\right)\right) /;\, n \in \mathbb{N}$$

01.07.21.1961.01

$$\int z^n e^{p\sqrt{z}} \cos(b z)\cos(c z)\, dz ==$$

$$2^{-2n-3}\left(-\frac{(-i(b-c))^{-2n}}{(b-c)^2} e^{\frac{i p^2}{4c-4b}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k p^{-h-k+2n}\left(p-2 i (b-c)\sqrt{z}\right)^{h+k}\left(\frac{i\left(2\sqrt{z}\,(b-c)+i p\right)^2}{b-c}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(p\left(p-2 i (b-c)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(2\sqrt{z}\,(b-c)+i p\right)^2}{4(b-c)}\right)-\right.$$

$$\left.2 i (b-c)\sqrt{\frac{i\left(2\sqrt{z}\,(b-c)+i p\right)^2}{b-c}}\ \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(2\sqrt{z}\,(b-c)+i p\right)^2}{4(b-c)}\right)\right)-$$

$$\frac{(i(b-c))^{-2n}}{(b-c)^2} e^{\frac{i p^2}{4b-4c}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k p^{-h-k+2n}\left(p+2 i (b-c)\sqrt{z}\right)^{h+k}\left(\frac{i\left(p+2 i (b-c)\sqrt{z}\right)^2}{b-c}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(p\left(p+2 i (b-c)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(p+2 i (b-c)\sqrt{z}\right)^2}{4(b-c)}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(p+2 i (b-c)\sqrt{z}\right)^2}{b-c}}\ (b-c)\, i\,\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(p+2 i (b-c)\sqrt{z}\right)^2}{4(b-c)}\right)\right)+$$

$$\frac{1}{(b+c)^2} e^{-\frac{i p^2}{4(b+c)}}\left(-(-i(b+c))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k p^{-h-k+2n}\left(p-2 i (b+c)\sqrt{z}\right)^{h+k}\left(\frac{i\left(2\sqrt{z}\,(b+c)+i p\right)^2}{b+c}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(p\left(p-2 i (b+c)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(2\sqrt{z}\,(b+c)+i p\right)^2}{4(b+c)}\right)-\right.$$

$$\left.2 i (b+c)\sqrt{\frac{i\left(2\sqrt{z}\,(b+c)+i p\right)^2}{b+c}}\ \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(2\sqrt{z}\,(b+c)+i p\right)^2}{4(b+c)}\right)\right)-$$

$$(i(b+c))^{-2n}\, e^{\frac{i p^2}{2(b+c)}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, p^{-h-k+2n}\left(p+2\,i\,(b+c)\sqrt{z}\right)^{h+k}\left(\frac{i\left(p+2\,i\,(b+c)\sqrt{z}\right)^2}{b+c}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(p\left(p+2\,i\,(b+c)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\, \frac{i\left(p+2\,i\,(b+c)\sqrt{z}\right)^2}{4(b+c)}\right)+\right.$$

$$\left.\left.\left. 2\sqrt{\frac{i\left(p+2\,i\,(b+c)\sqrt{z}\right)^2}{b+c}}\,(b+c)\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\, \frac{i\left(p+2\,i\,(b+c)\sqrt{z}\right)^2}{4(b+c)}\right)\right)\right)\right)\, /;\, n\in\mathbb{N}$$

Involving $z^n\, e^{p z} \cos\left(b\, z^r\right) \cos(c\, z)$

01.07.21.1962.01

$$\int z^n\, e^{p z} \cos\left(b\, z^2\right)\cos(c\, z)\, dz = \frac{1}{8}(-1)^n (i\, b)^{-n-1}\, e^{-\frac{i\left(c^2-6\, i\, p\, c+p^2\right)}{4b}}$$

$$\left(e^{\frac{c(i c+2p)}{2b}}\sum_{q=0}^{n} 2^{q-n}(i\, c-p)^{n-q}(-i\, c+p-2\, i\, b\, z)^{q+1}\left(\frac{i(c+i\, p+2\, b\, z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\, \frac{i(c+i\, p+2\, b\, z)^2}{4b}\right)+\right.$$

$$e^{\frac{c(i c+4p)}{2b}}\sum_{q=0}^{n} 2^{q-n}(-i\, c-p)^{n-q}\left(\frac{i(c-i\, p-2\, b\, z)^2}{b}\right)^{\frac{1}{2}(-q-1)}(i\, c+p-2\, i\, b\, z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\, \frac{i(c-i\, p-2\, b\, z)^2}{4b}\right)-$$

$$(-1)^n\, e^{\frac{(2c+i p)p}{2b}}\sum_{q=0}^{n} 2^{q-n}(-i\, c-p)^{n-q}(i\, c+p+2\, i\, b\, z)^{q+1}$$

$$\left(-\frac{i(c-i\, p+2\, b\, z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\, -\frac{i(c-i\, p+2\, b\, z)^2}{4b}\right)-(-1)^n\, e^{\frac{(4c+i p)p}{2b}}$$

$$\left.\sum_{q=0}^{n} 2^{q-n}(i\, c-p)^{n-q}\left(-\frac{i(c+i\, p-2\, b\, z)^2}{b}\right)^{\frac{1}{2}(-q-1)}(-i\, c+p+2\, i\, b\, z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\, -\frac{i(c+i\, p-2\, b\, z)^2}{4b}\right)\right)\, /;\, n\in\mathbb{N}$$

01.07.21.1963.01

$$\int z^n\, e^{p z}\cos\left(b\sqrt{z}\right)\cos(c\, z)\, dz =$$

$$2^{-2n-3}\left(e^{\frac{b^2}{4(i c+p)}}(i\, c+p)^{-2(n+1)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n}\left(i\, b+2\,(i\, c+p)\sqrt{z}\right)^{h+k}\left(-\frac{\left(i\, b+2\,(i\, c+p)\sqrt{z}\right)^2}{i\, c+p}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(2\,(i\,c+p)\sqrt{-\frac{\left(i\,b+2\,(i\,c+p)\sqrt{z}\right)^2}{i\,c+p}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(i\,b+2\,(i\,c+p)\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)-\right.$$

$$\left.\left.b\left(b+2\,(c-i\,p)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(i\,b+2\,(i\,c+p)\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)\right)\right)-$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-\frac{\left(i\,b-2\,(i\,c+p)\sqrt{z}\right)^2}{i\,c+p}\right)^{\frac{1}{2}(-h-k-1)}\left(-i\,b+2\,(i\,c+p)\sqrt{z}\right)^{h+k}$$

$$\binom{k}{h}\binom{n}{k}\left(b\left(b-2\,(c-i\,p)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(i\,b-2\,(i\,c+p)\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)-\right.$$

$$\left.\left.\left.2\,i\,(c-i\,p)\sqrt{-\frac{i\left(b-2\,(c-i\,p)\sqrt{z}\right)^2}{c-i\,p}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(i\,b-2\,(i\,c+p)\sqrt{z}\right)^2}{4\,(i\,c+p)}\right)\right)\right)\right)+$$

$$\frac{1}{(c+i\,p)^2}\left(e^{\frac{b^2}{4(-i\,c+p)}}\,(-i\,c+p)^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(\frac{i\left(b+2\,(c+i\,p)\sqrt{z}\right)^2}{c+i\,p}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\left(-i\,b+2\,(-i\,c+p)\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}\left(b\left(b+2\,(c+i\,p)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,(c+i\,p)\sqrt{z}\right)^2}{4\,(c+i\,p)}\right)+\right.$$

$$\left.\left.\left.2\,i\sqrt{\frac{i\left(b+2\,(c+i\,p)\sqrt{z}\right)^2}{c+i\,p}}\;(c+i\,p)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+2\,(c+i\,p)\sqrt{z}\right)^2}{4\,(c+i\,p)}\right)\right)\right)\right)+$$

$$\frac{1}{(c+i\,p)^2}\left(e^{\frac{b^2}{4(-i\,c+p)}}\,(-i\,c+p)^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\left(\frac{i\left(b-2\,(c+i\,p)\sqrt{z}\right)^2}{c+i\,p}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\left(i\,b+2\,(-i\,c+p)\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}\left(b\left(b-2\,(c+i\,p)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b-2\,(c+i\,p)\sqrt{z}\right)^2}{4\,(c+i\,p)}\right)+\right.$$

Involving $z^n e^{p z^r} \cos(b z^r) \cos(c z)$

01.07.21.1964.01

$$\int z^n e^{p z^2} \cos(b z^2) \cos(c z) \, dz = -\frac{1}{8} e^{\frac{c^2 p}{2(b^2+p^2)}} (b^2+p^2)^{-n-1} \left(e^{-\frac{c^2}{4(-i b+p)}} \left(\sum_{q=0}^{n} 2^{q-n} (i c)^{n-q} \left(-\frac{i(c-2bz+2ipz)^2}{b-ip}\right)^{\frac{1}{2}(-q-1)} (-ic+2(ib+p)z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(c-2bz+2ipz)^2}{4(b-ip)}\right) + \sum_{q=0}^{n} 2^{q-n} (-ic)^{n-q} \left(-\frac{i(c+2(b-ip)z)^2}{b-ip}\right)^{\frac{1}{2}(-q-1)} (ic+2(ib+p)z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(c+2(b-ip)z)^2}{4(b-ip)}\right)\right) (-ib+p)^{n+1} + e^{-\frac{c^2}{4(ib+p)}} (ib+p)^{n+1} \left(\sum_{q=0}^{n} 2^{q-n} (ic)^{n-q} (-i(c+2(b+ip)z))^{q+1} \left(\frac{i(c+2(b+ip)z)^2}{b+ip}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(c+2(b+ip)z)^2}{4(b+ip)}\right) + \sum_{q=0}^{n} 2^{q-n} (-ic)^{n-q} \left(\frac{i(c-2(b+ip)z)^2}{b+ip}\right)^{\frac{1}{2}(-q-1)} (ic+2(-ib+p)z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(c-2(b+ip)z)^2}{4(b+ip)}\right)\right)\right) /; n \in \mathbb{N}$$

01.07.21.1965.01

$$\int z^n e^{p\sqrt{z}} \cos(b\sqrt{z}) \cos(c z) \, dz = \frac{1}{c^2} \left(\left(2^{-2n-3} (ic)^{-2n}\right) e^{-\frac{i(b^2-6ipb-p^2)}{4c}} \left(e^{\frac{i(b-ip)^2}{2c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-ib+p)^{-h-k+2n} \left(-ib+p-2ic\sqrt{z}\right)^{h+k} \left(\frac{i\left(b+ip+2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+ip)\left(b+ip+2c\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+ip+2c\sqrt{z}\right)^2}{4c}\right) + 2\sqrt{\frac{i\left(b+ip+2c\sqrt{z}\right)^2}{c}} \, c \, i \, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+ip+2c\sqrt{z}\right)^2}{4c}\right)\right) + e^{\frac{i(b^2-4ipb-p^2)}{2c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (ib+p)^{-h-k+2n} \left(\frac{i\left(b-ip-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \left(ib+p-2ic\sqrt{z}\right)^{h+k}$$

$$\binom{k}{h}\binom{n}{k}\left((b-i\,p)\left(b-i\,p-2\,c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b-i\,p-2\,c\sqrt{z}\right)^2}{4\,c}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(b-i\,p-2\,c\sqrt{z}\right)^2}{c}}\;c\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b-i\,p-2\,c\sqrt{z}\right)^2}{4\,c}\right)\right)-$$

$$e^{\frac{b\,p}{c}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+p)^{-h-k+2\,n}\left(i\,b+p+2\,i\,c\sqrt{z}\right)^{h+k}\left(-\frac{i\left(b-i\,p+2\,c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((i\,b+p)\left(i\,b+p+2\,i\,c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b-i\,p+2\,c\sqrt{z}\right)^2}{4\,c}\right)+\right.$$

$$\left.2\sqrt{-\frac{i\left(b-i\,p+2\,c\sqrt{z}\right)^2}{c}}\;c\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b-i\,p+2\,c\sqrt{z}\right)^2}{4\,c}\right)\right)+$$

$$e^{\frac{2\,b\,p}{c}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+p)^{-h-k+2\,n}\left(-\frac{i\left(b+i\,p-2\,c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)}\left(-i\,b+p+2\,i\,c\sqrt{z}\right)^{h+k}$$

$$\binom{k}{h}\binom{n}{k}\left((b+i\,p)\left(b+i\,p-2\,c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+i\,p-2\,c\sqrt{z}\right)^2}{4\,c}\right)-\right.$$

$$\left.\left.\left.2\,i\,c\sqrt{-\frac{i\left(b+i\,p-2\,c\sqrt{z}\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+i\,p-2\,c\sqrt{z}\right)^2}{4\,c}\right)\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\cos\left(b\,z^r\right)\cos\left(c\,z^r\right)$

01.07.21.1966.01

$$\int z^n e^{p z} \cos(b z^2) \cos(c z^2)\, dz = -\frac{1}{8}\left(e^{\frac{i p^2}{4c-4b}}\left(\sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (p - 2 i (b-c) z)^{q+1} \left(\frac{i (i p + 2 (b-c) z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (i p + 2 (b-c) z)^2}{4 (b-c)}\right)\right)\right.$$

$$(-i (b-c))^{-n-1} + (i (b-c))^{-n-1} e^{\frac{i p^2}{4b-4c}} \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (p + 2 (b-c) i z)^{q+1}$$

$$\left(\frac{i (p + 2 (b-c) i z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (p + 2 (b-c) i z)^2}{4 (b-c)}\right) + (-i (b+c))^{-n-1} e^{-\frac{i p^2}{4(b+c)}}$$

$$\sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (p - 2 i (b+c) z)^{q+1} \left(\frac{i (i p + 2 (b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (i p + 2 (b+c) z)^2}{4 (b+c)}\right) + (i (b+c))^{-n-1}$$

$$\left. e^{\frac{i p^2}{4(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (p + 2 (b+c) i z)^{q+1} \left(\frac{i (p + 2 (b+c) i z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (p + 2 (b+c) i z)^2}{4 (b+c)}\right)\right) /;\ n \in \mathbb{N}$$

01.07.21.1967.01

$$\int z^n e^{p z} \cos\left(b \sqrt{z}\right) \cos\left(c \sqrt{z}\right) dz = 2^{-2n-3} p^{-2(n+1)} \left(e^{\frac{(c-b)^2}{4p}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-i (c-b))^{-h-i+2n} \left(\frac{\left(-b + c + 2 i p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \left(i b - i c + 2 p \sqrt{z}\right)^{h+i}\right.$$

$$\binom{i}{h} \binom{n}{i} \left(2 p \sqrt{\frac{\left(-b + c + 2 i p \sqrt{z}\right)^2}{p}}\, \Gamma\left(\frac{1}{2}(h+i+2), \frac{\left(-b + c + 2 i p \sqrt{z}\right)^2}{4 p}\right) - \right.$$

$$\left.\left. i (c-b) \left(i b - i c + 2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), \frac{\left(-b + c + 2 i p \sqrt{z}\right)^2}{4 p}\right)\right)\right) +$$

$$e^{\frac{(b+c)^2}{4p}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (i (-b-c))^{-h-i+2n} \left(\frac{\left(-b - c - 2 i p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \left(-i b - i c + 2 p \sqrt{z}\right)^{h+i}$$

$$\binom{i}{h} \binom{n}{i} \left((-b-c)\, i \left(-i b - i c + 2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), \frac{\left(-b - c - 2 i p \sqrt{z}\right)^2}{4 p}\right) + \right.$$

$$2 \sqrt{\frac{\left(-b-c-2 i p \sqrt{z}\right)^2}{p}} \; p \, \Gamma\left(\frac{1}{2}(h+i+2), \frac{\left(-b-c-2 i p \sqrt{z}\right)^2}{4 p}\right)\Bigg)\Bigg) +$$

$$e^{\frac{(b-c)^2}{4 p}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} \, 4^i \, (i (c-b))^{-h-i+2 n} \left(\frac{\left(-b+c-2 i p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \left(-i b+i c+2 p \sqrt{z}\right)^{h+i}$$

$$\binom{i}{h} \binom{n}{i} \left((c-b) \, i \left(-i b+i c+2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), \frac{\left(-b+c-2 i p \sqrt{z}\right)^2}{4 p}\right) +\right.$$

$$\left. 2 \sqrt{\frac{\left(-b+c-2 i p \sqrt{z}\right)^2}{p}} \; p \, \Gamma\left(\frac{1}{2}(h+i+2), \frac{\left(-b+c-2 i p \sqrt{z}\right)^2}{4 p}\right)\right) +$$

$$e^{-\frac{(i b+i c)^2}{4 p}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} \, 4^i \, (i b+i c)^{-h-i+2 n} \left(i b+i c+2 p \sqrt{z}\right)^{h+i} \left(-\frac{\left(i b+i c+2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h} \binom{n}{i} \left((i b+i c) \left(i b+i c+2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(i b+i c+2 p \sqrt{z}\right)^2}{4 p}\right) +\right.$$

$$\left. 2 \sqrt{-\frac{\left(i b+i c+2 p \sqrt{z}\right)^2}{p}} \; p \, \Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(i b+i c+2 p \sqrt{z}\right)^2}{4 p}\right)\right)\Bigg)\Bigg) \; /; \; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z^r} \cos\left(b z^r\right) \cos\left(c z^r\right)$

01.07.21.1968.01

$$\int z^{\alpha-1} e^{p z^r} \cos\left(b z^r\right) \cos\left(c z^r\right) dz ==$$

$$-\frac{1}{4 r}\left(z^\alpha \left(\Gamma\left(\frac{\alpha}{r}, i (b-c+i p) z^r\right) \left(i (b-c+i p) z^r\right)^{-\frac{\alpha}{r}} + \left(i (b+c+i p) z^r\right)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, i (b+c+i p) z^r\right) +\right.\right.$$

$$\left.\left.\left(-i (b-c-i p) z^r\right)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -i (b-c-i p) z^r\right) + \left(-i (b+c-i p) z^r\right)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -i (b+c-i p) z^r\right)\right)\right)$$

Involving $z^{\alpha-1} e^{b z^r + e} \cos\left(a z^r + q\right) \cos\left(c z^r + g\right)$

01.07.21.1969.01

$$\int z^{\alpha-1} e^{b z^r+e} \cos(a z^r+q)\cos(c z^r+g)\, dz = -\frac{1}{4r}\left(e^{e-i(g+q)} z^{\alpha}\left(e^{2ig}\Gamma\left(\frac{\alpha}{r}, i(a-c+ib)z^r\right)(i(a-c+ib)z^r)^{-\frac{\alpha}{r}} + e^{2iq}(-i(a-ib-c)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, -i(a-ib-c)z^r\right) + (i(a+c+ib)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, i(a+c+ib)z^r\right) + e^{2i(g+q)}(-i(a-ib+c)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, -i(a-ib+c)z^r\right)\right)\right)$$

Involving $z^n e^{b z^r+d z+e}\cos(a z^r+p z+q)\cos(c z^r+f z+g)$

01.07.21.1970.01

$$\int z^n e^{b z^2+d z+e}\cos(a z^2+p z+q)\cos(c z^2+f z+g)\, dz = \frac{1}{8} e^{e-i(g+q)}\left(-e^{-\frac{i(d-i(f+p))^2}{4(a+c+ib)}}\left(\sum_{j=0}^{n} -i\, 2^{j-n}(i(f+p)-d)^{n-j}(f+id+p+2az+2cz+2ibz)\left(\frac{i(f+id+p+2az+2cz+2ibz)^2}{a+c+ib}\right)^{\frac{1}{2}(-j-1)}(d-i(f+p+2(a+c+ib)z))^j \binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i(f+id+p+2az+2cz+2ibz)^2}{4(a+c+ib)}\right)\right)(-i(a+c+ib))^{-n-1} - (b-ia+ic)^{-n-1} e^{2ig-\frac{i(d+i(f-p))^2}{4(a-c+ib)}}\sum_{j=0}^{n} 2^{j-n}(-d-i(f-p))^{n-j}\left(\frac{i(-f+id+p+2az-2cz+2ibz)^2}{a-c+ib}\right)^{\frac{1}{2}(-j-1)}(d-i(-f+p+2(a-c+ib)z))^{j+1}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i(-f+id+p+2az-2cz+2ibz)^2}{4(a-c+ib)}\right) - (b-ic+ia)^{-n-1} e^{\frac{1}{4}i\left(\frac{(d-if+ip)^2}{a-ib-c}+8q\right)}\sum_{j=0}^{n} 2^{j-n}(i(f-p)-d)^{n-j}\left(-\frac{i(f+id-p-2az+2cz+2ibz)^2}{a-ib-c}\right)^{\frac{1}{2}(-j-1)}(d+i(-f+p+2(a-ib-c)z))^{j+1}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{i(f+id-p-2az+2cz+2ibz)^2}{4(a-ib-c)}\right) + \frac{1}{a-ib+c}\left(i(b+ia+ic)^{-n} e^{\frac{1}{4}i\left(\frac{(d+i(f+p))^2}{a-ib+c}+8g+8q\right)}\sum_{j=0}^{n} 2^{j-n}(-d-i(f+p))^{n-j}\left(-\frac{i(f-id+p+2az-2ibz+2cz)^2}{a-ib+c}\right)^{\frac{1}{2}(-j-1)}(d+i(f+p+2(a-ib+c)z))^{j+1}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{i(f-id+p+2az-2ibz+2cz)^2}{4(a-ib+c)}\right)\right)\right) /; n\in\mathbb{N}$$

01.07.21.1971.01

$$\int z^n e^{\sqrt{z}\, b+e+d\,z} \cos\left(\sqrt{z}\, a+q+p\,z\right) \cos\left(\sqrt{z}\, c+g+f\,z\right) dz =$$

$$2^{-2n-3} e^{e-i(g+q)} \left(e^{\frac{(a-c+i\,b)^2}{4(d+i(f-p))}+2\,i\,g} \left(\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h}\, 4^i\, (b-i\,a+i\,c)^{-h-i+2n} \right.\right.$$

$$\left(b-i\,a+i\,c+2\,(d+i\,(f-p))\sqrt{z}\right)^{h+i} \left(-\frac{\left(b-i\,a+i\,c+2\,(d+i\,(f-p))\sqrt{z}\right)^2}{d+i\,(f-p)}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i} \left((b-i\,a+i\,c)\left(b-i\,a+i\,c+2\,(d+i\,(f-p))\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1),\right.\right.$$

$$\left.-\frac{\left(b-i\,a+i\,c+2\,(d+i\,(f-p))\sqrt{z}\right)^2}{4\,(d+i\,(f-p))}\right) + 2\sqrt{-\frac{\left(b-i\,a+i\,c+2\,(d+i\,(f-p))\sqrt{z}\right)^2}{d+i\,(f-p)}}$$

$$\left.\left.\left.(d+i\,(f-p))\,\Gamma\left(\frac{1}{2}(h+i+2),\, -\frac{\left(b-i\,a+i\,c+2\,(d+i\,(f-p))\sqrt{z}\right)^2}{4\,(d+i\,(f-p))}\right)\right)\right) (d+i\,(f-p))^{-2(n+1)} +$$

$$e^{\frac{(-a+c+i\,b)^2}{4(d-i(f-p))}+2\,i\,q}\, (d-i\,(f-p))^{-2(n+1)} \sum_{i=0}^{n}\sum_{h=0}^{i} (-1)^{i-h}\, 4^i\, (b-i\,c+i\,a)^{-h-i+2n} \left(b+i\,a-i\left(c+2\,(f+i\,d-p)\sqrt{z}\right)\right)^{h+i}$$

$$\left(-\frac{\left(b+i\,a-i\left(c+2\,(f+i\,d-p)\sqrt{z}\right)\right)^2}{d-i\,(f-p)}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}\binom{n}{i}$$

$$\left((b-i\,c+i\,a)\left(b+i\,a-i\left(c+2\,(f+i\,d-p)\sqrt{z}\right)\right) \Gamma\left(\frac{1}{2}(h+i+1),\, -\frac{\left(b+i\,a-i\left(c+2\,(f+i\,d-p)\sqrt{z}\right)\right)^2}{4\,(d-i\,(f-p))}\right) + \right.$$

$$2\sqrt{-\frac{\left(b+i\,a-i\left(c+2\,(f+i\,d-p)\sqrt{z}\right)\right)^2}{d-i\,(f-p)}}\; (d-i\,(f-p))$$

$$\left.\Gamma\left(\frac{1}{2}(h+i+2),\, -\frac{\left(b+i\,a-i\left(c+2\,(f+i\,d-p)\sqrt{z}\right)\right)^2}{4\,(d-i\,(f-p))}\right)\right) +$$

$$e^{\frac{(a-i b+c)^2}{4 (d+i (f+p))}+2 i g+2 i q} (d+i (f+p))^{-2 (n+1)} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (b+i a+i c)^{-h-i+2 n}$$

$$\left(b+i a+i c+2 (d+i (f+p)) \sqrt{z}\right)^{h+i} \left(-\frac{\left(b+i a+i c+2 (d+i (f+p)) \sqrt{z}\right)^2}{d+i (f+p)}\right)^{\frac{1}{2} (-h-i-1)}$$

$$\binom{i}{h} \binom{n}{i} \left((b+i a+i c) \left(b+i a+i c+2 (d+i (f+p)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+i+1),\right.\right.$$

$$\left.-\frac{\left(b+i a+i c+2 (d+i (f+p)) \sqrt{z}\right)^2}{4 (d+i (f+p))}\right)+2 \sqrt{-\frac{\left(b+i a+i c+2 (d+i (f+p)) \sqrt{z}\right)^2}{d+i (f+p)}}$$

$$\left.(d+i (f+p)) \Gamma\left(\frac{1}{2} (h+i+2), -\frac{\left(b+i a+i c+2 (d+i (f+p)) \sqrt{z}\right)^2}{4 (d+i (f+p))}\right)\right)+$$

$$e^{\frac{(a+c+i b)^2}{4 (d-i (f+p))}} (d-i (f+p))^{-2 (n+1)} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-i (a+c+i b))^{-h-i+2 n} \left(b-i a-i \left(c+2 (f+i d+p) \sqrt{z}\right)\right)^{h+i}$$

$$\left(\frac{\left(a+c+i b+2 f \sqrt{z}+2 i d \sqrt{z}+2 p \sqrt{z}\right)^2}{d-i (f+p)}\right)^{\frac{1}{2} (-h-i-1)} \binom{i}{h} \binom{n}{i}$$

$$\left(2 (d-i (f+p)) \sqrt{\frac{\left(a+c+i b+2 f \sqrt{z}+2 i d \sqrt{z}+2 p \sqrt{z}\right)^2}{d-i (f+p)}}\right.$$

$$\Gamma\left(\frac{1}{2} (h+i+2), \frac{\left(a+c+i b+2 f \sqrt{z}+2 i d \sqrt{z}+2 p \sqrt{z}\right)^2}{4 (d-i (f+p))}\right)-(a+c+i b) \left(a+c+i b+2 f \sqrt{z}+\right.$$

$$\left.\left.2 i d \sqrt{z}+2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+i+1), \frac{\left(a+c+i b+2 f \sqrt{z}+2 i d \sqrt{z}+2 p \sqrt{z}\right)^2}{4 (d-i (f+p))}\right)\right)\right) /; n \in \mathbb{N}$$

Involving products of several direct functions, exponential and a power functions

Involving $z^{\alpha-1} e^{p z} \cos(a z) \cos(b z) \cos(c z)$

01.07.21.1972.01

$$\int z^{\alpha-1} e^{p z} \cos(a z) \cos(b z) \cos(c z)\, dz == \frac{1}{8} z^{\alpha} \Big(-\Gamma(\alpha, -(i (a-b-c)+p) z) (-(i (a-b-c)+p) z)^{-\alpha} - (-(i (a+b-c)+p) z)^{-\alpha} \Gamma(\alpha, -(i (a+b-c)+p) z) - (-(i (a-b+c)+p) z)^{-\alpha} \Gamma(\alpha, -(i (a-b+c)+p) z) - (-(i (a+b+c)+p) z)^{-\alpha} \Gamma(\alpha, -(i (a+b+c)+p) z) - (i (a-b-c+i p) z)^{-\alpha} \Gamma(\alpha, i (a-b-c+i p) z) - (i (a+b-c+i p) z)^{-\alpha} \Gamma(\alpha, i (a+b-c+i p) z) - (i (a-b+c+i p) z)^{-\alpha} \Gamma(\alpha, i (a-b+c+i p) z) - (i (a+b+c+i p) z)^{-\alpha} \Gamma(\alpha, i (a+b+c+i p) z)\Big)$$

Involving $z^{\alpha-1} e^{p z} \prod_{k=1}^{n} \cos(a_k z)$

01.07.21.1973.01

$$\int z^{\alpha-1} e^{p z} \prod_{k=1}^{n} \cos(a_k z)\, dz == -2^{-n-1} z^{\alpha} \sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1} \sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1} \ldots \sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1} \left(\Gamma\left(\alpha, \left(i \sum_{j=1}^{n} (k_j a_j) - p\right) z\right) \left(\left(i \sum_{j=1}^{n} (k_j a_j) - p\right) z\right)^{-\alpha} + \left(-\left(i \sum_{j=1}^{n} (k_j a_j) + p\right) z\right)^{-\alpha} \Gamma\left(\alpha, -\left(i \sum_{j=1}^{n} (k_j a_j) + p\right) z\right)\right)$$

01.07.21.1974.01

$$\int \frac{1}{z} e^{p z} \prod_{k=1}^{n} \cos(a_k z)\, dz == \frac{1}{2^{n+1}} \sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1} \sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1} \ldots \sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1} \left(\mathrm{Ei}\left(\left(p + i \sum_{j=1}^{n} k_j a_j\right) z\right) + \mathrm{Ei}\left(\left(p - i \sum_{j=1}^{n} k_j a_j\right) z\right)\right)$$

Involving products of powers of the direct function, exponential and a power functions

Involving product of power of the direct function, the direct function, exponential and a power functions

Involving $z^{\alpha-1} e^{b z} \cos(c z) \cos^{\nu}(a z)$

01.07.21.1975.01

$$\int z^{\alpha-1} e^{b z} \cos(c z) \cos^{\nu}(a z)\, dz == 2^{-\nu-1} z^{\alpha} \left(\binom{\nu}{\frac{\nu}{2}} (E_{1-\alpha}(-(b + i c) z) + E_{1-\alpha}(i c z - b z)) (\nu \bmod 2 - 1) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} (E_{1-\alpha}(-(b + i (c - 2 a s + a \nu)) z) + E_{1-\alpha}(-(b - i (c - 2 a s + a \nu)) z) + E_{1-\alpha}(-(b + i (c + 2 a s - a \nu)) z) + E_{1-\alpha}(-(b - i (c + 2 a s - a \nu)) z))\right) /;\ \nu \in \mathbb{N}^{+}$$

01.07.21.1976.01

$$\int z^n e^{bz}\cos(cz)\cos^\nu(az)\,dz = \frac{1}{2}\,n!\,e^{bz}\cos^\nu(az)\left(1+e^{2iaz}\right)^{-\nu}\left(e^{icz}\sum_{p=0}^{n}\frac{((-1)^p z^{n-p})}{(n-p)!\,(b+ic-ia\nu)^{p+1}}\,{}_{p+2}F_{p+1}\left(\frac{-ib+c-a\nu}{2a},\ldots,\frac{-ib+c-a\nu}{2a},-\nu;\frac{-ib+c-a\nu}{2a}+1,\ldots,\frac{-ib+c-a\nu}{2a}+1;-e^{2iaz}\right)+e^{-icz}\sum_{p=0}^{n}\frac{((-1)^p z^{n-p})}{(n-p)!\,(b-ic-ia\nu)^{p+1}}\,{}_{p+2}F_{p+1}\left(-\frac{ib+c+a\nu}{2a},\ldots,-\frac{ib+c+a\nu}{2a},-\nu;1-\frac{ib+c+a\nu}{2a},\ldots,1-\frac{ib+c+a\nu}{2a};-e^{2iaz}\right)\right)/;\,n\in\mathbb{N}$$

Involving $z^n e^{bz}\cos(cz+d)\cos^\nu(az)$

01.07.21.1977.01

$$\int z^{\alpha-1}e^{bz}\cos(cz+d)\cos^\nu(az)\,dz = 2^{-\nu-1}z^\alpha\left(e^{-id}\binom{\nu}{\frac{\nu}{2}}\left(e^{2id}E_{1-\alpha}(-icz-bz)+E_{1-\alpha}(icz-bz)\right)(\nu\bmod 2-1)-\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-id}\binom{\nu}{s}\left(E_{1-\alpha}(i(c+ib-2as+a\nu)z)+e^{2id}E_{1-\alpha}(-i(c-ib-2as+a\nu)z)+E_{1-\alpha}(i(c+ib+2as-a\nu)z)+e^{2id}E_{1-\alpha}(-i(c-ib+2as-a\nu)z)\right)\right)/;\,\nu\in\mathbb{N}^+$$

01.07.21.1978.01

$$\int z^n e^{bz}\cos(cz+d)\cos^\nu(az)\,dz = \frac{n!}{2}\cos^\nu(az)\left(1+e^{2iaz}\right)^{-\nu}\left(e^{id+(b+ic)z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}}{(n-p)!\,(b+ic-ia\nu)^{p+1}}\,{}_{p+2}F_{p+1}\left(\frac{-ib+c-a\nu}{2a},\ldots,\frac{-ib+c-a\nu}{2a},-\nu;1+\frac{-ib+c-a\nu}{2a},\ldots,1+\frac{-ib+c-a\nu}{2a};-e^{2iaz}\right)+e^{-id+(b-ic)z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}}{(n-p)!\,(b-ic-ia\nu)^{p+1}}\,{}_{p+2}F_{p+1}\left(-\frac{ib+c+a\nu}{2a},\ldots,-\frac{ib+c+a\nu}{2a},-\nu;1-\frac{ib+c+a\nu}{2a},\ldots,1-\frac{ib+c+a\nu}{2a};-e^{2iaz}\right)\right)/;\,n\in\mathbb{N}$$

Involving $z^{\alpha-1}e^{pz}\,c\,os(cz)\cos^\nu(az+b)$

01.07.21.1979.01

$$\int z^{\alpha-1} e^{p z} \cos(c z) \cos^{\nu}(b + a z) \, dz = 2^{-\nu-1} z^{\alpha} \left(\binom{\nu}{\frac{\nu}{2}} (E_{1-\alpha}(-i c z - p z) + E_{1-\alpha}(i c z - p z)) (\nu \bmod 2 - 1) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i b (2 s + \nu)} \binom{\nu}{s} \left(e^{4 i b s} E_{1-\alpha}(i (c + i p - 2 a s + a \nu) z) + e^{2 i b \nu} E_{1-\alpha}(-i (c - i p - 2 a s + a \nu) z) + e^{2 i b \nu} E_{1-\alpha}(i (c + i p + 2 a s - a \nu) z) + e^{4 i b s} E_{1-\alpha}(-i (c - i p + 2 a s - a \nu) z) \right) \right) /; \nu \in \mathbb{N}^+$$

01.07.21.1980.01

$$\int z^{n} e^{p z} \cos(c z) \cos^{\nu}(b + a z) \, dz = \frac{1}{2} \left(1 + e^{2 i (b + a z)}\right)^{-\nu} \cos^{\nu}(b + a z) \, n! \left(e^{(i c + p) z} \sum_{j=0}^{n} \frac{(-1)^{j} z^{n-j} (i c + p - i a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-c + i p + a \nu}{2 a}, \ldots, -\frac{-c + i p + a \nu}{2 a}, -\nu; 1 - \frac{-c + i p + a \nu}{2 a}, \ldots, 1 - \frac{-c + i p + a \nu}{2 a}; -e^{2 i (b + a z)} \right) + e^{(-i c + p) z} \sum_{j=0}^{n} \frac{(-1)^{j} z^{n-j} (-i c + p - i a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{c + i p + a \nu}{2 a}, \ldots, -\frac{c + i p + a \nu}{2 a}, -\nu; 1 - \frac{c + i p + a \nu}{2 a}, \ldots, 1 - \frac{c + i p + a \nu}{2 a}; -e^{2 i (b + a z)} \right) \right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \cos(c z + d) \cos^{\nu}(a z + b)$

01.07.21.1981.01

$$\int z^{\alpha-1} e^{p z} \cos(c z + d) \cos^{\nu}(a z + b) \, dz = 2^{-\nu-1} z^{\alpha} \left(e^{-i d} \binom{\nu}{\frac{\nu}{2}} \left(e^{2 i d} E_{1-\alpha}(-i c z - p z) + E_{1-\alpha}(i c z - p z) \right) (\nu \bmod 2 - 1) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i (d + b (2 s + \nu))} \binom{\nu}{s} \left(e^{4 i b s} E_{1-\alpha}(i (c + i p - 2 a s + a \nu) z) + e^{2 i (d + b \nu)} E_{1-\alpha}(-i (c - i p - 2 a s + a \nu) z) + e^{2 i b \nu} E_{1-\alpha}(i (c + i p + 2 a s - a \nu) z) + e^{2 i (d + 2 b s)} E_{1-\alpha}(-i (c - i p + 2 a s - a \nu) z) \right) \right) /; \nu \in \mathbb{N}^+$$

01.07.21.1982.01

$$\int z^n e^{p z} \cos(d + c z) \cos^\nu(b + a z)\, dz = \frac{1}{2} \left(1 + e^{2 i (b+a z)}\right)^{-\nu} \cos^\nu(b + a z)\, n! \left(e^{i d+(i c+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i c + p - i a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-c + i p + a \nu}{2 a}, \ldots, -\frac{-c + i p + a \nu}{2 a}, -\nu; 1 - \frac{-c + i p + a \nu}{2 a}, \ldots, 1 - \frac{-c + i p + a \nu}{2 a}; -e^{2 i (b+a z)}\right) + e^{-i d+(-i c+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c + p - i a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{c + i p + a \nu}{2 a}, \ldots, -\frac{c + i p + a \nu}{2 a}, -\nu; 1 - \frac{c + i p + a \nu}{2 a}, \ldots, 1 - \frac{c + i p + a \nu}{2 a}; -e^{2 i (b+a z)}\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \cos(b z) \cos^\nu(c z)$

01.07.21.1983.01

$$\int z^n e^{p z^2} \cos(b z) \cos^\nu(c z)\, dz = 2^{-\nu-2} p^{-n-1} \left(e^{\frac{b^2}{4p}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} \left(\frac{(b+2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} (-i b + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b+2 i p z)^2}{4p}\right) + \right.$$

$$e^{\frac{b^2}{4p}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} \left(\frac{(b-2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} (i b + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b-2 i p z)^2}{4p}\right) -$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{\frac{b^2+c^2 (\nu-2s)^2}{2p}} \binom{\nu}{s} \left(e^{-\frac{(b+2 c s - c \nu)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} (i (b - 2 c s + c \nu))^{n-q} (-i (b - 2 c s + c \nu + 2 i p z))^{q+1} \right.$$

$$\left(\frac{(b-2 c s + c \nu + 2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b-2 c s + c \nu + 2 i p z)^2}{4p}\right) + e^{-\frac{(b-2 c s + c \nu)^2}{4p}}$$

$$\sum_{q=0}^{n} 2^{q-n} (i (b + 2 c s - c \nu))^{n-q} (-i (b + 2 c s - c \nu + 2 i p z))^{q+1} \left(\frac{(b+2 c s - c \nu + 2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \right.$$

$$\left. \frac{(b+2 c s - c \nu + 2 i p z)^2}{4p}\right) + e^{-\frac{(b+2 c s - c \nu)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} (-i (b - 2 c s + c \nu))^{n-q} (i (b - 2 c s + c \nu - 2 i p z))^{q+1}$$

$$\left(\frac{(b-2 c s + c \nu - 2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b-2 c s + c \nu - 2 i p z)^2}{4p}\right) +$$

$$e^{-\frac{(b-2 c s + c \nu)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} (-i (b + 2 c s - c \nu))^{n-q} (i (b + 2 c s - c \nu - 2 i p z))^{q+1} \left(\frac{(b+2 c s - c \nu - 2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b+2 c s - c \nu - 2 i p z)^2}{4p}\right)\right)\right) \;/;\; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.07.21.1984.01

$$\int z^n e^{p \sqrt{z}} \cos(b z) \cos^\nu(c z)\, dz = 2^{-2n-\nu-2} \left(b^2\right)^{-2n-1} e^{-\frac{i p^2}{4b}} \left(e^{\frac{i p^2}{2b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(p + 2 i b \sqrt{z}\right)^{h+k} \right.\right.$$

$$\left(\frac{i \left(p + 2 i b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(p \left(p + 2 i b \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(p + 2 i b \sqrt{z}\right)^2}{4b}\right) + \right.$$

$$2\sqrt{\frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{b}}\;b\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,\frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\Bigg)\Bigg)\Bigg)(-i\,b)^{2n}+(i\,b)^{2n}\binom{v}{\frac{v}{2}}(v\bmod 2-1)$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}\left(p-2\,i\,b\sqrt{z}\right)^{h+k}\left(\frac{i\left(2\sqrt{z}\;b+i\,p\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p-2\,i\,b\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+k+1),\,\frac{i\left(2\sqrt{z}\;b+i\,p\right)^2}{4\,b}\right)-2\,i\,b\sqrt{\frac{i\left(2\sqrt{z}\;b+i\,p\right)^2}{b}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),\,\frac{i\left(2\sqrt{z}\;b+i\,p\right)^2}{4\,b}\right)\Bigg)+$$

$$\left(b^2\right)^{2n+1}e^{\frac{i\,p^2}{4\,b}}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{-\frac{i\,p^2}{4\,(b-2\,c\,s+c\,v)}}\left((b-2\,c\,s+c\,v)^2\right)^{-2n-1}\Bigg(-e^{\frac{i\,p^2}{2\,(b-2\,c\,s+c\,v)}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}$$

$$\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^{h+k}\left(\frac{i\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{b-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(p\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\,\frac{i\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{4\,(b-2\,c\,s+c\,v)}\right)+$$

$$2\,i\sqrt{\frac{i\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{b-2\,c\,s+c\,v}}\;(b-2\,c\,s+c\,v)$$

$$\Gamma\!\left(\frac{1}{2}(h+k+2),\,\frac{i\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{4\,(b-2\,c\,s+c\,v)}\right)\Bigg)\Bigg)(-i\,(b-2\,c\,s+c\,v))^{2n}-$$

$$(i\,(b-2\,c\,s+c\,v))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}\left(p-2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(i\,p+2\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{b-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p-2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(i\,p+2\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{4\,(b-2\,c\,s+c\,v)}\right)-2\,i\,(b-2\,c\,s+c\,v)$$

$$\sqrt{\frac{i\left(i\,p+2\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{b-2\,c\,s+c\,v}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(i\,p+2\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{4\,(b-2\,c\,s+c\,v)}\right)\Bigg)\Bigg)\Bigg)-$$

$$\frac{1}{(b+2\,c\,s-c\,v)^2}\Bigg(e^{\frac{i\,p^2}{4\,b+8\,c\,s-4\,c\,v}}\,(i\,(b+2\,c\,s-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{b+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(b+2\,c\,s-c\,v)}\right)+2\,i\sqrt{\frac{i\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{b+2\,c\,s-c\,v}}$$

$$(b+2\,c\,s-c\,v)\,\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(b+2\,c\,s-c\,v)}\right)\Bigg)\Bigg)-$$

$$\frac{1}{(b+2\,c\,s-c\,v)^2}\Bigg(e^{\frac{i\,p^2}{-4\,b-8\,c\,s+4\,c\,v}}\,(-i\,(b+2\,c\,s-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}$$

$$\left(p-2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^{h+k}\left(\frac{i\left(i\,p+2\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{b+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(p\left(p-2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(i\,p+2\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(b+2\,c\,s-c\,v)}\right)-$$

$$2\,i\,(b+2\,c\,s-c\,v)\sqrt{\frac{i\left(i\,p+2\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{b+2\,c\,s-c\,v}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(i\,p+2\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(b+2\,c\,s-c\,v)}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\ /;\ v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n e^{p z} \cos(b z^r) \cos^\nu(c z)$

01.07.21.1985.01

$$\int z^n e^{p z} \cos(b z^2) \cos^\nu(c z)\, dz = 2^{-\nu-2} \left(\frac{1}{\sqrt{b^2}} \left(e^{-\frac{i p^2}{4 b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\sqrt{i b} \sum_{q=0}^{n} 2^{q-n} (-i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p - 2 i b z)^{q+1} \left(\frac{i (i p + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (i p + 2 b z)^2}{4 b} \right) + \sqrt{-i b}\; e^{\frac{i p^2}{2 b}} \sum_{q=0}^{n} 2^{q-n} (i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p + 2 i b z)^{q+1} \left(\frac{i (p + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (p + 2 i b z)^2}{4 b} \right) \right) \right) + \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(-i b)^{3/2}} \left(e^{-\frac{i (p + c i (\nu - 2 s))^2}{4 b}} \binom{\nu}{s} \left(b\, i \sum_{q=0}^{n} 2^{q-n} (-i b)^{-n-\frac{1}{2}} (i c (2 s - \nu) - p)^{n-q} (p + c i (\nu - 2 s) - 2 i b z)^{q+1} \left(\frac{i (i p + 2 c s - c \nu + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (i p + 2 c s - c \nu + 2 b z)^2}{4 b} \right) + b\, e^{\frac{c p (2 s - \nu)}{b}}\, i \sum_{q=0}^{n} 2^{q-n} (-i b)^{-n-\frac{1}{2}} (i c (\nu - 2 s) - p)^{n-q} \left(\frac{i (i p + c (\nu - 2 s) + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} (p - i (c (\nu - 2 s) + 2 b z))^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (i p + c (\nu - 2 s) + 2 b z)^2}{4 b} \right) + \sqrt{b^2}\; e^{\frac{i \left(p^2 - c^2 (\nu - 2 s)^2\right)}{2 b}} \left(\sum_{q=0}^{n} 2^{q-n} (i b)^{-n-\frac{1}{2}} (i c (\nu - 2 s) - p)^{n-q} (p + i (2 c s - c \nu + 2 b z))^{q+1} \left(\frac{i (p + i (2 c s - c \nu + 2 b z))^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (p + i (2 c s - c \nu + 2 b z))^2}{4 b} \right) + e^{\frac{c p (2 s - \nu)}{b}} \sum_{q=0}^{n} 2^{q-n} (i b)^{-n-\frac{1}{2}} (i c (2 s - \nu) - p)^{n-q} (p + i (-2 c s + c \nu + 2 b z))^{q+1} \left(\frac{i (p + i (-2 c s + c \nu + 2 b z))^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-i p - 2 c s + c \nu + 2 b z)^2}{4 b} \right) \right) \right) \right) \right) /;\ \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{p z} \cos\left(b \sqrt{z}\right) \cos^{\nu}(c z)\, dz ==$$

$$2^{-2 n-\nu-2} p^{-2 (n+1)} \left(\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(e^{\frac{b^2}{4 p-8 i c s+4 i c \nu}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2 n} \left(i b+2 (p-2 i c s+i c \nu) \sqrt{z}\right)^{h+k}\right.\right.\right.\right.$$

$$\left(\frac{\left(b+2 (-i p-2 c s+c \nu) \sqrt{z}\right)^2}{p-2 i c s+i c \nu}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\, i \left(i b+2 (p-2 i c s+i c \nu) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2} (h+k+1), \frac{\left(b+2 (-i p-2 c s+c \nu) \sqrt{z}\right)^2}{4 (p-2 i c s+i c \nu)}\right)+2 \sqrt{\frac{\left(b+2 (-i p-2 c s+c \nu) \sqrt{z}\right)^2}{p-2 i c s+i c \nu}}$$

$$\left.\left.(p-2 i c s+i c \nu)\, \Gamma\left(\frac{1}{2} (h+k+2), \frac{\left(b+2 (-i p-2 c s+c \nu) \sqrt{z}\right)^2}{4 (p-2 i c s+i c \nu)}\right)\right)\right)+\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k$$

$$(-i b)^{-h-k+2 n} \left(\frac{\left(b+2 (i p+2 c s-c \nu) \sqrt{z}\right)^2}{p-2 i c s+i c \nu}\right)^{\frac{1}{2} (-h-k-1)} \left(-i b+2 (p-2 i c s+i c \nu) \sqrt{z}\right)^{h+k}$$

$$\binom{k}{h} \binom{n}{k} \left(2 (p-2 i c s+i c \nu) \sqrt{\frac{\left(b+2 (i p+2 c s-c \nu) \sqrt{z}\right)^2}{p-2 i c s+i c \nu}}\right.$$

$$\Gamma\left(\frac{1}{2} (h+k+2), \frac{\left(b+2 (i p+2 c s-c \nu) \sqrt{z}\right)^2}{4 (p-2 i c s+i c \nu)}\right)-b \left(b+2 (i p+2 c s-c \nu) \sqrt{z}\right)$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2} (h+k+1), \frac{\left(b+2 (i p+2 c s-c \nu) \sqrt{z}\right)^2}{4 (p-2 i c s+i c \nu)}\right)\right)\right)\right) (p-2 i c s+i c \nu)^{-2 (n+1)}+$$

$$e^{\frac{b^2}{4 p+8 i c s-4 i c \nu}} (p+2 i c s-i c \nu)^{-2 (n+1)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2 n} \left(-i b+2 (p+2 i c s-i c \nu) \sqrt{z}\right)^{h+k}$$

$$\left(\frac{\left(b+2 (i p-2 c s+c \nu) \sqrt{z}\right)^2}{p+2 i c s-i c \nu}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2 (p+2 i c s-i c \nu)\right.$$

$$\sqrt{\frac{\left(b+2\,(i\,p-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{p+2\,i\,c\,s-i\,c\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(b+2\,(i\,p-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{4\,(p+2\,i\,c\,s-i\,c\,v)}\right)-$$

$$b\left(b+2\,(i\,p-2\,c\,s+c\,v)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(b+2\,(i\,p-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{4\,(p+2\,i\,c\,s-i\,c\,v)}\right)\Bigg)\Bigg)+e^{\frac{b^2}{4\,p+8\,i\,c\,s-4\,i\,c\,v}}$$

$$(p+2\,i\,c\,s-i\,c\,v)^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\left(\frac{\left(b+2\,(-i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{p+2\,i\,c\,s-i\,c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\left(i\,b+2\,(p+2\,i\,c\,s-i\,c\,v)\,\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}\Bigg(b\,i\left(i\,b+2\,(p+2\,i\,c\,s-i\,c\,v)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(b+2\,(-i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{4\,(p+2\,i\,c\,s-i\,c\,v)}\right)+2\sqrt{\frac{\left(b+2\,(-i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{p+2\,i\,c\,s-i\,c\,v}}$$

$$(p+2\,i\,c\,s-i\,c\,v)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(b+2\,(-i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{4\,(p+2\,i\,c\,s-i\,c\,v)}\right)\Bigg)\Bigg)\Bigg)\,p^{2\,(n+1)}-$$

$$e^{\frac{b^2}{4\,p}}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}-(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(\frac{\left(b+2\,i\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}\,(-h-k-1)}\left(-i\,b+2\,p\,\sqrt{z}\right)^{h+k}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2\,i\,p\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(b+2\,i\,p\,\sqrt{z}\right)^2}{4\,p}\right)-$$

$$2\,p\sqrt{\frac{\left(b+2\,i\,p\,\sqrt{z}\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(b+2\,i\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)-$$

$$e^{\frac{b^2}{4p}} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h} 4^k (i\, b)^{-h-k+2n} \left(\frac{\left(b - 2\, i\, p \sqrt{z}\right)^2}{p} \right)^{\frac{1}{2}(-h-k-1)} \left(i\, b + 2\, p \sqrt{z}\right)^{h+k}$$

$$\binom{k}{h} \binom{n}{k} \left(b \left(b - 2\, i\, p \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h + k + 1), \frac{\left(b - 2\, i\, p \sqrt{z}\right)^2}{4\, p} \right) - \right.$$

$$\left. 2\, p \sqrt{\frac{\left(b - 2\, i\, p \sqrt{z}\right)^2}{p}}\; \Gamma\left(\frac{1}{2} (h + k + 2), \frac{\left(b - 2\, i\, p \sqrt{z}\right)^2}{4\, p} \right) \right) \Bigg) \Bigg) /;\ v \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

Involving $z^n\, e^{p\, z} \cos(b\, z) \cos^v\left(c\, z^r\right)$

01.07.21.1987.01

$$\int z^n e^{pz}\cos(bz)\cos^\nu(cz^2)\,dz = 2^{-\nu-2}\left(2\binom{\nu}{\frac{\nu}{2}}(E_{-n}((-ib-p)z)+E_{-n}((ib-p)z))(\nu \bmod 2-1)z^{n+1}+\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(ic(2k-\nu))^{3/2}}\right.$$

$$\left(e^{\frac{i(ib+p)^2}{c(8k-4\nu)}}\binom{\nu}{k}\left(ci(\nu-2k)\sum_{q=0}^{n}2^{q-n}(-ib-p)^{n-q}(ic(2k-\nu))^{-n-\frac{1}{2}}\left(-\frac{i(-b+ip+2c(\nu-2k)z)^2}{c(2k-\nu)}\right)^{\frac{1}{2}(-q-1)}\right.\right.$$

$$(p+i(b+4ckz-2c\nu z))^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(p+i(b+4ckz-2c\nu z))^2}{c(8k-4\nu)}\right)-$$

$$ic\,e^{\frac{bp}{c(2k-\nu)}}(2k-\nu)\sum_{q=0}^{n}2^{q-n}(ib-p)^{n-q}(ic(2k-\nu))^{-n-\frac{1}{2}}\left(-\frac{i(b+ip+2c(\nu-2k)z)^2}{c(2k-\nu)}\right)^{\frac{1}{2}(-q-1)}$$

$$(p+i(-b+4ckz-2c\nu z))^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(b+ip+2c(\nu-2k)z)^2}{c(8k-4\nu)}\right)+$$

$$e^{-\frac{i(ib+p)^2}{c(4k-2\nu)}}\sqrt{c^2(\nu-2k)^2}\left(\sum_{q=0}^{n}2^{q-n}(-ib-p)^{n-q}(ic(\nu-2k))^{-n-\frac{1}{2}}(ib+p+2ic(\nu-2k)z)^{q+1}\right.$$

$$\left(\frac{i(ib+p+2ic(\nu-2k)z)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(-b+ip+4ckz-2c\nu z)^2}{4(2ck-c\nu)}\right)+$$

$$e^{-\frac{bp}{2ck-c\nu}}\sum_{q=0}^{n}2^{q-n}(ib-p)^{n-q}(ic(\nu-2k))^{-n-\frac{1}{2}}\left(\frac{i(b+ip+4ckz-2c\nu z)^2}{c(2k-\nu)}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\left.\left.(p-i(b+4ckz-2c\nu z))^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(b+ip+4ckz-2c\nu z)^2}{4(2ck-c\nu)}\right)\right)\right)\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+\land n\in\mathbb{N}$$

01.07.21.1988.01

$$\int z^n e^{pz}\cos(bz)\cos^\nu\left(c\sqrt{z}\right)dz ==$$

$$2^{-\nu-2}\left(2\binom{\nu}{\frac{\nu}{2}}\left(\Gamma(n+1,(-ib-p)z)(-ib-p)^{-n-1}+(ib-p)^{-n-1}\Gamma(n+1,(ib-p)z)\right)(\nu \bmod 2-1)+\right.$$

$$4^{-n}\sum_{u=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{u}\left(e^{\frac{c^2(\nu-2u)^2}{4(-ib+p)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-ic(\nu-2u))^{-h-k+2n}\left(\frac{\left(2\sqrt{z}\,(b+ip)+c(\nu-2u)\right)^2}{-ib+p}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\left(2\,(-i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,u)\right)^{h+k}\binom{k}{h}\binom{n}{k}\left(2\,(-i\,b+p)\,\sqrt{\frac{\left(2\,\sqrt{z}\,(b+i\,p)+c\,(v-2\,u)\right)^2}{-i\,b+p}}\;\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+k+2),\,\frac{\left(2\,\sqrt{z}\,(b+i\,p)+c\,(v-2\,u)\right)^2}{4\,(-i\,b+p)}\right)-i\,c\,(v-2\,u)\left(2\,(-i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,u)\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(2\,\sqrt{z}\,(b+i\,p)+c\,(v-2\,u)\right)^2}{4\,(-i\,b+p)}\right)\right)\right)(-i\,b+p)^{-2\,(n+1)}+$$

$$e^{\frac{c^2\,(v-2\,u)^2}{4\,(-i\,b+p)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,u))^{-h-k+2\,n}\left(\frac{\left(2\,\sqrt{z}\,(-b-i\,p)+c\,(v-2\,u)\right)^2}{-i\,b+p}\right)^{\frac{1}{2}\,(-h-k-1)}\right.$$

$$\left(2\,\sqrt{z}\,(-i\,b+p)+c\,i\,(v-2\,u)\right)^{h+k}\binom{k}{h}\binom{n}{k}\left(c\,i\,(v-2\,u)\left(2\,\sqrt{z}\,(-i\,b+p)+c\,i\,(v-2\,u)\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(2\,\sqrt{z}\,(-b-i\,p)+c\,(v-2\,u)\right)^2}{4\,(-i\,b+p)}\right)+2\,\sqrt{\frac{\left(2\,\sqrt{z}\,(-b-i\,p)+c\,(v-2\,u)\right)^2}{-i\,b+p}}$$

$$\left.\left.(-i\,b+p)\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(2\,\sqrt{z}\,(-b-i\,p)+c\,(v-2\,u)\right)^2}{4\,(-i\,b+p)}\right)\right)\right)$$

$$(-i\,b+p)^{-2\,(n+1)}+e^{\frac{c^2\,(v-2\,u)^2}{4\,(i\,b+p)}}\,(i\,b+p)^{-2\,(n+1)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(v-2\,u))^{-h-k+2\,n}\right.$$

$$\left(\frac{\left(2\,\sqrt{z}\,(i\,p-b)+c\,(v-2\,u)\right)^2}{i\,b+p}\right)^{\frac{1}{2}\,(-h-k-1)}\left(2\,(i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,u)\right)^{h+k}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,(i\,b+p)\,\sqrt{\frac{\left(2\,\sqrt{z}\,(i\,p-b)+c\,(v-2\,u)\right)^2}{i\,b+p}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(2\,\sqrt{z}\,(i\,p-b)+c\,(v-2\,u)\right)^2}{4\,(i\,b+p)}\right)-\right.$$

$$i\, c\,(v-2\,u)\left(2\,(i\,b+p)\,\sqrt{z}\;-i\,c\,(v-2\,u)\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(2\,\sqrt{z}\;(i\,p-b)+c\,(v-2\,u)\right)^2}{4\,(i\,b+p)}\right)\Bigg)+$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,u))^{-h-k+2\,n}\left(\frac{\left(2\,\sqrt{z}\;(b-i\,p)+c\,(v-2\,u)\right)^2}{i\,b+p}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\left(2\,\sqrt{z}\;(i\,b+p)+c\,i\,(v-2\,u)\right)^{h+k}\binom{k}{h}\binom{n}{k}\Bigg(c\,i\,(v-2\,u)\left(2\,\sqrt{z}\;(i\,b+p)+c\,i\,(v-2\,u)\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(2\,\sqrt{z}\;(b-i\,p)+c\,(v-2\,u)\right)^2}{4\,(i\,b+p)}\right)+2\,\sqrt{\frac{\left(2\,\sqrt{z}\;(b-i\,p)+c\,(v-2\,u)\right)^2}{i\,b+p}}$$

$$(i\,b+p)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(2\,\sqrt{z}\;(b-i\,p)+c\,(v-2\,u)\right)^2}{4\,(i\,b+p)}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\, e^{p\,z}\cos\left(b\,z^r\right)\cos^v\left(c\,z^r\right)$

01.07.21.1989.01

$$\int z^n\, e^{p\,z}\cos\left(b\,z^2\right)\cos^v\left(c\,z^2\right)dz=$$

$$\frac{1}{\sqrt{b^2}}\Bigg(2^{-v-2}\,e^{-\frac{i\,p^2}{4\,b}}\Bigg(-\sqrt{b^2}\;e^{\frac{i\,p^2}{4\,b}}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\frac{1}{\sqrt{-i\,(b-2\,c\,s+c\,v)}}\Bigg(e^{-\frac{i\,p^2}{4\,(b-2\,c\,s+c\,v)}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(-i\,(b-2\,c\,s+c\,v))^{-n-\frac{1}{2}}$$

$$(p-2\,i\,(b-2\,c\,s+c\,v)\,z)^{q+1}\left(\frac{i\,(i\,p+2\,(b-2\,c\,s+c\,v)\,z)^2}{b-2\,c\,s+c\,v}\right)^{\frac{1}{2}\,(-q-1)}$$

$$\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(i\,p+2\,(b-2\,c\,s+c\,v)\,z)^2}{4\,(b-2\,c\,s+c\,v)}\right)\Bigg)+\frac{1}{\sqrt{i\,(b-2\,c\,s+c\,v)}}$$

$$\Bigg(e^{\frac{i\,p^2}{4\,(b-2\,c\,s+c\,v)}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(i\,(b-2\,c\,s+c\,v))^{-n-\frac{1}{2}}\,(p+2\,i\,(b-2\,c\,s+c\,v)\,z)^{q+1}$$

$$\left(\frac{i\,(p+2\,i\,(b-2\,c\,s+c\,v)\,z)^2}{b-2\,c\,s+c\,v}\right)^{\frac{1}{2}\,(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(p+2\,i\,(b-2\,c\,s+c\,v)\,z)^2}{4\,(b-2\,c\,s+c\,v)}\right)\Bigg)+$$

$$\frac{1}{\sqrt{-i\,(b+2\,c\,s-c\,v)}}\left(e^{\frac{i\,p^2}{-4\,b-8\,c\,s+4\,c\,v}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(-i\,(b+2\,c\,s-c\,v))^{-n-\frac{1}{2}}\,(p-2\,i\,(b+2\,c\,s-c\,v)\,z)^{q+1}\right.$$

$$\left.\left(\frac{i\,(i\,p+2\,(b+2\,c\,s-c\,v)\,z)^2}{b+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(i\,p+2\,(b+2\,c\,s-c\,v)\,z)^2}{4\,(b+2\,c\,s-c\,v)}\right)\right)+$$

$$\frac{1}{\sqrt{i\,(b+2\,c\,s-c\,v)}}\left(e^{\frac{i\,p^2}{4\,b+8\,c\,s-4\,c\,v}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(i\,(b+2\,c\,s-c\,v))^{-n-\frac{1}{2}}\,(p+2\,i\,(b+2\,c\,s-c\,v)\,z)^{q+1}\right.$$

$$\left.\left.\left(\frac{i\,(p+2\,i\,(b+2\,c\,s-c\,v)\,z)^2}{b+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(p+2\,i\,(b+2\,c\,s-c\,v)\,z)^2}{4\,(b+2\,c\,s-c\,v)}\right)\right)\right)+$$

$$\sqrt{i\,b}\,\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{q=0}^{n}2^{q-n}\,(-i\,b)^{-n-\frac{1}{2}}\,(-p)^{n-q}\,(p-2\,i\,b\,z)^{q+1}\left(\frac{i\,(i\,p+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(i\,p+2\,b\,z)^2}{4\,b}\right)+$$

$$\sqrt{-i\,b}\;e^{\frac{i\,p^2}{2\,b}}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{q=0}^{n}2^{q-n}\,(i\,b)^{-n-\frac{1}{2}}\,(-p)^{n-q}\,(p+2\,i\,b\,z)^{q+1}\left(\frac{i\,(p+2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(p+2\,i\,b\,z)^2}{4\,b}\right)\right)\right)\;/;\;v\in\mathbb{N}^+\land n\in\mathbb{N}$$

01.07.21.1990.01

$$\int z^n\,e^{p\,z}\cos\!\left(b\,\sqrt{z}\right)\cos^v\!\left(c\,\sqrt{z}\right)dz=$$

$$2^{-2\,n-v-2}\left(\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(e^{\frac{b^2}{4\,p}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,b)^{-h-i+2\,n}\left(\frac{\left(b+2\,i\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\right.\right.\right.$$

$$\left(-i\,b+2\,p\,\sqrt{z}\right)^{h+i}\binom{i}{h}\binom{n}{i}\left(2\,p\,\sqrt{\frac{\left(b+2\,i\,p\,\sqrt{z}\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,\frac{\left(b+2\,i\,p\,\sqrt{z}\right)^2}{4\,p}\right)-i\right.$$

$$\left.\left.\left.b\left(-i\,b+2\,p\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,\frac{\left(b+2\,i\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)\right)p^{-2\,(n+1)}+$$

$$e^{\frac{b^2}{4p}} \left(\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} \, 4^i \, (i\, b)^{-h-i+2n} \left(i\, b + 2\, p \sqrt{z}\right)^{h+i} \left(-\frac{\left(i\, b + 2\, p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i} \right.$$

$$\left(b\, i \left(i\, b + 2\, p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(i\, b + 2\, p \sqrt{z}\right)^2}{4\, p}\right) + 2 \right.$$

$$\left.\left.\sqrt{-\frac{\left(i\, b + 2\, p \sqrt{z}\right)^2}{p}} \; p\, \Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(i\, b + 2\, p \sqrt{z}\right)^2}{4\, p}\right)\right) p^{-2(n+1)} \right) +$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{\frac{(b-2\,c\,s+c\,v)^2}{4\,p}} \left(\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} \, 4^i \, (-i\,(b - 2\,c\,s + c\,v))^{-h-i+2n} \left(\frac{\left(b - 2\,c\,s + c\,v + 2\,i\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \right.\right.$$

$$\left(-i\, b + i\, c\,(2\,s - v) + 2\, p \sqrt{z}\right)^{h+i} \binom{i}{h} \binom{n}{i}$$

$$\left((-b + 2\,c\,s - c\,v) \left(b - 2\,c\,s + c\,v + 2\,i\,p\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), \frac{\left(b - 2\,c\,s + c\,v + 2\,i\,p\sqrt{z}\right)^2}{4\,p}\right) + \right.$$

$$\left.\left. 2\sqrt{\frac{\left(b - 2\,c\,s + c\,v + 2\,i\,p\sqrt{z}\right)^2}{p}} \; p\, \Gamma\left(\frac{1}{2}(h+i+2), \frac{\left(b - 2\,c\,s + c\,v + 2\,i\,p\sqrt{z}\right)^2}{4\,p}\right)\right)\right) p^{-2(n+1)} +$$

$$e^{\frac{(b+2\,c\,s-c\,v)^2}{4\,p}} \left(\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} \, 4^i \, (i\, b + 2\, i\, c\, s - i\, c\, v)^{-h-i+2n} \left(i\, b + i\, c\,(2\,s - v) + 2\, p \sqrt{z}\right)^{h+i} \right.$$

$$\left(-\frac{\left(i\, b + i\, c\,(2\,s - v) + 2\, p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i}$$

$$\left((i\, b + 2\, i\, c\, s - i\, c\, v) \left(i\, b + i\, c\,(2\,s - v) + 2\, p\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(i\, b + i\, c\,(2\,s - v) + 2\, p\sqrt{z}\right)^2}{4\,p}\right) + \right.$$

$$2\sqrt{-\frac{\left(i\,b+i\,c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}(h+i+2),-\frac{\left(i\,b+i\,c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)\Bigg)$$

$$p^{-2\,(n+1)}+e^{\frac{(b+2\,c\,s-c\,v)^2}{4\,p}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,b+i\,c\,(v-2\,s))^{-h-i+2\,n}\left(-i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^{h+i}\right.$$

$$\left(-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((-i\,b+i\,c\,(v-2\,s))$$

$$\left(-i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+i+1),-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+$$

$$2\sqrt{-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}(h+i+2),-\frac{\left(-i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)\Bigg)$$

$$p^{-2\,(n+1)}+e^{\frac{(b-2\,c\,s+c\,v)^2}{4\,p}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,b+i\,c\,(v-2\,s))^{-h-i+2\,n}\left(i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^{h+i}\right.$$

$$\left(-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((i\,b+i\,c\,(v-2\,s))\left(i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+i+1),-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\sqrt{-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}$$

$$p\,\Gamma\!\left(\frac{1}{2}(h+i+2),-\frac{\left(i\,b+i\,c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)\,p^{-2\,(n+1)}\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\,e^{p\,z^r}\cos(b\,z)\cos^v(c\,z^r)$

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$$\int z^n e^{p z^2} \cos(b z) \cos^{\nu}(c z^2)\, dz = 2^{-\nu-2} \left(e^{\frac{b^2}{4p}} p^{-n-1} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} \left(\frac{(2 i p z - b)^2}{p} \right)^{\frac{1}{2}(-q-1)} (i b + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(2 i p z - b)^2}{4p} \right) + \sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} \left(\frac{(b + 2 i p z)^2}{p} \right)^{\frac{1}{2}(-q-1)} (-i b + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b + 2 i p z)^2}{4p} \right) \right) - \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\binom{\nu}{k} \left(e^{\frac{b^2}{4(p + c i (\nu - 2k))}} \sqrt{2 i c k + p - i c \nu} \sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (-2 c i k + p + i c \nu)^{-n-\frac{1}{2}} \left(\frac{i(-b + 4 c k z + 2 i p z - 2 c \nu z)^2}{2 c k + i p - c \nu} \right)^{\frac{1}{2}(-q-1)} (i b + 2(-2 c i k + p + i c \nu) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-b + 4 c k z + 2 i p z - 2 c \nu z)^2}{8 c k + 4 i p - 4 c \nu} \right) + e^{\frac{b^2}{4(p + c i (\nu - 2k))}} \sqrt{2 i c k + p - i c \nu} \sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (-2 c i k + p + i c \nu)^{-n-\frac{1}{2}} \left(\frac{i(b + 4 c k z + 2 i p z - 2 c \nu z)^2}{2 c k + i p - c \nu} \right)^{\frac{1}{2}(-q-1)} (-i b + 2(-2 c i k + p + i c \nu) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(b + 4 c k z + 2 i p z - 2 c \nu z)^2}{8 c k + 4 i p - 4 c \nu} \right) + e^{\frac{b^2}{4(2 i c k + p - i c \nu)}} \sqrt{-2 c i k + p + i c \nu} \sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (2 i c k + p - i c \nu)^{-n-\frac{1}{2}} \left(-\frac{i(-b - 4 c k z + 2 i p z + 2 c \nu z)^2}{2 c k - i p - c \nu} \right)^{\frac{1}{2}(-q-1)} (i b + 2(2 i c k + p - i c \nu) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-b - 4 c k z + 2 i p z + 2 c \nu z)^2}{8 c k - 4 i p - 4 c \nu} \right) + e^{\frac{b^2}{4(p + c i (2k - \nu))}} \sqrt{p + c i (\nu - 2k)} \sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (p + c i (2k - \nu))^{-n-\frac{1}{2}} (-i b + 2(2 i c k + p - i c \nu) z)^{q+1} \left(-\frac{i(b + 2(-2 c k + i p + c \nu) z)^2}{2 c k - i p - c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(b + 2(-2 c k + i p + c \nu) z)^2}{8 c k - 4 i p - 4 c \nu} \right) \right) \Big/ \left(\sqrt{p + c i (2k - \nu)} \sqrt{p + c i (\nu - 2k)} \right) \right) /;\ \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{p\sqrt{z}} \cos(b\,z)\cos^\nu\left(c\sqrt{z}\right) dz = (-1)^n 2^{-2n-\nu-2} b^{-2n-2} \left(e^{\frac{i p^2}{4b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(p + 2\,i\,b\sqrt{z}\right)^{h+k} \left(\frac{i\left(p + 2\,i\,b\sqrt{z}\right)^2}{b} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(p\left(p + 2\,i\,b\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{4b}\right) + 2\sqrt{\frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{b}}\; b\,i\,\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{4b}\right)\right) + e^{-\frac{i p^2}{2b}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(p - 2\,i\,b\sqrt{z}\right)^{h+k} \left(-\frac{i\left(p - 2\,i\,b\sqrt{z}\right)^2}{b} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(p\left(p - 2\,i\,b\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{4b}\right) - 2\,i\,b\sqrt{-\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{b}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{4b}\right)\right)\right) - \sum_{u=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{u} \left(e^{\frac{i(i p - 2 c u + c \nu)^2}{4b}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (p - i\,c(\nu - 2u))^{-h-k+2n} \left(p - i\,c(\nu-2u) - 2\,i\,b\sqrt{z}\right)^{h+k} \left(\frac{i\left(2\sqrt{z}\; b + i\,p + c(\nu - 2u)\right)^2}{b} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((p - i\,c(\nu-2u))\left(p - i\,c(\nu-2u) - 2\,i\,b\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(2\sqrt{z}\; b + i\,p + c(\nu-2u)\right)^2}{4b}\right) - 2 \right.\right.$$

$$i\, b \sqrt{\frac{i\left(2\sqrt{z}\; b + i\, p + c\,(v-2\,u)\right)^2}{b}}\; \Gamma\!\left(\frac{1}{2}\,(h+k+2),\, \frac{i\left(2\sqrt{z}\; b + i\, p + c\,(v-2\,u)\right)^2}{4\,b}\right)\Bigg) +$$

$$e^{-\frac{i\,(-i\,p-2\,c\,u+c\,v)^2}{4\,b}} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (p + c\, i\,(v-2\,u))^{-h-k+2\,n} \left(p + i\, c\,(v-2\,u) + 2\, i\, b\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p + i\, c\,(v-2\,u) + 2\, i\, b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\Bigg((p + c\, i\,(v-2\,u))\left(p + i\, c\,(v-2\,u) + 2\, i\, b\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}\,(h+k+1),\, -\frac{i\left(2\sqrt{z}\; b - i\, p + c\,(v-2\,u)\right)^2}{4\,b}\right) + 2$$

$$\sqrt{\frac{i\left(p + i\, c\,(v-2\,u) + 2\, i\, b\sqrt{z}\right)^2}{b}}\; b\, i\, \Gamma\!\left(\frac{1}{2}\,(h+k+2),\, -\frac{i\left(2\sqrt{z}\; b - i\, p + c\,(v-2\,u)\right)^2}{4\,b}\right)\Bigg) +$$

$$e^{-\frac{i\,(i\,p-2\,c\,u+c\,v)^2}{4\,b}} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (p - i\, c\,(v-2\,u))^{-h-k+2\,n} \left(p - i\, c\,(v-2\,u) + 2\, i\, b\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p - i\, c\,(v-2\,u) + 2\, i\, b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\Bigg((p - i\, c\,(v-2\,u))\left(p - i\, c\,(v-2\,u) + 2\, i\, b\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}\,(h+k+1),\, -\frac{i\left(-2\sqrt{z}\; b + i\, p + c\,(v-2\,u)\right)^2}{4\,b}\right) + 2$$

$$\sqrt{\frac{i\left(p - i\, c\,(v-2\,u) + 2\, i\, b\sqrt{z}\right)^2}{b}}\; b\, i\, \Gamma\!\left(\frac{1}{2}\,(h+k+2),\, -\frac{i\left(-2\sqrt{z}\; b + i\, p + c\,(v-2\,u)\right)^2}{4\,b}\right)\Bigg) +$$

$$e^{-\frac{i\,(p+c\,i\,(v-2\,u))^2}{4\,b}} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (p + c\, i\,(v-2\,u))^{-h-k+2\,n} \left(p + i\, c\,(v-2\,u) - 2\, i\, b\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(p+i\,c\,(v-2\,u)-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((p+c\,i\,(v-2\,u))\left(p+i\,c\,(v-2\,u)-2\,i\,b\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(p+i\,c\,(v-2\,u)-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)-2\,i\,b\sqrt{-\frac{i\left(p+i\,c\,(v-2\,u)-2\,i\,b\sqrt{z}\right)^2}{b}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(p+i\,c\,(v-2\,u)-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;v\in\mathbb{N}^+\land n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z^r}\cos\left(b\,z^r\right)\cos^v(c\,z)$

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$$\int z^n e^{p z^2} \cos(b z^2) \cos^\nu(c z)\, dz = 2^{-\nu-2} \left(z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{n+1}{2}, (-i b - p) z^2\right) \left((-i b - p) z^2\right)^{\frac{1}{2}(-n-1)} + \left(i (b + i p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i (b + i p) z^2\right)\right) (\nu \bmod 2 - 1) - \frac{1}{\sqrt{-i b + p}\, \sqrt{i b + p}} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{c^2 (\nu - 2 s)^2}{4 (i b + p)}} \sqrt{-i b + p} \sum_{q=0}^{n} (i b + p)^{-n-\frac{1}{2}} \left(i c \left(s - \frac{\nu}{2}\right)\right)^{n-q} (c i (\nu - 2 s) + 2 (i b + p) z)^{q+1} \left(-\frac{(c i (\nu - 2 s) + 2 (i b + p) z)^2}{i b + p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c i (\nu - 2 s) + 2 (i b + p) z)^2}{4 (i b + p)}\right) + e^{\frac{c^2 (\nu-2 s)^2}{4 (-i b + p)}} \sqrt{i b + p} \sum_{q=0}^{n} (-i b + p)^{-n-\frac{1}{2}} \left(i c \left(s - \frac{\nu}{2}\right)\right)^{n-q} \left(\frac{i (2 c s - c \nu + 2 b z + 2 i p z)^2}{b + i p}\right)^{\frac{1}{2}(-q-1)} (c i (\nu - 2 s) + 2 (-i b + p) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2 c s - c \nu + 2 b z + 2 i p z)^2}{4 (b + i p)}\right) + e^{\frac{c^2 (\nu-2 s)^2}{4 (-i b + p)}} \sqrt{i b + p} \sum_{q=0}^{n} 2^{q-n} (-i b + p)^{-n-\frac{1}{2}} (i c (\nu - 2 s))^{n-q} (-i (c (\nu - 2 s) + 2 (b + i p) z))^{q+1} \left(\frac{i (c (\nu - 2 s) + 2 (b + i p) z)^2}{b + i p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c (\nu - 2 s) + 2 (b + i p) z)^2}{4 (b + i p)}\right) + e^{\frac{c^2 (\nu-2 s)^2}{4 (i b + p)}} \sqrt{-i b + p} \sum_{q=0}^{n} 2^{q-n} (i b + p)^{-n-\frac{1}{2}} (i c (\nu - 2 s))^{n-q} \left(-\frac{i (-2 c s + c \nu - 2 b z + 2 i p z)^2}{b - i p}\right)^{\frac{1}{2}(-q-1)} (2 i c s - i c \nu + 2 i b z + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-2 c s + c \nu - 2 b z + 2 i p z)^2}{4 (b - i p)}\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

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$$\int z^n e^{p \sqrt{z}} \cos\left(b \sqrt{z}\right) \cos^\nu(c z)\, dz = 2^{-\nu-2} \left(4 \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2 (n + 1), (-i b - p) \sqrt{z}\right) (-i b - p)^{-2 (n+1)} + (i b - p)^{-2 (n+1)} \Gamma\left(2 (n + 1), i (b + i p) \sqrt{z}\right)\right) (\nu \bmod 2 - 1) + 4^{-n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} -\left(c^2 (\nu - 2 s)^2\right)^{-2 n-1} \binom{\nu}{s} \left(e^{-\frac{i (b-i p)^2}{c (8 s - 4 \nu)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i b + p)^{-h-k+2 n} \left(i b + p + 2 i c (2 s - \nu) \sqrt{z}\right)^{h+k} \right.\right.\right.$$

$$\left(\frac{i\left(i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((i\,b+p)\left(i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+2\,c\,i\,(2\,s-v)$$

$$\left.\left.\left.\sqrt{\frac{i\left(i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\right)\right)\right)$$

$$(i\,c\,(v-2\,s))^{2\,n}+e^{-\frac{i\,(b+i\,p)^2}{c\,(8\,s-4\,v)}}\left(e^{\frac{i\,(b+i\,p)^2}{4\,c\,s-2\,c\,v}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+p)^{-h-k+2\,n}\left(-i\,b+p+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+k}\right.\right.$$

$$\left(\frac{i\left(-i\,b+p+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((-i\,b+p)\left(-i\,b+p+\right.\right.$$

$$\left.2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+i\,p+2\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+2\,c\,i\,(v-2\,s)$$

$$\left.\left.\left.\sqrt{\frac{i\left(-i\,b+p+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+i\,p+2\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\right)\right)\right)$$

$$(i\,c\,(2\,s-v))^{2\,n}+e^{\frac{i\left(b^2-p^2\right)}{4\,c\,s-2\,c\,v}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+p)^{-h-k+2\,n}\left(i\,b+p+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+k}\right.$$

$$\left(\frac{i\left(i\,b+p+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((i\,b+p)\left(i\,b+p+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b-i\,p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+2\,c\,i\,(v-2\,s)$$

$$\sqrt{\frac{i\left(i\,b+p+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\;\frac{i\left(b-i\,p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\Bigg)\Bigg)\Bigg)$$

$$(i\,c\,(2\,s-v))^{2\,n}+(i\,c\,(v-2\,s))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+p)^{-h-k+2\,n}$$

$$\left(-i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)^{h+k}\left(-\frac{i\left(b+i\,p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-i\,b+p)\left(-i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\;-\frac{i\left(b+i\,p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+$$

$$2\,c\,i\,(2\,s-v)\sqrt{-\frac{i\left(b+i\,p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\;-\frac{i\left(b+i\,p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^{\alpha-1}\,e^{p\,z^r}\cos(b\,z^r)\cos^v(c\,z^r)$

01.07.21.1995.01

$$\int z^{\alpha-1}\,e^{p\,z^r}\cos(b\,z^r)\cos^v(c\,z^r)\,dz=$$

$$-\frac{2^{-v-1}\,z^\alpha}{r}\Bigg(\binom{v}{\frac{v}{2}}\left(\Gamma\!\left(\frac{\alpha}{r},(-i\,b-p)\,z^r\right)((-i\,b-p)\,z^r)^{-\frac{\alpha}{r}}+(i\,(b+i\,p)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},i\,(b+i\,p)\,z^r\right)\right)(1-v\bmod 2)+$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\Gamma\!\left(\frac{\alpha}{r},i\,(b+i\,p-2\,c\,s+c\,v)\,z^r\right)(i\,(b+i\,p-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}}+(-i\,(b-i\,p-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}}$$

$$\Gamma\!\left(\frac{\alpha}{r},-i\,(b-i\,p-2\,c\,s+c\,v)\,z^r\right)+(i\,(b+i\,p+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},i\,(b+i\,p+2\,c\,s-c\,v)\,z^r\right)+$$

$$(-i\,(b-i\,p+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},-i\,(b-i\,p+2\,c\,s-c\,v)\,z^r\right)\Bigg)\Bigg)\;/;\;v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\,e^{b\,z^r+e}\cos(a\,z^r+q)\cos^v(c\,z^r+g)$

01.07.21.1996.01

$$\int z^{\alpha-1} e^{b z^r+e} \cos(a z^r + q) \cos^v(c z^r + g) \, dz = -\frac{2^{-v-1} z^\alpha}{r} \left(e^{e-i q} \binom{v}{\frac{v}{2}} \left(e^{2 i q} \Gamma\left(\frac{\alpha}{r}, (-b - i a) z^r\right) ((-b - i a) z^r)^{-\frac{\alpha}{r}} + (i (a + i b) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, i (a + i b) z^r\right)\right) (1 - v \bmod 2) + \right.$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{e-i (q+g (2 s+v))} \binom{v}{s} \left(e^{4 i g s} \Gamma\left(\frac{\alpha}{r}, i (a + i b - 2 c s + c v) z^r\right) (i (a + i b - 2 c s + c v) z^r)^{-\frac{\alpha}{r}} + \right.$$

$$e^{2 i (q+g v)} (-i (a - i b - 2 c s + c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -i (a - i b - 2 c s + c v) z^r\right) +$$

$$e^{2 i g v} (i (a + i b + 2 c s - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, i (a + i b + 2 c s - c v) z^r\right) +$$

$$\left.\left. e^{2 i (q+2 g s)} (-i (a - i b + 2 c s - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -i (a - i b + 2 c s - c v) z^r\right)\right)\right) /; v \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + d z + e} \cos(a z^r + p z + q) \cos^v(c z^r + f z + g)$

01.07.21.1997.01

$$\int z^n e^{b z^2+d z+e} \cos(a z^2 + p z + q) \cos^v(c z^2 + f z + g) \, dz = 2^{-v-2} \left(-\binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(e^{-\frac{(d-i p)^2}{4 (b-i a)}+e-i q} \left(\sum_{j=0}^{n} 2^{j-n} (i p - d)^{n-j} \left(\frac{i (i d + p + 2 a z + 2 i b z)^2}{a + i b}\right)^{\frac{1}{2}(-j-1)} \right.\right.\right.$$

$$\left.\left. (d - i (p + 2 a z + 2 i b z))^{j+1} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + p + 2 a z + 2 i b z)^2}{4 (a + i b)}\right)\right) (b - i a)^{-n-1} +$$

$$(b + i a)^{-n-1} e^{-\frac{(d+i p)^2}{4 (b+i a)}+e+i q} \sum_{j=0}^{n} 2^{j-n} (-d - i p)^{n-j} (d + i p + 2 b z + 2 i a z)^{j+1}$$

$$\left.\left(-\frac{(d + i p + 2 b z + 2 i a z)^2}{b + i a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + i p + 2 b z + 2 i a z)^2}{4 (b + i a)}\right)\right) -$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{e-i (q+2 g s-g v)} \binom{v}{s} \left(e^{\frac{1}{4} i \left(\frac{(i d+p-2 f s+f v)^2}{a+i b-2 c s+c v}+8 g (2 s-v)\right)} \left(\sum_{j=0}^{n} -i \, 2^{j-n} (i (p - 2 f s + f v) - d)^{n-j} (i d + p - 2 f s + f v + \right.\right.$$

$$2 a z + 2 i b z - 4 c s z + 2 c v z) \left(\frac{i (i d + p - 2 f s + f v + 2 a z + 2 i b z - 4 c s z + 2 c v z)^2}{a + i b - 2 c s + c v}\right)^{\frac{1}{2}(-j-1)}$$

$$(d - i (p + f (v - 2 s) + 2 (a + i b - 2 c s + c v) z))^j \binom{n}{j}$$

$$\left.\left.\Gamma\left(\frac{j+1}{2}, \frac{i\,(i\,d+p-2\,f\,s+f\,v+2\,a\,z+2\,i\,b\,z-4\,c\,s\,z+2\,c\,v\,z)^2}{4\,(a+i\,b\,-2\,c\,s+c\,v)}\right)\right)\right)$$

$$(-i\,(a+i\,b\,-2\,c\,s+c\,v))^{-n-1}+e^{\frac{1}{4}\,i\left(\frac{(d+i\,(p-2\,f\,s+f\,v))^2}{a-i\,b-2\,c\,s+c\,v}+8\,q\right)}\,(b+i\,a\,+c\,i\,(v-2\,s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\,(-d-i\,(p-2\,f\,s+f\,v))^{n-j}\left(-\frac{i\,(-i\,d+p-2\,f\,s+f\,v+2\,a\,z-2\,i\,b\,z-4\,c\,s\,z+2\,c\,v\,z)^2}{a-i\,b-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-j-1)}$$

$$(d+i\,(p+f\,(v-2\,s)+2\,(a-i\,b-2\,c\,s+c\,v)\,z))^{j+1}\binom{n}{j}$$

$$\left.\Gamma\left(\frac{j+1}{2}, -\frac{i\,(-i\,d+p-2\,f\,s+f\,v+2\,a\,z-2\,i\,b\,z-4\,c\,s\,z+2\,c\,v\,z)^2}{4\,(a-i\,b-2\,c\,s+c\,v)}\right)\right)+$$

$$\frac{1}{a+i\,b\,+2\,c\,s-c\,v}\left(i\,e^{\frac{i\,(i\,d+p+2\,f\,s-f\,v)^2}{4\,(a+i\,b\,+2\,c\,s-c\,v)}}\,(b+-i\,a\,+c\,i\,(v-2\,s))^{-n}\right.$$

$$\sum_{j=0}^{n} 2^{j-n}\,(i\,(p+2\,f\,s-f\,v)-d)^{n-j}\left(\frac{i\,(i\,d+p+2\,f\,s-f\,v+2\,a\,z+2\,i\,b\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{a+i\,b\,+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-j-1)}$$

$$(d-i\,(p+f\,(2\,s-v)+2\,(a+i\,b\,+2\,c\,s-c\,v)\,z))^{j+1}\binom{n}{j}$$

$$\left.\left.\Gamma\left(\frac{j+1}{2}, \frac{i\,(i\,d+p+2\,f\,s-f\,v+2\,a\,z+2\,i\,b\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{4\,(a+i\,b\,+2\,c\,s-c\,v)}\right)\right)\right)-$$

$$\frac{1}{a-i\,b+2\,c\,s-c\,v}\left(i\,e^{\frac{1}{4}\,i\left(\frac{(d+i\,(p+2\,f\,s-f\,v))^2}{a-i\,b+2\,c\,s-c\,v}+8\,q+8\,g\,(2\,s-v)\right)}\,(b+i\,a\,+2\,i\,c\,s-i\,c\,v)^{-n}\right.$$

$$\sum_{j=0}^{n} 2^{j-n}\,(-d-i\,(p+2\,f\,s-f\,v))^{n-j}\left(-\frac{i\,(-i\,d+p+2\,f\,s-f\,v+2\,a\,z-2\,i\,b\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{a-i\,b+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-j-1)}$$

$$(d+i\,(p+f\,(2\,s-v)+2\,(a-i\,b+2\,c\,s-c\,v)\,z))^{j+1}\binom{n}{j}$$

$$\left.\left.\left.\Gamma\left(\frac{j+1}{2}, -\frac{i\,(-i\,d+p+2\,f\,s-f\,v+2\,a\,z-2\,i\,b\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{4\,(a-i\,b+2\,c\,s-c\,v)}\right)\right)\right)\right)\,/;\, n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\,e^{\sqrt{z}\,b+e+d\,z}\cos\left(\sqrt{z}\,a+q+p\,z\right)\cos^{v}\left(\sqrt{z}\,c+g+f\,z\right)dz==$$

$$2^{-2\,n-v-2}\left(\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(e^{\frac{(a-i\,b)^2}{4\,(d+i\,p)}+e+i\,q}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+i\,a\,)^{-h-i+2\,n}\left(b+i\,a\,+2\,(d+i\,p)\,\sqrt{z}\right)^{h+i}\right.\right.\right.$$

$$\left(-\frac{\left(b+i\,a+2\,(d+i\,p)\,\sqrt{z}\right)^2}{d+i\,p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\left((b+i\,a)\left(b+i\,a+2\,(d+i\,p)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(b+i\,a+2\,(d+i\,p)\,\sqrt{z}\right)^2}{4\,(d+i\,p)}\right)+2\,\sqrt{-\frac{\left(b+i\,a+2\,(d+i\,p)\,\sqrt{z}\right)^2}{d+i\,p}}\;(d+i\,p)$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+i\,a+2\,(d+i\,p)\,\sqrt{z}\right)^2}{4\,(d+i\,p)}\right)\right)\right)(d+i\,p)^{-2\,(n+1)}+e^{\frac{(a+i\,b)^2}{4\,(d-i\,p)}+e-i\,q}\,(d-i\,p)^{-2\,(n+1)}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-i\,a)^{-h-i+2\,n}\left(b-i\,a+2\,(d-i\,p)\,\sqrt{z}\right)^{h+i}\left(\frac{\left(a+i\,b+2\,(i\,d+p)\,\sqrt{z}\right)^2}{d-i\,p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((b-i\,a)\left(b-i\,a+2\,(d-i\,p)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\,\frac{\left(a+i\,b+2\,(i\,d+p)\,\sqrt{z}\right)^2}{4\,(d-i\,p)}\right)+\right.$$

$$\left.\left.2\,\sqrt{\frac{\left(a+i\,b+2\,(i\,d+p)\,\sqrt{z}\right)^2}{d-i\,p}}\;(d-i\,p)\,\Gamma\left(\frac{1}{2}\,(h+i+2),\,\frac{\left(a+i\,b+2\,(i\,d+p)\,\sqrt{z}\right)^2}{4\,(d-i\,p)}\right)\right)\right)+$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{e-i\,(q+2\,g\,s-g\,v)}\binom{v}{s}\left(e^{i\left(\frac{(a-i\,b-2\,c\,s+c\,v)^2}{4\,i\,d-4\,(p-2\,f\,s+f\,v)}+2\,q\right)}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+i\,a+c\,i\,(v-2\,s))^{-h-i+2\,n}\right.\right.$$

$$\left(b+i\,a+c\,i\,(v-2\,s)+2\,(d+i\,(p-2\,f\,s+f\,v))\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+i\,a+c\,i\,(v-2\,s)+2\,(d+i\,(p-2\,f\,s+f\,v))\,\sqrt{z}\right)^2}{d+i\,(p-2\,f\,s+f\,v)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b+i\,a+c\,i\,(v-2\,s))\left(b+i\,a+c\,i\,(v-2\,s)+2\,(d+i\,(p-2\,f\,s+f\,v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\right.\right.$$

$$\left.-\frac{\left(b+i\,a+c\,i\,(v-2\,s)+2\,(d+i\,(p-2\,f\,s+f\,v))\,\sqrt{z}\right)^2}{4\,(d+i\,(p-2\,f\,s+f\,v))}\right)+2\,(d+i\,(p-2\,f\,s+f\,v))$$

$$\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(b+i a+c i (v-2 s)+2 (d+i (p-2 f s+f v)) \sqrt{z}\right)^2}{4 (d+i (p-2 f s+f v))}\right)$$

$$\sqrt{-\frac{\left(b+i a+c i (v-2 s)+2 (d+i (p-2 f s+f v)) \sqrt{z}\right)^2}{d+i (p-2 f s+f v)}}\Bigg)\Bigg) (d+i (p-2 f s+f v))^{-2 (n+1)}+$$

$$e^{2 i g (2 s-v)-\frac{i (a+i b-2 c s+c v)^2}{-4 i d-4 (p-2 f s+f v)}} (d-i (p-2 f s+f v))^{-2 (n+1)} \sum_{i=0}^n \sum_{h=0}^i (-1)^{i-h} 4^i (-i (a+i b-2 c s+c v))^{-h-i+2 n}$$

$$\left(\left(a+i b-2 c s+c v+2 i d \sqrt{z}+2 p \sqrt{z}-4 f s \sqrt{z}+2 f v \sqrt{z}\right)^2 \Big/ (d-i (p-2 f s+f v))\right)^{\frac{1}{2} (-h-i-1)}$$

$$\left(b-i a+c i (2 s-v)+2 (d-i (p-2 f s+f v)) \sqrt{z}\right)^{h+i} \binom{i}{h} \binom{n}{i} \Bigg(2 (d-i (p-2 f s+f v))$$

$$\sqrt{\left(\left(a+i b-2 c s+c v+2 i d \sqrt{z}+2 p \sqrt{z}-4 f s \sqrt{z}+2 f v \sqrt{z}\right)^2 \Big/ (d-i (p-2 f s+f v))\right)}$$

$$\Gamma\Bigg(\frac{1}{2} (h+i+2), \left(a+i b-2 c s+c v+2 i d \sqrt{z}+2 p \sqrt{z}-4 f s \sqrt{z}+2 f v \sqrt{z}\right)^2 \Big/$$

$$(4 (d-i (p-2 f s+f v)))\Bigg)-(a+i b-2 c s+c v) \Big(a+i b-2 c s+c v+2 i d \sqrt{z}+$$

$$2 p \sqrt{z}-4 f s \sqrt{z}+2 f v \sqrt{z}\Big) \Gamma\Bigg(\frac{1}{2} (h+i+1), \Big(a+i b-2 c s+c v+2 i d \sqrt{z}+$$

$$2 p \sqrt{z}-4 f s \sqrt{z}+2 f v \sqrt{z}\Big)^2 \Big/ (4 (d-i (p-2 f s+f v)))\Bigg)\Bigg)+$$

$$e^{\frac{1}{4} i \left(-\frac{(a-i b+2 c s-c v)^2}{-i d+p+2 f s-f v}+8 q+8 g (2 s-v)\right)} (d+i (p+2 f s-f v))^{-2 (n+1)} \sum_{i=0}^n \sum_{h=0}^i (-1)^{i-h} 4^i (b+i a+2 i c s-i c v)^{-h-i+2 n}$$

$$\left(b+i a+c i (2 s-v)+2 (d+i (p+2 f s-f v)) \sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+i a+c i (2 s-v)+2 (d+i (p+2 f s-f v)) \sqrt{z}\right)^2}{d+i (p+2 f s-f v)}\right)^{\frac{1}{2} (-h-i-1)} \binom{i}{h} \binom{n}{i}$$

$$\Bigg((b+i a+2 i c s-i c v) \left(b+i a+c i (2 s-v)+2 (d+i (p+2 f s-f v)) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2} (h+i+1), -\frac{\left(b+i a+c i (2 s-v)+2 (d+i (p+2 f s-f v)) \sqrt{z}\right)^2}{4 (d+i (p+2 f s-f v))}\right)+2$$

$$(d+i (p+2 f s-f v)) \Gamma\left(\frac{1}{2} (h+i+2), -\frac{\left(b+i a+c i (2 s-v)+2 (d+i (p+2 f s-f v)) \sqrt{z}\right)^2}{4 (d+i (p+2 f s-f v))}\right)$$

$$\left.\sqrt{-\frac{\left(b+i\,a+c\,i\,(2\,s-v)+2\,(d+i\,(p+2\,f\,s-f\,v))\sqrt{z}\right)^2}{d+i\,(p+2\,f\,s-f\,v)}}\right)+$$

$$e^{\frac{i\,(a+i\,b+2\,c\,s-c\,v)^2}{4\,(i\,d+p+2\,f\,s-f\,v)}}\,(d-i\,(p+2\,f\,s-f\,v))^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-i\,a+c\,i\,(v-2\,s))^{-h-i+2\,n}$$

$$\left(b-i\,a+c\,i\,(v-2\,s)+2\,(d-i\,(p+2\,f\,s-f\,v))\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b-i\,a+c\,i\,(v-2\,s)+2\,(d-i\,(p+2\,f\,s-f\,v))\sqrt{z}\right)^2}{d-i\,(p+2\,f\,s-f\,v)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b-i\,a+c\,i\,(v-2\,s))\left(b-i\,a+c\,i\,(v-2\,s)+2\,(d-i\,(p+2\,f\,s-f\,v))\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\right.\right.$$

$$\left.-\left(b-i\,a+c\,i\,(v-2\,s)+2\,(d-i\,(p+2\,f\,s-f\,v))\sqrt{z}\right)^2\Big/(4\,(d-i\,(p+2\,f\,s-f\,v)))\right)+2$$

$$(d-i\,(p+2\,f\,s-f\,v))\,\Gamma\left(\frac{1}{2}\,(h+i+2),-\left(b-i\,a+c\,i\,(v-2\,s)+2\,(d-i\,(p+2\,f\,s-f\,v))\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(d-i\,(p+2\,f\,s-f\,v)))\right)\sqrt{\left(-\left(b-i\,a+c\,i\,(v-2\,s)+2\,(d-i\,(p+2\,f\,s-f\,v))\sqrt{z}\right)^2\Big/\right.}$$

$$\left.\left.\left.\overline{(d-i\,(p+2\,f\,s-f\,v))\Big)}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving product of powers of two direct functions, exponential and a power functions

Involving $z^{\alpha-1}\,e^{b\,z}\,\cos^{\mu}(c\,z)\cos^{v}(a\,z)$

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$$\int z^{\alpha-1} e^{b z} \cos^m(c z) \cos^v(a z) \, dz = 2^{-m-v} z^{\alpha} \left(-\binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} E_{1-\alpha}(-b z) (m \bmod 2 - 1) (v \bmod 2 - 1) + \binom{v}{\frac{v}{2}} \left(\sum_{s=0}^{\lfloor \frac{m-1}{2} \rfloor} \binom{m}{s} (E_{1-\alpha}((i c (m-2 s) - b) z) + E_{1-\alpha}(-(b + c i (m - 2 s)) z)) \right) (v \bmod 2 - 1) + \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\lfloor \frac{v-1}{2} \rfloor} \binom{v}{s} (E_{1-\alpha}(-(b + a i (2 s - v)) z) + E_{1-\alpha}(-(b - 2 i a s + i a v) z)) - \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} \binom{m}{k} \sum_{s=0}^{\lfloor \frac{v-1}{2} \rfloor} \binom{v}{s} (E_{1-\alpha}(-(b + i (2 c k - c m - 2 a s + a v)) z) + E_{1-\alpha}(-(b + i (-2 c k + c m + 2 a s - a v)) z) + E_{1-\alpha}((-b - i (2 c k - c m + 2 a s - a v)) z) + E_{1-\alpha}(-(b - i (2 c k - c m + 2 a s - a v)) z)) \right) /; m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.07.21.2000.01

$$\int z^n e^{b z} \cos^{\mu}(c z) \cos^v(a z) \, dz = 2^{-v} e^{b z} \binom{v}{\frac{v}{2}} \cos^{\mu}(c z) \, n! \, (1 - v \bmod 2) \left(1 + e^{2 i c z}\right)^{-\mu} \sum_{p=0}^{n} \frac{(-1)^p z^{n-p} (b - i c \mu)^{-p-1}}{(n-p)!} \, {}_{p+2}F_{p+1}\left(-\frac{i b + c \mu}{2 c}, \ldots, -\frac{i b + c \mu}{2 c}, -\mu; 1 - \frac{i b + c \mu}{2 c}, \ldots, 1 - \frac{i b + c \mu}{2 c}; -e^{2 i c z}\right) + 2^{-v} e^{b z} \cos^{\mu}(c z) \, n! \left(1 + e^{2 i c z}\right)^{-\mu} \sum_{s=0}^{\lfloor \frac{v-1}{2} \rfloor} \binom{v}{s} \left(e^{-i a (v - 2 s) z} \sum_{p=0}^{n} \frac{(-1)^p z^{n-p} (b - i a (v - 2 s) - i c \mu)^{-p-1}}{(n-p)!} \, {}_{p+2}F_{p+1}\left(-\frac{i b - 2 a s + a v + c \mu}{2 c}, \ldots, -\frac{i b - 2 a s + a v + c \mu}{2 c}, -\mu; 1 - \frac{i b - 2 a s + a v + c \mu}{2 c}, \ldots, 1 - \frac{i b - 2 a s + a v + c \mu}{2 c}; -e^{2 i c z}\right) + e^{i a (v - 2 s) z} \sum_{p=0}^{n} \frac{(-1)^p z^{n-p} (b + i a (v - 2 s) - i c \mu)^{-p-1}}{(n-p)!} \, {}_{p+2}F_{p+1}\left(-\frac{i b + 2 a s - a v + c \mu}{2 c}, \ldots, -\frac{i b + 2 a s - a v + c \mu}{2 c}, -\mu; 1 - \frac{i b + 2 a s - a v + c \mu}{2 c}, \ldots, 1 - \frac{i b + 2 a s - a v + c \mu}{2 c}; -e^{2 i c z}\right) \right) /; v \in \mathbb{N} \land n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \cos^m(c z) \cos^v(a z + b)$

01.07.21.2001.01

$$\int z^{\alpha-1} e^{p z} \cos^m(c z) \cos^\nu(b + a z)\, dz = 2^{-m-\nu} z^\alpha \left(-\binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} E_{1-\alpha}(-p z)\, (m \bmod 2 - 1)\, (\nu \bmod 2 - 1) + \binom{\nu}{\frac{\nu}{2}} \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} (E_{1-\alpha}((i\, c\, (m - 2 s) - p)\, z) + E_{1-\alpha}(-(p + c\, i\, (m - 2 s))\, z)) \right) (\nu \bmod 2 - 1) + \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i\, b\, (2 s + \nu)} \binom{\nu}{s} \left(e^{4 i b s} E_{1-\alpha}(-(p + a\, i\, (2 s - \nu))\, z) + e^{2 i b \nu} E_{1-\alpha}(-(p - 2\, i\, a\, s + i\, a\, \nu)\, z) \right) - \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i\, b\, (2 s + \nu)} \binom{\nu}{s} \left(e^{4 i b s} E_{1-\alpha}(i\, (2\, c\, k - c\, m + i\, p - 2\, a\, s + a\, \nu)\, z) + e^{2 i b \nu} E_{1-\alpha}(-i\, (2\, c\, k - c\, m - i\, p - 2\, a\, s + a\, \nu)\, z) + e^{2 i b \nu} E_{1-\alpha}(i\, (2\, c\, k - c\, m + i\, p + 2\, a\, s - a\, \nu)\, z) + e^{4 i b s} E_{1-\alpha}(-i\, (2\, c\, k - c\, m - i\, p + 2\, a\, s - a\, \nu)\, z) \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2002.01

$$\int z^n e^{p z} \cos^\mu(c z) \cos^\nu(a z + b)\, dz = 2^{-\nu} e^{p z} \binom{\nu}{\frac{\nu}{2}} n!\, (1 - \nu \bmod 2) \cos^\mu(c z) \left(1 + e^{2 i c z}\right)^{-\mu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n - j)!\, (p - i\, c\, \mu)^{j+1}}\, {}_{j+2}F_{j+1}\left(-\frac{i\, p + c\, \mu}{2 c}, \ldots, -\frac{i\, p + c\, \mu}{2 c}, -\mu; 1 - \frac{i\, p + c\, \mu}{2 c}, \ldots, 1 - \frac{i\, p + c\, \mu}{2 c}; -e^{2 i c z} \right) + 2^{-\nu} n! \cos^\mu(c z) \left(1 + e^{2 i c z}\right)^{-\mu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \left(e^{-i\, b\, (\nu - 2 k) + (p - i\, a\, (\nu - 2 k))\, z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i\, a\, (\nu - 2 k) - i\, c\, \mu)^{-j-1}}{(n - j)!}\, {}_{j+2}F_{j+1}\left(-\frac{i\, p + a\, (-2 k + \nu) + c\, \mu}{2 c}, \ldots, -\frac{i\, p + a\, (-2 k + \nu) + c\, \mu}{2 c}, -\mu; 1 - \frac{i\, p + a\, (-2 k + \nu) + c\, \mu}{2 c}, \ldots, 1 - \frac{i\, p + a\, (-2 k + \nu) + c\, \mu}{2 c}; -e^{2 i c z} \right) + e^{b\, i\, (\nu - 2 k) + (p + a\, i\, (\nu - 2 k))\, z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a\, i\, (\nu - 2 k) - i\, c\, \mu)^{-j-1}}{(n - j)!}\, {}_{j+2}F_{j+1}\left(-\frac{i\, p - a\, (-2 k + \nu) + c\, \mu}{2 c}, \ldots, -\frac{i\, p - a\, (-2 k + \nu) + c\, \mu}{2 c}, -\mu; 1 - \frac{i\, p - a\, (-2 k + \nu) + c\, \mu}{2 c}, \ldots, 1 - \frac{i\, p - a\, (-2 k + \nu) + c\, \mu}{2 c}; -e^{2 i c z} \right) \right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2003.01

$$\int z^n e^{pz} \cos^m(cz)\cos^\nu(b+az)\,dz = 2^{-m} e^{pz}\binom{m}{\frac{m}{2}}\cos^\nu(b+az)\,n!\,(1-m\bmod 2)\left(1+e^{2i(b+az)}\right)^{-\nu}$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-i a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{ip+a\nu}{2a},\ldots,-\frac{ip+a\nu}{2a},-\nu;1-\frac{ip+a\nu}{2a},\ldots,1-\frac{ip+a\nu}{2a};-e^{2i(b+az)}\right)+$$
$$2^{-m}\cos^\nu(b+az)\,n!\left(1+e^{2i(b+az)}\right)^{-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\Bigg(e^{(ci(m-2k)+p)z}$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(ci(m-2k)+p-ia\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\Bigg(-\frac{-c(m-2k)+ip+a\nu}{2a},\ldots,-\frac{-c(m-2k)+ip+a\nu}{2a},$$
$$-\nu;1-\frac{-c(m-2k)+ip+a\nu}{2a},\ldots,1-\frac{-c(m-2k)+ip+a\nu}{2a};-e^{2i(b+az)}\Bigg)+e^{(p-ic(m-2k))z}$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-ic(m-2k)+p-ia\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\Bigg(-\frac{c(m-2k)+ip+a\nu}{2a},\ldots,-\frac{c(m-2k)+ip+a\nu}{2a},$$
$$-\nu;1-\frac{c(m-2k)+ip+a\nu}{2a},\ldots,1-\frac{c(m-2k)+ip+a\nu}{2a};-e^{2i(b+az)}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1} e^{pz} \cos^m(cz+d)\cos^\nu(az+b)$

01.07.21.2004.01

$$\int z^{\alpha-1}e^{pz}\cos^m(d+cz)\cos^\nu(b+az)\,dz = 2^{-m-\nu}z^\alpha\Bigg(-\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}E_{1-\alpha}(-pz)(m\bmod 2-1)(\nu\bmod 2-1)+$$
$$\binom{\nu}{\frac{\nu}{2}}\left(\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}e^{-id(m-2s)}\binom{m}{s}\left(E_{1-\alpha}((ic(m-2s)-p)z)+e^{2id(m-2s)}E_{1-\alpha}(-(p+ci(m-2s))z)\right)\right)(\nu\bmod 2-1)+$$
$$\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-ib(2s+\nu)}\binom{\nu}{s}\left(e^{4ibs}E_{1-\alpha}(-(p+ai(2s-\nu))z)+e^{2ib\nu}E_{1-\alpha}(-(p-2ias+ia\nu)z)\right)-$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i(d(2k+m)+b(2s+\nu))}\binom{\nu}{s}\Big(e^{2i(dm+2bs)}E_{1-\alpha}(i(2ck-cm+ip-2as+a\nu)z)+$$
$$e^{2i(2dk+b\nu)}E_{1-\alpha}(-i(2ck-cm-ip-2as+a\nu)z)+e^{2i(dm+b\nu)}E_{1-\alpha}(i(2ck-cm+ip+2as-a\nu)z)+$$
$$e^{4i(dk+bs)}E_{1-\alpha}(-i(2ck-cm-ip+2as-a\nu)z)\Big)\Bigg)\,/;\,m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.07.21.2005.01

$$\int z^n e^{pz}\cos^\mu(cz+d)\cos^\nu(az+b)\,dz = 2^{-\nu} e^{pz}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\cos^\mu(d+cz)\left(1+e^{2i(d+cz)}\right)^{-\mu} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}}{(n-j)!\,(p-ic\mu)^{j+1}}\, {}_{j+2}F_{j+1}\left(-\frac{ip+c\mu}{2c},\ldots,-\frac{ip+c\mu}{2c},-\mu;1-\frac{ip+c\mu}{2c},\ldots,1-\frac{ip+c\mu}{2c};-e^{2i(d+cz)}\right)+ 2^{-\nu} n!\cos^\mu(d+cz)\left(1+e^{2i(d+cz)}\right)^{-\mu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\Bigg(e^{-ib(\nu-2k)+(p-ia(\nu-2k))z} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-ia(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{ip+a(-2k+\nu)+c\mu}{2c},\ldots,-\frac{ip+a(-2k+\nu)+c\mu}{2c},-\mu;1-\frac{ip+a(-2k+\nu)+c\mu}{2c},\ldots,1-\frac{ip+a(-2k+\nu)+c\mu}{2c};-e^{2i(d+cz)}\right)+e^{bi(\nu-2k)+(p+ai(\nu-2k))z} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p+ai(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{ip-a(-2k+\nu)+c\mu}{2c},\ldots,-\frac{ip-a(-2k+\nu)+c\mu}{2c},-\mu;1-\frac{ip-a(-2k+\nu)+c\mu}{2c},\ldots,1-\frac{ip-a(-2k+\nu)+c\mu}{2c};-e^{2i(d+cz)}\right)\Bigg)\,/;\, n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

Involving $z^n e^{p z^r}\cos^m(bz)\cos^\nu(cz)$

01.07.21.2006.01

$$\int z^n e^{pz^2}\cos^m(bz)\cos^\nu(cz)\,dz = 2^{-m-\nu-1}\Bigg(\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\Bigg(\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} e^{\frac{b^2(m-2s)^2}{4p}}\binom{m}{s}\Bigg(\sum_{q=0}^{n}2^{q-n}(ib(m-2s))^{n-q}\left(\frac{(b(m-2s)+2ipz)^2}{p}\right)^{\frac{1}{2}(-q-1)} (2pz-ib(m-2s))^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(b(m-2s)+2ipz)^2}{4p}\right)+\sum_{q=0}^{n}\left(ib\left(s-\frac{m}{2}\right)\right)^{n-q} \left(\frac{(b(m-2s)-2ipz)^2}{p}\right)^{\frac{1}{2}(-q-1)}(bi(m-2s)+2pz)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(b(m-2s)-2ipz)^2}{4p}\right)\Bigg)\Bigg)p^{-n-1}+ \binom{m}{\frac{m}{2}}(m \bmod 2-1)\Bigg(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{\frac{c^2(\nu-2s)^2}{4p}}\binom{\nu}{s}\Bigg(\sum_{q=0}^{n}\left(ic\left(s-\frac{\nu}{2}\right)\right)^{n-q}\left(\frac{(2cs-c\nu+2ipz)^2}{p}\right)^{\frac{1}{2}(-q-1)} (ci(\nu-2s)+2pz)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(2cs-c\nu+2ipz)^2}{4p}\right)+\sum_{q=0}^{n}2^{q-n}(ic(\nu-2s))^{n-q} \left(\frac{(c(\nu-2s)+2ipz)^2}{p}\right)^{\frac{1}{2}(-q-1)}(ci(2s-\nu)+2pz)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(c(\nu-2s)+2ipz)^2}{4p}\right)\Bigg)\Bigg)p^{-n-1}-$$

$$\left(\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}e^{\frac{b^2(m-2k)^2+c^2(v-2s)^2}{2p}}\binom{m}{k}\left(e^{-\frac{(2bk-bm-2cs+cv)^2}{4p}}\sum_{q=0}^{n}2^{q-n}\left(i\left(-2bk+bm-2cs+cv\right)\right)^{n-q}\right.\right.$$

$$\left(i\left(2bk-bm+2cs-cv-2ipz\right)\right)^{q+1}\left(\frac{\left(-2bk+bm-2cs+cv+2ipz\right)^2}{p}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{\left(-2bk+bm-2cs+cv+2ipz\right)^2}{4p}\right)+$$

$$e^{-\frac{(-2bk+bm-2cs+cv)^2}{4p}}\sum_{q=0}^{n}2^{q-n}\left(i\left(2bk-bm-2cs+cv\right)\right)^{n-q}\left(-i\left(2bk-bm-2cs+cv+2ipz\right)\right)^{q+1}$$

$$\left(\frac{\left(2bk-bm-2cs+cv+2ipz\right)^2}{p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{\left(2bk-bm-2cs+cv+2ipz\right)^2}{4p}\right)+$$

$$e^{-\frac{(-2bk+bm-2cs+cv)^2}{4p}}\sum_{q=0}^{n}2^{q-n}\left(-i\left(2bk-bm-2cs+cv\right)\right)^{n-q}\left(i\left(2bk-bm-2cs+cv-2ipz\right)\right)^{q+1}$$

$$\left(\frac{\left(-2bk+bm+2cs-cv+2ipz\right)^2}{p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2},\frac{\left(-2bk+bm+2cs-cv+2ipz\right)^2}{4p}\right)+$$

$$e^{-\frac{(2bk-bm-2cs+cv)^2}{4p}}\sum_{q=0}^{n}2^{q-n}\left(i\left(2bk-bm+2cs-cv\right)\right)^{n-q}\left(\frac{\left(b(m-2k)-2cs+cv-2ipz\right)^2}{p}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\left(-i\left(2bk-bm+2cs-cv+2ipz\right)\right)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{\left(b(m-2k)-2cs+cv-2ipz\right)^2}{4p}\right)\right)\right)$$

$$p^{-n-1}-z^{n+1}\left(-pz^2\right)^{\frac{1}{2}(-n-1)}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\left(\frac{n+1}{2},-pz^2\right)(m\bmod 2-1)$$

$$\left.(v\bmod 2-1)\right)/;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

01.07.21.2007.01

$$\int z^n e^{p\sqrt{z}}\cos^m(bz)\cos^v(cz)\,dz=$$

$$-2^{-m-v+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\left(2(n+1),-p\sqrt{z}\right)(1-m\bmod 2)(1-v\bmod 2)\,p^{-2n-2}-\frac{1}{b^2}\left(2^{-m-2n-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2s)^2}\left(e^{\frac{p^2}{8ibs-4ibm}}\binom{m}{s}\left(e^{\frac{p^2}{2ibm-4ibs}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k p^{-h-k+2n}\left(p-2ib(m-2s)\sqrt{z}\right)^{h+k}\right.\right.\right.$$

$$\left(-\frac{i\left(p-2ib(m-2s)\sqrt{z}\right)^2}{b(m-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(p\left(p-2ib(m-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(p-2ib(m-2s)\sqrt{z}\right)^2}{4b(m-2s)}\right)-2ib(m-2s)\sqrt{-\frac{i\left(p-2ib(m-2s)\sqrt{z}\right)^2}{b(m-2s)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(p-2ib(m-2s)\sqrt{z}\right)^2}{4b(m-2s)}\right)\right)\right)\right)(-ib(m-2s))^{-2n}+(ib(m-2s))^{-2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k p^{-h-k+2n}\left(p+2bi(m-2s)\sqrt{z}\right)^{h+k}\left(\frac{i\left(p+2bi(m-2s)\sqrt{z}\right)^2}{b(m-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(p\left(p+2bi(m-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(p+2bi(m-2s)\sqrt{z}\right)^2}{4b(m-2s)}\right)+2bi\right.$$

$$\left.\left.\left.\left.(m-2s)\sqrt{\frac{i\left(p+2bi(m-2s)\sqrt{z}\right)^2}{b(m-2s)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(p+2bi(m-2s)\sqrt{z}\right)^2}{4b(m-2s)}\right)\right)\right)\right)\right)+$$

$$2^{-m-2n-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{\frac{p^2}{4icv-8ics}}(ic(2s-v))^{-2n}(ic(v-2s))^{-2(n+1)}\binom{v}{s}$$

$$\left(e^{\frac{p^2}{4ics-2icv}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k p^{-h-k+2n}\left(p+2ci(v-2s)\sqrt{z}\right)^{h+k}\left(\frac{i\left(p+2ci(v-2s)\sqrt{z}\right)^2}{c(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(p\left(p+2ci(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(p+2ci(v-2s)\sqrt{z}\right)^2}{c(8s-4v)}\right)+2ci\right.$$

$$\sqrt{-\frac{i\left(p+2\,c\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}}\;(v-2\,s)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(p+2\,c\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\Bigg)\Bigg)\Bigg)$$

$$(i\,c\,(2\,s-v))^{2\,n}+(i\,c\,(v-2\,s))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(p\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+2\,c\,i\,(2\,s-v)$$

$$\sqrt{\frac{i\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\Bigg)\Bigg)\Bigg)+2^{-m-2\,n-v-1}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{u}\Bigg(e^{\frac{p^2}{4\,i\,b\,m+8\,i\,c\,s-8\,i\,b\,u-4\,i\,c\,v}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,(-i\,b\,m-2\,i\,c\,s+2\,i\,b\,u+i\,c\,v)\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{\left(p+2\,(-i\,b\,m-2\,i\,c\,s+2\,i\,b\,u+i\,c\,v)\,\sqrt{z}\right)^2}{i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,(-i\,b\,m-2\,i\,c\,s+\right.$$

$$\left.2\,i\,b\,u+i\,c\,v)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(p+2\,(-i\,b\,m-2\,i\,c\,s+2\,i\,b\,u+i\,c\,v)\,\sqrt{z}\right)^2}{4\,i\,b\,m+8\,i\,c\,s-8\,i\,b\,u-4\,i\,c\,v}\right)+$$

$$2\,(-i\,b\,m-2\,i\,c\,s+2\,i\,b\,u+i\,c\,v)\sqrt{\frac{\left(p+2\,(-i\,b\,m-2\,i\,c\,s+2\,i\,b\,u+i\,c\,v)\,\sqrt{z}\right)^2}{i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(p+2\,(-i\,b\,m-2\,i\,c\,s+2\,i\,b\,u+i\,c\,v)\,\sqrt{z}\right)^2}{4\,i\,b\,m+8\,i\,c\,s-8\,i\,b\,u-4\,i\,c\,v}\right)\Bigg)\Bigg)$$

$$(-i\,b\,m-2\,i\,c\,s+2\,i\,b\,u+i\,c\,v)^{-2\,(n+1)}+e^{\frac{p^2}{4\,i\,b\,m-8\,i\,c\,s-8\,i\,b\,u+4\,i\,c\,v}}\,(-i\,b\,m+2\,i\,c\,s+2\,i\,b\,u-i\,c\,v)^{-2\,(n+1)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p-2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{\left(p-2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\sqrt{z}\right)^2}{i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p-2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+\right.$$

$$\left.i\,c\,v)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{\left(p-2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\sqrt{z}\right)^2}{4\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)}\right)-$$

$$2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\sqrt{\frac{\left(p-2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\sqrt{z}\right)^2}{i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v}}$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{\left(p-2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\sqrt{z}\right)^2}{4\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)}\right)\right)+$$

$$e^{\frac{p^2}{-4\,b\,i\,m+8\,i\,c\,s+8\,i\,b\,u-4\,i\,c\,v}}\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}$$

$$\left(p+2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\sqrt{z}\right)^{h+k}\left(-\frac{\left(p+2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\sqrt{z}\right)^2}{i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{\left(p+2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\sqrt{z}\right)^2}{4\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)}\right)+$$

$$2\sqrt{-\frac{\left(p+2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\sqrt{z}\right)^2}{i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v}}\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{\left(p+2\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)\sqrt{z}\right)^2}{4\,(i\,b\,m-2\,i\,c\,s-2\,i\,b\,u+i\,c\,v)}\right)\right)+$$

$$e^{\frac{p^2}{-4\,b\,i\,m-8\,i\,c\,s+8\,i\,b\,u+4\,i\,c\,v}}\,(i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v)^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}$$

$$\left(p+2\,(i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v)\,\sqrt{z}\right)^{h+k}\left(-\frac{\left(p+2\,(i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v)\,\sqrt{z}\right)^2}{i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,(i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{\left(p+2\,(i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v)\,\sqrt{z}\right)^2}{8\,i\,c\,s+4\,b\,i\,(m-2\,u)-4\,i\,c\,v}\right)+$$

$$2\,\sqrt{-\frac{\left(p+2\,(i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v)\,\sqrt{z}\right)^2}{i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v}}\;(i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v)$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{\left(p+2\,(i\,b\,m+2\,i\,c\,s-2\,i\,b\,u-i\,c\,v)\,\sqrt{z}\right)^2}{8\,i\,c\,s+4\,b\,i\,(m-2\,u)-4\,i\,c\,v}\right)\Bigg)\Bigg)\Bigg)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\cos^m\left(b\,z^r\right)\cos^v(c\,z)$

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$$\int z^n\,e^{p\,z}\cos^m\left(b\,z^2\right)\cos^v(c\,z)\,dz = 2^{-m-v-1}\left(\frac{2\,z^n\,(-p\,z)^{-n}\,\Gamma(n+1,\,-p\,z)\,(m \bmod 2-1)\,(v \bmod 2-1)}{p}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}+\right.$$

$$2\,z^{n+1}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(E_{-n}(-(p+c\,i\,(2\,s-v))\,z)+E_{-n}(-(p-2\,i\,c\,s+i\,c\,v)\,z)\right)+$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(i\,b\,(2\,k-m))^{3/2}}\left(e^{\frac{i\,(p+c\,i\,(v-2\,s))^2}{b\,(8\,k-4\,m)}}\binom{v}{s}\left(b\,i\,(m-2\,k)\sum_{q=0}^{n}2^{q-n}\,(i\,b\,(2\,k-m))^{-n-\frac{1}{2}}\,(i\,c\,(2\,s-v)-p)^{n-q}\right.\right.$$

$$\left(-\frac{i\,(i\,p+c\,(2\,s-v)+2\,b\,(m-2\,k)\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-q-1)}(p+i\,(-2\,c\,s+c\,v+4\,b\,k\,z-2\,b\,m\,z))^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(p+i\,(-2\,c\,s+c\,v+4\,b\,k\,z-2\,b\,m\,z))^2}{b\,(8\,k-4\,m)}\right)-i\,b\,e^{\frac{c\,p\,(v-2\,s)}{b\,(2\,k-m)}}\,(2\,k-m)$$

$$\sum_{q=0}^{n}2^{q-n}\,(i\,b\,(2\,k-m))^{-n-\frac{1}{2}}\,(i\,c\,(v-2\,s)-p)^{n-q}\left(-\frac{i\,(i\,p+c\,(v-2\,s)+2\,b\,(m-2\,k)\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-q-1)}$$

$$(p+i(2cs-cv+4bkz-2bmz))^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(ip+c(v-2s)+2b(m-2k)z)^2}{b(8k-4m)}\right)+$$

$$e^{-\frac{i(p-2ics+icv)^2}{b(4k-2m)}}\sqrt{b^2(m-2k)^2}\left(e^{\frac{2cps-cpv}{2bk-bm}}\sum_{q=0}^{n}2^{q-n}(ib(m-2k))^{-n-\frac{1}{2}}(ic(v-2s)-p)^{n-q}\right.$$

$$\left(\frac{i(ip-2cs+cv+4bkz-2bmz)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)}(p-i(-2cs+cv+4bkz-2bmz))^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(ip-2cs+cv+4bkz-2bmz)^2}{4(2bk-bm)}\right)+$$

$$\sum_{q=0}^{n}2^{q-n}(ib(m-2k))^{-n-\frac{1}{2}}(ic(2s-v)-p)^{n-q}(p+ci(v-2s)+2bi(m-2k)z)^{q+1}$$

$$\left(\frac{i(p+ci(v-2s)+2bi(m-2k)z)^2}{b(m-2k)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\left.\left.\left.\Gamma\left(\frac{q+1}{2},\frac{i(ip+2cs-cv+4bkz-2bmz)^2}{4(2bk-bm)}\right)\right)\right)\right)+\binom{v}{\frac{v}{2}}(v\bmod 2-1)$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{b^2(m-2s)^2}}\left(e^{\frac{ip^2}{4bm-8bs}}\binom{m}{s}\left(\sqrt{-ib(m-2s)}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(ib(m-2s))^{-n-\frac{1}{2}}(p+2bi(m-2s)z)^{q+1}\right.\right.$$

$$\left(\frac{i(p+2bi(m-2s)z)^2}{b(m-2s)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(p+2bi(m-2s)z)^2}{4b(m-2s)}\right)+e^{\frac{ip^2}{4bs-2bm}}\sqrt{ib(m-2s)}$$

$$\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(-ib(m-2s))^{-n-\frac{1}{2}}(p-2ib(m-2s)z)^{q+1}\left(-\frac{i(p-2ib(m-2s)z)^2}{b(m-2s)}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(p-2ib(m-2s)z)^2}{4b(m-2s)}\right)\right)\right)\right)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

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$$\int z^n e^{pz}\cos^m\left(b\sqrt{z}\right)\cos^v(cz)\,dz=$$

$$2^{-m-v-1}\left(\frac{2(-p)^{-n}\,\Gamma(n+1,-pz)(m\bmod 2-1)(v\bmod 2-1)}{p}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}+2\binom{m}{\frac{m}{2}}(m\bmod 2-1)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma(n+1,-(p-2ics+icv)z)(ic(2s-v)-p)^{-n-1}+(ic(v-2s)-p)^{-n-1}\Gamma(n+1,-(p+ci(2s-v))z)\right)-$$

$$4^{-n} p^{-2(n+1)} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{\frac{b^2 (m-2s)^2}{4p}} \binom{m}{s}$$

$$\left(\sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h} 4^k (-i\, b\,(m-2s))^{-h-k+2n} \left(\frac{\left(2 i \sqrt{z}\; p + b\,(m-2s)\right)^2}{p} \right)^{\frac{1}{2}(-h-k-1)} \left(2 p \sqrt{z} - i\, b\,(m-2s)\right)^{h+k} \right.$$

$$\binom{k}{h} \binom{n}{k} \left(b\,(m-2s) \left(2 i \sqrt{z}\; p + b\,(m-2s)\right) \Gamma\!\left(\frac{1}{2}(h+k+1), \frac{\left(2 i \sqrt{z}\; p + b\,(m-2s)\right)^2}{4p} \right) - 2 \right.$$

$$\left.\left. p \sqrt{\frac{\left(2 i \sqrt{z}\; p + b\,(m-2s)\right)^2}{p}}\; \Gamma\!\left(\frac{1}{2}(h+k+2), \frac{\left(2 i \sqrt{z}\; p + b\,(m-2s)\right)^2}{4p} \right) \right) \right) +$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h} 4^k (i\, b\,(m-2s))^{-h-k+2n} \left(\frac{\left(b\,(m-2s) - 2 i\, p \sqrt{z}\right)^2}{p} \right)^{\frac{1}{2}(-h-k-1)} \left(2 \sqrt{z}\; p + b\, i\,(m-2s)\right)^{h+k}$$

$$\binom{k}{h} \binom{n}{k} \left(b\,(m-2s) \left(b\,(m-2s) - 2 i\, p \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1), \frac{\left(b\,(m-2s) - 2 i\, p \sqrt{z}\right)^2}{4p} \right) - 2 \right.$$

$$\left.\left. p \sqrt{\frac{\left(b\,(m-2s) - 2 i\, p \sqrt{z}\right)^2}{p}}\; \Gamma\!\left(\frac{1}{2}(h+k+2), \frac{\left(b\,(m-2s) - 2 i\, p \sqrt{z}\right)^2}{4p} \right) \right) \right) +$$

$$4^{-n} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{u} \left(e^{\frac{b^2 (m-2u)^2}{4(p+c\, i\,(2s-v))}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i\, b\,(m-2u))^{-h-k+2n} \left(b\, i\,(m-2u) + 2\,(p + c\, i\,(2s-v)) \sqrt{z}\right)^{h+k} \right.\right.$$

$$\left(\frac{\left(b\,(m-2u) + 2\,(-i\, p + 2 c s - c v) \sqrt{z}\right)^2}{p + c\, i\,(2s-v)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\, i\,(m-2u) \left(b\, i\,(m-2u) + \right.\right.$$

$$\left. 2\,(p + c\, i\,(2s-v)) \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1), \frac{\left(b\,(m-2u) + 2\,(-i\, p + 2 c s - c v) \sqrt{z}\right)^2}{4\,(p + c\, i\,(2s-v))} \right) +$$

$$2\sqrt{\frac{\left(b\,(m-2\,u)+2\,(-i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{p+c\,i\,(2\,s-v)}}\;(p+c\,i\,(2\,s-v))$$

$$\left.\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+k+2),\;\frac{\left(b\,(m-2\,u)+2\,(-i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{4\,(p+c\,i\,(2\,s-v))}\right)\right)\right)\right)(p+c\,i\,(2\,s-v))^{-2\,(n+1)}+$$

$$e^{\frac{b^2\,(m-2\,u)^2}{4\,(p+c\,i\,(2\,s-v))}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(2\,(p+c\,i\,(2\,s-v))\,\sqrt{z}\;-i\,b\,(m-2\,u)\right)^{h+k}\right.$$

$$\left(\frac{\left(b\,(m-2\,u)+2\,(i\,p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{p+c\,i\,(2\,s-v)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,(p+c\,i\,(2\,s-v))\sqrt{\frac{\left(b\,(m-2\,u)+2\,(i\,p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{p+c\,i\,(2\,s-v)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.\right.$$

$$\left.\frac{\left(b\,(m-2\,u)+2\,(i\,p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(p+c\,i\,(2\,s-v))}\right)-i\,b\,(m-2\,u)\left(2\,(p+c\,i\,(2\,s-v))\,\sqrt{z}\;-\right.$$

$$\left.\left.\left.\left.i\,b\,(m-2\,u)\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\;\frac{\left(b\,(m-2\,u)+2\,(i\,p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(p+c\,i\,(2\,s-v))}\right)\right)\right)\right)$$

$$(p+c\,i\,(2\,s-v))^{-2\,(n+1)}+e^{\frac{b^2\,(m-2\,u)^2}{4\,(p-2\,i\,c\,s+i\,c\,v)}}\,(p-2\,i\,c\,s+i\,c\,v)^{-2\,(n+1)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(i\,b\,(m-2\,u))^{-h-k+2\,n}\left(b\,i\,(m-2\,u)+2\,(p-2\,i\,c\,s+i\,c\,v)\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{\left(b\,(m-2\,u)+2\,(-i\,p-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(b\,i\,(m-2\,u)\left(b\,i\,(m-2\,u)+2\,(p-2\,i\,c\,s+i\,c\,v)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{\left(b(m-2u)+2(-i\,p-2\,c\,s+c\,v)\sqrt{z}\right)^2}{4(p-2\,i\,c\,s+i\,c\,v)}\right)+$$

$$2\sqrt{\frac{\left(b(m-2u)+2(-i\,p-2\,c\,s+c\,v)\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}}\ (p-2\,i\,c\,s+i\,c\,v)$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{\left(b(m-2u)+2(-i\,p-2\,c\,s+c\,v)\sqrt{z}\right)^2}{4(p-2\,i\,c\,s+i\,c\,v)}\right)\right)+$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b(m-2u))^{-h-k+2n}\left(\frac{\left(b(m-2u)+2(i\,p+2\,c\,s-c\,v)\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\left(2(p-2\,i\,c\,s+i\,c\,v)\sqrt{z}-i\,b(m-2u)\right)^{h+k}\binom{k}{h}\binom{n}{k}$$

$$\left(2(p-2\,i\,c\,s+i\,c\,v)\sqrt{\frac{\left(b(m-2u)+2(i\,p+2\,c\,s-c\,v)\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{\left(b(m-2u)+2(i\,p+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4(p-2\,i\,c\,s+i\,c\,v)}\right)-$$

$$i\,b(m-2u)\left(2(p-2\,i\,c\,s+i\,c\,v)\sqrt{z}-i\,b(m-2u)\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.$$

$$\left.\left.\left.\left.\left.\frac{\left(b(m-2u)+2(i\,p+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4(p-2\,i\,c\,s+i\,c\,v)}\right)\right)\right)\right)\right)\ /;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z^r}\cos^m(b\,z^r)\cos^v(c\,z)$

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$$\int z^n\,e^{p\,z^2}\cos^m(b\,z^2)\cos^v(c\,z)\,dz=$$

$$2^{-m-v-1}\left(\binom{m}{\frac{m}{2}}(m \bmod 2-1)\left(\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{\frac{c^2(v-2s)^2}{4p}}\binom{v}{s}\left(\sum_{q=0}^{n}\left(i\,c\left(s-\frac{v}{2}\right)\right)^{n-q}\left(\frac{(2\,c\,s-c\,v+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}\right.\right.\right.$$

$$(c\,i\,(v-2\,s)+2\,p\,z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{(2\,c\,s-c\,v+2\,i\,p\,z)^2}{4\,p}\right)+\sum_{q=0}^{n}2^{q-n}\,(i\,c\,(v-2\,s))^{n-q}$$

$$\left(\frac{(c\,(v-2\,s)+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(c\,i\,(2\,s-v)+2\,p\,z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{(c\,(v-2\,s)+2\,i\,p\,z)^2}{4\,p}\right)\Bigg)\Bigg)\,p^{-n-1}-$$

$$z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}E_{\frac{1}{2}-\frac{n}{2}}(-p\,z^2)\,(m\bmod 2-1)\,(v\bmod 2-1)+z^{n+1}\binom{v}{\frac{v}{2}}(v\bmod 2-1)$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\Gamma\left(\frac{n+1}{2},\,(i\,b\,(m-2\,s)-p)\,z^2\right)\left((i\,b\,(m-2\,s)-p)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$\left.\left(-(p+b\,i\,(m-2\,s))\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,-(p+b\,i\,(m-2\,s))\,z^2\right)\right)-$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(\binom{v}{s}\left(e^{\frac{c^2\,(v-2\,s)^2}{4\,(b\,i\,(m-2\,k)+p)}}\sqrt{2\,i\,b\,k-i\,b\,m+p}\,\sum_{q=0}^{n}2^{q-n}\,(-2\,b\,i\,k+i\,b\,m+p)^{-n-\frac{1}{2}}\,(i\,c\,(v-2\,s))^{n-q}\right.\right.$$

$$\left(\frac{i\,(-2\,c\,s+c\,v+4\,b\,k\,z-2\,b\,m\,z+2\,i\,p\,z)^2}{2\,b\,k-b\,m+i\,p}\right)^{\frac{1}{2}(-q-1)}(c\,i\,(2\,s-v)+2\,(-2\,b\,i\,k+i\,b\,m+p)\,z)^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(-2\,c\,s+c\,v+4\,b\,k\,z-2\,b\,m\,z+2\,i\,p\,z)^2}{8\,b\,k-4\,b\,m+4\,i\,p}\right)+$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,(b\,i\,(m-2\,k)+p)}}\sqrt{2\,i\,b\,k-i\,b\,m+p}\,\sum_{q=0}^{n}(-2\,b\,i\,k+i\,b\,m+p)^{-n-\frac{1}{2}}\left(i\,c\left(s-\frac{v}{2}\right)\right)^{n-q}$$

$$\left(\frac{i\,(2\,c\,s-c\,v+4\,b\,k\,z-2\,b\,m\,z+2\,i\,p\,z)^2}{2\,b\,k-b\,m+i\,p}\right)^{\frac{1}{2}(-q-1)}(c\,i\,(v-2\,s)+2\,(-2\,b\,i\,k+i\,b\,m+p)\,z)^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(2\,c\,s-c\,v+4\,b\,k\,z-2\,b\,m\,z+2\,i\,p\,z)^2}{8\,b\,k-4\,b\,m+4\,i\,p}\right)+$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,(2\,i\,b\,k-i\,b\,m+p)}}\sqrt{-2\,b\,i\,k+i\,b\,m+p}\,\sum_{q=0}^{n}(2\,i\,b\,k-i\,b\,m+p)^{-n-\frac{1}{2}}\left(i\,c\left(s-\frac{v}{2}\right)\right)^{n-q}$$

$$\left(-\frac{i\,(2\,c\,s-c\,v-4\,b\,k\,z+2\,b\,m\,z+2\,i\,p\,z)^2}{2\,b\,k-b\,m-i\,p}\right)^{\frac{1}{2}(-q-1)}(c\,i\,(v-2\,s)+2\,(2\,i\,b\,k-i\,b\,m+p)\,z)^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(2\,c\,s-c\,v-4\,b\,k\,z+2\,b\,m\,z+2\,i\,p\,z)^2}{8\,b\,k-4\,b\,m-4\,i\,p}\right)+$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,(b\,i\,(2\,k-m)+p)}}\sqrt{b\,i\,(m-2\,k)+p}\,\sum_{q=0}^{n}2^{q-n}\,(b\,i\,(2\,k-m)+p)^{-n-\frac{1}{2}}\,(i\,c\,(v-2\,s))^{n-q}$$

$$\left(-\frac{i\,(c\,(v-2\,s)+2\,(-2\,b\,k+b\,m+i\,p)\,z)^2}{2\,b\,k-b\,m-i\,p}\right)^{\frac{1}{2}(-q-1)}\,(c\,i\,(2\,s-v)+2\,(2\,i\,b\,k-i\,b\,m+p)\,z)^{q+1}$$

$$\left.\left.\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(c\,(v-2\,s)+2\,(-2\,b\,k+b\,m+i\,p)\,z)^2}{8\,b\,k-4\,b\,m-4\,i\,p}\right)\right)\right)\Big/$$

$$\left(\sqrt{b\,i\,(2\,k-m)+p}\,\sqrt{b\,i\,(m-2\,k)+p}\right)\right)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

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$$\int z^n\,e^{p\sqrt{z}}\,\cos^m\!\left(b\sqrt{z}\right)\cos^v(c\,z)\,dz=$$

$$2^{-m-v-1}\left(-4\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\!\left(2\,(n+1),\,-p\sqrt{z}\right)(m\bmod 2-1)\,(v\bmod 2-1)\,p^{-2\,(n+1)}+4\binom{v}{\frac{v}{2}}(v\bmod 2-1)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\Gamma\!\left(2\,(n+1),\,(i\,b\,(m-2\,s)-p)\sqrt{z}\right)(i\,b\,(m-2\,s)-p)^{-2\,(n+1)}+(-p-i\,b\,(m-2\,s))^{-2\,(n+1)}\,\Gamma\!\left(\right.\right.$$

$$\left.\left.2\,(n+1),\,-(p+b\,i\,(m-2\,s))\sqrt{z}\right)\right)-4^{-n}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}-e^{\frac{i\,p^2}{4\,c\,v-8\,c\,s}}\left(c^2\,(v-2\,s)^2\right)^{-2\,n-1}$$

$$\binom{v}{s}\left(\left(\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,c\,i\,(v-2\,s)\sqrt{z}\right)^{h+k}\left(\frac{i\left(p+2\,c\,i\,(v-2\,s)\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\right.\right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left(p\left(p+2\,c\,i\,(v-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(p+2\,c\,i\,(v-2\,s)\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+\right.$$

$$\left.\left.2\,c\,i\sqrt{-\frac{i\left(p+2\,c\,i\,(v-2\,s)\sqrt{z}\right)^2}{c\,(2\,s-v)}}\,(v-2\,s)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(p+2\,c\,i\,(v-2\,s)\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\right)\right)$$

$$(i\,c\,(2\,s-v))^{2\,n}+e^{\frac{i\,p^2}{4\,c\,s-2\,c\,v}}\,(i\,c\,(v-2\,s))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,c\,i\,(2\,s-v)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p+2\,c\,i\,(2\,s-v)\sqrt{z}\right)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(p\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+\right.$$

$$\left.\left.2\,c\,i\,(2\,s-v)\sqrt{\frac{i\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\right)\right)+$$

$$4^{-n}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}-\left(c^2\,(v-2\,s)^2\right)^{-2\,n-1}\binom{m}{u}\left(e^{\frac{i\,(b\,m+i\,p-2\,b\,u)^2}{8\,c\,s-4\,c\,v}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p-i\,b\,(m-2\,u))^{-h-k+2\,n}\right.\right.$$

$$\left(p-i\,b\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\right)^{h+k}\left(\frac{i\left(p-i\,b\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((p-i\,b\,(m-2\,u))\left(p-i\,b\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(i\,p+b\,(m-2\,u)+2\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+$$

$$2\,c\,i\,(v-2\,s)\sqrt{\frac{i\left(p-i\,b\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(i\,p+b\,(m-2\,u)+2\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\right)\right)(i\,c\,(2\,s-v))^{2\,n}+$$

$$e^{\frac{i\,(b\,m-i\,p-2\,b\,u)^2}{8\,c\,s-4\,c\,v}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p+b\,i\,(m-2\,u))^{-h-k+2\,n}\left(p+b\,i\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\right)^{h+k}\right.$$

$$\left(\frac{i\left(p+b\,i\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((p + b\,i\,(m-2u))\left(p + b\,i\,(m-2u) + 2\,c\,i\,(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(-i\,p + b\,(m-2u) + 2\,c\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right) +$$

$$2\,c\,i\,(v-2s)\sqrt{\frac{i\left(p + b\,i\,(m-2u) + 2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(v-2s)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(-i\,p + b\,(m-2u) + 2\,c\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)\Bigg)\Bigg)$$

$$(i\,c\,(2s-v))^{2n} + e^{\frac{i\,(p+b\,i\,(m-2u))^2}{c\,(8s-4v)}}\,(i\,c\,(v-2s))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p + b\,i\,(m-2u))^{-h-k+2n}$$

$$\left(p + b\,i\,(m-2u) + 2\,c\,i\,(2s-v)\sqrt{z}\right)^{h+k}\left(\frac{i\left(p + b\,i\,(m-2u) + 2\,c\,i\,(2s-v)\sqrt{z}\right)^2}{c\,(2s-v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((p + b\,i\,(m-2u))\left(p + b\,i\,(m-2u) + 2\,c\,i\,(2s-v)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(p + b\,i\,(m-2u) + 2\,c\,i\,(2s-v)\sqrt{z}\right)^2}{c\,(8s-4v)}\right) +$$

$$2\,c\,i\,(2s-v)\sqrt{\frac{i\left(p + b\,i\,(m-2u) + 2\,c\,i\,(2s-v)\sqrt{z}\right)^2}{c\,(2s-v)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(p + b\,i\,(m-2u) + 2\,c\,i\,(2s-v)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)\Bigg) +$$

$$e^{-\frac{i\,(b\,m+i\,p-2\,b\,u)^2}{8\,c\,s-4\,c\,v}}\,(i\,c\,(v-2s))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p - i\,b\,(m-2u))^{-h-k+2n}$$

$$\left(p - i\, b\,(m-2u) + 2\,c\,i\,(2s-v)\sqrt{z}\right)^{h+k} \left(-\frac{i\left(i\,p + b\,(m-2u) + 2\,c\,(v-2s)\sqrt{z}\right)^2}{c\,(2s-v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((p - i\, b\,(m-2u))\left(p - i\, b\,(m-2u) + 2\,c\,i\,(2s-v)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(i\,p + b\,(m-2u) + 2\,c\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right) +$$

$$2\,c\,i\,(2s-v)\sqrt{-\frac{i\left(i\,p + b\,(m-2u) + 2\,c\,(v-2s)\sqrt{z}\right)^2}{c\,(2s-v)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.-\frac{i\left(i\,p + b\,(m-2u) + 2\,c\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)\right)\Bigg)\Bigg) \;/;\; m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

Involving $z^n\, e^{p\,z} \cos^m(b\, z^r) \cos^v(c\, z^r)$

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$$\int z^n\, e^{p\,z} \cos^m(b\,z^2)\cos^v(c\,z^2)\,dz =$$

$$2^{-m-v-1}\left(\frac{2\,(-p)^{-n}\,\Gamma(n+1, -p\,z)\,(m \bmod 2 - 1)\,(v \bmod 2 - 1)}{p}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} + \binom{m}{\frac{m}{2}}(m \bmod 2 - 1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{\sqrt{i\,c\,(2s-v)}}\right.\right.$$

$$\left(e^{\frac{i\,p^2}{8\,c\,s-4\,c\,v}}\sum_{q=0}^{n} 2^{q-n}\,(-p)^{n-q}\,(i\,c\,(2s-v))^{-n-\frac{1}{2}}\,(p+2\,c\,i\,(2s-v)\,z)^{q+1}\left(\frac{i\,(p+2\,c\,i\,(2s-v)\,z)^2}{c\,(2s-v)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\right.\right.$$

$$\left.\left.\frac{q+1}{2}, \frac{i\,(p+2\,c\,i\,(2s-v)\,z)^2}{c\,(8s-4v)}\right)\right) + \frac{1}{\sqrt{i\,c\,(v-2s)}}\left(e^{\frac{i\,p^2}{4\,c\,v-8\,c\,s}}\sum_{q=0}^{n} 2^{q-n}\,(-p)^{n-q}\,(i\,c\,(v-2s))^{-n-\frac{1}{2}}\right.$$

$$\left.\left.\left.(p+2\,c\,i\,(v-2s)\,z)^{q+1}\left(\frac{i\,(p+2\,c\,i\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i\,(p+2\,c\,i\,(v-2s)\,z)^2}{c\,(8s-4v)}\right)\right)\right) +$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(-\left(e^{\frac{i\,p^2}{-8\,b\,k+4\,b\,m-8\,c\,s+4\,c\,v}}\sum_{q=0}^{n} 2^{q-n}\,(-p)^{n-q}\,(-i\,(2\,b\,k - b\,m + 2\,c\,s - c\,v))^{-n-\frac{1}{2}}\right.\right.$$

$$(p - 2\,i\,(2\,b\,k - b\,m + 2\,c\,s - c\,v)\,z)^{q+1} \left(\frac{i\,(i\,p + 2\,(2\,b\,k - b\,m + 2\,c\,s - c\,v)\,z)^2}{2\,b\,k - b\,m + 2\,c\,s - c\,v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$

$$\Gamma\!\left(\frac{q+1}{2},\, \frac{i\,(i\,p + 2\,(2\,b\,k - b\,m + 2\,c\,s - c\,v)\,z)^2}{8\,b\,k - 4\,b\,m + 8\,c\,s - 4\,c\,v}\right)\Bigg) \Big/ \left(\sqrt{-i\,(2\,b\,k - b\,m + 2\,c\,s - c\,v)}\right) -$$

$$\Bigg(e^{\frac{i\,p^2}{-8\,b\,k + 4\,b\,m + 8\,c\,s - 4\,c\,v}} \sum_{q=0}^{n} 2^{q-n}\,(-p)^{n-q}\,(-i\,(2\,b\,k - b\,m - 2\,c\,s + c\,v))^{-n-\frac{1}{2}}\,(p - 2\,i\,(2\,b\,k - b\,m - 2\,c\,s + c\,v)\,z)^{q+1}$$

$$\left(\frac{i\,(i\,p + 2\,(2\,b\,k - b\,m - 2\,c\,s + c\,v)\,z)^2}{2\,b\,k - b\,m - 2\,c\,s + c\,v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\,\Gamma\!\Bigg(\frac{q+1}{2},$$

$$\frac{i\,(i\,p + 2\,(2\,b\,k - b\,m - 2\,c\,s + c\,v)\,z)^2}{8\,b\,k - 4\,b\,m - 8\,c\,s + 4\,c\,v}\Bigg)\Bigg) \Big/ \left(\sqrt{-i\,(2\,b\,k - b\,m - 2\,c\,s + c\,v)}\right) - \Bigg(e^{\frac{i\,p^2}{8\,b\,k - 4\,b\,m - 8\,c\,s + 4\,c\,v}}$$

$$\sum_{q=0}^{n} 2^{q-n}\,(-p)^{n-q}\,(i\,(2\,b\,k - b\,m - 2\,c\,s + c\,v))^{-n-\frac{1}{2}} \left(-\frac{i\,(i\,p + 2\,(-2\,b\,k + b\,m + 2\,c\,s - c\,v)\,z)^2}{2\,b\,k - b\,m - 2\,c\,s + c\,v}\right)^{\frac{1}{2}(-q-1)}$$

$$(p + 2\,i\,(2\,b\,k - b\,m - 2\,c\,s + c\,v)\,z)^{q+1} \binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\, -\frac{i\,(i\,p + 2\,(-2\,b\,k + b\,m + 2\,c\,s - c\,v)\,z)^2}{8\,b\,k - 4\,b\,m - 8\,c\,s + 4\,c\,v}\right)\Bigg) \Big/$$

$$\left(\sqrt{i\,(2\,b\,k - b\,m - 2\,c\,s + c\,v)}\right) - \Bigg(e^{\frac{i\,p^2}{8\,b\,k - 4\,b\,m + 8\,c\,s - 4\,c\,v}} \sum_{q=0}^{n} 2^{q-n}\,(-p)^{n-q}\,(i\,(2\,b\,k - b\,m + 2\,c\,s - c\,v))^{-n-\frac{1}{2}}$$

$$(p + 2\,i\,(2\,b\,k - b\,m + 2\,c\,s - c\,v)\,z)^{q+1} \left(-\frac{i\,(i\,p + 2\,(-2\,b\,k + b\,m - 2\,c\,s + c\,v)\,z)^2}{2\,b\,k - b\,m + 2\,c\,s - c\,v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$

$$\Gamma\!\left(\frac{q+1}{2},\, -\frac{i\,(i\,p + 2\,(-2\,b\,k + b\,m - 2\,c\,s + c\,v)\,z)^2}{8\,b\,k - 4\,b\,m + 8\,c\,s - 4\,c\,v}\right)\Bigg) \Big/ \left(\sqrt{i\,(2\,b\,k - b\,m + 2\,c\,s - c\,v)}\right)\Bigg) +$$

$$\binom{v}{\frac{v}{2}}\,(v \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b^2\,(m - 2\,s)^2}} \Bigg(e^{\frac{i\,p^2}{8\,b\,s - 4\,b\,m}} \binom{m}{s} \Bigg(e^{\frac{i\,p^2}{2\,b\,m - 4\,b\,s}} \sqrt{-i\,b\,(m - 2\,s)}$$

$$\sum_{q=0}^{n} 2^{q-n}\,(-p)^{n-q}\,(i\,b\,(m - 2\,s))^{-n-\frac{1}{2}}\,(p + 2\,b\,i\,(m - 2\,s)\,z)^{q+1} \left(\frac{i\,(p + 2\,b\,i\,(m - 2\,s)\,z)^2}{b\,(m - 2\,s)}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i\,(p+2\,b\,i\,(m-2\,s)\,z)^2}{4\,b\,(m-2\,s)}\right)+\sqrt{i\,b\,(m-2\,s)}$$

$$\sum_{q=0}^{n} 2^{q-n}\,(-p)^{n-q}\,(-i\,b\,(m-2\,s))^{-n-\frac{1}{2}}\,(p-2\,i\,b\,(m-2\,s)\,z)^{q+1}\left(-\frac{i\,(p-2\,i\,b\,(m-2\,s)\,z)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i\,(p-2\,i\,b\,(m-2\,s)\,z)^2}{4\,b\,(m-2\,s)}\right)\right)\right)\right) /;\, m\in\mathbb{N}^+ \bigwedge v\in\mathbb{N}^+ \bigwedge n\in\mathbb{N}$$

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$$\int z^n\, e^{p\,z} \cos^m\!\left(b\sqrt{z}\right)\cos^v\!\left(c\sqrt{z}\right) dz ==$$

$$2^{-m-2\,n-v-1}\left(-\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{\frac{b^2\,(2\,k-m)^2}{4\,p}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,b\,(2\,k-m))^{-h-i+2\,n}\left(b\,i\,(2\,k-m)+2\,p\sqrt{z}\right)^{h+i}\right.\right.\right.$$

$$\left(-\frac{\left(b\,i\,(2\,k-m)+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\left(b\,i\,(2\,k-m)\left(b\,i\,(2\,k-m)+2\,p\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(b\,i\,(2\,k-m)+2\,p\sqrt{z}\right)^2}{4\,p}\right)+2\sqrt{-\frac{\left(b\,i\,(2\,k-m)+2\,p\sqrt{z}\right)^2}{p}}$$

$$\left.\left.\left. p\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(b\,i\,(2\,k-m)+2\,p\sqrt{z}\right)^2}{4\,p}\right)\right)\right)p^{-2\,(n+1)}+e^{\frac{b^2\,(m-2\,k)^2}{4\,p}}$$

$$\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,b\,(m-2\,k))^{-h-i+2\,n}\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)^{h+i}\left(-\frac{\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\right.$$

$$\binom{i}{h}\binom{n}{i}\left(b\,i\,(m-2\,k)\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)^2}{4\,p}\right)+\right.$$

$$\left.\left.\left.2\sqrt{-\frac{\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)^2}{4\,p}\right)\right)\right)p^{-2\,(n+1)}\right)-$$

$$\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{-\frac{(2 i c s-i c v)^2}{4 p}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(2 i c s-i c v)^{-h-i+2 n}\left(2\sqrt{z}\,p+c\,i\,(2 s-v)\right)^{h+i}\right.\right.$$

$$\left(-\frac{\left(2\sqrt{z}\,p+c\,i\,(2 s-v)\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\left((2 i c s-i c v)\left(2\sqrt{z}\,p+c\,i\,(2 s-v)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(2\sqrt{z}\,p+c\,i\,(2 s-v)\right)^2}{4 p}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,p+c\,i\,(2 s-v)\right)^2}{p}}$$

$$\left.\left.\left.p\,\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(2\sqrt{z}\,p+c\,i\,(2 s-v)\right)^2}{4 p}\right)\right)\right)p^{-2(n+1)}+e^{\frac{c^2(v-2 s)^2}{4 p}}$$

$$\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,c\,(v-2 s))^{-h-i+2 n}\left(2\sqrt{z}\,p+c\,i\,(v-2 s)\right)^{h+i}\left(-\frac{\left(2\sqrt{z}\,p+c\,i\,(v-2 s)\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\right.$$

$$\binom{i}{h}\binom{n}{i}\left(c\,i\,(v-2 s)\left(2\sqrt{z}\,p+c\,i\,(v-2 s)\right)\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(2\sqrt{z}\,p+c\,i\,(v-2 s)\right)^2}{4 p}\right)+\right.$$

$$\left.\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\,p+c\,i\,(v-2 s)\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(2\sqrt{z}\,p+c\,i\,(v-2 s)\right)^2}{4 p}\right)\right)\right)p^{-2(n+1)}\right)+$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{\frac{(2 b k-b m-2 c s+c v)^2}{4 p}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,(2 b k-b m-2 c s+c v))^{-h-i+2 n}\right.\right.$$

$$\left(\frac{\left(b\,(2 k-m)+c\,(v-2 s)+2\,i\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\left(b\,i\,(m-2 k)+c\,i\,(2 s-v)+2\,p\sqrt{z}\right)^{h+i}$$

$$\binom{i}{h}\binom{n}{i}\left(2\,p\sqrt{\frac{\left(b\,(2 k-m)+c\,(v-2 s)+2\,i\,p\sqrt{z}\right)^2}{p}}\;\Gamma\left(\frac{1}{2}(h+i+2),\right.\right.$$

$$\left.\left.\frac{\left(b\,(2\,k-m)+c\,(v-2\,s)+2\,\mathbb{i}\,p\,\sqrt{z}\right)^2}{4\,p}\right)-\mathbb{i}\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\left(b\,\mathbb{i}\,(m-2\,k)+\right.\right.$$

$$\left.\left.\left.c\,\mathbb{i}\,(2\,s-v)+2\,p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\,\frac{\left(b\,(2\,k-m)+c\,(v-2\,s)+2\,\mathbb{i}\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)\right)$$

$$p^{-2\,(n+1)}+e^{\frac{(-2\,b\,k+b\,m-2\,c\,s+c\,v)^2}{4\,p}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(\mathbb{i}\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-h-i+2\,n}\right.$$

$$\left(\frac{\left(b\,(2\,k-m)+c\,(2\,s-v)-2\,\mathbb{i}\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}\,(-h-i-1)}\left(b\,\mathbb{i}\,(2\,k-m)+c\,\mathbb{i}\,(2\,s-v)+2\,p\,\sqrt{z}\right)^{h+i}$$

$$\binom{i}{h}\binom{n}{i}\left(\mathbb{i}\,(2\,b\,k-b\,m+2\,c\,s-c\,v)\left(b\,\mathbb{i}\,(2\,k-m)+c\,\mathbb{i}\,(2\,s-v)+2\,p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\right.\right.$$

$$\left.\frac{\left(b\,(2\,k-m)+c\,(2\,s-v)-2\,\mathbb{i}\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\,\sqrt{\frac{\left(b\,(2\,k-m)+c\,(2\,s-v)-2\,\mathbb{i}\,p\,\sqrt{z}\right)^2}{p}}$$

$$\left.\left.\left.p\,\Gamma\left(\frac{1}{2}\,(h+i+2),\,\frac{\left(b\,(2\,k-m)+c\,(2\,s-v)-2\,\mathbb{i}\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)\right)\right)$$

$$p^{-2\,(n+1)}+e^{\frac{(-2\,b\,k+b\,m+2\,c\,s-c\,v)^2}{4\,p}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(\mathbb{i}\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-h-i+2\,n}\right.$$

$$\left(\frac{\left(b\,(2\,k-m)+c\,(v-2\,s)-2\,\mathbb{i}\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}\,(-h-i-1)}\left(b\,\mathbb{i}\,(2\,k-m)+c\,\mathbb{i}\,(v-2\,s)+2\,p\,\sqrt{z}\right)^{h+i}$$

$$\binom{i}{h}\binom{n}{i}\left(\mathbb{i}\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\left(b\,\mathbb{i}\,(2\,k-m)+c\,\mathbb{i}\,(v-2\,s)+2\,p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\right.\right.$$

$$\frac{\left(b\,(2\,k-m)+c\,(v-2\,s)-2\,i\,p\,\sqrt{z}\right)^2}{4\,p}\Bigg)+2\,\sqrt{\frac{\left(b\,(2\,k-m)+c\,(v-2\,s)-2\,i\,p\,\sqrt{z}\right)^2}{p}}$$

$$p\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,\frac{\left(b\,(2\,k-m)+c\,(v-2\,s)-2\,i\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)$$

$$p^{-2\,(n+1)}+e^{-\frac{(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))^2}{4\,p}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))^{-h-i+2\,n}\right.$$

$$\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^{h+i}\left(-\frac{\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg((b\,i\,(m-2\,k)+c\,i\,(v-2\,s))\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+$$

$$2\,\sqrt{-\frac{\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\Bigg(\frac{1}{2}\,(h+i+2),$$

$$-\frac{\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\Bigg)\Bigg)\Bigg)\,p^{-2\,(n+1)}\Bigg)\Bigg)-$$

$$2^{-m-v}\,(-p)^{-n-1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-p\,z)\,(m\bmod 2-1)\,(v\bmod 2-1)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\,e^{p\,z^r}\cos^m\!\left(b\,z^r\right)\cos^v\!\left(c\,z^r\right)$

01.07.21.2014.01

$$\int z^{\alpha-1} e^{p z^r} \cos^m(b z^r) \cos^v(c z^r) \, dz = -\frac{2^{-m-v} z^\alpha}{r} \left(\binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\!\left(\frac{\alpha}{r}, -p z^r\right) (m \bmod 2 - 1)(v \bmod 2 - 1)(-p z^r)^{-\frac{\alpha}{r}} - \right.$$

$$\binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma\!\left(\frac{\alpha}{r}, (-2 b i k + i b m - p) z^r\right) ((-2 b i k + i b m - p) z^r)^{-\frac{\alpha}{r}} + \right.$$

$$\left. (i (2 b k - b m + i p) z^r)^{-\frac{\alpha}{r}} \Gamma\!\left(\frac{\alpha}{r}, i (2 b k - b m + i p) z^r\right) \right) -$$

$$\binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\Gamma\!\left(\frac{\alpha}{r}, -(p + c i (2 s - v)) z^r\right) (-(p + c i (2 s - v)) z^r)^{-\frac{\alpha}{r}} + \right.$$

$$\left. (-(p - 2 i c s + i c v) z^r)^{-\frac{\alpha}{r}} \Gamma\!\left(\frac{\alpha}{r}, -(p - 2 i c s + i c v) z^r\right) \right) +$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\Gamma\!\left(\frac{\alpha}{r}, i (2 b k - b m + i p - 2 c s + c v) z^r\right) (i (2 b k - b m + i p - 2 c s + c v) z^r)^{-\frac{\alpha}{r}} + \right.$$

$$(-i (2 b k - b m - i p - 2 c s + c v) z^r)^{-\frac{\alpha}{r}} \Gamma\!\left(\frac{\alpha}{r}, -i (2 b k - b m - i p - 2 c s + c v) z^r\right) +$$

$$(i (2 b k - b m + i p + 2 c s - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\!\left(\frac{\alpha}{r}, i (2 b k - b m + i p + 2 c s - c v) z^r\right) +$$

$$\left.\left. (-i (2 b k - b m - i p + 2 c s - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\!\left(\frac{\alpha}{r}, -i (2 b k - b m - i p + 2 c s - c v) z^r\right) \right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{b z^r + e} \cos^m(a z^r + q) \cos^v(c z^r + g)$

01.07.21.2015.01

$$\int z^{\alpha-1} e^{b z^r+e} \cos^m(a z^r+q) \cos^v(c z^r+g)\, dz = -\frac{1}{r}\left(2^{-m-v} z^\alpha \left(e^e \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right)(1-m \bmod 2)(1-v \bmod 2)(-b z^r)^{-\frac{\alpha}{r}} + \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \left(e^{e+2 i k q - i m q}\, \Gamma\left(\frac{\alpha}{r}, (-b-2 i a k + i a m) z^r\right)((-b-2 i a k+i a m) z^r)^{-\frac{\alpha}{r}} + e^{e-2 i k q + i m q} ((-b+2 i a k - i a m) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (-b+2 i a k - i a m) z^r\right)\right) + \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} \left(e^{e+2 i g s - i g v}\, \Gamma\left(\frac{\alpha}{r}, (-b-2 i c s + i c v) z^r\right)((-b-2 i c s+i c v) z^r)^{-\frac{\alpha}{r}} + e^{e-2 i g s + i g v} ((-b+2 i c s - i c v) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (-b+2 i c s - i c v) z^r\right)\right) + \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} \left(e^{e+2 i k q - i m q + 2 i g s - i g v}\, \Gamma\left(\frac{\alpha}{r}, (-b-2 i a k + i a m - 2 i c s + i c v) z^r\right) ((-b-2 i a k+i a m-2 i c s+i c v) z^r)^{-\frac{\alpha}{r}} + e^{e-2 i k q + i m q + 2 i g s - i g v} ((-b+2 i a k - i a m - 2 i c s + i c v) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (-b+2 i a k - i a m - 2 i c s + i c v) z^r\right) + e^{e+2 i k q - i m q - 2 i g s + i g v} ((-b-2 i a k + i a m + 2 i c s - i c v) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (-b-2 i a k + i a m + 2 i c s - i c v) z^r\right) + e^{e-2 i k q + i m q - 2 i g s + i g v} ((-b+2 i a k - i a m + 2 i c s - i c v) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (-b+2 i a k - i a m + 2 i c s - i c v) z^r\right)\right)\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^n e^{b z^2+d z+e} \cos^m(a z^2+p z+q) \cos^v(c z^2+f z+g)$

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$$\int z^n e^{b z^2+d z+e} \cos^m(a z^2+p z+q) \cos^v(c z^2+f z+g)\, dz = 2^{-m-v-1} b^{-n-1} e^{-\frac{d^2}{4 b}} \left(b^{n+1} e^{\frac{d^2}{4 b}} \left(\binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \left(e^{\frac{(i d+(m-2 k) p)^2}{4 (b+a i (2 k-m))}+e+i (2 k-m) q} \left(\sum_{j=0}^{n} 2^{j-n} (-d-2 i k p+i m p)^{n-j} (d+i (2 k-m) p + 2 (b+a i (2 k-m)) z)^{j+1} \left(-\frac{(d+i (2 k-m) p+2 (b+a i (2 k-m)) z)^2}{b+a i (2 k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+i (2 k-m) p+2 (b+a i (2 k-m)) z)^2}{4 (b+a i (2 k-m))}\right)\right) (b+a i (2 k-m))^{-n-1} + \right.\right.\right.$$

$$e^{-\frac{(d+i(m-2k)p)^2}{4(b+a i(m-2k))}+e+i(m-2k)q}\,(b+a\,i\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-d-i\,(m-2k)\,p)^{n-j}$$

$$(d+i\,(m-2k)\,p+2\,(b+a\,i\,(m-2k))\,z)^{j+1}\left(-\frac{(d+i\,(m-2k)\,p+2\,(b+a\,i\,(m-2k))\,z)^2}{b+a\,i\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+i\,(m-2k)\,p+2\,(b+a\,i\,(m-2k))\,z)^2}{4\,(b+a\,i\,(m-2k))}\right)\Bigg)+$$

$$\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{\frac{(i\,d-2\,f\,s+f\,v)^2}{4\,(b+2\,i\,c\,s-i\,c\,v)}+e+g\,i\,(2s-v)}\left(\sum_{j=0}^{n}2^{j-n}\,(-d-2\,i\,f\,s+i\,f\,v)^{n-j}\right.\right.$$

$$(d+f\,i\,(2s-v)+2\,(b+2\,i\,c\,s-i\,c\,v)\,z)^{j+1}\left(-\frac{(d+f\,i\,(2s-v)+2\,(b+2\,i\,c\,s-i\,c\,v)\,z)^2}{b+2\,i\,c\,s-i\,c\,v}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+f\,i\,(2s-v)+2\,(b+2\,i\,c\,s-i\,c\,v)\,z)^2}{4\,(b+2\,i\,c\,s-i\,c\,v)}\right)\Bigg)(b+2\,i\,c\,s-i\,c\,v)^{-n-1}+$$

$$e^{-\frac{(d+f\,i\,(v-2s))^2}{4\,(b+c\,i\,(v-2s))}+e+g\,i\,(v-2s)}\,(b+c\,i\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-d-i\,f\,(v-2s))^{n-j}$$

$$(d+f\,i\,(v-2s)+2\,(b+c\,i\,(v-2s))\,z)^{j+1}\left(-\frac{(d+f\,i\,(v-2s)+2\,(b+c\,i\,(v-2s))\,z)^2}{b+c\,i\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+f\,i\,(v-2s)+2\,(b+c\,i\,(v-2s))\,z)^2}{4\,(b+c\,i\,(v-2s))}\right)\Bigg)\Bigg)-$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{e-i\,(2kq-mq+2gs-gv)}\binom{v}{s}\left(e^{-\frac{(d+i(m-2k)p+f\,i\,(v-2s))^2}{4\,(b+a\,i\,(m-2k)+c\,i\,(v-2s))}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,(2\,k\,p-m\,p+2\,f\,s-f\,v)-d)^{n-j}\right.\right.$$

$$(d+i\,(m-2k)\,p+f\,i\,(v-2s)+2\,(b+a\,i\,(m-2k)+c\,i\,(v-2s))\,z)^{j+1}$$
$$\Big(-(d+i\,(m-2k)\,p+f\,i\,(v-2s)+2\,(b+a\,i\,(m-2k)+c\,i\,(v-2s))\,z)^2\Big/$$
$$(b+a\,i\,(m-2k)+c\,i\,(v-2s))\Big)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-(d+i\,(m-2k)\,p+f\,i\,(v-2s)+2\,(b+a\,i\,(m-2k)+c\,i\,(v-2s))\,z)^2\right/$$
$$\left.(4\,(b+a\,i\,(m-2k)+c\,i\,(v-2s)))\right)\Bigg)(b+a\,i\,(m-2k)+c\,i\,(v-2s))^{-n-1}+$$

$$e^{2\,i\,(2k-m)\,q}\left(e^{-\frac{i\,(i\,d-2\,k\,p+m\,p+2\,f\,s-f\,v)^2}{4\,(-i\,b+2\,a\,k-a\,m-2\,c\,s+c\,v)}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,(-2\,k\,p+m\,p+2\,f\,s-f\,v)-d)^{n-j}\right.\right.$$

$$\Big((i\,d+m\,p+2\,f\,s-f\,v+2\,i\,b\,z+2\,a\,m\,z+4\,c\,s\,z-2\,c\,v\,z-2\,k\,(p+2\,a\,z))^2\Big/$$

$$(b+i(2ak-am-2cs+cv))\Big)^{\frac{1}{2}(-j-1)}(d+i(-2fs-4czs+fv-2ibz+2cvz+2k(p+2az)-m(p+2az)))^{j+1}\binom{n}{j}\Gamma\Bigg(\frac{j+1}{2},-\Big(i(id+mp+2fs-fv+2ibz+2amz+4csz-2cvz-2k(p+2az))^2\Big)\Big/(4(-ib+2ak-am-2cs+cv))\Bigg)\Bigg)(b+i(2ak-am-2cs+cv))^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{(id-2kp+mp-2fs+fv)^2}{ib-2ak+am-2cs+cv}+8g(2s-v)\right)}(b+i(2ak-am+2cs-cv))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-d-i(2kp-mp+2fs-fv))^{n-j}\Big((id+mp-2fs+fv+2ibz+2amz-4csz+2cvz-2k(p+2az))^2\Big/(b+i(2ak-am+2cs-cv))\Big)^{\frac{1}{2}(-j-1)}(d+i(2fs+4czs-fv-2ibz-2cvz+2k(p+2az)-m(p+2az)))^{j+1}\binom{n}{j}\Gamma\Bigg(\frac{j+1}{2},\Big(i(id+mp-2fs+fv+2ibz+2amz-4csz+2cvz-2k(p+2az))^2\Big)\Big/(4(ib-2ak+am-2cs+cv))\Bigg)\Bigg)+e^{\frac{1}{4}i\left(\frac{(id+2kp-mp-2fs+fv)^2}{ib+2ak-am-2cs+cv}+8g(2s-v)\right)}$$

$$(b-i(2ak-am-2cs+cv))^{-n-1}\sum_{j=0}^{n}2^{j-n}(i(2kp-mp-2fs+fv)-d)^{n-j}\Big((id+2kp-mp-2fs+fv+2ibz+4akz-2amz-4csz+2cvz)^2\Big/(b-i(2ak-am-2cs+cv))\Big)^{\frac{1}{2}(-j-1)}(d-i(-2fs-4czs+fv+2ibz+2cvz+2k(p+2az)-m(p+2az)))^{j+1}\binom{n}{j}\Gamma\Bigg(\frac{j+1}{2},\Big(i(id+2kp-mp-2fs+fv+2ibz+4akz-2amz-4csz+2cvz)^2\Big)\Big/(4(ib+2ak-am-2cs+cv))\Bigg)\Bigg)\Bigg)-$$

$$e^{e}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)(v\bmod 2-1)\sum_{j=0}^{n}2^{j-n}(-d)^{n-j}(d+2bz)^{j+1}\left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+2bz)^2}{4b}\right)\Bigg/;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n e^{\sqrt{z}\, b+d z+e} \cos^m\left(\sqrt{z}\, a+p z+q\right) \cos^\nu\left(\sqrt{z}\, c+f z+g\right) dz = 2^{-m-2n-\nu-1} d^{-2(n+1)} e^{-\frac{b^2}{4d}}$$

$$\left(e^{\frac{b^2}{4d}} \left(-\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2-1) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \left(e^{-\frac{(b+a i(2k-m))^2}{4(d+i(2k-m)p)}+e+i(2k-m)q} \left(\sum_{i=0}^n \sum_{h=0}^i (-1)^{i-h} 4^i (b+a i(2k-m))^{-h-i+2n} \left(b+a i(2k-m)+\right.\right.\right.\right.\right.$$

$$\left.2(d+i(2k-m)p)\sqrt{z}\right)^{h+i} \left(-\frac{\left(b+a i(2k-m)+2(d+i(2k-m)p)\sqrt{z}\right)^2}{d+i(2k-m)p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i} \left((b+a i(2k-m))\left(b+a i(2k-m)+2(d+i(2k-m)p)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(b+a i(2k-m)+2(d+i(2k-m)p)\sqrt{z}\right)^2}{4(d+i(2k-m)p)}\right)+$$

$$2(d+i(2k-m)p)\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(b+a i(2k-m)+2(d+i(2k-m)p)\sqrt{z}\right)^2}{4(d+i(2k-m)p)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b+a i(2k-m)+2(d+i(2k-m)p)\sqrt{z}\right)^2}{d+i(2k-m)p}}\right)\right)$$

$$(d+i(2k-m)p)^{-2(n+1)} + e^{-\frac{(b+a i(m-2k))^2}{4(d+i(m-2k)p)}+e+i(m-2k)q} (d+i(m-2k)p)^{-2(n+1)}$$

$$\sum_{i=0}^n \sum_{h=0}^i (-1)^{i-h} 4^i (b+a i(m-2k))^{-h-i+2n} \left(b+a i(m-2k)+2(d+i(m-2k)p)\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+a i(m-2k)+2(d+i(m-2k)p)\sqrt{z}\right)^2}{d+i(m-2k)p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}$$

$$\binom{n}{i} \left((b+a i(m-2k))\left(b+a i(m-2k)+2(d+i(m-2k)p)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(b+a i(m-2k)+2(d+i(m-2k)p)\sqrt{z}\right)^2}{4(d+i(m-2k)p)}\right)+$$

$$2\,(d + i\,(m - 2\,k)\,p)\,\Gamma\!\left(\frac{1}{2}\,(h + i + 2),\, -\frac{\left(b + a\,i\,(m - 2\,k) + 2\,(d + i\,(m - 2\,k)\,p)\,\sqrt{z}\right)^2}{4\,(d + i\,(m - 2\,k)\,p)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b + a\,i\,(m - 2\,k) + 2\,(d + i\,(m - 2\,k)\,p)\,\sqrt{z}\right)^2}{d + i\,(m - 2\,k)\,p}}\right)\right) -$$

$$\binom{m}{\frac{m}{2}}\,(m \bmod 2 - 1)\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor}\binom{v}{s}\left(e^{-\frac{(b + 2\,i\,c\,s - i\,c\,v)^2}{4\,(d + 2\,i\,f\,s - i\,f\,v)} + e + g\,i\,(2\,s - v)}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b + 2\,i\,c\,s - i\,c\,v)^{-h-i+2\,n}\right.\right.$$

$$\left(b + c\,i\,(2\,s - v) + 2\,(d + 2\,i\,f\,s - i\,f\,v)\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b + c\,i\,(2\,s - v) + 2\,(d + 2\,i\,f\,s - i\,f\,v)\,\sqrt{z}\right)^2}{d + 2\,i\,f\,s - i\,f\,v}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b + 2\,i\,c\,s - i\,c\,v)\left(b + c\,i\,(2\,s - v) + 2\,(d + 2\,i\,f\,s - i\,f\,v)\,\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h + i + 1),\, -\frac{\left(b + c\,i\,(2\,s - v) + 2\,(d + 2\,i\,f\,s - i\,f\,v)\,\sqrt{z}\right)^2}{4\,(d + 2\,i\,f\,s - i\,f\,v)}\right) +$$

$$2\,(d + 2\,i\,f\,s - i\,f\,v)\,\Gamma\!\left(\frac{1}{2}\,(h + i + 2),\, -\frac{\left(b + c\,i\,(2\,s - v) + 2\,(d + 2\,i\,f\,s - i\,f\,v)\,\sqrt{z}\right)^2}{4\,(d + 2\,i\,f\,s - i\,f\,v)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b + c\,i\,(2\,s - v) + 2\,(d + 2\,i\,f\,s - i\,f\,v)\,\sqrt{z}\right)^2}{d + 2\,i\,f\,s - i\,f\,v}}\right)\right)$$

$$(d + 2\,i\,f\,s - i\,f\,v)^{-2\,(n+1)} + e^{-\frac{(b + c\,i\,(v - 2\,s))^2}{4\,(d + f\,i\,(v - 2\,s))} + e + g\,i\,(v - 2\,s)}\,(d + f\,i\,(v - 2\,s))^{-2\,(n+1)}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b + c\,i\,(v - 2\,s))^{-h-i+2\,n}\left(b + c\,i\,(v - 2\,s) + 2\,(d + f\,i\,(v - 2\,s))\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b + c\,i\,(v - 2\,s) + 2\,(d + f\,i\,(v - 2\,s))\,\sqrt{z}\right)^2}{d + f\,i\,(v - 2\,s)}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}$$

$$\binom{n}{i}\Bigg((b+c\,i\,(v-2\,s))\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+i+1),-\frac{\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2\,s))}\right)+$$

$$2\,(d+f\,i\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+i+2),-\frac{\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2\,s))}\right)$$

$$\sqrt{-\frac{\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{d+f\,i\,(v-2\,s)}}\Bigg)\Bigg)+\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{e-i\,(2\,k\,q-m\,q+2\,g\,s-g\,v)}\binom{v}{s}\Bigg(e^{-\frac{(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s))^2}{4\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))}}\Bigg(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s))^{-h-i+2\,n}$$

$$\left(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\sqrt{z}\right)^{h+i}$$

$$\Big(-\left(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\sqrt{z}\right)^2\Big/$$

$$(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\Big)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}$$

$$\binom{n}{i}\Big((b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s))\big(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+$$

$$2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\sqrt{z}\big)\,\Gamma\Big(\frac{1}{2}\,(h+i+1),$$

$$-\left(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\sqrt{z}\right)^2\Big/$$

$$(4\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s)))\Big)+2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))$$

$$\Gamma\Big(\frac{1}{2}\,(h+i+2),-\big(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,(d+i\,(m-2\,k)\,p+$$

$$f\,i\,(v-2\,s))\sqrt{z}\big)^2\Big/(4\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s)))\Big)$$

$$\sqrt{\Big(-\left(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\sqrt{z}\right)^2\Big/}$$

$$(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\Big)\Big)\Bigg)(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))^{-2\,(n+1)}+$$

$$e^{\frac{(i\,b-2\,a\,k+a\,m+2\,c\,s-c\,v)^2}{4\,(d+i\,(2\,k\,p-m\,p-2\,f\,s+f\,v))}+2\,i\,(2\,k-m)\,q}\,(d+i\,(2\,k\,p-m\,p-2\,f\,s+f\,v))^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}$$

$$4^i\,(b+i\,(2\,a\,k-a\,m-2\,c\,s+c\,v))^{-h-i+2\,n}$$

$$\left(-\left(b+i\left(a(2k-m)+c(v-2s)+2(-i d+2kp-mp-2fs+fv)\sqrt{z}\right)\right)^2 \Big/ (d+i(2kp-mp-2fs+fv))\right)^{\frac{1}{2}(-h-i-1)}$$

$$\left(b+a i(2k-m)+c i(v-2s)+2(d+i(2kp-mp-2fs+fv))\sqrt{z}\right)^{h+i}$$

$$\binom{i}{h}\binom{n}{i}\Bigg((b+i(2ak-am-2cs+cv))\left(b+a i(2k-m)+c i(v-2s)+2(d+i(2kp-mp-2fs+fv))\sqrt{z}\right)\Gamma\Big(\frac{1}{2}(h+i+1), -\left(b+i\left(a(2k-m)+c(v-2s)+2(-i d+2kp-mp-2fs+fv)\sqrt{z}\right)\right)^2 \Big/ (4(d+i(2kp-mp-2fs+fv)))\Big)+2(d+i(2kp-mp-2fs+fv))$$

$$\Gamma\Big(\frac{1}{2}(h+i+2), -\left(b+i\left(a(2k-m)+c(v-2s)+2(-i d+2kp-mp-2fs+fv)\sqrt{z}\right)\right)^2 \Big/ (4(d+i(2kp-mp-2fs+fv)))\Big)$$

$$\sqrt{\left(-\left(b+i\left(a(2k-m)+c(v-2s)+2(-i d+2kp-mp-2fs+fv)\sqrt{z}\right)\right)^2 \Big/ (d+i(2kp-mp-2fs+fv))\right)}\Bigg)+$$

$$e^{\frac{(i b+2ak-am-2cs+cv)^2}{4(d+i(-2kp+mp+2fs-fv))}+2 g i(2s-v)}(d+i(-2kp+mp+2fs-fv))^{-2(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}$$

$$4^i(b-i(2ak-am-2cs+cv))^{-h-i+2n}$$

$$\left(-\left(b-i\left(a(2k-m)+c(v-2s)+2(i d+2kp-mp-2fs+fv)\sqrt{z}\right)\right)^2 \Big/ (d+i(-2kp+mp+2fs-fv))\right)^{\frac{1}{2}(-h-i-1)}$$

$$\left(b+a i(m-2k)+c i(2s-v)+2(d+i(-2kp+mp+2fs-fv))\sqrt{z}\right)^{h+i}$$

$$\binom{i}{h}\binom{n}{i}\Bigg((b-i(2ak-am-2cs+cv))\left(b+a i(m-2k)+c i(2s-v)+2(d+i(-2kp+mp+2fs-fv))\sqrt{z}\right)\Gamma\Big(\frac{1}{2}(h+i+1), -\left(b-i\left(a(2k-m)+c(v-2s)+2(i d+2kp-mp-2fs+fv)\sqrt{z}\right)\right)^2 \Big/ (4(d+i(-2kp+mp+2fs-fv)))\Big)+2(d+i(-2kp+mp+2fs-fv))$$

$$\Gamma\Big(\frac{1}{2}(h+i+2), -\left(b-i\left(a(2k-m)+c(v-2s)+2(i d+2kp-mp-2fs+fv)\sqrt{z}\right)\right)^2 \Big/ (4(d+i(-2kp+mp+2fs-fv)))\Big)$$

$$\sqrt{\left(-\left(b-i\left(a(2k-m)+c(v-2s)+2(i d+2kp-mp-2fs+fv)\sqrt{z}\right)\right)^2 \Big/ (d+i(-2kp+mp+2fs-fv))\right)}\Bigg)+$$

$$e^{\frac{(i b-2ak+am-2cs+cv)^2}{4(d+i(2kp-mp+2fs-fv))}+2i(2k-m)q+2 g i(2s-v)}(d+i(2kp-mp+2fs-fv))^{-2(n+1)}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+\mathbb{i}\,(2\,a\,k-a\,m+2\,c\,s-c\,v))^{-h-i+2\,n}$$

$$\left(-\left(b+\mathbb{i}\left(a\,(2\,k-m)+c\,(2\,s-v)+2\,(-\mathbb{i}\,d+2\,k\,p-m\,p+2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^2\Big/\right.$$

$$\left.(d+\mathbb{i}\,(2\,k\,p-m\,p+2\,f\,s-f\,v))\right)^{\frac{1}{2}(-h-i-1)}$$

$$\left(b+a\,\mathbb{i}\,(2\,k-m)+c\,\mathbb{i}\,(2\,s-v)+2\,(d+\mathbb{i}\,(2\,k\,p-m\,p+2\,f\,s-f\,v))\,\sqrt{z}\right)^{h+i}$$

$$\binom{i}{h}\binom{n}{i}\Bigg(\left((b+\mathbb{i}\,(2\,a\,k-a\,m+2\,c\,s-c\,v))\left(b+a\,\mathbb{i}\,(2\,k-m)+c\,\mathbb{i}\,(2\,s-v)+\right.\right.$$

$$\left.\left.2\,(d+\mathbb{i}\,(2\,k\,p-m\,p+2\,f\,s-f\,v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\right.\right.$$

$$-\left(b+\mathbb{i}\left(a\,(2\,k-m)+c\,(2\,s-v)+2\,(-\mathbb{i}\,d+2\,k\,p-m\,p+2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^2\Big/$$

$$\left.\left.(4\,(d+\mathbb{i}\,(2\,k\,p-m\,p+2\,f\,s-f\,v)))\right)+2\,(d+\mathbb{i}\,(2\,k\,p-m\,p+2\,f\,s-f\,v))\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+i+2),-\left(b+\mathbb{i}\left(a\,(2\,k-m)+c\,(2\,s-v)+2\,(-\mathbb{i}\,d+2\,k\,p-m\,p+\right.\right.\right.$$

$$\left.\left.\left.2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^2\Big/(4\,(d+\mathbb{i}\,(2\,k\,p-m\,p+2\,f\,s-f\,v)))\right)$$

$$\sqrt{\left(-\left(b+\mathbb{i}\left(a\,(2\,k-m)+c\,(2\,s-v)+2\,(-\mathbb{i}\,d+2\,k\,p-m\,p+2\,f\,s-f\,v)\right.\right.\right.}$$

$$\left.\left.\left.\left.\sqrt{z}\right)\right)^2\Big/(d+\mathbb{i}\,(2\,k\,p-m\,p+2\,f\,s-f\,v))\right)\right)\Bigg)$$

$$d^{2\,(n+1)}+e^e\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,b^{-h-i+2\,n}\left(b+2\,d\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}$$

$$\binom{n}{i}$$

$$\left(b\left(b+2\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),-\frac{\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$2\sqrt{-\frac{\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;d$$

Involving functions of the direct function, exponential and algebraic functions

Involving powers of the direct function, exponential and algebraic functions

Involving powers of cos, exp and algebraic functions

Involving $(a z+b)^{\beta} d^{z} \cos^{v}(c z+e)$

01.07.21.2018.01

$$\int (a z+b)^{\beta} d^{z} \cos^{v}(c z+e)\, dz = \frac{2^{-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)}{\log(d)}\left(d^{-\frac{b}{a}}(b+a z)^{\beta}\, \Gamma\left(\beta+1,-\frac{(b+a z)\log(d)}{a}\right)\left(-\frac{(b+a z)\log(d)}{a}\right)^{-\beta}\right)-2^{1-v}\, i\, d^{-\frac{b}{a}}(b+a z)^{\beta} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(\binom{v}{s}\left(-\frac{i(b+a z)(c(v-2 s)-i\log(d))}{a}\right)^{-\beta}\left(\frac{i(b+a z)(c(v-2 s)+i\log(d))}{a}\right)^{-\beta}\left(e^{-i\left(\frac{b c}{a}-e\right)(v-2 s)}\, \Gamma\left(\beta+1,-\frac{i(b+a z)(c(v-2 s)-i\log(d))}{a}\right)(c(v-2 s)+i\log(d))\left(\frac{i(b+a z)(c(v-2 s)+i\log(d))}{a}\right)^{\beta}-e^{i\left(\frac{b c}{a}-e\right)(v-2 s)}\, \Gamma\left(\beta+1,\frac{i(b+a z)(c(v-2 s)+i\log(d))}{a}\right)(c(v-2 s)-i\log(d))\left(-\frac{i(b+a z)(c(v-2 s)-i\log(d))}{a}\right)^{\beta}\right)\right)\Big/\left(2\left(c^{2}(v-2 s)^{2}+\log^{2}(d)\right)\right) \;/;\; v\in\mathbb{N}$$

01.07.21.2019.01

$$\int (b+a z)^{\beta} e^{p z} \cos^{v}(e+c z)\, dz = -\frac{1}{a}\left(2^{-v} e^{-\frac{p b}{a}}\left(\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{k}\left(e^{-i\left(-\frac{b c(2 k-v)}{a}-e(v-2 k)\right)} E_{-\beta}\left(\frac{i(b+a z)(i p+c(2 k-v))}{a}\right)+e^{i\left(-\frac{b c(2 k-v)}{a}-e(v-2 k)\right)} E_{-\beta}\left(-\frac{i(b+a z)(c(2 k-v)-i p)}{a}\right)\right)\right)(b+a z)^{\beta+1}\right)-\frac{2^{-v}\left(e^{-\frac{p b}{a}}(b+a z)^{\beta+1} E_{-\beta}\left(-\frac{(b+a z) p}{a}\right)\right)\binom{v}{\frac{v}{2}}(1-v \bmod 2)}{a} \;/;\; v\in\mathbb{N}$$

01.07.21.2020.01

$$\int (b+a\,z)^{\beta}\,d^{z}\cos^{\nu}(c\,z)\,dz = \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(d^{-\frac{b}{a}}(b+a\,z)^{\beta}\,\Gamma\left(\beta+1,-\frac{(b+a\,z)\log(d)}{a}\right)\left(-\frac{(b+a\,z)\log(d)}{a}\right)^{-\beta}\right)}{\log(d)} -$$
$$2^{1-\nu}\,i\,d^{-\frac{b}{a}}(b+a\,z)^{\beta}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(\binom{\nu}{s}\left(-\frac{i\,(b+a\,z)\,(c\,(\nu-2\,s)-i\log(d))}{a}\right)^{-\beta}\left(\frac{i\,(b+a\,z)\,(c\,(\nu-2\,s)+i\log(d))}{a}\right)^{-\beta}\right.$$
$$\left(e^{-\frac{i\,(b\,c)\,(\nu-2\,s)}{a}}\,\Gamma\left(\beta+1,-\frac{i\,(b+a\,z)\,(c\,(\nu-2\,s)-i\log(d))}{a}\right)(c\,(\nu-2\,s)+i\log(d))\right.$$
$$\left(\frac{i\,(b+a\,z)\,(c\,(\nu-2\,s)+i\log(d))}{a}\right)^{\beta}-e^{\frac{i\,(b\,c)\,(\nu-2\,s)}{a}}\,\Gamma\left(\beta+1,\frac{i\,(b+a\,z)\,(c\,(\nu-2\,s)+i\log(d))}{a}\right)$$
$$\left.\left.(c\,(\nu-2\,s)-i\log(d))\left(-\frac{i\,(b+a\,z)\,(c\,(\nu-2\,s)-i\log(d))}{a}\right)^{\beta}\right)\right)\Big/\left(2\left(c^{2}\,(\nu-2\,s)^{2}+\log^{2}(d)\right)\right)\;/;\;\nu\in\mathbb{N}$$

01.07.21.2021.01

$$\int (b+a\,z)^{\beta}\,e^{p\,z}\cos^{\nu}(c\,z)\,dz =$$
$$-\frac{1}{a}\left(2^{-\nu}\,e^{-\frac{p\,b}{a}}\left(\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{\frac{i\,b\,c\,(2\,k-\nu)}{a}}\,E_{-\beta}\left(\frac{i\,(b+a\,z)\,(i\,p+c\,(2\,k-\nu))}{a}\right)+e^{-\frac{i\,b\,c\,(2\,k-\nu)}{a}}\,E_{-\beta}\left(-\frac{i\,(b+a\,z)\,(c\,(2\,k-\nu)-i\,p)}{a}\right)\right)\right)\right.$$
$$\left.(b+a\,z)^{\beta+1}\right)-\frac{2^{-\nu}\left(e^{-\frac{p\,b}{a}}\,(b+a\,z)^{\beta+1}\,E_{-\beta}\left(-\frac{(b+a\,z)\,p}{a}\right)\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{a}\;/;\;\nu\in\mathbb{N}$$

01.07.21.2022.01

$$\int \frac{e^{p\,z}\cos^{\nu}(c\,z)}{\sqrt{a\,z+b}}\,dz = \frac{2^{-\nu}\,e^{-\frac{b\,p}{a}}\sqrt{\pi}\;(1-\nu \bmod 2)}{a\sqrt{\frac{p}{a}}}\binom{\nu}{\frac{\nu}{2}}\operatorname{erfi}\left(\sqrt{\frac{p}{a}}\;\sqrt{b+a\,z}\right)+$$
$$\frac{2^{-\nu}\sqrt{\pi}}{a}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(\frac{1}{\sqrt{\frac{p-i\,c\,(\nu-2\,k)}{a}}}\,e^{-\frac{b\,(p-i\,c\,(\nu-2\,k))}{a}}\operatorname{erfi}\left(\sqrt{\frac{p-i\,c\,(\nu-2\,k)}{a}}\;\sqrt{b+a\,z}\right)+\right.$$
$$\left.\frac{1}{\sqrt{\frac{p+c\,i\,(\nu-2\,k)}{a}}}\,e^{-\frac{b\,(p+c\,i\,(\nu-2\,k))}{a}}\operatorname{erfi}\left(\sqrt{\frac{p+c\,i\,(\nu-2\,k)}{a}}\;\sqrt{b+a\,z}\right)\right)\;/;\;\nu\in\mathbb{N}$$

01.07.21.2023.01

$$\int \frac{e^{p z} \cos^2(c z)}{\sqrt{b+a z}}\, dz = \frac{\sqrt{\pi}}{4 a}\left(\frac{e^{-\frac{b(-2 i c+p)}{a}} \operatorname{erfi}\left(\sqrt{\frac{-2 i c+p}{a}}\sqrt{b+a z}\right)}{\sqrt{\frac{-2 i c+p}{a}}}+\frac{e^{-\frac{b(2 i c+p)}{a}} \operatorname{erfi}\left(\sqrt{\frac{2 i c+p}{a}}\sqrt{b+a z}\right)}{\sqrt{\frac{2 i c+p}{a}}}\right)+\frac{e^{-\frac{b p}{a}}\sqrt{\pi}}{2 a \sqrt{\frac{p}{a}}} \operatorname{erfi}\left(\sqrt{\frac{p}{a}}\sqrt{b+a z}\right)$$

Involving products of the direct function, exponential and algebraic functions

Involving products of cos, exp and algebraic functions

Involving $(a z+b)^{\beta} d^{z} \cos(c z) \cos(e z)$

01.07.21.2024.01

$$\int (a+b z)^{\beta} d^{z} \cos(c z) \cos(e z)\, dz = -\frac{1}{4} i\, d^{-\frac{a}{b}} (a+b z)^{\beta} \left(-\frac{1}{b}\left(i (a+b z)\, \Gamma\left(\beta+1, \frac{i (a+b z)(c-e+i \log(d))}{b}\right)\left(\frac{i (a+b z)(c-e+i \log(d))}{b}\right)^{-\beta-1}\left(\cos\left(\frac{a(c-e)}{b}\right)+i \sin\left(\frac{a(c-e)}{b}\right)\right)\right)+\right.$$

$$\frac{1}{c-e-i \log(d)} \left(\Gamma\left(\beta+1, -\frac{i (a+b z)(c-e-i \log(d))}{b}\right)\left(-\frac{i (a+b z)(c-e-i \log(d))}{b}\right)^{-\beta}\left(\cos\left(\frac{a(c-e)}{b}\right)-i \sin\left(\frac{a(c-e)}{b}\right)\right)\right)-$$

$$\frac{\Gamma\left(\beta+1, \frac{i (a+b z)(c+e+i \log(d))}{b}\right)\left(\frac{i (a+b z)(c+e+i \log(d))}{b}\right)^{-\beta}\left(\cos\left(\frac{a(c+e)}{b}\right)+i \sin\left(\frac{a(c+e)}{b}\right)\right)}{c+e+i \log(d)}+\frac{1}{c+e-i \log(d)}$$

$$\left.\left(\Gamma\left(\beta+1, -\frac{i (a+b z)(c+e-i \log(d))}{b}\right)\left(-\frac{i (a+b z)(c+e-i \log(d))}{b}\right)^{-\beta}\left(\cos\left(\frac{a(c+e)}{b}\right)-i \sin\left(\frac{a(c+e)}{b}\right)\right)\right)\right)$$

Involving functions of the direct function and trigonometric functions

Involving powers of the direct function and trigonometric functions

Involving sin

Involving $\sin(c z) \sin^{\nu}(a z)$

01.07.21.2025.01

$$\int \sin(c\,z)\cos^{\nu}(a\,z)\,dz = \frac{1}{(a\,\nu-c)\,(c+a\,\nu)}\left(2^{-\nu-1}\,e^{-i\,c\,z}\left(e^{-i\,a\,z}+e^{i\,a\,z}\right)^{\nu}\left(1+e^{2\,i\,a\,z}\right)^{-\nu}\left(e^{2\,i\,c\,z}\,(c+a\,\nu)\,{}_2F_1\!\left(\frac{c-a\,\nu}{2\,a},-\nu;\frac{1}{2}\left(\frac{c}{a}-\nu+2\right);-e^{2\,i\,a\,z}\right)+(c-a\,\nu)\,{}_2F_1\!\left(-\frac{c+a\,\nu}{2\,a},-\nu;-\frac{c+a\,(\nu-2)}{2\,a};-e^{2\,i\,a\,z}\right)\right)\right)$$

01.07.21.2026.01

$$\int \sin(c\,z)\cos^{\nu}(a\,z)\,dz = 2^{1-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\left(-c\cos((2\,s-\nu)\,a\,z)\cos(c\,z)-a\,(2\,s-\nu)\sin(c\,z)\sin((2\,s-\nu)\,a\,z)\right)}{c^2-a^2\,(\nu-2\,s)^2}-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(c\,z)\,(1-\nu\bmod 2)}{c}\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin(c\,z+d)\cos^{\nu}(a\,z)$

01.07.21.2027.01

$$\int \sin(d+c\,z)\cos^{\nu}(a\,z)\,dz = -\frac{1}{2}\,e^{i\,d}\left(1+e^{-2\,i\,a\,z}\right)^{-\nu}\cos^{\nu}(a\,z)\left(\frac{e^{-i\,(2\,d+c\,z)}}{c-a\,\nu}\,{}_2F_1\!\left(\frac{c}{2\,a}-\frac{\nu}{2},-\nu;\frac{c}{2\,a}-\frac{\nu}{2}+1;-e^{-2\,i\,a\,z}\right)+\frac{e^{i\,c\,z}}{c+a\,\nu}\,{}_2F_1\!\left(-\frac{c+a\,\nu}{2\,a},-\nu;-\frac{c}{2\,a}-\frac{\nu}{2}+1;-e^{-2\,i\,a\,z}\right)\right)$$

01.07.21.2028.01

$$\int \sin(d+c\,z)\cos^{\nu}(a\,z)\,dz = 2^{1-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\left(-c\cos((2\,s-\nu)\,a\,z)\cos(d+c\,z)-a\,(2\,s-\nu)\sin(d+c\,z)\sin((2\,s-\nu)\,a\,z)\right)}{c^2-a^2\,(\nu-2\,s)^2}-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(d+c\,z)\,(1-\nu\bmod 2)}{c}\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin(c\,z)\cos^{\nu}(a\,z+b)$

01.07.21.2029.01

$$\int \sin(c\,z)\cos^{\nu}(b+a\,z)\,dz = -\frac{1}{2}\left(1+e^{-2\,i\,(b+a\,z)}\right)^{-\nu}\cos^{\nu}(b+a\,z)\left(\frac{e^{-i\,c\,z}}{c-a\,\nu}\,{}_2F_1\!\left(\frac{c}{2\,a}-\frac{\nu}{2},-\nu;\frac{c}{2\,a}-\frac{\nu}{2}+1;-e^{-2\,i\,(b+a\,z)}\right)+\frac{e^{i\,c\,z}}{c+a\,\nu}\,{}_2F_1\!\left(-\frac{c+a\,\nu}{2\,a},-\nu;-\frac{c}{2\,a}-\frac{\nu}{2}+1;-e^{-2\,i\,(b+a\,z)}\right)\right)$$

01.07.21.2030.01

$$\int \sin(c\,z)\cos^{\nu}(b+a\,z)\,dz = 2^{1-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\left(-c\cos(c\,z)\cos((2\,s-\nu)\,(b+a\,z))-a\,(2\,s-\nu)\sin(c\,z)\sin((2\,s-\nu)\,(b+a\,z))\right)}{c^2-a^2\,(\nu-2\,s)^2}-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(c\,z)\,(1-\nu\bmod 2)}{c}\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin(c\,z+d)\cos^{\nu}(a\,z+b)$

01.07.21.2031.01

$$\int \sin(d+c\,z)\cos^{\nu}(b+a\,z)\,dz = -\frac{1}{2}\,e^{i\,d}\left(1+e^{-2\,i\,(b+a\,z)}\right)^{-\nu}\cos^{\nu}(b+a\,z)\left(\frac{e^{-i\,(2\,d+c\,z)}}{c-a\,\nu}\,{}_2F_1\!\left(\frac{c}{2\,a}-\frac{\nu}{2},-\nu;\frac{c}{2\,a}-\frac{\nu}{2}+1;-e^{-2\,i\,(b+a\,z)}\right)+\frac{e^{i\,c\,z}}{c+a\,\nu}\,{}_2F_1\!\left(-\frac{c+a\,\nu}{2\,a},-\nu;-\frac{c}{2\,a}-\frac{\nu}{2}+1;-e^{-2\,i\,(b+a\,z)}\right)\right)$$

01.07.21.2032.01

$$\int \sin(d+c\,z)\cos^{\nu}(b+a\,z)\,dz = 2^{1-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{c^2-a^2\,(\nu-2\,s)^2}\left(\binom{\nu}{s}(-c\cos((2\,s-\nu)\,(b+a\,z))\cos(d+c\,z)-a\,(2\,s-\nu)\sin(d+c\,z)\sin((2\,s-\nu)\,(b+a\,z)))\right)-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(d+c\,z)\,(1-\nu \bmod 2)}{c}\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin(b\,z^r)\cos^{\nu}(c\,z)$

01.07.21.2033.01

$$\int \sin(b\,z^2)\cos^{\nu}(c\,z)\,dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\,S\!\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\;z\right)}{\sqrt{b}}-\frac{1}{\sqrt{-b}}\left(\left(2^{-\nu-\frac{1}{2}}\sqrt{\pi}\right)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\cos\!\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,b}\right)S\!\left(\frac{-2\,c\,s+c\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)+\cos\!\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,b}\right)S\!\left(\frac{2\,c\,s-c\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)+C\!\left(\frac{-2\,c\,s+c\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)\sin\!\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,b}\right)+C\!\left(\frac{2\,c\,s-c\,\nu-2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)\sin\!\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,b}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2034.01

$$\int \sin\!\left(\sqrt{z}\;b\right)\cos^{\nu}(c\,z)\,dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sin\!\left(b\sqrt{z}\right)-b\sqrt{z}\;\cos\!\left(b\sqrt{z}\right)\right)}{b^2}+2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(c\,\nu-2\,c\,s)^{3/2}}\left(2\sqrt{c\,\nu-2\,c\,s}\;\cos\!\left(b\sqrt{z}\;-(c\,\nu-2\,c\,s)\,z\right)-b\sqrt{2\,\pi}\;\cos\!\left(\frac{b^2}{4\,(c\,\nu-2\,c\,s)}\right)S\!\left(\frac{2\,(c\,\nu-2\,c\,s)\sqrt{z}\;-b}{\sqrt{2\,\pi}\;\sqrt{c\,\nu-2\,c\,s}}\right)+b\sqrt{2\,\pi}\;C\!\left(\frac{2\,(c\,\nu-2\,c\,s)\sqrt{z}\;-b}{\sqrt{2\,\pi}\;\sqrt{c\,\nu-2\,c\,s}}\right)\sin\!\left(\frac{b^2}{4\,(c\,\nu-2\,c\,s)}\right)\right)+\frac{1}{(2\,c\,s-c\,\nu)^{3/2}}\left(2\sqrt{2\,c\,s-c\,\nu}\;\cos\!\left(b\sqrt{z}\;-(2\,c\,s-c\,\nu)\,z\right)-b\sqrt{2\,\pi}\;\cos\!\left(\frac{b^2}{4\,(2\,c\,s-c\,\nu)}\right)S\!\left(\frac{2\,(2\,c\,s-c\,\nu)\sqrt{z}\;-b}{\sqrt{2\,\pi}\;\sqrt{2\,c\,s-c\,\nu}}\right)+b\sqrt{2\,\pi}\;C\!\left(\frac{2\,(2\,c\,s-c\,\nu)\sqrt{z}\;-b}{\sqrt{2\,\pi}\;\sqrt{2\,c\,s-c\,\nu}}\right)\sin\!\left(\frac{b^2}{4\,(2\,c\,s-c\,\nu)}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin\left(b\,z^r+e\right)\cos^\nu(c\,z)$

01.07.21.2035.01

$$\int \sin\left(b\,z^2+e\right)\cos^\nu(c\,z)\,dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos(e)\,S\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right)+C\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right)\sin(e)\right)}{\sqrt{b}}+$$
$$\frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{-b}}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(-\cos\left(e-\frac{(c\,\nu-2\,c\,s)^2}{4\,b}\right)S\left(\frac{-2\,c\,s+c\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\,\pi}}\right)-\cos\left(e-\frac{(2\,c\,s-c\,\nu)^2}{4\,b}\right)S\left(\frac{2\,c\,s-c\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\,\pi}}\right)+\right.$$
$$\left.C\left(\frac{-2\,c\,s+c\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\,\pi}}\right)\sin\left(e-\frac{(c\,\nu-2\,c\,s)^2}{4\,b}\right)+C\left(\frac{2\,c\,s-c\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\,\pi}}\right)\sin\left(e-\frac{(2\,c\,s-c\,\nu)^2}{4\,b}\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2036.01

$$\int \sin\left(\sqrt{z}\,b+e\right)\cos^\nu(c\,z)\,dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sin\left(\sqrt{z}\,b+e\right)-b\sqrt{z}\cos\left(\sqrt{z}\,b+e\right)\right)}{b^2}+$$
$$2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(c\,\nu-2\,c\,s)^{3/2}}\left(2\sqrt{c\,\nu-2\,c\,s}\,\cos\left(\sqrt{z}\,b+e-(c\,\nu-2\,c\,s)\,z\right)-b\sqrt{2\,\pi}\,\cos\left(\frac{b^2}{4\,(c\,\nu-2\,c\,s)}+e\right)\right.\right.$$
$$\left.S\left(\frac{2\,(c\,\nu-2\,c\,s)\sqrt{z}-b}{\sqrt{2\,\pi}\sqrt{c\,\nu-2\,c\,s}}\right)+b\sqrt{2\,\pi}\,C\left(\frac{2\,(c\,\nu-2\,c\,s)\sqrt{z}-b}{\sqrt{2\,\pi}\sqrt{c\,\nu-2\,c\,s}}\right)\sin\left(\frac{b^2}{4\,(c\,\nu-2\,c\,s)}+e\right)\right)+$$
$$\frac{1}{(2\,c\,s-c\,\nu)^{3/2}}\left(2\sqrt{2\,c\,s-c\,\nu}\,\cos\left(\sqrt{z}\,b+e-(2\,c\,s-c\,\nu)\,z\right)-b\sqrt{2\,\pi}\,\cos\left(\frac{b^2}{4\,(2\,c\,s-c\,\nu)}+e\right)\right.$$
$$\left.\left.S\left(\frac{2\,(2\,c\,s-c\,\nu)\sqrt{z}-b}{\sqrt{2\,\pi}\sqrt{2\,c\,s-c\,\nu}}\right)+b\sqrt{2\,\pi}\,C\left(\frac{2\,(2\,c\,s-c\,\nu)\sqrt{z}-b}{\sqrt{2\,\pi}\sqrt{2\,c\,s-c\,\nu}}\right)\sin\left(\frac{b^2}{4\,(2\,c\,s-c\,\nu)}+e\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin\left(b\,z^r+d\,z\right)\cos^\nu(c\,z)$

01.07.21.2037.01

$$\int \sin\left(b\,z^2+d\,z\right)\cos^\nu(c\,z)\,dz =$$
$$\frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{b}}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos\left(\frac{d^2}{4\,b}\right)S\left(\frac{d+2\,b\,z}{\sqrt{b}\sqrt{2\,\pi}}\right)-C\left(\frac{d+2\,b\,z}{\sqrt{b}\sqrt{2\,\pi}}\right)\sin\left(\frac{d^2}{4\,b}\right)\right)+2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}$$
$$\left(\frac{1}{\sqrt{-b}}\left(-\cos\left(\frac{(-d-2\,c\,s+c\,\nu)^2}{4\,b}\right)S\left(\frac{-d-2\,c\,s+c\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\,\pi}}\right)-C\left(\frac{-d-2\,c\,s+c\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\,\pi}}\right)\sin\left(\frac{(-d-2\,c\,s+c\,\nu)^2}{4\,b}\right)\right)+\right.$$
$$\frac{1}{\sqrt{-b}}\left(-\cos\left(\frac{(-d+2\,c\,s-c\,\nu)^2}{4\,b}\right)S\left(\frac{-d+2\,c\,s-c\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\,\pi}}\right)-\right.$$
$$\left.\left.C\left(\frac{-d+2\,c\,s-c\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\,\pi}}\right)\sin\left(\frac{(-d+2\,c\,s-c\,\nu)^2}{4\,b}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2038.01

$$\int \sin\left(\sqrt{z}\, b + d\, z\right) \cos^{\nu}(c\, z)\, dz = \frac{1}{d^{3/2}}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-2 \sqrt{d}\, \cos\left(\sqrt{z}\, b + d\, z\right) - b \sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, d}\right) S\left(\frac{b + 2\, d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) + b \sqrt{2\pi}\, C\left(\frac{b + 2\, d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d}\right)\right) + 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(-d - 2\, c\, s + c\, \nu)^{3/2}} \left(2 \sqrt{-d - 2\, c\, s + c\, \nu}\, \cos\left(b \sqrt{z} - (-d - 2\, c\, s + c\, \nu)\, z\right) - b \sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, (-d - 2\, c\, s + c\, \nu)}\right) S\left(\frac{2\, (-d - 2\, c\, s + c\, \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d - 2\, c\, s + c\, \nu}}\right) + b \sqrt{2\pi}\, C\left(\frac{2\, (-d - 2\, c\, s + c\, \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d - 2\, c\, s + c\, \nu}}\right) \sin\left(\frac{b^2}{4\, (-d - 2\, c\, s + c\, \nu)}\right)\right) + \frac{1}{(-d + 2\, c\, s - c\, \nu)^{3/2}} \left(2 \sqrt{-d + 2\, c\, s - c\, \nu}\, \cos\left(b \sqrt{z} - (-d + 2\, c\, s - c\, \nu)\, z\right) - b \sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, (-d + 2\, c\, s - c\, \nu)}\right) S\left(\frac{2\, (-d + 2\, c\, s - c\, \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2\, c\, s - c\, \nu}}\right) + b \sqrt{2\pi}\, C\left(\frac{2\, (-d + 2\, c\, s - c\, \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2\, c\, s - c\, \nu}}\right) \sin\left(\frac{b^2}{4\, (-d + 2\, c\, s - c\, \nu)}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b\, z^r + d\, z + e\right) \cos^{\nu}(c\, z)$

01.07.21.2039.01

$$\int \sin\left(b\, z^2 + d\, z + e\right) \cos^{\nu}(c\, z)\, dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4\, b} - e\right) S\left(\frac{d + 2\, b\, z}{\sqrt{b}\, \sqrt{2\pi}}\right) - C\left(\frac{d + 2\, b\, z}{\sqrt{b}\, \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4\, b} - e\right)\right) + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b}} \left(C\left(\frac{-d - 2\, c\, s + c\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(e - \frac{(-d - 2\, c\, s + c\, \nu)^2}{4\, b}\right) - \cos\left(e - \frac{(-d - 2\, c\, s + c\, \nu)^2}{4\, b}\right) S\left(\frac{-d - 2\, c\, s + c\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right)\right) + \frac{1}{\sqrt{-b}} \left(C\left(\frac{-d + 2\, c\, s - c\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(e - \frac{(-d + 2\, c\, s - c\, \nu)^2}{4\, b}\right) - \cos\left(e - \frac{(-d + 2\, c\, s - c\, \nu)^2}{4\, b}\right) S\left(\frac{-d + 2\, c\, s - c\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2040.01

$$\int \sin\left(\sqrt{z}\, b + d\, z + e\right) \cos^{\nu}(c\, z)\, dz = \frac{2^{-\nu-1}}{d^{3/2}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-2\sqrt{d}\, \cos\left(\sqrt{z}\, b + e + d\, z\right) - b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, d} - e\right) S\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) + b\sqrt{2\pi}\, C\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d} - e\right)\right) +$$
$$2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(-d - 2\, c\, s + c\, \nu)^{3/2}} \left(2\sqrt{-d - 2\, c\, s + c\, \nu}\, \cos\left(\sqrt{z}\, b + e - (-d - 2\, c\, s + c\, \nu)\, z\right) - b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\,(-d - 2\, c\, s + c\, \nu)} + e\right) S\left(\frac{2\,(-d - 2\, c\, s + c\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d - 2\, c\, s + c\, \nu}}\right) + b\sqrt{2\pi}\, C\left(\frac{2\,(-d - 2\, c\, s + c\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d - 2\, c\, s + c\, \nu}}\right) \sin\left(\frac{b^2}{4\,(-d - 2\, c\, s + c\, \nu)} + e\right)\right) + \frac{1}{(-d + 2\, c\, s - c\, \nu)^{3/2}} \left(2\sqrt{-d + 2\, c\, s - c\, \nu}\, \cos\left(\sqrt{z}\, b + e - (-d + 2\, c\, s - c\, \nu)\, z\right) - b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\,(-d + 2\, c\, s - c\, \nu)} + e\right) S\left(\frac{2\,(-d + 2\, c\, s - c\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2\, c\, s - c\, \nu}}\right) + b\sqrt{2\pi}\, C\left(\frac{2\,(-d + 2\, c\, s - c\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2\, c\, s - c\, \nu}}\right) \sin\left(\frac{b^2}{4\,(-d + 2\, c\, s - c\, \nu)} + e\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b\, z^r\right) \cos^{\nu}(f\, z + g)$

01.07.21.2041.01

$$\int \sin\left(b\, z^2\right) \cos^{\nu}(f\, z + g)\, dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, S\left(\sqrt{b}\, \sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{b}} + \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{-b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(-\cos\left(-\frac{(f\, \nu - 2\, f\, s)^2}{4\, b} + 2\, g\, s - g\, \nu\right) S\left(\frac{-2\, f\, s + f\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) - \cos\left(-\frac{(2\, f\, s - f\, \nu)^2}{4\, b} - 2\, g\, s + g\, \nu\right) S\left(\frac{2\, f\, s - f\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) + C\left(\frac{-2\, f\, s + f\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(f\, \nu - 2\, f\, s)^2}{4\, b} + 2\, g\, s - g\, \nu\right) + C\left(\frac{2\, f\, s - f\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(2\, f\, s - f\, \nu)^2}{4\, b} - 2\, g\, s + g\, \nu\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2042.01

$$\int \sin\left(\sqrt{z}\, b\right) \cos^{\nu}(f\,z+g)\, dz = \frac{2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sin\left(b\sqrt{z}\right) - b\sqrt{z}\cos\left(b\sqrt{z}\right)\right)}{b^2} + 2^{-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(\frac{1}{(f\,\nu-2\,f\,s)^{3/2}} \left(2\sqrt{f\,\nu-2\,f\,s}\cos\left(\sqrt{z}\, b+2\,g\,s-g\,\nu-(f\,\nu-2\,f\,s)\,z\right) + b\sqrt{2\pi}\left(C\left(\frac{2\,(f\,\nu-2\,f\,s)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{f\,\nu-2\,f\,s}}\right) \sin\left(\frac{b^2}{4\,(f\,\nu-2\,f\,s)}+2\,g\,s-g\,\nu\right) - \cos\left(\frac{b^2}{4\,(f\,\nu-2\,f\,s)}+2\,g\,s-g\,\nu\right) S\left(\frac{2\,(f\,\nu-2\,f\,s)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{f\,\nu-2\,f\,s}}\right)\right)\right) + \frac{1}{(2\,f\,s-f\,\nu)^{3/2}} \left(2\sqrt{2\,f\,s-f\,\nu}\cos\left(\sqrt{z}\, b-2\,g\,s+g\,\nu-(2\,f\,s-f\,\nu)\,z\right) + b\sqrt{2\pi}\left(C\left(\frac{2\,(2\,f\,s-f\,\nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{2\,f\,s-f\,\nu}}\right) \sin\left(\frac{b^2}{4\,(2\,f\,s-f\,\nu)}-2\,g\,s+g\,\nu\right) - \cos\left(\frac{b^2}{4\,(2\,f\,s-f\,\nu)}-2\,g\,s+g\,\nu\right) S\left(\frac{2\,(2\,f\,s-f\,\nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{2\,f\,s-f\,\nu}}\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b\,z^r+e\right)\cos^{\nu}(f\,z+g)$

01.07.21.2043.01

$$\int \sin\left(b\,z^2+e\right) \cos^{\nu}(f\,z+g)\, dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{\sqrt{b}} \left(\cos(e)\, S\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\, z\right) + C\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\, z\right)\sin(e)\right) + \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{-b}} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(-\cos\left(-\frac{(f\,\nu-2\,f\,s)^2}{4\,b}+e+2\,g\,s-g\,\nu\right) S\left(\frac{-2\,f\,s+f\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\pi}}\right) - \cos\left(-\frac{(2\,f\,s-f\,\nu)^2}{4\,b}+e-2\,g\,s+g\,\nu\right) S\left(\frac{2\,f\,s-f\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\pi}}\right) + C\left(\frac{-2\,f\,s+f\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\pi}}\right) \sin\left(-\frac{(f\,\nu-2\,f\,s)^2}{4\,b}+e+2\,g\,s-g\,\nu\right) + C\left(\frac{2\,f\,s-f\,\nu-2\,b\,z}{\sqrt{-b}\sqrt{2\pi}}\right) \sin\left(-\frac{(2\,f\,s-f\,\nu)^2}{4\,b}+e-2\,g\,s+g\,\nu\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2044.01

$$\int \sin\left(\sqrt{z}\, b+e\right) \cos^{v}(f z+g)\, dz = \frac{2^{1-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\left(\sin\left(\sqrt{z}\, b+e\right)-b\sqrt{z}\,\cos\left(\sqrt{z}\, b+e\right)\right)}{b^2}+ 2^{-v-1}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{(f v-2 f s)^{3/2}}\left(2\sqrt{f v-2 f s}\,\cos\left(\sqrt{z}\, b+e+2 g s-g v-(f v-2 f s) z\right)+ b\sqrt{2\pi}\left(C\left(\frac{2(f v-2 f s)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{f v-2 f s}}\right)\sin\left(\frac{b^2}{4(f v-2 f s)}+e+2 g s-g v\right)- \cos\left(\frac{b^2}{4(f v-2 f s)}+e+2 g s-g v\right)S\left(\frac{2(f v-2 f s)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{f v-2 f s}}\right)\right)\right)+ \frac{1}{(2 f s-f v)^{3/2}}\left(2\sqrt{2 f s-f v}\,\cos\left(\sqrt{z}\, b+e-2 g s+g v-(2 f s-f v) z\right)+ b\sqrt{2\pi}\left(C\left(\frac{2(2 f s-f v)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{2 f s-f v}}\right)\sin\left(\frac{b^2}{4(2 f s-f v)}+e-2 g s+g v\right)- \cos\left(\frac{b^2}{4(2 f s-f v)}+e-2 g s+g v\right)S\left(\frac{2(2 f s-f v)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{2 f s-f v}}\right)\right)\right)\right) /;\ v\in\mathbb{N}^+$$

Involving $\sin\left(b z^r+d z\right)\cos^{v}(f z+g)$

01.07.21.2045.01

$$\int \sin\left(b z^2+d z\right)\cos^{v}(g+f z)\, dz = \frac{2^{-v-\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\left(\cos\left(\frac{d^2}{4b}\right)S\left(\frac{d+2 b z}{\sqrt{b}\sqrt{2\pi}}\right)-C\left(\frac{d+2 b z}{\sqrt{b}\sqrt{2\pi}}\right)\sin\left(\frac{d^2}{4b}\right)\right)}{\sqrt{b}}+\frac{2^{-v-\frac{1}{2}}\sqrt{\pi}}{\sqrt{-b}} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(-\cos\left(-\frac{(-d-2 f s+f v)^2}{4b}+2 g s-g v\right)S\left(\frac{-d-2 f s+f v-2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)-\cos\left(-\frac{(-d+2 f s-f v)^2}{4b}-2 g s+g v\right) S\left(\frac{-d+2 f s-f v-2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)+C\left(\frac{-d-2 f s+f v-2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)\sin\left(-\frac{(-d-2 f s+f v)^2}{4b}+2 g s-g v\right)+ C\left(\frac{-d+2 f s-f v-2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)\sin\left(-\frac{(-d+2 f s-f v)^2}{4b}-2 g s+g v\right)\right) /;\ v\in\mathbb{N}^+$$

01.07.21.2046.01

$$\int \sin\left(\sqrt{z}\, b + d\, z\right) \cos^{\nu}(f\, z + g)\, dz = \frac{1}{(-d)^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\right.$$

$$\left(2\sqrt{-d}\, \cos\left(\sqrt{z}\, b + d\, z\right) + b\sqrt{2\pi}\left(-\cos\left(\frac{b^2}{4\, d}\right) S\left(\frac{-b - 2\, d\sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) - C\left(\frac{-b - 2\, d\sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d}\right)\right)\right) +$$

$$2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(-d - 2\, f\, s + f\, \nu)^{3/2}} \left(2\sqrt{-d - 2\, f\, s + f\, \nu}\, \cos\left(\sqrt{z}\, b + 2\, g\, s - g\, \nu - (-d - 2\, f\, s + f\, \nu)\, z\right) + \right.\right.$$

$$b\sqrt{2\pi}\left(C\left(\frac{2\,(-d - 2\, f\, s + f\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d - 2\, f\, s + f\, \nu}}\right) \sin\left(\frac{b^2}{4\,(-d - 2\, f\, s + f\, \nu)} + 2\, g\, s - g\, \nu\right) - \right.$$

$$\left.\left.\cos\left(\frac{b^2}{4\,(-d - 2\, f\, s + f\, \nu)} + 2\, g\, s - g\, \nu\right) S\left(\frac{2\,(-d - 2\, f\, s + f\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d - 2\, f\, s + f\, \nu}}\right)\right)\right) +$$

$$\frac{1}{(-d + 2\, f\, s - f\, \nu)^{3/2}} \left(2\sqrt{-d + 2\, f\, s - f\, \nu}\, \cos\left(-\sqrt{z}\, b + 2\, g\, s - g\, \nu + (-d + 2\, f\, s - f\, \nu)\, z\right) + \right.$$

$$b\sqrt{2\pi}\left(-\cos\left(-\frac{b^2}{4\,(-d + 2\, f\, s - f\, \nu)} + 2\, g\, s - g\, \nu\right) S\left(\frac{2\,(-d + 2\, f\, s - f\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2\, f\, s - f\, \nu}}\right) - \right.$$

$$\left.\left.\left.\left. C\left(\frac{2\,(-d + 2\, f\, s - f\, \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2\, f\, s - f\, \nu}}\right) \sin\left(-\frac{b^2}{4\,(-d + 2\, f\, s - f\, \nu)} + 2\, g\, s - g\, \nu\right)\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b\, z^r + d\, z + e\right) \cos^{\nu}(f\, z + g)$

01.07.21.2047.01

$$\int \sin\left(b\, z^2 + d\, z + e\right) \cos^{\nu}(f\, z + g)\, dz =$$

$$\frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\left(\cos\left(\frac{d^2}{4\, b} - e\right) S\left(\frac{d + 2\, b\, z}{\sqrt{b}\, \sqrt{2\pi}}\right) - C\left(\frac{d + 2\, b\, z}{\sqrt{b}\, \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4\, b} - e\right)\right) +$$

$$\frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{-b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(-\cos\left(-\frac{(-d - 2\, f\, s + f\, \nu)^2}{4\, b} + e + 2\, g\, s - g\, \nu\right) S\left(\frac{-d - 2\, f\, s + f\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) - \right.$$

$$\cos\left(-\frac{(-d + 2\, f\, s - f\, \nu)^2}{4\, b} + e - 2\, g\, s + g\, \nu\right) S\left(\frac{-d + 2\, f\, s - f\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) +$$

$$C\left(\frac{-d - 2\, f\, s + f\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(-d - 2\, f\, s + f\, \nu)^2}{4\, b} + e + 2\, g\, s - g\, \nu\right) +$$

$$\left. C\left(\frac{-d + 2\, f\, s - f\, \nu - 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(-d + 2\, f\, s - f\, \nu)^2}{4\, b} + e - 2\, g\, s + g\, \nu\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2048.01

$$\int \sin\left(\sqrt{z}\, b + d\, z + e\right) \cos^{\nu}(f\, z + g)\, dz = \frac{1}{(-d)^{3/2}}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2 \sqrt{-d}\, \cos\left(\sqrt{z}\, b + e + d\, z\right) + b\sqrt{2\pi} \left(-\cos\left(\frac{b^2}{4\, d} - e\right) S\left(\frac{-b - 2\, d \sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) - C\left(\frac{-b - 2\, d\sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d} - e\right)\right)\right) +$$
$$2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(-d - 2\, f\, s + f\, \nu)^{3/2}} \left(2 \sqrt{-d - 2\, f\, s + f\, \nu}\, \cos\left(\sqrt{z}\, b + e + 2\, g\, s - g\, \nu - (-d - 2\, f\, s + f\, \nu)\, z\right) + \right.\right.$$
$$b\sqrt{2\pi} \left(C\left(\frac{2\, (-d - 2\, f\, s + f\, \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d - 2\, f\, s + f\, \nu}}\right) \sin\left(\frac{b^2}{4\, (-d - 2\, f\, s + f\, \nu)} + e + 2\, g\, s - g\, \nu\right) - \right.$$
$$\left.\left.\cos\left(\frac{b^2}{4\, (-d - 2\, f\, s + f\, \nu)} + e + 2\, g\, s - g\, \nu\right) S\left(\frac{2\, (-d - 2\, f\, s + f\, \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d - 2\, f\, s + f\, \nu}}\right)\right)\right) +$$
$$\frac{1}{(-d + 2\, f\, s - f\, \nu)^{3/2}} \left(2 \sqrt{-d + 2\, f\, s - f\, \nu}\, \cos\left(\sqrt{z}\, b + e - 2\, g\, s + g\, \nu - (-d + 2\, f\, s - f\, \nu)\, z\right) + \right.$$
$$b\sqrt{2\pi} \left(C\left(\frac{2\, (-d + 2\, f\, s - f\, \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2\, f\, s - f\, \nu}}\right) \sin\left(\frac{b^2}{4\, (-d + 2\, f\, s - f\, \nu)} + e - 2\, g\, s + g\, \nu\right) - \right.$$
$$\left.\left.\left.\cos\left(\frac{b^2}{4\, (-d + 2\, f\, s - f\, \nu)} + e - 2\, g\, s + g\, \nu\right) S\left(\frac{2\, (-d + 2\, f\, s - f\, \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2\, f\, s - f\, \nu}}\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin(b\, z) \cos^{\nu}(c\, z^r)$

01.07.21.2049.01

$$\int \sin(b\, z) \cos^{\nu}(c\, z^2)\, dz = 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{C\left(\frac{2\, (c\, \nu - 2\, c\, s)\, z - b}{\sqrt{2\pi}\, \sqrt{c\, \nu - 2\, c\, s}}\right) \sin\left(\frac{b^2}{4\, (c\, \nu - 2\, c\, s)}\right) - \cos\left(\frac{b^2}{4\, (c\, \nu - 2\, c\, s)}\right) S\left(\frac{2\, (c\, \nu - 2\, c\, s)\, z - b}{\sqrt{2\pi}\, \sqrt{c\, \nu - 2\, c\, s}}\right)}{\sqrt{c\, \nu - 2\, c\, s}} + \right.$$
$$\left.\frac{C\left(\frac{2\, (2\, c\, s - c\, \nu)\, z - b}{\sqrt{2\pi}\, \sqrt{2\, c\, s - c\, \nu}}\right) \sin\left(\frac{b^2}{4\, (2\, c\, s - c\, \nu)}\right) - \cos\left(\frac{b^2}{4\, (2\, c\, s - c\, \nu)}\right) S\left(\frac{2\, (2\, c\, s - c\, \nu)\, z - b}{\sqrt{2\pi}\, \sqrt{2\, c\, s - c\, \nu}}\right)}{\sqrt{2\, c\, s - c\, \nu}}\right) - \frac{2^{-\nu} \cos(b\, z)\, (1 - \nu \bmod 2)}{b} \binom{\nu}{\frac{\nu}{2}} /;\ \nu \in \mathbb{N}^+$$

01.07.21.2050.01

$$\int \sin(b\, z) \cos^{\nu}\left(c \sqrt{z}\right) dz = 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(-b)^{3/2}} \left(2 \sqrt{-b} \cos\left((c\, \nu - 2\, c\, s) \sqrt{z} - b\, z\right) + \sqrt{2\pi} \, (c\, \nu - 2\, c\, s) \cos\left(\frac{(c\, \nu - 2\, c\, s)^2}{4\, b}\right) S\left(\frac{-2 \sqrt{z}\, b - 2\, c\, s + c\, \nu}{\sqrt{-b} \sqrt{2\pi}} \right) - \sqrt{2\pi} \, (2\, c\, s - c\, \nu) \, C\left(\frac{-2 \sqrt{z}\, b - 2\, c\, s + c\, \nu}{\sqrt{-b} \sqrt{2\pi}} \right) \sin\left(\frac{(c\, \nu - 2\, c\, s)^2}{4\, b} \right) \right) + \frac{1}{(-b)^{3/2}} \left(2 \sqrt{-b} \cos\left((2\, c\, s - c\, \nu) \sqrt{z} - b\, z\right) + \sqrt{2\pi} \, (2\, c\, s - c\, \nu) \cos\left(\frac{(2\, c\, s - c\, \nu)^2}{4\, b} \right) S\left(\frac{-2 \sqrt{z}\, b + 2\, c\, s - c\, \nu}{\sqrt{-b} \sqrt{2\pi}} \right) - \sqrt{2\pi} \, (c\, \nu - 2\, c\, s) \, C\left(\frac{-2 \sqrt{z}\, b + 2\, c\, s - c\, \nu}{\sqrt{-b} \sqrt{2\pi}} \right) \sin\left(\frac{(2\, c\, s - c\, \nu)^2}{4\, b} \right) \right) \right) - \frac{2^{-\nu} \cos(b\, z) \, (1 - \nu \bmod 2)}{b} \binom{\nu}{\frac{\nu}{2}} \; /; \; 12\, \nu \in \mathbb{N}^+$$

Involving $\sin(d\, z + e) \cos^{\nu}\left(c\, z^r\right)$

01.07.21.2051.01

$$\int \sin(d\, z + e) \cos^{\nu}\left(c\, z^2\right) dz = 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{C\left(\frac{2\,(c\, \nu - 2\, c\, s)\, z - d}{\sqrt{2\pi} \sqrt{c\, \nu - 2\, c\, s}} \right) \sin\left(\frac{d^2}{4\,(c\, \nu - 2\, c\, s)} + e \right) - \cos\left(\frac{d^2}{4\,(c\, \nu - 2\, c\, s)} + e \right) S\left(\frac{2\,(c\, \nu - 2\, c\, s)\, z - d}{\sqrt{2\pi} \sqrt{c\, \nu - 2\, c\, s}} \right)}{\sqrt{c\, \nu - 2\, c\, s}} + \frac{C\left(\frac{2\,(2\, c\, s - c\, \nu)\, z - d}{\sqrt{2\pi} \sqrt{2\, c\, s - c\, \nu}} \right) \sin\left(\frac{d^2}{4\,(2\, c\, s - c\, \nu)} + e \right) - \cos\left(\frac{d^2}{4\,(2\, c\, s - c\, \nu)} + e \right) S\left(\frac{2\,(2\, c\, s - c\, \nu)\, z - d}{\sqrt{2\pi} \sqrt{2\, c\, s - c\, \nu}} \right)}{\sqrt{2\, c\, s - c\, \nu}} \right) - \frac{2^{-\nu} \cos(e + d\, z) \, (1 - \nu \bmod 2)}{d} \binom{\nu}{\frac{\nu}{2}} \; /; \; \nu \in \mathbb{N}^+$$

01.07.21.2052.01

$$\int \sin(e+d\,z)\cos^{\nu}\left(c\sqrt{z}\right)dz = 2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(-d)^{3/2}}\left(2\sqrt{-d}\,\cos\left(e+d\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)+\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cos\left(e-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}\right)S\left(\frac{-2\sqrt{z}\,d-2\,c\,s+c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,C\left(\frac{-2\sqrt{z}\,d-2\,c\,s+c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(e-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}\right)\right)+\frac{1}{(-d)^{3/2}}\left(2\sqrt{-d}\,\cos\left(e+d\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)+\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\cos\left(e-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}\right)S\left(\frac{-2\sqrt{z}\,d+2\,c\,s-c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,C\left(\frac{-2\sqrt{z}\,d+2\,c\,s-c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(e-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}\right)\right)\right)-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(e+d\,z)\,(1-\nu \bmod 2)}{d}\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin(b\,z^r)\cos^{\nu}(c\,z^r)$

01.07.21.2053.01

$$\int \sin(b\,z^r)\cos^{\nu}(c\,z^r)\,dz = \frac{-i\,2^{-\nu-1}\,z\binom{\nu}{\frac{\nu}{2}}\left((i\,b\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,i\,b\,z^r\right)-(-i\,b\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,-i\,b\,z^r\right)\right)(1-\nu \bmod 2)}{r}-\frac{1}{r}\left(i\,2^{-\nu-1}\,z\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\Gamma\left(\frac{1}{r},\,-i\,(-b-2\,c\,s+c\,\nu)\,z^r\right)(-i\,(-b-2\,c\,s+c\,\nu)\,z^r)^{-1/r}-(i\,(-b-2\,c\,s+c\,\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,i\,(-b-2\,c\,s+c\,\nu)\,z^r\right)+(-i\,(-b+2\,c\,s-c\,\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,-i\,(-b+2\,c\,s-c\,\nu)\,z^r\right)-(i\,(-b+2\,c\,s-c\,\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,i\,(-b+2\,c\,s-c\,\nu)\,z^r\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2054.01

$$\int \sin\left(b\,z^2\right)\cos^{\nu}\left(c\,z^2\right)dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\,S\left(\sqrt{b}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{b}}-2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{S\left(\sqrt{\frac{2}{\pi}}\,\sqrt{-b-2\,c\,s+c\,\nu}\,z\right)}{\sqrt{-b-2\,c\,s+c\,\nu}}+\frac{S\left(\sqrt{\frac{2}{\pi}}\,\sqrt{-b+2\,c\,s-c\,\nu}\,z\right)}{\sqrt{-b+2\,c\,s-c\,\nu}}\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2055.01

$$\int \sin\left(b\sqrt{z}\right)\cos^{v}\left(c\sqrt{z}\right)dz = \frac{2^{1-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\left(\sin\left(b\sqrt{z}\right)-b\sqrt{z}\cos\left(b\sqrt{z}\right)\right)}{b^2} + 2^{1-v}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{(-b-2cs+cv)\sqrt{z}\cos\left((-b-2cs+cv)\sqrt{z}\right)-\sin\left((-b-2cs+cv)\sqrt{z}\right)}{(-b-2cs+cv)^2} + \frac{(-b+2cs-cv)\sqrt{z}\cos\left((-b+2cs-cv)\sqrt{z}\right)-\sin\left((-b+2cs-cv)\sqrt{z}\right)}{(-b+2cs-cv)^2}\right)\text{/; } v\in\mathbb{N}^+$$

Involving $\sin\left(b z^r + e\right)\cos^v\left(c z^r\right)$

01.07.21.2056.01

$$\int \sin(b z^r+e)\cos^v(c z^r)\,dz = -\frac{2^{-v-1}\, i\, z}{r}\binom{v}{\frac{v}{2}}\left(e^{-ie}(i b z^r)^{-1/r}\Gamma\left(\frac{1}{r}, i b z^r\right)-e^{ie}(-i b z^r)^{-1/r}\Gamma\left(\frac{1}{r}, -i b z^r\right)\right)(1-v \bmod 2) - \frac{i\, 2^{-v-1} z}{r}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{-ie}\Gamma\left(\frac{1}{r}, -i(-b-2cs+cv)z^r\right)(-i(-b-2cs+cv)z^r)^{-1/r} - e^{ie}(i(-b-2cs+cv)z^r)^{-1/r}\Gamma\left(\frac{1}{r}, i(-b-2cs+cv)z^r\right)+e^{-ie}(-i(-b+2cs-cv)z^r)^{-1/r}\Gamma\left(\frac{1}{r}, -i(-b+2cs-cv)z^r\right)-e^{ie}(i(-b+2cs-cv)z^r)^{-1/r}\Gamma\left(\frac{1}{r}, i(-b+2cs-cv)z^r\right)\right)\text{/; } v\in\mathbb{N}^+$$

01.07.21.2057.01

$$\int \sin\left(b z^2+e\right)\cos^v\left(c z^2\right)dz = \frac{2^{-v-\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\left(\cos(e)S\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right)+C\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right)\sin(e)\right)}{\sqrt{b}} + 2^{-v-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{C\left(\sqrt{\frac{2}{\pi}}\sqrt{-b-2cs+cv}\,z\right)\sin(e)-\cos(e)S\left(\sqrt{\frac{2}{\pi}}\sqrt{-b-2cs+cv}\,z\right)}{\sqrt{-b-2cs+cv}} + \frac{C\left(\sqrt{\frac{2}{\pi}}\sqrt{-b+2cs-cv}\,z\right)\sin(e)-\cos(e)S\left(\sqrt{\frac{2}{\pi}}\sqrt{-b+2cs-cv}\,z\right)}{\sqrt{-b+2cs-cv}}\right)\text{/; } v\in\mathbb{N}^+$$

01.07.21.2058.01

$$\int \sin\left(\sqrt{z}\, b+e\right) \cos^{\nu}\left(\sqrt{z}\, c\right) dz = \frac{2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sin\left(\sqrt{z}\, b+e\right) - b\sqrt{z} \cos\left(\sqrt{z}\, b+e\right)\right)}{b^2} + 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(-b-2cs+c\nu)^2} \left((-b-2cs+c\nu)\sqrt{z} \cos\left(e-(-b-2cs+c\nu)\sqrt{z}\right) + \sin\left(e-(-b-2cs+c\nu)\sqrt{z}\right)\right) + \frac{1}{(-b+2cs-c\nu)^2} \left((-b+2cs-c\nu)\sqrt{z} \cos\left(e-(-b+2cs-c\nu)\sqrt{z}\right) + \sin\left(e-(-b+2cs-c\nu)\sqrt{z}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b z^r + d z\right) \cos^{\nu}\left(c z^r\right)$

01.07.21.2059.01

$$\int \sin\left(b z^2 + d z\right) \cos^{\nu}\left(c z^2\right) dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\cos\left(\frac{d^2}{4b}\right) S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) - C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4b}\right)\right) + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b-2cs+c\nu}} \left(C\left(\frac{2(-b-2cs+c\nu)z-d}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right) \sin\left(\frac{d^2}{4(-b-2cs+c\nu)}\right) - \cos\left(\frac{d^2}{4(-b-2cs+c\nu)}\right) S\left(\frac{2(-b-2cs+c\nu)z-d}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right)\right) + \frac{1}{\sqrt{-b+2cs-c\nu}} \left(C\left(\frac{2(-b+2cs-c\nu)z-d}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right) \sin\left(\frac{d^2}{4(-b+2cs-c\nu)}\right) - \cos\left(\frac{d^2}{4(-b+2cs-c\nu)}\right) S\left(\frac{2(-b+2cs-c\nu)z-d}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2060.01

$$\int \sin\left(\sqrt{z}\, b + d\, z\right) \cos^{\nu}\left(c \sqrt{z}\right) dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-2 \sqrt{d} \cos\left(\sqrt{z}\, b + d\, z\right) - b \sqrt{2\pi} \cos\left(\frac{b^2}{4d}\right) S\left(\frac{b + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2\pi}}\right) + b \sqrt{2\pi}\, C\left(\frac{b + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d}\right)\right)\right) +$$

$$2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(-d)^{3/2}} \left(2 \sqrt{-d} \cos\left((-b - 2 c s + c \nu) \sqrt{z} - d z\right) + \sqrt{2\pi}\, (-b - 2 c s + c \nu) \cos\left(\frac{(-b - 2 c s + c \nu)^2}{4d}\right) S\left(\frac{-b - 2 c s + c \nu - 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2\pi}}\right) - \sqrt{2\pi}\, (b + 2 c s - c \nu)\, C\left(\frac{-b - 2 c s + c \nu - 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2\pi}}\right) \sin\left(\frac{(-b - 2 c s + c \nu)^2}{4d}\right)\right) + \frac{1}{(-d)^{3/2}} \left(2 \sqrt{-d} \cos\left((-b + 2 c s - c \nu) \sqrt{z} - d z\right) + \sqrt{2\pi}\, (-b + 2 c s - c \nu) \cos\left(\frac{(-b + 2 c s - c \nu)^2}{4d}\right) S\left(\frac{-b + 2 c s - c \nu - 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2\pi}}\right) - \sqrt{2\pi}\, (b - 2 c s + c \nu)\, C\left(\frac{-b + 2 c s - c \nu - 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2\pi}}\right) \sin\left(\frac{(-b + 2 c s - c \nu)^2}{4d}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b z^r + d z + e\right) \cos^{\nu}\left(c z^r\right)$

01.07.21.2061.01

$$\int \sin\left(b z^2 + d z + e\right) \cos^{\nu}\left(c z^2\right) dz =$$

$$\frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4b} - e\right) S\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) - C\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4b} - e\right)\right) +$$

$$2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 c s + c \nu}} \left(C\left(\frac{2 (-b - 2 c s + c \nu) z - d}{\sqrt{2\pi} \sqrt{-b - 2 c s + c \nu}}\right) \sin\left(\frac{d^2}{4 (-b - 2 c s + c \nu)} + e\right) - \cos\left(\frac{d^2}{4 (-b - 2 c s + c \nu)} + e\right) S\left(\frac{2 (-b - 2 c s + c \nu) z - d}{\sqrt{2\pi} \sqrt{-b - 2 c s + c \nu}}\right)\right) + \frac{1}{\sqrt{-b + 2 c s - c \nu}} \left(C\left(\frac{2 (-b + 2 c s - c \nu) z - d}{\sqrt{2\pi} \sqrt{-b + 2 c s - c \nu}}\right) \sin\left(\frac{d^2}{4 (-b + 2 c s - c \nu)} + e\right) - \cos\left(\frac{d^2}{4 (-b + 2 c s - c \nu)} + e\right) S\left(\frac{2 (-b + 2 c s - c \nu) z - d}{\sqrt{2\pi} \sqrt{-b + 2 c s - c \nu}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2062.01

$$\int \sin\left(\sqrt{z}\, b + d\, z + e\right) \cos^{\nu}\left(c\sqrt{z}\right) dz = \frac{1}{d^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-2\sqrt{d}\, \cos\left(\sqrt{z}\, b + e + d\, z\right) - b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, d} - e\right) S\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) + b\sqrt{2\pi}\, C\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d} - e\right)\right)\right) + 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(-d)^{3/2}} \left(2\sqrt{-d}\, \cos\left(e + d\, z - (-b - 2\, c\, s + c\, \nu)\sqrt{z}\right) + \sqrt{2\pi}\, (-b - 2\, c\, s + c\, \nu) \cos\left(e - \frac{(-b - 2\, c\, s + c\, \nu)^2}{4\, d}\right) S\left(\frac{-b - 2\, c\, s + c\, \nu - 2\, d\sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) + \sqrt{2\pi}\, (b + 2\, c\, s - c\, \nu)\, C\left(\frac{-b - 2\, c\, s + c\, \nu - 2\, d\sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) \sin\left(e - \frac{(-b - 2\, c\, s + c\, \nu)^2}{4\, d}\right)\right) + \frac{1}{(-d)^{3/2}} \left(2\sqrt{-d}\, \cos\left(e + d\, z - (-b + 2\, c\, s - c\, \nu)\sqrt{z}\right) + \sqrt{2\pi}\, (-b + 2\, c\, s - c\, \nu) \cos\left(e - \frac{(-b + 2\, c\, s - c\, \nu)^2}{4\, d}\right) S\left(\frac{-b + 2\, c\, s - c\, \nu - 2\, d\sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) + \sqrt{2\pi}\, (b - 2\, c\, s + c\, \nu)\, C\left(\frac{-b + 2\, c\, s - c\, \nu - 2\, d\sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) \sin\left(e - \frac{(-b + 2\, c\, s - c\, \nu)^2}{4\, d}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin(d\, z) \cos^{\nu}\left(c\, z^r + g\right)$

01.07.21.2063.01

$$\int \sin(d\, z) \cos^{\nu}\left(c\, z^2 + g\right) dz = 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{c\, \nu - 2\, c\, s}} \left(C\left(\frac{2\, (c\, \nu - 2\, c\, s)\, z - d}{\sqrt{2\pi}\, \sqrt{c\, \nu - 2\, c\, s}}\right) \sin\left(\frac{d^2}{4\, (c\, \nu - 2\, c\, s)} + 2\, g\, s - g\, \nu\right) - \cos\left(\frac{d^2}{4\, (c\, \nu - 2\, c\, s)} + 2\, g\, s - g\, \nu\right) S\left(\frac{2\, (c\, \nu - 2\, c\, s)\, z - d}{\sqrt{2\pi}\, \sqrt{c\, \nu - 2\, c\, s}}\right)\right) + \frac{1}{\sqrt{2\, c\, s - c\, \nu}} \left(C\left(\frac{2\, (2\, c\, s - c\, \nu)\, z - d}{\sqrt{2\pi}\, \sqrt{2\, c\, s - c\, \nu}}\right) \sin\left(\frac{d^2}{4\, (2\, c\, s - c\, \nu)} - 2\, g\, s + g\, \nu\right) - \cos\left(\frac{d^2}{4\, (2\, c\, s - c\, \nu)} - 2\, g\, s + g\, \nu\right) S\left(\frac{2\, (2\, c\, s - c\, \nu)\, z - d}{\sqrt{2\pi}\, \sqrt{2\, c\, s - c\, \nu}}\right)\right)\right) - \frac{2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \cos(d\, z)\, (1 - \nu \bmod 2)}{d} /;\ \nu \in \mathbb{N}^+$$

01.07.21.2064.01

$$\int \sin(d\,z)\cos^{\nu}\left(\sqrt{z}\;c+g\right)dz = 2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(-d)^{3/2}}\left(2\sqrt{-d}\;\cos\left(2\,g\,s-g\,\nu+d\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)+\sqrt{2\pi}\;(2\,c\,s-c\,\nu)\left(C\left(\frac{-2\sqrt{z}\;d-2\,c\,s+c\,\nu}{\sqrt{-d}\;\sqrt{2\pi}}\right)\sin\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+2\,g\,s-g\,\nu\right)-\cos\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+2\,g\,s-g\,\nu\right)S\left(\frac{-2\sqrt{z}\;d-2\,c\,s+c\,\nu}{\sqrt{-d}\;\sqrt{2\pi}}\right)\right)\right)+\frac{1}{(-d)^{3/2}}\left(2\sqrt{-d}\;\cos\left(-2\,g\,s+g\,\nu+d\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)+\sqrt{2\pi}\;(c\,\nu-2\,c\,s)\left(C\left(\frac{-2\sqrt{z}\;d+2\,c\,s-c\,\nu}{\sqrt{-d}\;\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}-2\,g\,s+g\,\nu\right)-\cos\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}-2\,g\,s+g\,\nu\right)S\left(\frac{-2\sqrt{z}\;d+2\,c\,s-c\,\nu}{\sqrt{-d}\;\sqrt{2\pi}}\right)\right)\right)\right)-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(d\,z)\,(1-\nu \bmod 2)}{d}\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin(d\,z+e)\cos^{\nu}\left(c\,z^r+g\right)$

01.07.21.2065.01

$$\int \sin(d\,z+e)\cos^{\nu}\left(c\,z^2+g\right)dz = 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\,\nu-2\,c\,s}}\left(C\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\pi}\;\sqrt{c\,\nu-2\,c\,s}}\right)\sin\left(\frac{d^2}{4\,(c\,\nu-2\,c\,s)}+e+2\,g\,s-g\,\nu\right)-\cos\left(\frac{d^2}{4\,(c\,\nu-2\,c\,s)}+e+2\,g\,s-g\,\nu\right)S\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\pi}\;\sqrt{c\,\nu-2\,c\,s}}\right)\right)+\frac{1}{\sqrt{2\,c\,s-c\,\nu}}\left(C\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\pi}\;\sqrt{2\,c\,s-c\,\nu}}\right)\sin\left(\frac{d^2}{4\,(2\,c\,s-c\,\nu)}+e-2\,g\,s+g\,\nu\right)-\cos\left(\frac{d^2}{4\,(2\,c\,s-c\,\nu)}+e-2\,g\,s+g\,\nu\right)S\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\pi}\;\sqrt{2\,c\,s-c\,\nu}}\right)\right)\right)-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(e+d\,z)\,(1-\nu \bmod 2)}{d}\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2066.01

$$\int \sin(d z+e)\cos^{\nu}\left(\sqrt{z}\, c+g\right) dz = 2^{-\nu-1}\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(-d)^{3/2}}\left(2\sqrt{-d}\cos\left(e+2 g s-g \nu+d z-(c \nu-2 c s)\sqrt{z}\right)+\sqrt{2\pi}\,(2 c s-c \nu)\left(C\left(\frac{-2\sqrt{z}\, d-2 c s+c \nu}{\sqrt{-d}\sqrt{2\pi}}\right)\sin\left(-\frac{(c \nu-2 c s)^2}{4 d}+e+2 g s-g \nu\right)-\cos\left(-\frac{(c \nu-2 c s)^2}{4 d}+e+2 g s-g \nu\right) S\left(\frac{-2\sqrt{z}\, d-2 c s+c \nu}{\sqrt{-d}\sqrt{2\pi}}\right)\right)\right)+\frac{1}{(-d)^{3/2}}\left(2\sqrt{-d}\cos\left(e-2 g s+g \nu+d z-(2 c s-c \nu)\sqrt{z}\right)+\sqrt{2\pi}\,(c \nu-2 c s)\left(C\left(\frac{-2\sqrt{z}\, d+2 c s-c \nu}{\sqrt{-d}\sqrt{2\pi}}\right)\sin\left(-\frac{(2 c s-c \nu)^2}{4 d}+e-2 g s+g \nu\right)-\cos\left(-\frac{(2 c s-c \nu)^2}{4 d}+e-2 g s+g \nu\right) S\left(\frac{-2\sqrt{z}\, d+2 c s-c \nu}{\sqrt{-d}\sqrt{2\pi}}\right)\right)\right)\right)-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(e+d z)\,(1-\nu \bmod 2)}{d} \;/;\; \nu\in\mathbb{N}^{+}$$

Involving $\sin(b z^r)\cos^{\nu}(c z^r+g)$

01.07.21.2067.01

$$\int \sin(b z^r)\cos^{\nu}(c z^r+g)\, dz = -\frac{i\, 2^{-\nu-1} z}{r}\binom{\nu}{\frac{\nu}{2}}\left((i b z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i b z^r\right)-(-i b z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, -i b z^r\right)\right)(1-\nu \bmod 2)-\frac{i\, 2^{-\nu-1} z}{r}\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{i (g \nu-2 g s)}\,\Gamma\left(\frac{1}{r}, -i(-b-2 c s+c \nu) z^r\right)(-i(-b-2 c s+c \nu) z^r)^{-1/r}-e^{-i (g \nu-2 g s)}\,(i(-b-2 c s+c \nu) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i(-b-2 c s+c \nu) z^r\right)+e^{i (2 g s-g \nu)}\,(-i(-b+2 c s-c \nu) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, -i(-b+2 c s-c \nu) z^r\right)-e^{-i (2 g s-g \nu)}\,(i(-b+2 c s-c \nu) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i(-b+2 c s-c \nu) z^r\right)\right) \;/;\; \nu\in\mathbb{N}^{+}$$

01.07.21.2068.01

$$\int \sin(b z^2)\cos^\nu(c z^2+g)\,dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\,S\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{b}} + 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b+2cs-c\nu}}\left(C\left(\sqrt{\frac{2}{\pi}}\sqrt{-b+2cs-c\nu}\,z\right)\sin(g\nu-2gs)-\cos(g\nu-2gs)\,S\left(\sqrt{\frac{2}{\pi}}\sqrt{-b+2cs-c\nu}\,z\right)\right)+\frac{1}{\sqrt{-b-2cs+c\nu}}\left(C\left(\sqrt{\frac{2}{\pi}}\sqrt{-b-2cs+c\nu}\,z\right)\sin(2gs-g\nu)-\cos(2gs-g\nu)\,S\left(\sqrt{\frac{2}{\pi}}\sqrt{-b-2cs+c\nu}\,z\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2069.01

$$\int \sin(\sqrt{z}\,b)\cos^\nu(\sqrt{z}\,c+g)\,dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sin(b\sqrt{z})-b\sqrt{z}\cos(b\sqrt{z})\right)}{b^2} + 2^{1-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(-b-2cs+c\nu)^2}\left((-b-2cs+c\nu)\sqrt{z}\cos\left(2gs-g\nu-(-b-2cs+c\nu)\sqrt{z}\right)+\sin\left(2gs-g\nu-(-b-2cs+c\nu)\sqrt{z}\right)\right)+\frac{1}{(-b+2cs-c\nu)^2}\left((-b+2cs-c\nu)\sqrt{z}\cos\left(-2gs+g\nu-(-b+2cs-c\nu)\sqrt{z}\right)+\sin\left(-2gs+g\nu-(-b+2cs-c\nu)\sqrt{z}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin(b z^r+e)\cos^\nu(c z^r+g)$

01.07.21.2070.01

$$\int \sin(b z^r+e)\cos^\nu(c z^r+g)\,dz = -\frac{i\,2^{-\nu-1}z}{r}\binom{\nu}{\frac{\nu}{2}}\left(e^{-ie}(i b z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,i b z^r\right)-e^{ie}(-i b z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,-i b z^r\right)\right)(1-\nu \bmod 2) - \frac{i\,2^{-\nu-1}z}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{i(-e-2gs+g\nu)}\,\Gamma\left(\frac{1}{r},\,-i(-b-2cs+c\nu)z^r\right)(-i(-b-2cs+c\nu)z^r)^{-1/r} - e^{-i(-e-2gs+g\nu)}(i(-b-2cs+c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,i(-b-2cs+c\nu)z^r\right)+e^{i(-e+2gs-g\nu)}(-i(-b+2cs-c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,-i(-b+2cs-c\nu)z^r\right)-e^{-i(-e+2gs-g\nu)}(i(-b+2cs-c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},\,i(-b+2cs-c\nu)z^r\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2071.01

$$\int \sin\left(b z^2+e\right) \cos^\nu\left(c z^2+g\right) dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{\sqrt{b}} \left(\cos(e)\, S\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) + C\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) \sin(e)\right) + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b+2cs-c\nu}} \left(C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b+2cs-c\nu}\, z\right) \sin(e-2gs+g\nu) - \cos(e-2gs+g\nu)\, S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b+2cs-c\nu}\, z\right)\right) + \frac{1}{\sqrt{-b-2cs+c\nu}} \left(C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b-2cs+c\nu}\, z\right) \sin(e+2gs-g\nu) - \cos(e+2gs-g\nu)\, S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b-2cs+c\nu}\, z\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.2072.01

$$\int \sin\left(\sqrt{z}\, b+e\right) \cos^\nu\left(\sqrt{z}\, c+g\right) dz = \frac{2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sin\left(\sqrt{z}\, b+e\right) - b\sqrt{z} \cos\left(\sqrt{z}\, b+e\right)\right)}{b^2} + 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(-b-2cs+c\nu)^2} \left((-b-2cs+c\nu)\sqrt{z} \cos\left(e+2gs-g\nu-(-b-2cs+c\nu)\sqrt{z}\right) + \sin\left(e+2gs-g\nu-(-b-2cs+c\nu)\sqrt{z}\right)\right) + \frac{1}{(-b+2cs-c\nu)^2} \left((-b+2cs-c\nu)\sqrt{z} \cos\left(e-2gs+g\nu-(-b+2cs-c\nu)\sqrt{z}\right) + \sin\left(e-2gs+g\nu-(-b+2cs-c\nu)\sqrt{z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\sin\left(b z^r + d z\right) \cos^\nu\left(c z^r + g\right)$

01.07.21.2073.01

$$\int \sin\left(b z^2+d z\right) \cos^\nu\left(c z^2+g\right) dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\cos\left(\frac{d^2}{4b}\right) S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) - C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4b}\right)\right) + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b-2cs+c\nu}} \left(C\left(\frac{2(-b-2cs+c\nu)z-d}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right) \sin\left(\frac{d^2}{4(-b-2cs+c\nu)}+2gs-g\nu\right) - \cos\left(\frac{d^2}{4(-b-2cs+c\nu)}+2gs-g\nu\right) S\left(\frac{2(-b-2cs+c\nu)z-d}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right)\right) + \frac{1}{\sqrt{-b+2cs-c\nu}} \left(C\left(\frac{2(-b+2cs-c\nu)z-d}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right) \sin\left(\frac{d^2}{4(-b+2cs-c\nu)}-2gs+g\nu\right) - \cos\left(\frac{d^2}{4(-b+2cs-c\nu)}-2gs+g\nu\right) S\left(\frac{2(-b+2cs-c\nu)z-d}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.2074.01

$$\int \sin\left(\sqrt{z}\, b + d z\right) \cos^{\nu}\left(\sqrt{z}\, c + g\right) dz = \frac{1}{(-d)^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2\sqrt{-d}\, \cos\left(\sqrt{z}\, b + d z\right) + b\sqrt{2\pi} \left(-\cos\left(\frac{b^2}{4d}\right) S\left(\frac{-b - 2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) - C\left(\frac{-b - 2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d}\right)\right)\right)\right) + 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(-d)^{3/2}} \left(2\sqrt{-d}\, \cos\left(2 g s - g \nu + d z - (-b - 2 c s + c \nu)\sqrt{z}\right) + \sqrt{2\pi}\, (b + 2 c s - c \nu) \left(C\left(\frac{-b - 2 c s + c \nu - 2 d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) \sin\left(-\frac{(-b - 2 c s + c \nu)^2}{4d} + 2 g s - g \nu\right) - \cos\left(-\frac{(-b - 2 c s + c \nu)^2}{4d} + 2 g s - g \nu\right) S\left(\frac{-b - 2 c s + c \nu - 2 d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)\right)\right) + \frac{1}{(-d)^{3/2}} \left(2\sqrt{-d}\, \cos\left(-2 g s + g \nu + d z - (-b + 2 c s - c \nu)\sqrt{z}\right) + \sqrt{2\pi}\, (b - 2 c s + c \nu) \left(C\left(\frac{-b + 2 c s - c \nu - 2 d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) \sin\left(-\frac{(-b + 2 c s - c \nu)^2}{4d} - 2 g s + g \nu\right) - \cos\left(-\frac{(-b + 2 c s - c \nu)^2}{4d} - 2 g s + g \nu\right) S\left(\frac{-b + 2 c s - c \nu - 2 d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b z^r + d z + e\right) \cos^{\nu}\left(c z^r + g\right)$

01.07.21.2075.01

$$\int \sin\left(b z^2 + d z + e\right) \cos^{\nu}\left(c z^2 + g\right) dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4b} - e\right) S\left(\frac{d + 2 b z}{\sqrt{b}\,\sqrt{2\pi}}\right) - C\left(\frac{d + 2 b z}{\sqrt{b}\,\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4b} - e\right)\right)}{\sqrt{b}} + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 c s + c \nu}} \left(C\left(\frac{2(-b - 2 c s + c \nu) z - d}{\sqrt{2\pi}\,\sqrt{-b - 2 c s + c \nu}}\right) \sin\left(\frac{d^2}{4(-b - 2 c s + c \nu)} + e + 2 g s - g \nu\right) - \cos\left(\frac{d^2}{4(-b - 2 c s + c \nu)} + e + 2 g s - g \nu\right) S\left(\frac{2(-b - 2 c s + c \nu) z - d}{\sqrt{2\pi}\,\sqrt{-b - 2 c s + c \nu}}\right)\right) + \frac{1}{\sqrt{-b + 2 c s - c \nu}} \left(C\left(\frac{2(-b + 2 c s - c \nu) z - d}{\sqrt{2\pi}\,\sqrt{-b + 2 c s - c \nu}}\right) \sin\left(\frac{d^2}{4(-b + 2 c s - c \nu)} + e - 2 g s + g \nu\right) - \cos\left(\frac{d^2}{4(-b + 2 c s - c \nu)} + e - 2 g s + g \nu\right) S\left(\frac{2(-b + 2 c s - c \nu) z - d}{\sqrt{2\pi}\,\sqrt{-b + 2 c s - c \nu}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2076.01

$$\int \sin\left(\sqrt{z}\, b + d\, z + e\right) \cos^{\nu}\left(\sqrt{z}\, c + g\right) dz = \frac{1}{(-d)^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\right.$$
$$\left(2\sqrt{-d}\, \cos\left(\sqrt{z}\, b + e + d\, z\right) + b\sqrt{2\pi}\left(-\cos\left(\frac{b^2}{4d} - e\right) S\left(\frac{-b - 2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) - C\left(\frac{-b - 2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{b^2}{4d} - e\right)\right)\right)\Bigg) +$$
$$2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(-d)^{3/2}} \left(2\sqrt{-d}\, \cos\left(e + 2g\,s - g\,\nu + d\,z - (-b - 2c\,s + c\,\nu)\sqrt{z}\right) + \right.\right.$$
$$\sqrt{2\pi}\,(b + 2c\,s - c\,\nu)\left(C\left(\frac{-b - 2c\,s + c\,\nu - 2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(-b - 2c\,s + c\,\nu)^2}{4d} + e + 2g\,s - g\,\nu\right) - \right.$$
$$\left.\left.\cos\left(-\frac{(-b - 2c\,s + c\,\nu)^2}{4d} + e + 2g\,s - g\,\nu\right) S\left(\frac{-b - 2c\,s + c\,\nu - 2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)\right)\right) +$$
$$\frac{1}{(-d)^{3/2}}\left(2\sqrt{-d}\, \cos\left(e - 2g\,s + g\,\nu + d\,z - (-b + 2c\,s - c\,\nu)\sqrt{z}\right) + \sqrt{2\pi}\,(b - 2c\,s + c\,\nu)\right.$$
$$\left(C\left(\frac{-b + 2c\,s - c\,\nu - 2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(-b + 2c\,s - c\,\nu)^2}{4d} + e - 2g\,s + g\,\nu\right) - \right.$$
$$\left.\left.\left.\cos\left(-\frac{(-b + 2c\,s - c\,\nu)^2}{4d} + e - 2g\,s + g\,\nu\right) S\left(\frac{-b + 2c\,s - c\,\nu - 2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin(d\,z)\cos^{\nu}(c\,z^r + f\,z)$

01.07.21.2077.01

$$\int \sin(d\,z)\cos^{\nu}\left(c\,z^2 + f\,z\right) dz =$$
$$2^{-\nu-\frac{1}{2}}\sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{c\,\nu - 2c\,s}}\left(C\left(\frac{-d - 2f\,s + f\,\nu + 2(c\,\nu - 2c\,s)z}{\sqrt{2\pi}\,\sqrt{c\,\nu - 2c\,s}}\right)\sin\left(\frac{(-d - 2f\,s + f\,\nu)^2}{4(c\,\nu - 2c\,s)}\right) - \right.\right.$$
$$\left.\cos\left(\frac{(-d - 2f\,s + f\,\nu)^2}{4(c\,\nu - 2c\,s)}\right) S\left(\frac{-d - 2f\,s + f\,\nu + 2(c\,\nu - 2c\,s)z}{\sqrt{2\pi}\,\sqrt{c\,\nu - 2c\,s}}\right)\right) +$$
$$\frac{1}{\sqrt{2c\,s - c\,\nu}}\left(C\left(\frac{-d + 2f\,s - f\,\nu + 2(2c\,s - c\,\nu)z}{\sqrt{2\pi}\,\sqrt{2c\,s - c\,\nu}}\right)\sin\left(\frac{(-d + 2f\,s - f\,\nu)^2}{4(2c\,s - c\,\nu)}\right) - \right.$$
$$\left.\left.\cos\left(\frac{(-d + 2f\,s - f\,\nu)^2}{4(2c\,s - c\,\nu)}\right) S\left(\frac{-d + 2f\,s - f\,\nu + 2(2c\,s - c\,\nu)z}{\sqrt{2\pi}\,\sqrt{2c\,s - c\,\nu}}\right)\right)\right) - \frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(d\,z)(1 - \nu \bmod 2)}{d} /;\ \nu \in \mathbb{N}^+$$

01.07.21.2078.01

$$\int \sin(d\,z)\cos^{\nu}\left(\sqrt{z}\;c+f\,z\right)dz = 2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Bigg(\frac{1}{(-d-2\,f\,s+f\,\nu)^{3/2}}\Bigg(2\sqrt{-d-2\,f\,s+f\,\nu}\,\cos\left(\sqrt{z}\,(c\,\nu-2\,c\,s)+(-d-2\,f\,s+f\,\nu)\,z\right)+ \sqrt{2\pi}\,(2\,c\,s-c\,\nu)\Bigg(C\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)\sin\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}\right)- \cos\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}\right)S\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)\Bigg)\Bigg)+ \frac{1}{(-d+2\,f\,s-f\,\nu)^{3/2}}\Bigg(2\sqrt{-d+2\,f\,s-f\,\nu}\,\cos\left(\sqrt{z}\,(2\,c\,s-c\,\nu)+(-d+2\,f\,s-f\,\nu)\,z\right)+\sqrt{2\pi}\,(c\,\nu-2\,c\,s) \Bigg(C\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}\right)-\cos\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}\right)S\Bigg(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\Bigg)\Bigg)\Bigg)\Bigg)-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(d\,z)\,(1-\nu\bmod 2)}{d}\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin(d\,z+e)\cos^{\nu}\left(c\,z^r+f\,z\right)$

01.07.21.2079.01

$$\int \sin(d\,z+e)\cos^{\nu}\left(c\,z^2+f\,z\right)dz = 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Bigg(\frac{1}{\sqrt{c\,\nu-2\,c\,s}}\Bigg(C\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)\sin\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+e\right)- \cos\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+e\right)S\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,\nu-2\,c\,s}}\right)\Bigg)+ \frac{1}{\sqrt{2\,c\,s-c\,\nu}}\Bigg(C\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)\sin\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}+e\right)-\cos\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}+e\right) S\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,\nu}}\right)\Bigg)\Bigg)-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(e+d\,z)\,(1-\nu\bmod 2)}{d}\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2080.01

$$\int \sin(d\,z+e)\cos^{\nu}\left(\sqrt{z}\,c+f\,z\right)dz = 2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(-d-2\,f\,s+f\,\nu)^{3/2}}\left(2\sqrt{-d-2\,f\,s+f\,\nu}\,\cos\left(e-(-d-2\,f\,s+f\,\nu)\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)+\right.\right.$$
$$\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\left(C\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)\sin\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+e\right)-\right.$$
$$\left.\left.\cos\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+e\right)S\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)\right)\right)+$$
$$\frac{1}{(-d+2\,f\,s-f\,\nu)^{3/2}}\left(2\sqrt{-d+2\,f\,s-f\,\nu}\,\cos\left(e-(-d+2\,f\,s-f\,\nu)\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)+\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\right.$$
$$\left(C\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}+e\right)-\cos\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}+e\right)S\left(\right.\right.$$
$$\left.\left.\left.\left.\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)\right)\right)\right)-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(e+d\,z)\,(1-\nu\bmod 2)}{d}\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin\left(b\,z^r\right)\cos^{\nu}\left(c\,z^r+f\,z\right)$

01.07.21.2081.01

$$\int \sin\left(b\,z^2\right)\cos^{\nu}\left(c\,z^2+f\,z\right)dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)}{\sqrt{b}}\,S\left(\sqrt{b}\,\sqrt{\frac{2}{\pi}}\,z\right)+$$
$$2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2\,c\,s+c\,\nu}}\left(C\left(\frac{-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b-2\,c\,s+c\,\nu}}\right)\sin\left(\frac{(f\,\nu-2\,f\,s)^2}{4\,(-b-2\,c\,s+c\,\nu)}\right)-\right.\right.$$
$$\left.\cos\left(\frac{(f\,\nu-2\,f\,s)^2}{4\,(-b-2\,c\,s+c\,\nu)}\right)S\left(\frac{-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b-2\,c\,s+c\,\nu}}\right)\right)+$$
$$\frac{1}{\sqrt{-b+2\,c\,s-c\,\nu}}\left(C\left(\frac{2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b+2\,c\,s-c\,\nu}}\right)\sin\left(\frac{(2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}\right)-\right.$$
$$\left.\left.\cos\left(\frac{(2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}\right)S\left(\frac{2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b+2\,c\,s-c\,\nu}}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2082.01

$$\int \sin\left(b\sqrt{z}\right)\cos^{\nu}\left(\sqrt{z}\, c+f\, z\right) dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sin\left(b\sqrt{z}\right)-b\sqrt{z}\,\cos\left(b\sqrt{z}\right)\right)}{b^2}+$$
$$2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(f\,\nu-2\,f\,s)^{3/2}}\left(2\sqrt{f\,\nu-2\,f\,s}\,\cos\left(\sqrt{z}\,(-b-2\,c\,s+c\,\nu)+(f\,\nu-2\,f\,s)\,z\right)+\right.\right.$$
$$\sqrt{2\pi}\,(b+2\,c\,s-c\,\nu)\left(C\left(\frac{-b-2\,c\,s+c\,\nu+2\,(f\,\nu-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{f\,\nu-2\,f\,s}}\right)\sin\left(\frac{(-b-2\,c\,s+c\,\nu)^2}{4\,(f\,\nu-2\,f\,s)}\right)-\right.$$
$$\left.\left.\cos\left(\frac{(-b-2\,c\,s+c\,\nu)^2}{4\,(f\,\nu-2\,f\,s)}\right)S\left(\frac{-b-2\,c\,s+c\,\nu+2\,(f\,\nu-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{f\,\nu-2\,f\,s}}\right)\right)\right)+$$
$$\frac{1}{(2\,f\,s-f\,\nu)^{3/2}}\left(2\sqrt{2\,f\,s-f\,\nu}\,\cos\left(\sqrt{z}\,(-b+2\,c\,s-c\,\nu)+(2\,f\,s-f\,\nu)\,z\right)+\right.$$
$$\sqrt{2\pi}\,(b-2\,c\,s+c\,\nu)\left(C\left(\frac{-b+2\,c\,s-c\,\nu+2\,(2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(-b+2\,c\,s-c\,\nu)^2}{4\,(2\,f\,s-f\,\nu)}\right)-\right.$$
$$\left.\left.\left.\cos\left(\frac{(-b+2\,c\,s-c\,\nu)^2}{4\,(2\,f\,s-f\,\nu)}\right)S\left(\frac{-b+2\,c\,s-c\,\nu+2\,(2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,f\,s-f\,\nu}}\right)\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $\sin\left(b\, z^r+e\right)\cos^{\nu}\left(c\, z^r+f\, z\right)$

01.07.21.2083.01

$$\int \sin\left(b\, z^2+e\right)\cos^{\nu}\left(c\, z^2+f\, z\right) dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos(e)\,S\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\, z\right)+C\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\, z\right)\sin(e)\right)}{\sqrt{b}}+$$
$$2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2\,c\,s+c\,\nu}}\left(C\left(\frac{-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b-2\,c\,s+c\,\nu}}\right)\sin\left(\frac{(f\,\nu-2\,f\,s)^2}{4\,(-b-2\,c\,s+c\,\nu)}+e\right)-\right.\right.$$
$$\left.\cos\left(\frac{(f\,\nu-2\,f\,s)^2}{4\,(-b-2\,c\,s+c\,\nu)}+e\right)S\left(\frac{-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b-2\,c\,s+c\,\nu}}\right)\right)+$$
$$\frac{1}{\sqrt{-b+2\,c\,s-c\,\nu}}\left(C\left(\frac{2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b+2\,c\,s-c\,\nu}}\right)\sin\left(\frac{(2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}+e\right)-\right.$$
$$\left.\left.\cos\left(\frac{(2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}+e\right)S\left(\frac{2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b+2\,c\,s-c\,\nu}}\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.07.21.2084.01

$$\int \sin\left(b\sqrt{z}+e\right)\cos^{\nu}\left(\sqrt{z}\,c+f\,z\right)dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sin\left(\sqrt{z}\,b+e\right)-b\sqrt{z}\cos\left(\sqrt{z}\,b+e\right)\right)}{b^2}+ 2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(f\nu-2fs)^{3/2}}\left(2\sqrt{f\nu-2fs}\cos\left(e-(f\nu-2fs)z-(-b-2cs+c\nu)\sqrt{z}\right)+\sqrt{2\pi}\,(b+2cs-c\nu)\left(C\left(\frac{-b-2cs+c\nu+2(f\nu-2fs)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\nu-2fs}}\right)\sin\left(\frac{(-b-2cs+c\nu)^2}{4(f\nu-2fs)}+e\right)-\cos\left(\frac{(-b-2cs+c\nu)^2}{4(f\nu-2fs)}+e\right)S\left(\frac{-b-2cs+c\nu+2(f\nu-2fs)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\nu-2fs}}\right)\right)\right)+\frac{1}{(2fs-f\nu)^{3/2}}\left(2\sqrt{2fs-f\nu}\cos\left(e-(2fs-f\nu)z-(-b+2cs-c\nu)\sqrt{z}\right)+\sqrt{2\pi}\,(b-2cs+c\nu)\left(C\left(\frac{-b+2cs-c\nu+2(2fs-f\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2fs-f\nu}}\right)\sin\left(\frac{(-b+2cs-c\nu)^2}{4(2fs-f\nu)}+e\right)-\cos\left(\frac{(-b+2cs-c\nu)^2}{4(2fs-f\nu)}+e\right)S\left(\frac{-b+2cs-c\nu+2(2fs-f\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2fs-f\nu}}\right)\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin\left(b\,z^r+d\,z\right)\cos^{\nu}\left(c\,z^r+f\,z\right)$

01.07.21.2085.01

$$\int \sin\left(b\,z^2+d\,z\right)\cos^{\nu}\left(c\,z^2+f\,z\right)dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{b}}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos\left(\frac{d^2}{4b}\right)S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right)-C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right)\sin\left(\frac{d^2}{4b}\right)\right)+ 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2cs+c\nu}}\left(C\left(\frac{-d-2fs+f\nu+2(-b-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right)\sin\left(\frac{(-d-2fs+f\nu)^2}{4(-b-2cs+c\nu)}\right)-\cos\left(\frac{(-d-2fs+f\nu)^2}{4(-b-2cs+c\nu)}\right)S\left(\frac{-d-2fs+f\nu+2(-b-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{-b-2cs+c\nu}}\right)\right)+\frac{1}{\sqrt{-b+2cs-c\nu}}\left(C\left(\frac{-d+2fs-f\nu+2(-b+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right)\sin\left(\frac{(-d+2fs-f\nu)^2}{4(-b+2cs-c\nu)}\right)-\cos\left(\frac{(-d+2fs-f\nu)^2}{4(-b+2cs-c\nu)}\right)S\left(\frac{-d+2fs-f\nu+2(-b+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{-b+2cs-c\nu}}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2086.01

$$\int \sin\left(b\sqrt{z}+d\,z\right)\cos^{\nu}\left(\sqrt{z}\,c+f\,z\right)dz = \frac{1}{d^{3/2}}\left(2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\right.$$
$$\left(-2\sqrt{d}\,\cos\left(\sqrt{z}\,b+d\,z\right)-b\sqrt{2\pi}\,\cos\left(\frac{b^2}{4\,d}\right)S\left(\frac{b+2\,d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right)+b\sqrt{2\pi}\,C\left(\frac{b+2\,d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right)\sin\left(\frac{b^2}{4\,d}\right)\right)\Bigg)+$$
$$2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(-d-2\,f\,s+f\,\nu)^{3/2}}\left(2\sqrt{-d-2\,f\,s+f\,\nu}\,\cos\left(\sqrt{z}\,(-b-2\,c\,s+c\,\nu)+(-d-2\,f\,s+f\,\nu)\,z\right)+\right.\right.$$
$$\sqrt{2\pi}\,(-b-2\,c\,s+c\,\nu)\cos\left(\frac{(-b-2\,c\,s+c\,\nu)^2}{4\,(-d-2\,f\,s+f\,\nu)}\right)S\left(\frac{-b-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)+$$
$$\left.\sqrt{2\pi}\,(b+2\,c\,s-c\,\nu)\,C\left(\frac{-b-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)\sin\left(\frac{(-b-2\,c\,s+c\,\nu)^2}{4\,(-d-2\,f\,s+f\,\nu)}\right)\right)+$$
$$\frac{1}{(-d+2\,f\,s-f\,\nu)^{3/2}}\left(2\sqrt{-d+2\,f\,s-f\,\nu}\,\cos\left(\sqrt{z}\,(-b+2\,c\,s-c\,\nu)+(-d+2\,f\,s-f\,\nu)\,z\right)+\right.$$
$$\sqrt{2\pi}\,(-b+2\,c\,s-c\,\nu)\cos\left(\frac{(-b+2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}\right)S\left(\frac{-b+2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)+$$
$$\left.\left.\sqrt{2\pi}\,(b-2\,c\,s+c\,\nu)\,C\left(\frac{-b+2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(-b+2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin\left(b\,z^r+d\,z+e\right)\cos^{\nu}\left(c\,z^r+f\,z\right)$

01.07.21.2087.01

$$\int \sin\left(b\,z^2+d\,z+e\right)\cos^{\nu}\left(c\,z^2+f\,z\right)dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\,\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\left(\cos\left(\frac{d^2}{4b}-e\right)S\left(\frac{d+2bz}{\sqrt{b}\,\sqrt{2\pi}}\right)-C\left(\frac{d+2bz}{\sqrt{b}\,\sqrt{2\pi}}\right)\sin\left(\frac{d^2}{4b}-e\right)\right)}{\sqrt{b}}+$$
$$2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2\,c\,s+c\,\nu}}\left(C\left(\frac{-d-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b-2\,c\,s+c\,\nu}}\right)\sin\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(-b-2\,c\,s+c\,\nu)}+e\right)-\right.\right.$$
$$\left.\cos\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(-b-2\,c\,s+c\,\nu)}+e\right)S\left(\frac{-d-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b-2\,c\,s+c\,\nu}}\right)\right)+$$
$$\frac{1}{\sqrt{-b+2\,c\,s-c\,\nu}}\left(C\left(\frac{-d+2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b+2\,c\,s-c\,\nu}}\right)\sin\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}+e\right)-\right.$$
$$\left.\left.\cos\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}+e\right)S\left(\frac{-d+2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b+2\,c\,s-c\,\nu}}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2088.01

$$\int \sin\left(\sqrt{z}\, b + d\, z + e\right) \cos^{\nu}\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{(-d)^{3/2}} \left(2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2\sqrt{-d}\, \cos\left(\sqrt{z}\, b + e + d\, z\right) + b\sqrt{2\pi} \left(-\cos\left(\frac{b^2}{4d} - e\right) S\left(\frac{-b - 2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) - C\left(\frac{-b - 2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d} - e\right)\right)\right) + 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(2\sqrt{-d - 2fs + f\nu}\, \cos\left(e - (-d - 2fs + f\nu) z - (-b - 2cs + c\nu)\sqrt{z}\right) + \sqrt{2\pi}\, (b + 2cs - c\nu) \left(C\left(\frac{-b - 2cs + c\nu + 2(-d - 2fs + f\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2fs + f\nu}}\right) \sin\left(\frac{(-b - 2cs + c\nu)^2}{4(-d - 2fs + f\nu)} + e\right) - \cos\left(\frac{(-b - 2cs + c\nu)^2}{4(-d - 2fs + f\nu)} + e\right) S\left(\frac{-b - 2cs + c\nu + 2(-d - 2fs + f\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2fs + f\nu}}\right)\right)\right) \Big/ (-d - 2fs + f\nu)^{3/2} + \left(2\sqrt{-d + 2fs - f\nu}\, \cos\left(e - (-d + 2fs - f\nu) z - (-b + 2cs - c\nu)\sqrt{z}\right) + \sqrt{2\pi}\, (b - 2cs + c\nu) \left(C\left(\frac{-b + 2cs - c\nu + 2(-d + 2fs - f\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2fs - f\nu}}\right) \sin\left(\frac{(-b + 2cs - c\nu)^2}{4(-d + 2fs - f\nu)} + e\right) - \cos\left(\frac{(-b + 2cs - c\nu)^2}{4(-d + 2fs - f\nu)} + e\right) S\left(\frac{-b + 2cs - c\nu + 2(-d + 2fs - f\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2fs - f\nu}}\right)\right)\right) \Big/ (-d + 2fs - f\nu)^{3/2}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin(d\, z) \cos^{\nu}\left(c\, z^r + f\, z + g\right)$

01.07.21.2089.01

$$\int \sin(d\, z) \cos^{\nu}\left(c\, z^2 + f\, z + g\right) dz = 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{c\nu - 2cs}} \left(C\left(\frac{-d - 2fs + f\nu + 2(c\nu - 2cs) z}{\sqrt{2\pi}\,\sqrt{c\nu - 2cs}}\right) \sin\left(\frac{(-d - 2fs + f\nu)^2}{4(c\nu - 2cs)} + 2gs - g\nu\right) - \cos\left(\frac{(-d - 2fs + f\nu)^2}{4(c\nu - 2cs)} + 2gs - g\nu\right) S\left(\frac{-d - 2fs + f\nu + 2(c\nu - 2cs) z}{\sqrt{2\pi}\,\sqrt{c\nu - 2cs}}\right)\right) + \frac{1}{\sqrt{2cs - c\nu}} \left(C\left(\frac{-d + 2fs - f\nu + 2(2cs - c\nu) z}{\sqrt{2\pi}\,\sqrt{2cs - c\nu}}\right) \sin\left(\frac{(-d + 2fs - f\nu)^2}{4(2cs - c\nu)} - 2gs + g\nu\right) - \cos\left(\frac{(-d + 2fs - f\nu)^2}{4(2cs - c\nu)} - 2gs + g\nu\right) S\left(\frac{-d + 2fs - f\nu + 2(2cs - c\nu) z}{\sqrt{2\pi}\,\sqrt{2cs - c\nu}}\right)\right)\right) - \frac{2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \cos(d\, z)\, (1 - \nu \bmod 2)}{d} /;\ \nu \in \mathbb{N}^+$$

01.07.21.2090.01

$$\int \sin(d\,z)\cos^{v}\left(\sqrt{z}\;c+f\,z+g\right)dz ==$$

$$2^{-v-1}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{(-d-2\,f\,s+f\,v)^{3/2}}\left(2\sqrt{-d-2\,f\,s+f\,v}\;\cos\left(2\,g\,s-g\,v-(-d-2\,f\,s+f\,v)\,z-(c\,v-2\,c\,s)\sqrt{z}\right)+\right.\right.$$
$$\sqrt{2\pi}\;(2\,c\,s-c\,v)\left(C\left(\frac{-2\,c\,s+c\,v+2\,(-d-2\,f\,s+f\,v)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{-d-2\,f\,s+f\,v}}\right)\sin\left(\frac{(c\,v-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,v)}+2\,g\,s-g\,v\right)-\right.$$
$$\left.\left.\cos\left(\frac{(c\,v-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,v)}+2\,g\,s-g\,v\right)S\left(\frac{-2\,c\,s+c\,v+2\,(-d-2\,f\,s+f\,v)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{-d-2\,f\,s+f\,v}}\right)\right)\right)+$$
$$\frac{1}{(-d+2\,f\,s-f\,v)^{3/2}}\left(2\sqrt{-d+2\,f\,s-f\,v}\;\cos\left(-2\,g\,s+g\,v-(-d+2\,f\,s-f\,v)\,z-(2\,c\,s-c\,v)\sqrt{z}\right)+\right.$$
$$\sqrt{2\pi}\;(c\,v-2\,c\,s)\left(C\left(\frac{2\,c\,s-c\,v+2\,(-d+2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{-d+2\,f\,s-f\,v}}\right)\sin\left(\right.\right.$$
$$\left.\frac{(2\,c\,s-c\,v)^2}{4\,(-d+2\,f\,s-f\,v)}-2\,g\,s+g\,v\right)-\cos\left(\frac{(2\,c\,s-c\,v)^2}{4\,(-d+2\,f\,s-f\,v)}-2\,g\,s+g\,v\right)S\left(\right.$$
$$\left.\left.\left.\left.\frac{2\,c\,s-c\,v+2\,(-d+2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{-d+2\,f\,s-f\,v}}\right)\right)\right)\right)-\frac{2^{-v}\binom{v}{\frac{v}{2}}\cos(d\,z)\,(1-v\bmod 2)}{d}\;/;\;v\in\mathbb{N}^{+}$$

Involving $\sin(d\,z+e)\cos^{v}\left(c\,z^{r}+f\,z+g\right)$

01.07.21.2091.01

$$\int \sin(d\,z+e)\cos^{v}\left(c\,z^2+f\,z+g\right)dz ==$$

$$2^{-v-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{\sqrt{c\,v-2\,c\,s}}\left(C\left(\frac{-d-2\,f\,s+f\,v+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\pi}\;\sqrt{c\,v-2\,c\,s}}\right)\sin\left(\frac{(-d-2\,f\,s+f\,v)^2}{4\,(c\,v-2\,c\,s)}+e+2\,g\,s-g\,v\right)-\right.\right.$$
$$\left.\cos\left(\frac{(-d-2\,f\,s+f\,v)^2}{4\,(c\,v-2\,c\,s)}+e+2\,g\,s-g\,v\right)S\left(\frac{-d-2\,f\,s+f\,v+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\pi}\;\sqrt{c\,v-2\,c\,s}}\right)\right)+\frac{1}{\sqrt{2\,c\,s-c\,v}}$$
$$\left(C\left(\frac{-d+2\,f\,s-f\,v+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\pi}\;\sqrt{2\,c\,s-c\,v}}\right)\sin\left(\frac{(-d+2\,f\,s-f\,v)^2}{4\,(2\,c\,s-c\,v)}+e-2\,g\,s+g\,v\right)-\cos\left(\frac{(-d+2\,f\,s-f\,v)^2}{4\,(2\,c\,s-c\,v)}+\right.\right.$$
$$\left.\left.\left.e-2\,g\,s+g\,v\right)S\left(\frac{-d+2\,f\,s-f\,v+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\pi}\;\sqrt{2\,c\,s-c\,v}}\right)\right)\right)-\frac{2^{-v}\binom{v}{\frac{v}{2}}\cos(e+d\,z)\,(1-v\bmod 2)}{d}\;/;\;v\in\mathbb{N}^{+}$$

01.07.21.2092.01

$$\int \sin(d\,z+e)\cos^{\nu}\left(\sqrt{z}\;c+f\,z+g\right)dz = 2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(-d-2\,f\,s+f\,\nu)^{3/2}}\left(2\sqrt{-d-2\,f\,s+f\,\nu}\,\cos\left(e+2\,g\,s-g\,\nu-(-d-2\,f\,s+f\,\nu)\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)+\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\left(C\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)\sin\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+e+2\,g\,s-g\,\nu\right)-\cos\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+e+2\,g\,s-g\,\nu\right)S\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)\right)\right)+\frac{1}{(-d+2\,f\,s-f\,\nu)^{3/2}}\left(2\sqrt{-d+2\,f\,s-f\,\nu}\,\cos\left(e-2\,g\,s+g\,\nu-(-d+2\,f\,s-f\,\nu)\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)+\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\left(C\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}+e-2\,g\,s+g\,\nu\right)-\cos\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}+e-2\,g\,s+g\,\nu\right)S\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)\right)\right)\right)-\frac{2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(e+d\,z)\,(1-\nu \bmod 2)}{d}\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin\left(b\,z^r\right)\cos^{\nu}\left(c\,z^r+f\,z+g\right)$

01.07.21.2093.01

$$\int \sin\left(b\,z^2\right)\cos^{\nu}\left(c\,z^2+f\,z+g\right)dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\,S\left(\sqrt{b}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{b}}+2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2\,c\,s+c\,\nu}}\left(C\left(\frac{-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b-2\,c\,s+c\,\nu}}\right)\sin\left(\frac{(f\,\nu-2\,f\,s)^2}{4\,(-b-2\,c\,s+c\,\nu)}+2\,g\,s-g\,\nu\right)-\cos\left(\frac{(f\,\nu-2\,f\,s)^2}{4\,(-b-2\,c\,s+c\,\nu)}+2\,g\,s-g\,\nu\right)S\left(\frac{-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b-2\,c\,s+c\,\nu}}\right)\right)+\frac{1}{\sqrt{-b+2\,c\,s-c\,\nu}}\left(C\left(\frac{2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b+2\,c\,s-c\,\nu}}\right)\sin\left(\frac{(2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}-2\,g\,s+g\,\nu\right)-\cos\left(\frac{(2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}-2\,g\,s+g\,\nu\right)S\left(\frac{2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b+2\,c\,s-c\,\nu}}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2094.01

$$\int \sin\left(b\sqrt{z}\right)\cos^{\nu}\left(\sqrt{z}\;c+f\,z+g\right)dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\left(\sin\left(b\sqrt{z}\right)-b\sqrt{z}\cos\left(b\sqrt{z}\right)\right)}{b^2}+ 2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(f\,\nu-2\,f\,s)^{3/2}}\left(2\sqrt{f\,\nu-2\,f\,s}\cos\left(2\,g\,s-g\,\nu-(f\,\nu-2\,f\,s)\,z-(-b-2\,c\,s+c\,\nu)\sqrt{z}\right)+\sqrt{2\pi}\,(b+2\,c\,s-c\,\nu)\left(C\left(\frac{-b-2\,c\,s+c\,\nu+2\,(f\,\nu-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\,\nu-2\,f\,s}}\right)\sin\left(\frac{(-b-2\,c\,s+c\,\nu)^2}{4\,(f\,\nu-2\,f\,s)}+2\,g\,s-g\,\nu\right)-\cos\left(\frac{(-b-2\,c\,s+c\,\nu)^2}{4\,(f\,\nu-2\,f\,s)}+2\,g\,s-g\,\nu\right)S\left(\frac{-b-2\,c\,s+c\,\nu+2\,(f\,\nu-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\,\nu-2\,f\,s}}\right)\right)\right)+\frac{1}{(2\,f\,s-f\,\nu)^{3/2}}\left(2\sqrt{2\,f\,s-f\,\nu}\cos\left(-2\,g\,s+g\,\nu-(2\,f\,s-f\,\nu)\,z-(-b+2\,c\,s-c\,\nu)\sqrt{z}\right)+\sqrt{2\pi}\,(b-2\,c\,s+c\,\nu)\left(C\left(\frac{-b+2\,c\,s-c\,\nu+2\,(2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(-b+2\,c\,s-c\,\nu)^2}{4\,(2\,f\,s-f\,\nu)}-2\,g\,s+g\,\nu\right)-\cos\left(\frac{(-b+2\,c\,s-c\,\nu)^2}{4\,(2\,f\,s-f\,\nu)}-2\,g\,s+g\,\nu\right)S\left(\frac{-b+2\,c\,s-c\,\nu+2\,(2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,f\,s-f\,\nu}}\right)\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin\left(b\,z^r+e\right)\cos^{\nu}\left(c\,z^r+f\,z+g\right)$

01.07.21.2095.01

$$\int \sin\left(b\,z^2+e\right)\cos^{\nu}\left(c\,z^2+f\,z+g\right)dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{b}}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\left(\cos(e)\,S\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right)+C\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right)\sin(e)\right)+ 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2\,c\,s+c\,\nu}}\left(C\left(\frac{-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\sqrt{-b-2\,c\,s+c\,\nu}}\right)\sin\left(\frac{(f\,\nu-2\,f\,s)^2}{4\,(-b-2\,c\,s+c\,\nu)}+e+2\,g\,s-g\,\nu\right)-\cos\left(\frac{(f\,\nu-2\,f\,s)^2}{4\,(-b-2\,c\,s+c\,\nu)}+e+2\,g\,s-g\,\nu\right)S\left(\frac{-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\sqrt{-b-2\,c\,s+c\,\nu}}\right)\right)+\frac{1}{\sqrt{-b+2\,c\,s-c\,\nu}}\left(C\left(\frac{2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\sqrt{-b+2\,c\,s-c\,\nu}}\right)\sin\left(\frac{(2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}+e-2\,g\,s+g\,\nu\right)-\cos\left(\frac{(2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}+e-2\,g\,s+g\,\nu\right)S\left(\frac{2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\sqrt{-b+2\,c\,s-c\,\nu}}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2096.01

$$\int \sin\left(b\sqrt{z}+e\right)\cos^{\nu}\left(\sqrt{z}\,c+f\,z+g\right)dz = \frac{2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sin\left(\sqrt{z}\,b+e\right)-b\sqrt{z}\,\cos\left(\sqrt{z}\,b+e\right)\right)}{b^2}+$$
$$2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Bigg(\frac{1}{(f\,\nu-2\,f\,s)^{3/2}}\Bigg(2\sqrt{f\,\nu-2\,f\,s}\,\cos\left(e+2\,g\,s-g\,\nu-(f\,\nu-2\,f\,s)\,z-(-b-2\,c\,s+c\,\nu)\sqrt{z}\right)+$$
$$\sqrt{2\pi}\,(b+2\,c\,s-c\,\nu)\left(C\left(\frac{-b-2\,c\,s+c\,\nu+2\,(f\,\nu-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{f\,\nu-2\,f\,s}}\right)\sin\left(\frac{(-b-2\,c\,s+c\,\nu)^2}{4\,(f\,\nu-2\,f\,s)}+e+2\,g\,s-g\,\nu\right)-\right.$$
$$\left.\cos\left(\frac{(-b-2\,c\,s+c\,\nu)^2}{4\,(f\,\nu-2\,f\,s)}+e+2\,g\,s-g\,\nu\right)S\left(\frac{-b-2\,c\,s+c\,\nu+2\,(f\,\nu-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{f\,\nu-2\,f\,s}}\right)\right)\Bigg)+$$
$$\frac{1}{(2\,f\,s-f\,\nu)^{3/2}}\Bigg(2\sqrt{2\,f\,s-f\,\nu}\,\cos\left(e-2\,g\,s+g\,\nu-(2\,f\,s-f\,\nu)\,z-(-b+2\,c\,s-c\,\nu)\sqrt{z}\right)+$$
$$\sqrt{2\pi}\,(b-2\,c\,s+c\,\nu)\left(C\left(\frac{-b+2\,c\,s-c\,\nu+2\,(2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(-b+2\,c\,s-c\,\nu)^2}{4\,(2\,f\,s-f\,\nu)}+e-2\,g\,s+g\,\nu\right)-\right.$$
$$\left.\cos\left(\frac{(-b+2\,c\,s-c\,\nu)^2}{4\,(2\,f\,s-f\,\nu)}+e-2\,g\,s+g\,\nu\right)S\left(\frac{-b+2\,c\,s-c\,\nu+2\,(2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,f\,s-f\,\nu}}\right)\right)\Bigg)\Bigg)\ /;\ \nu\in\mathbb{N}^+$$

Involving $\sin\left(b\,z^r+d\,z\right)\cos^{\nu}\left(c\,z^r+f\,z+g\right)$

01.07.21.2097.01

$$\int \sin\left(b\,z^2+d\,z\right)\cos^{\nu}\left(c\,z^2+f\,z+g\right)dz = \frac{2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{b}}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos\left(\frac{d^2}{4\,b}\right)S\left(\frac{d+2\,b\,z}{\sqrt{b}\,\sqrt{2\pi}}\right)-C\left(\frac{d+2\,b\,z}{\sqrt{b}\,\sqrt{2\pi}}\right)\sin\left(\frac{d^2}{4\,b}\right)\right)+$$
$$2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Bigg(\frac{1}{\sqrt{-b-2\,c\,s+c\,\nu}}\left(C\left(\frac{-d-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b-2\,c\,s+c\,\nu}}\right)\sin\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(-b-2\,c\,s+c\,\nu)}+2\,g\,s-g\,\nu\right)-\right.$$
$$\left.\cos\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(-b-2\,c\,s+c\,\nu)}+2\,g\,s-g\,\nu\right)S\left(\frac{-d-2\,f\,s+f\,\nu+2\,(-b-2\,c\,s+c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b-2\,c\,s+c\,\nu}}\right)\right)+$$
$$\frac{1}{\sqrt{-b+2\,c\,s-c\,\nu}}\left(C\left(\frac{-d+2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b+2\,c\,s-c\,\nu}}\right)\sin\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}-2\,g\,s+g\,\nu\right)-\right.$$
$$\left.\cos\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(-b+2\,c\,s-c\,\nu)}-2\,g\,s+g\,\nu\right)S\left(\frac{-d+2\,f\,s-f\,\nu+2\,(-b+2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{-b+2\,c\,s-c\,\nu}}\right)\right)\Bigg)\ /;\ \nu\in\mathbb{N}^+$$

01.07.21.2098.01

$$\int \sin\left(b\sqrt{z}+d\,z\right)\cos^{\nu}\left(\sqrt{z}\,c+f\,z+g\right)dz = \frac{1}{d^{3/2}}\left(2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(-2\sqrt{d}\,\cos\left(\sqrt{z}\,b+d\,z\right)-b\sqrt{2\pi}\,\cos\left(\frac{b^2}{4\,d}\right)S\left(\frac{b+2\,d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right)+\right.\right.$$
$$\left.b\sqrt{2\pi}\,C\left(\frac{b+2\,d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right)\sin\left(\frac{b^2}{4\,d}\right)\right)+2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(-d-2\,f\,s+f\,\nu)^{3/2}}\right.$$
$$\left(2\sqrt{-d-2\,f\,s+f\,\nu}\,\cos\left(2\,g\,s-g\,\nu-(-d-2\,f\,s+f\,\nu)\,z-(-b-2\,c\,s+c\,\nu)\sqrt{z}\right)+\sqrt{2\pi}\,(-b-2\,c\,s+c\,\nu)\right.$$
$$\cos\left(\frac{(-b-2\,c\,s+c\,\nu)^2}{4\,(-d-2\,f\,s+f\,\nu)}+2\,g\,s-g\,\nu\right)S\left(\frac{-b-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)+\sqrt{2\pi}$$
$$\left.(b+2\,c\,s-c\,\nu)\,C\left(\frac{-b-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,f\,s+f\,\nu}}\right)\sin\left(\frac{(-b-2\,c\,s+c\,\nu)^2}{4\,(-d-2\,f\,s+f\,\nu)}+2\,g\,s-g\,\nu\right)\right)+$$
$$\frac{1}{(-d+2\,f\,s-f\,\nu)^{3/2}}\left(2\sqrt{-d+2\,f\,s-f\,\nu}\,\cos\left(-2\,g\,s+g\,\nu-(-d+2\,f\,s-f\,\nu)\,z-(-b+2\,c\,s-c\,\nu)\sqrt{z}\right)+\right.$$
$$\sqrt{2\pi}\,(-b+2\,c\,s-c\,\nu)\cos\left(\frac{(-b+2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}-2\,g\,s+g\,\nu\right)$$
$$S\left(\frac{-b+2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)+\sqrt{2\pi}\,(b-2\,c\,s+c\,\nu)$$
$$\left.\left.\left.C\left(\frac{-b+2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,f\,s-f\,\nu}}\right)\sin\left(\frac{(-b+2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}-2\,g\,s+g\,\nu\right)\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin\left(b\,z^r+d\,z+e\right)\cos^{\nu}\left(c\,z^r+f\,z+g\right)$

01.07.21.2099.01

$$\int \sin\left(b z^2 + d z + e\right) \cos^{\nu}\left(c z^2 + f z + g\right) dz = \frac{2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4 b} - e\right) S\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) - C\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) \sin\left(\frac{d^2}{4 b} - e\right)\right) + 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 c s + c \nu}} \left(C\left(\frac{-d - 2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 c s + c \nu}}\right) \sin\left(\frac{(-d - 2 f s + f \nu)^2}{4 (-b - 2 c s + c \nu)} + e + 2 g s - g \nu\right) - \cos\left(\frac{(-d - 2 f s + f \nu)^2}{4 (-b - 2 c s + c \nu)} + e + 2 g s - g \nu\right) S\left(\frac{-d - 2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 c s + c \nu}}\right)\right) + \frac{1}{\sqrt{-b + 2 c s - c \nu}} \left(C\left(\frac{-d + 2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 c s - c \nu}}\right) \sin\left(\frac{(-d + 2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} + e - 2 g s + g \nu\right) - \cos\left(\frac{(-d + 2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} + e - 2 g s + g \nu\right) S\left(\frac{-d + 2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 c s - c \nu}}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.2100.01

$$\int \sin\left(b\sqrt{z}+d\,z+e\right)\cos^{\nu}\left(\sqrt{z}\,c+f\,z+g\right)dz = \frac{1}{d^{3/2}}\left(2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(-2\sqrt{d}\cos\left(\sqrt{z}\,b+e+d\,z\right)-b\sqrt{2\pi}\cos\left(\frac{b^2}{4d}-e\right)S\left(\frac{b+2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right)+ b\sqrt{2\pi}\,C\left(\frac{b+2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right)\sin\left(\frac{b^2}{4d}-e\right)\right)\right)+2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(-d-2fs+fv)^{3/2}}\left(2\sqrt{-d-2fs+fv}\cos\left(e+2gs-gv-(-d-2fs+fv)z-(-b-2cs+cv)\sqrt{z}\right)+\sqrt{2\pi}\,(-b-2cs+cv)\cos\left(\frac{(-b-2cs+cv)^2}{4(-d-2fs+fv)}+e+2gs-gv\right)S\left(\frac{-b-2cs+cv+2(-d-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d-2fs+fv}}\right)+\sqrt{2\pi}\,(b+2cs-cv)\,C\left(\frac{-b-2cs+cv+2(-d-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d-2fs+fv}}\right)\sin\left(\frac{(-b-2cs+cv)^2}{4(-d-2fs+fv)}+e+2gs-gv\right)\right)+\frac{1}{(-d+2fs-fv)^{3/2}}\left(2\sqrt{-d+2fs-fv}\cos\left(e-2gs+gv-(-d+2fs-fv)z-(-b+2cs-cv)\sqrt{z}\right)+\sqrt{2\pi}\,(-b+2cs-cv)\cos\left(\frac{(-b+2cs-cv)^2}{4(-d+2fs-fv)}+e-2gs+gv\right)S\left(\frac{-b+2cs-cv+2(-d+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d+2fs-fv}}\right)+\sqrt{2\pi}\,(b-2cs+cv)\,C\left(\frac{-b+2cs-cv+2(-d+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d+2fs-fv}}\right)\sin\left(\frac{(-b+2cs-cv)^2}{4(-d+2fs-fv)}+e-2gs+gv\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving powers of sin

Involving $\sin^{\mu}(c\,z)\sin^{\nu}(a\,z)$

01.07.21.2101.01

$$\int \sin^{\mu}(c\,z)\cos^{\nu}(a\,z)\,dz = 2^{-\nu}\sin^{\mu}(c\,z)\left(\frac{(\nu \bmod 2 - 1)\sin^2(c\,z)^{\frac{1}{2}(-\mu-1)}\sin(2\,c\,z)}{2\,c}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\!\left(\frac{1}{2}, \frac{1-\mu}{2}; \frac{3}{2}; \cos^2(c\,z)\right) + \left(1-e^{2\,i\,c\,z}\right)^{-\mu} i \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{1}{c^2\,\mu^2 - a^2\,(\nu-2\,s)^2} \left(e^{-i\,a\,(\nu-2\,s)\,z}\binom{\nu}{s}\left(e^{2\,i\,a\,(\nu-2\,s)\,z}\,(a\,(\nu-2\,s)+c\,\mu)\,{}_2F_1\!\left(-\frac{2\,a\,s-a\,\nu+c\,\mu}{2\,c}, -\mu; \frac{1}{2}\left(\frac{a\,(\nu-2\,s)}{c}-\mu+2\right); e^{2\,i\,c\,z}\right) + (2\,a\,s-a\,\nu+c\,\mu)\,{}_2F_1\!\left(-\frac{a\,(\nu-2\,s)+c\,\mu}{2\,c}, -\mu; -\frac{a\,(\nu-2\,s)}{2\,c}-\frac{\mu}{2}+1; e^{2\,i\,c\,z}\right)\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.2102.01

$$\int \sin^{m}(c\,z)\cos^{\nu}(a\,z)\,dz = 2^{-m}\left(\frac{\cos^{\nu+1}(a\,z)\,(m \bmod 2-1)\sin(a\,z)}{a\,(\nu+1)\sqrt{\sin^2(a\,z)}}\binom{m}{\frac{m}{2}}\,{}_2F_1\!\left(\frac{\nu+1}{2}, \frac{1}{2}; \frac{\nu+3}{2}; \cos^2(a\,z)\right) - i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{c^2\,(m-2\,k)^2 - a^2\,\nu^2}\left((-1)^{k+m}\,e^{-\frac{1}{2}\,i\,(4\,c\,k\,z+m\,(\pi-2\,c\,z))}\left(1+e^{2\,i\,a\,z}\right)^{-\nu}\binom{m}{k}\cos^{\nu}(a\,z)\left(e^{i\,m\,\pi}\,(c\,(m-2\,k)+a\,\nu)\,{}_2F_1\!\left(-\frac{2\,c\,k-c\,m+a\,\nu}{2\,a}, -\nu; \frac{-\nu\,a+2\,a-2\,c\,k+c\,m}{2\,a}; -e^{2\,i\,a\,z}\right) + e^{-2\,i\,c\,(m-2\,k)\,z}\,(2\,c\,k-c\,m+a\,\nu)\,{}_2F_1\!\left(-\frac{c\,(m-2\,k)+a\,\nu}{2\,a}, -\nu; \frac{1}{2}\left(\frac{c\,(2\,k-m)}{a}-\nu+2\right); -e^{2\,i\,a\,z}\right)\right)\right)\right) /; m \in \mathbb{N}^+$$

01.07.21.2103.01

$$\int \sin^{m}(c\,z)\cos^{\nu}(a\,z)\,dz = 2^{-m-\nu}\left(z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2-1)\,(\nu \bmod 2-1) + \frac{2\,(\nu \bmod 2-1)}{c}\binom{\nu}{\frac{\nu}{2}}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\frac{\sin\!\left(\frac{1}{2}\,(m-2\,s)\,(\pi-2\,c\,z)\right)}{m-2\,s} - \frac{2\,(m \bmod 2-1)}{a}\binom{m}{\frac{m}{2}}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\frac{\sin(a\,(2\,s-\nu)\,z)}{2\,s-\nu} + 2\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(\binom{\nu}{s}\left((2\,c\,k-c\,m-2\,a\,s+a\,\nu)\sin\!\left(\frac{1}{2}\,\pi\,(m-2\,k)+c\,(2\,k-m)\,z+a\,(2\,s-\nu)\,z\right) + (2\,c\,k-c\,m+2\,a\,s-a\,\nu)\sin\!\left(\frac{1}{2}\,\pi\,(m-2\,k)+c\,(2\,k-m)\,z+a\,(\nu-2\,s)\,z\right)\right)\right)\Big/ \left((2\,c\,k-c\,m+2\,a\,s-a\,\nu)\,(2\,c\,k-c\,m-2\,a\,s+a\,\nu)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\sin^{\mu}(c\,z+d)\cos^{\nu}(a\,z)$

01.07.21.2104.01

$$\int \sin^{\mu}(d+c\,z)\cos^{\nu}(a\,z)\,dz = \frac{i\,2^{-\nu}\left(1-e^{2\,i\,(d+c\,z)}\right)^{-\mu}\sin^{\mu}(d+c\,z)}{c\,\mu}\left(\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\!\left(-\frac{\mu}{2},-\mu;1-\frac{\mu}{2};e^{2\,i\,(d+c\,z)}\right)(1-\nu\bmod 2)+\right.$$
$$c\,\mu\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{e^{i\,a\,(\nu-2\,s)\,z}}{2\,a\,s-a\,\nu+c\,\mu}\,{}_2F_1\!\left(-\frac{2\,a\,s-a\,\nu+c\,\mu}{2\,c},-\mu;\frac{-\mu\,c+2\,c-2\,a\,s+a\,\nu}{2\,c};e^{2\,i\,(d+c\,z)}\right)-\right.$$
$$\left.\left.\frac{e^{i\,a\,(2\,s-\nu)\,z}}{2\,a\,s-a\,\nu-c\,\mu}\,{}_2F_1\!\left(-\frac{-2\,a\,s+a\,\nu+c\,\mu}{2\,c},-\mu;-\frac{a\,(\nu-2\,s)+c\,(\mu-2)}{2\,c};e^{2\,i\,(d+c\,z)}\right)\right)\right)/;\ \nu\in\mathbb{N}^+$$

01.07.21.2105.01

$$\int \sin^{m}(d+c\,z)\cos^{\nu}(a\,z)\,dz =$$
$$i\,2^{-m}\cos^{\nu}(a\,z)\left(-\frac{\left(1+e^{2\,i\,a\,z}\right)^{-\nu}(m\bmod 2-1)}{a\,\nu}\binom{m}{\frac{m}{2}}\,{}_2F_1\!\left(-\frac{\nu}{2},-\nu;1-\frac{\nu}{2};-e^{2\,i\,a\,z}\right)+i^{-m}\left(1+e^{-2\,i\,a\,z}\right)^{-\nu}\right.$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{i\,d\,(m-2\,k)}\binom{m}{k}\left(\frac{e^{i\,c\,(m-2\,k)\,z}}{2\,c\,k-c\,m-a\,\nu}\,{}_2F_1\!\left(-\frac{c\,(m-2\,k)+a\,\nu}{2\,a},-\nu;-\frac{c\,(m-2\,k)+a\,(\nu-2)}{2\,a};-e^{-2\,i\,a\,z}\right)-\right.$$
$$\left.\left.\frac{e^{i\,(4\,d\,k+2\,c\,z\,k-2\,d\,m-c\,m\,z+m\,\pi)}}{2\,c\,k-c\,m+a\,\nu}\,{}_2F_1\!\left(-\frac{2\,c\,k-c\,m+a\,\nu}{2\,a},-\nu;\frac{-\nu\,a+2\,a-2\,c\,k+c\,m}{2\,a};-e^{-2\,i\,a\,z}\right)\right)\right)/;\ m\in\mathbb{N}^+$$

01.07.21.2106.01

$$\int \sin^{m}(d+c\,z)\cos^{\nu}(a\,z)\,dz = 2^{-m-\nu}\left(z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m\bmod 2-1)(\nu\bmod 2-1)+\right.$$
$$\frac{2\binom{\nu}{\frac{\nu}{2}}(\nu\bmod 2-1)}{c}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{s}\sin\!\left((m-2\,s)\left(-d-c\,z+\frac{\pi}{2}\right)\right)}{m-2\,s}-\frac{2\binom{m}{\frac{m}{2}}(m\bmod 2-1)}{a}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\sin(a\,(2\,s-\nu)\,z)}{2\,s-\nu}+$$
$$2\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(\binom{\nu}{s}\left((2\,c\,k-c\,m-2\,a\,s+a\,\nu)\sin\!\left(\frac{1}{2}(m-2\,k)(\pi-2\,d)+c\,(2\,k-m)\,z+a\,(2\,s-\nu)\,z\right)+\right.\right.$$
$$\left.\left.(2\,c\,k-c\,m+2\,a\,s-a\,\nu)\sin\!\left(\frac{1}{2}(m-2\,k)(\pi-2\,d)+c\,(2\,k-m)\,z+a\,(\nu-2\,s)\,z\right)\right)\right)\Big/$$
$$\left.((2\,c\,k-c\,m+2\,a\,s-a\,\nu)(2\,c\,k-c\,m-2\,a\,s+a\,\nu))\right)/;\ m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sin^{\mu}(c\,z)\cos^{\nu}(a\,z+b)$

01.07.21.2107.01

$$\int \sin^{\mu}(c z) \cos^{\nu}(b + a z) \, dz = \frac{1}{c \mu} \left(i \, 2^{-\nu} \left(1 - e^{2 i c z}\right)^{-\mu} \sin^{\mu}(c z) \left(\binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{\mu}{2}, -\mu; 1 - \frac{\mu}{2}; e^{2 i c z}\right) (1 - \nu \bmod 2) + c \mu \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{i b (2 s - \nu)} \binom{\nu}{s} \left(\frac{e^{i (\nu - 2 s)(2 b + a z)}}{2 a s - a \nu + c \mu} \, {}_2F_1\left(-\frac{2 a s - a \nu + c \mu}{2 c}, -\mu; \frac{-\mu c + 2 c - 2 a s + a \nu}{2 c}; e^{2 i c z}\right) - \frac{e^{i a (2 s - \nu) z}}{2 a s - a \nu - c \mu} \, {}_2F_1\left(-\frac{-2 a s + a \nu + c \mu}{2 c}, -\mu; -\frac{a (\nu - 2 s) + c (\mu - 2)}{2 c}; e^{2 i c z}\right) \right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.07.21.2108.01

$$\int \sin^{m}(c z) \cos^{\nu}(b + a z) \, dz = i \, 2^{-m} \cos^{\nu}(b + a z) \left(-\frac{(m \bmod 2 - 1)}{a \nu} \left(1 + e^{2 i (b + a z)}\right)^{-\nu} \binom{m}{\frac{m}{2}} {}_2F_1\left(-\frac{\nu}{2}, -\nu; 1 - \frac{\nu}{2}; -e^{2 i (b + a z)}\right) + i^{-m} \left(1 + e^{-2 i (b + a z)}\right)^{-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{e^{i c (m - 2 k) z}}{2 c k - c m - a \nu} \, {}_2F_1\left(-\frac{c (m - 2 k) + a \nu}{2 a}, -\nu; -\frac{c (m - 2 k) + a (\nu - 2)}{2 a}; -e^{-2 i (b + a z)}\right) - \frac{e^{i (-c z m + \pi m + 2 c k z)}}{2 c k - c m + a \nu} \, {}_2F_1\left(-\frac{2 c k - c m + a \nu}{2 a}, -\nu; \frac{-\nu a + 2 a - 2 c k + c m}{2 a}; -e^{-2 i (b + a z)}\right) \right) \right) /; m \in \mathbb{N}^+$$

01.07.21.2109.01

$$\int \sin^{m}(c z) \cos^{\nu}(b + a z) \, dz = 2^{-m-\nu} \left(z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (m \bmod 2 - 1)(\nu \bmod 2 - 1) + \frac{2}{c} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{s} \sin\left((m - 2 s)\left(\frac{\pi}{2} - c z\right)\right)}{m - 2 s} - \frac{2}{a} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{\binom{\nu}{s} \sin((2 s - \nu)(b + a z))}{2 s - \nu} + 2 \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\binom{\nu}{s} \left((2 c k - c m - 2 a s + a \nu) \sin\left(\frac{1}{2} \pi (m - 2 k) + b (2 s - \nu) + c (2 k - m) z + a (2 s - \nu) z\right) + (2 c k - c m + 2 a s - a \nu) \sin\left(\frac{1}{2} \pi (m - 2 k) + b (\nu - 2 s) + c (2 k - m) z + a (\nu - 2 s) z\right) \right) \right) \Big/ ((2 c k - c m + 2 a s - a \nu)(2 c k - c m - 2 a s + a \nu)) \right) /; m \in \mathbb{N}^+ \wedge \nu \in \mathbb{N}^+$$

Involving $\sin^{\mu}(c z + d) \cos^{\nu}(a z + b)$

01.07.21.2110.01

$$\int \sin^{\mu}(d+c\,z)\cos^{\nu}(b+a\,z)\,dz = \frac{i\,2^{-\nu}\left(1-e^{2\,i\,(d+c\,z)}\right)^{-\mu}\sin^{\mu}(d+c\,z)}{c\,\mu}\left(\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\left(-\frac{\mu}{2},-\mu;1-\frac{\mu}{2};e^{2\,i\,(d+c\,z)}\right)(1-\nu \bmod 2)+c\,\mu\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{i\,b\,(2\,s-\nu)}\binom{\nu}{s}\left(\frac{e^{i\,(\nu-2\,s)\,(2\,b+a\,z)}}{2\,a\,s-a\,\nu+c\,\mu}\,{}_2F_1\left(-\frac{2\,a\,s-a\,\nu+c\,\mu}{2\,c},-\mu;\frac{-\mu\,c+2\,c-2\,a\,s+a\,\nu}{2\,c};e^{2\,i\,(d+c\,z)}\right)-\frac{e^{i\,a\,(2\,s-\nu)\,z}}{2\,a\,s-a\,\nu-c\,\mu}\,{}_2F_1\left(-\frac{-2\,a\,s+a\,\nu+c\,\mu}{2\,c},-\mu;-\frac{a\,(\nu-2\,s)+c\,(\mu-2)}{2\,c};e^{2\,i\,(d+c\,z)}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2111.01

$$\int \sin^{m}(d+c\,z)\cos^{\nu}(b+a\,z)\,dz = 2^{-m}\cos^{\nu}(b+a\,z)\,i\left(-\frac{\left(1+e^{2\,i\,(b+a\,z)}\right)^{-\nu}(m \bmod 2-1)}{a\,\nu}\binom{m}{\frac{m}{2}}\,{}_2F_1\left(-\frac{\nu}{2},-\nu;1-\frac{\nu}{2};-e^{2\,i\,(b+a\,z)}\right)+i^{-m}\left(1+e^{-2\,i\,(b+a\,z)}\right)^{-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{i\,d\,(m-2\,k)}\binom{m}{k}\left(\frac{e^{i\,c\,(m-2\,k)\,z}}{2\,c\,k-c\,m-a\,\nu}\,{}_2F_1\left(-\frac{c\,(m-2\,k)+a\,\nu}{2\,a},-\nu;-\frac{c\,(m-2\,k)+a\,(\nu-2)}{2\,a};-e^{-2\,i\,(b+a\,z)}\right)-\frac{e^{i\,(4\,d\,k+2\,c\,z\,k-2\,d\,m-c\,m\,z+m\,\pi)}}{2\,c\,k-c\,m+a\,\nu}\,{}_2F_1\left(-\frac{2\,c\,k-c\,m+a\,\nu}{2\,a},-\nu;\frac{-\nu\,a+2\,a-2\,c\,k+c\,m}{2\,a};-e^{-2\,i\,(b+a\,z)}\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.07.21.2112.01

$$\int \sin^{m}(d+c\,z)\cos^{\nu}(b+a\,z)\,dz = 2^{-m-\nu}\left(z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2-1)(\nu \bmod 2-1)+\frac{2\,(\nu \bmod 2-1)}{c}\binom{\nu}{\frac{\nu}{2}}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\frac{\sin\left((m-2\,s)\left(-d-c\,z+\frac{\pi}{2}\right)\right)}{m-2\,s}-\frac{2\,(m \bmod 2-1)}{a}\binom{m}{\frac{m}{2}}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\frac{\sin((2\,s-\nu)\,(b+a\,z))}{2\,s-\nu}+2\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(\binom{\nu}{s}\left((2\,c\,k-c\,m-2\,a\,s+a\,\nu)\sin\left(\frac{1}{2}(m-2\,k)(\pi-2\,d)+b\,(2\,s-\nu)+c\,(2\,k-m)\,z+a\,(2\,s-\nu)\,z\right)+(2\,c\,k-c\,m+2\,a\,s-a\,\nu)\sin\left(\frac{1}{2}(m-2\,k)(\pi-2\,d)+b\,(\nu-2\,s)+c\,(2\,k-m)\,z+a\,(\nu-2\,s)\,z\right)\right)\right)\Big/\left((2\,c\,k-c\,m+2\,a\,s-a\,\nu)\,(2\,c\,k-c\,m-2\,a\,s+a\,\nu)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sin^{m}\left(b\,z^{r}\right)\cos^{\nu}(c\,z)$

01.07.21.2113.01

$$\int \sin^m(b z^2) \cos^v(c z)\, dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{b(m-2k)}} \binom{m}{k} \left(\cos\left(\frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) + S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(\frac{m\pi}{2}\right)\right) +$$

$$\frac{2^{-m-v+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \frac{\sin(c(v-2s)z)}{v-2s} +$$

$$2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{\sqrt{2bk-bm}} \left(\cos\left(\frac{m\pi}{2} - \frac{(cv-2cs)^2}{4(2bk-bm)}\right) C\left(\frac{-2cs+cv+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right) - \right.\right.$$

$$\left. S\left(\frac{-2cs+cv+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right) \sin\left(\frac{m\pi}{2} - \frac{(cv-2cs)^2}{4(2bk-bm)}\right)\right) +$$

$$\frac{1}{\sqrt{2bk-bm}} \left(\cos\left(\frac{m\pi}{2} - \frac{(2cs-cv)^2}{4(2bk-bm)}\right) C\left(\frac{2cs-cv+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right) - \right.$$

$$\left.\left. S\left(\frac{2cs-cv+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right) \sin\left(\frac{m\pi}{2} - \frac{(2cs-cv)^2}{4(2bk-bm)}\right)\right)\right) /;\, m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.07.21.2114.01

$$\int \sin^m\left(b\sqrt{z}\right)\cos^v(c\,z)\,dz = 2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)+$$
$$\frac{2^{-m-v+2}\,(1-v \bmod 2)}{b^2}\binom{v}{\frac{v}{2}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\frac{(-1)^k\left(\cos\left(\frac{m\pi}{2}-b\,(m-2\,k)\sqrt{z}\right)-b\,(m-2\,k)\sqrt{z}\,\sin\left(\frac{m\pi}{2}-b\,(m-2\,k)\sqrt{z}\right)\right)}{(m-2\,k)^2}+$$
$$\frac{2^{-m-v+1}}{c}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\frac{\sin(c\,(v-2\,s)\,z)}{v-2\,s}+$$
$$2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{2\,(c\,v-2\,c\,s)^{3/2}}\left((b\,m-2\,b\,k)\sqrt{2\pi}\,\cos\left(\frac{m\pi}{2}-\frac{(2\,b\,k-b\,m)^2}{4\,(c\,v-2\,c\,s)}\right)\right.\right.$$
$$C\left(\frac{2\,b\,k-b\,m+2\,(c\,v-2\,c\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{c\,v-2\,c\,s}}\right)+(2\,b\,k-b\,m)\sqrt{2\pi}\,S\left(\frac{2\,b\,k-b\,m+2\,(c\,v-2\,c\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{c\,v-2\,c\,s}}\right)$$
$$\left.\sin\left(\frac{m\pi}{2}-\frac{(2\,b\,k-b\,m)^2}{4\,(c\,v-2\,c\,s)}\right)+2\sqrt{c\,v-2\,c\,s}\,\sin\left(\frac{\pi\,m}{2}+(c\,v-2\,c\,s)\,z+(2\,b\,k-b\,m)\sqrt{z}\right)\right)+$$
$$\frac{1}{2\,(2\,c\,s-c\,v)^{3/2}}\left((b\,m-2\,b\,k)\sqrt{2\pi}\,\cos\left(\frac{m\pi}{2}-\frac{(2\,b\,k-b\,m)^2}{4\,(2\,c\,s-c\,v)}\right)C\left(\frac{2\,b\,k-b\,m+2\,(2\,c\,s-c\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,v}}\right)+\right.$$
$$(2\,b\,k-b\,m)\sqrt{2\pi}\,S\left(\frac{2\,b\,k-b\,m+2\,(2\,c\,s-c\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,v}}\right)\sin\left(\frac{m\pi}{2}-\frac{(2\,b\,k-b\,m)^2}{4\,(2\,c\,s-c\,v)}\right)+$$
$$\left.\left.2\sqrt{2\,c\,s-c\,v}\,\sin\left(\frac{\pi\,m}{2}+(2\,c\,s-c\,v)\,z+(2\,b\,k-b\,m)\sqrt{z}\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r+e\right)\cos^v(c\,z)$

01.07.21.2115.01

$$\int \sin^m(b z^2 + e) \cos^\nu(c z) \, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{b(m-2k)}} \binom{m}{k} \left(\cos\left(e(m-2k) - \frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(e(m-2k) - \frac{m\pi}{2}\right) \right) +$$

$$\frac{2^{-m-\nu+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{\binom{\nu}{s} \sin(c(\nu - 2s) z)}{\nu - 2s} + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{2bk - bm}} \left(\cos\left(-\frac{(c\nu - 2cs)^2}{4(2bk - bm)} + 2ek - em + \frac{m\pi}{2}\right) C\left(\frac{-2cs + c\nu + 2(2bk - bm) z}{\sqrt{2bk - bm}\, \sqrt{2\pi}}\right) - S\left(\frac{-2cs + c\nu + 2(2bk - bm) z}{\sqrt{2bk - bm}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(c\nu - 2cs)^2}{4(2bk - bm)} + 2ek - em + \frac{m\pi}{2}\right) \right) + \frac{1}{\sqrt{2bk - bm}} \left(\cos\left(-\frac{(2cs - c\nu)^2}{4(2bk - bm)} + 2ek - em + \frac{m\pi}{2}\right) C\left(\frac{2cs - c\nu + 2(2bk - bm) z}{\sqrt{2bk - bm}\, \sqrt{2\pi}}\right) - S\left(\frac{2cs - c\nu + 2(2bk - bm) z}{\sqrt{2bk - bm}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(2cs - c\nu)^2}{4(2bk - bm)} + 2ek - em + \frac{m\pi}{2}\right) \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2116.01

$$\int \sin^m\left(\sqrt{z}\, b + e\right) \cos^v(c z)\, dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + \frac{2^{-m-v+2}}{b^2} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(m-2k)^2}$$

$$\left((-1)^k \binom{m}{k} \left(\cos\left(2 e k - e m + b (2k - m)\sqrt{z} + \frac{m\pi}{2}\right) + b(2k-m)\sqrt{z} \sin\left(2 e k - e m + b(2k-m)\sqrt{z} + \frac{m\pi}{2}\right)\right)\right) +$$

$$\frac{2^{-m-v+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)}{c} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{\binom{v}{s} \sin(c(v-2s)z)}{v - 2s} + 2^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{(c v - 2 c s)^{3/2}}\right.$$

$$\left((b m - 2 b k)\sqrt{2\pi} \cos\left(-\frac{(2bk - bm)^2}{4(cv - 2cs)} + 2ek - em + \frac{m\pi}{2}\right) C\left(\frac{2bk - bm + 2(cv - 2cs)\sqrt{z}}{\sqrt{2\pi}\sqrt{cv - 2cs}}\right) + \right.$$

$$(2bk - bm)\sqrt{2\pi}\, S\left(\frac{2bk - bm + 2(cv - 2cs)\sqrt{z}}{\sqrt{2\pi}\sqrt{cv - 2cs}}\right) \sin\left(-\frac{(2bk - bm)^2}{4(cv - 2cs)} + 2ek - em + \frac{m\pi}{2}\right) +$$

$$\left. 2\sqrt{cv - 2cs} \sin\left(2ek - em + (cv - 2cs)z + (2bk - bm)\sqrt{z} + \frac{m\pi}{2}\right)\right) + \frac{1}{(2cs - cv)^{3/2}}$$

$$\left((b m - 2 b k)\sqrt{2\pi} \cos\left(-\frac{(2bk - bm)^2}{4(2cs - cv)} + 2ek - em + \frac{m\pi}{2}\right) C\left(\frac{2bk - bm + 2(2cs - cv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2cs - cv}}\right) + \right.$$

$$(2bk - bm)\sqrt{2\pi}\, S\left(\frac{2bk - bm + 2(2cs - cv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2cs - cv}}\right) \sin\left(-\frac{(2bk - bm)^2}{4(2cs - cv)} + 2ek - em + \frac{m\pi}{2}\right) +$$

$$\left.\left. 2\sqrt{2cs - cv} \sin\left(2ek - em + (2cs - cv)z + (2bk - bm)\sqrt{z} + \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z\right) \cos^v(c z)$

01.07.21.2117.01

$$\int \sin^m\left(b z^2 + d z\right) \cos^v(c z)\, dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{(m-2k)d^2}{4b} + \frac{m\pi}{2} \right) C\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)}\sqrt{2\pi}} \right) + S\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)}\sqrt{2\pi}} \right) \sin\left(\frac{(m-2k)d^2}{4b} + \frac{m\pi}{2} \right) \right) \right) \right) (1 - v \bmod 2) + \frac{2^{-m-v+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)}{c} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{\binom{v}{s} \sin(c(v-2s)z)}{v-2s} + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{\sqrt{2bk - bm}} \left(\cos\left(\frac{m\pi}{2} - \frac{(2dk - dm - 2cs + cv)^2}{4(2bk - bm)} \right) C\left(\frac{2dk - dm - 2cs + cv + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}} \right) - S\left(\frac{2dk - dm - 2cs + cv + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}} \right) \sin\left(\frac{m\pi}{2} - \frac{(2dk - dm - 2cs + cv)^2}{4(2bk - bm)} \right) \right) + \frac{1}{\sqrt{2bk - bm}} \left(\cos\left(\frac{m\pi}{2} - \frac{(2dk - dm + 2cs - cv)^2}{4(2bk - bm)} \right) C\left(\frac{2dk - dm + 2cs - cv + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}} \right) - S\left(\frac{2dk - dm + 2cs - cv + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}} \right) \sin\left(\frac{m\pi}{2} - \frac{(2dk - dm + 2cs - cv)^2}{4(2bk - bm)} \right) \right) \right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2118.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z\right) \cos^\nu(c\, z)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2) + 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}}$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{(d\, (m-2k))^{3/2}} \left((-1)^k \binom{m}{k} \left(-b\, (m-2k) \sqrt{2\pi} \cos\left(\frac{(m-2k)\, b^2}{4d} + \frac{m\pi}{2}\right) C\left(\frac{b\, (m-2k) + 2d\sqrt{z}\, (m-2k)}{\sqrt{d\, (m-2k)}\, \sqrt{2\pi}}\right) - \right.\right.\right.$$

$$b\, (m-2k) \sqrt{2\pi}\, S\left(\frac{b\, (m-2k) + 2d\sqrt{z}\, (m-2k)}{\sqrt{d\, (m-2k)}\, \sqrt{2\pi}}\right) \sin\left(\frac{(m-2k)\, b^2}{4d} + \frac{m\pi}{2}\right) -$$

$$\left.\left.\left. 2\sqrt{d\, (m-2k)} \sin\left(\frac{\pi m}{2} - d\, (m-2k)\, z - b\, (m-2k)\sqrt{z}\right)\right)\right)\right)$$

$$(1 - \nu \bmod 2) + \frac{2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)}{c} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{\binom{\nu}{s} \sin(c\, (\nu - 2s)\, z)}{\nu - 2s} +$$

$$2^{-m-\nu} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(\left((b\, m - 2b\, k)\sqrt{2\pi} \cos\left(\frac{m\pi}{2} - \frac{(2b\, k - b\, m)^2}{4\, (2d\, k - d\, m - 2c\, s + c\, \nu)}\right)\right.\right.$$

$$C\left(\frac{2b\, k - b\, m + 2\, (2d\, k - d\, m - 2c\, s + c\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2d\, k - d\, m - 2c\, s + c\, \nu}}\right) + (2b\, k - b\, m)\sqrt{2\pi}$$

$$S\left(\frac{2b\, k - b\, m + 2\, (2d\, k - d\, m - 2c\, s + c\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2d\, k - d\, m - 2c\, s + c\, \nu}}\right) \sin\left(\frac{m\pi}{2} - \frac{(2b\, k - b\, m)^2}{4\, (2d\, k - d\, m - 2c\, s + c\, \nu)}\right) +$$

$$\left. 2\sqrt{2d\, k - d\, m - 2c\, s + c\, \nu} \sin\left(\frac{\pi m}{2} + (2d\, k - d\, m - 2c\, s + c\, \nu)\, z + (2b\, k - b\, m)\sqrt{z}\right)\right) \Big/$$

$$(2d\, k - d\, m - 2c\, s + c\, \nu)^{3/2} + \left((b\, m - 2b\, k)\sqrt{2\pi} \cos\left(\frac{m\pi}{2} - \frac{(2b\, k - b\, m)^2}{4\, (2d\, k - d\, m + 2c\, s - c\, \nu)}\right)\right.$$

$$C\left(\frac{2b\, k - b\, m + 2\, (2d\, k - d\, m + 2c\, s - c\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2d\, k - d\, m + 2c\, s - c\, \nu}}\right) + (2b\, k - b\, m)\sqrt{2\pi}$$

$$S\left(\frac{2b\, k - b\, m + 2\, (2d\, k - d\, m + 2c\, s - c\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2d\, k - d\, m + 2c\, s - c\, \nu}}\right) \sin\left(\frac{m\pi}{2} - \frac{(2b\, k - b\, m)^2}{4\, (2d\, k - d\, m + 2c\, s - c\, \nu)}\right) +$$

$$\left. 2\sqrt{2d\, k - d\, m + 2c\, s - c\, \nu} \sin\left(\frac{\pi m}{2} + (2d\, k - d\, m + 2c\, s - c\, \nu)\, z + (2b\, k - b\, m)\sqrt{z}\right)\right) \Big/$$

$$\left.(2d\, k - d\, m + 2c\, s - c\, \nu)^{3/2}\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\sin^m\left(b\, z^r + d\, z + e\right) \cos^\nu(c\, z)$

01.07.21.2119.01

$$\int \sin^m\left(b z^2 + d z + e\right) \cos^\nu(c z)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{b(m-2k)}} \binom{m}{k} \left(\cos\left(\frac{(m-2k) d^2}{4b} - e(m-2k) + \frac{m\pi}{2}\right) C\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) + S\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) \sin\left(\frac{(m-2k) d^2}{4b} - e(m-2k) + \frac{m\pi}{2}\right)\right) + \frac{2^{-m-\nu+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \frac{\sin(c(\nu-2s)z)}{\nu-2s} + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{2bk - bm}} \left(\cos\left(-\frac{(2dk - dm - 2cs + c\nu)^2}{4(2bk - bm)} + 2ek - em + \frac{m\pi}{2}\right) C\left(\frac{2dk - dm - 2cs + c\nu + 2(2bk - bm)z}{\sqrt{2bk - bm} \sqrt{2\pi}}\right) - S\left(\frac{2dk - dm - 2cs + c\nu + 2(2bk - bm)z}{\sqrt{2bk - bm} \sqrt{2\pi}}\right) \sin\left(-\frac{(2dk - dm - 2cs + c\nu)^2}{4(2bk - bm)} + 2ek - em + \frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{2bk - bm}} \left(\cos\left(-\frac{(2dk - dm + 2cs - c\nu)^2}{4(2bk - bm)} + 2ek - em + \frac{m\pi}{2}\right) C\left(\frac{2dk - dm + 2cs - c\nu + 2(2bk - bm)z}{\sqrt{2bk - bm} \sqrt{2\pi}}\right) - S\left(\frac{2dk - dm + 2cs - c\nu + 2(2bk - bm)z}{\sqrt{2bk - bm} \sqrt{2\pi}}\right) \sin\left(-\frac{(2dk - dm + 2cs - c\nu)^2}{4(2bk - bm)} + 2ek - em + \frac{m\pi}{2}\right)\right)\right) \;/;\; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2120.01

$$\int \sin^m\left(\sqrt{z}\; b + d\,z + e\right)\cos^v(c\,z)\,dz = 2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1 - m \bmod 2)\,(1 - v \bmod 2) + 2^{-m-v}\binom{v}{\frac{v}{2}}(1 - v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k}{(d\,(m-2k))^{3/2}}\binom{m}{k}\left(-b\,(m-2k)\sqrt{2\pi}\,\cos\left(\frac{(m-2k)\,b^2}{4d} - e\,(m-2k) + \frac{m\pi}{2}\right)C\left(\frac{b\,(m-2k) + 2\,d\sqrt{z}\,(m-2k)}{\sqrt{d\,(m-2k)}\,\sqrt{2\pi}}\right) -\right.$$

$$b\,(m-2k)\sqrt{2\pi}\;S\left(\frac{b\,(m-2k) + 2\,d\sqrt{z}\,(m-2k)}{\sqrt{d\,(m-2k)}\,\sqrt{2\pi}}\right)\sin\left(\frac{(m-2k)\,b^2}{4d} - e\,(m-2k) + \frac{m\pi}{2}\right) +$$

$$\left.2\sqrt{d\,(m-2k)}\,\sin\left(-\frac{\pi m}{2} + e\,(m-2k) + d\,(m-2k)\,z + b\,(m-2k)\sqrt{z}\right)\right) +$$

$$\frac{2^{1-m-v}}{c}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\frac{\sin(c\,(v-2s)\,z)}{v-2s} + 2^{-m-v}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{(2\,d\,k - d\,m - 2\,c\,s + c\,v)^{3/2}}\left((b\,m - 2\,b\,k)\sqrt{2\pi}\,\cos\left(-\frac{(2\,b\,k - b\,m)^2}{4\,(2\,d\,k - d\,m - 2\,c\,s + c\,v)} +\right.\right.\right.$$

$$\left.2\,e\,k - e\,m + \frac{m\pi}{2}\right)C\left(\frac{2\,b\,k - b\,m + 2\,(2\,d\,k - d\,m - 2\,c\,s + c\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m - 2\,c\,s + c\,v}}\right) +$$

$$(2\,b\,k - b\,m)\sqrt{2\pi}\;S\left(\frac{2\,b\,k - b\,m + 2\,(2\,d\,k - d\,m - 2\,c\,s + c\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m - 2\,c\,s + c\,v}}\right)$$

$$\sin\left(-\frac{(2\,b\,k - b\,m)^2}{4\,(2\,d\,k - d\,m - 2\,c\,s + c\,v)} + 2\,e\,k - e\,m + \frac{m\pi}{2}\right) +$$

$$\left.2\sqrt{2\,d\,k - d\,m - 2\,c\,s + c\,v}\;\sin\left(2\,e\,k - e\,m + (2\,d\,k - d\,m - 2\,c\,s + c\,v)\,z + (2\,b\,k - b\,m)\sqrt{z} + \frac{m\pi}{2}\right)\right) +$$

$$\frac{1}{(2\,d\,k - d\,m + 2\,c\,s - c\,v)^{3/2}}\left((b\,m - 2\,b\,k)\sqrt{2\pi}\,\cos\left(-\frac{(2\,b\,k - b\,m)^2}{4\,(2\,d\,k - d\,m + 2\,c\,s - c\,v)} + 2\,e\,k - e\,m + \frac{m\pi}{2}\right)\right.$$

$$C\left(\frac{2\,b\,k - b\,m + 2\,(2\,d\,k - d\,m + 2\,c\,s - c\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m + 2\,c\,s - c\,v}}\right) +$$

$$(2\,b\,k - b\,m)\sqrt{2\pi}\;S\left(\frac{2\,b\,k - b\,m + 2\,(2\,d\,k - d\,m + 2\,c\,s - c\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m + 2\,c\,s - c\,v}}\right)$$

$$\sin\left(-\frac{(2\,b\,k - b\,m)^2}{4\,(2\,d\,k - d\,m + 2\,c\,s - c\,v)} + 2\,e\,k - e\,m + \frac{m\pi}{2}\right) + 2\sqrt{2\,d\,k - d\,m + 2\,c\,s - c\,v}$$

$$\left.\left.\left.\sin\left(2\,e\,k - e\,m + (2\,d\,k - d\,m + 2\,c\,s - c\,v)\,z + (2\,b\,k - b\,m)\sqrt{z} + \frac{m\pi}{2}\right)\right)\right)\right) /;\; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\sin^m(b\,z^r)\cos^v(f\,z + g)$

01.07.21.2121.01

$$\int \sin^m\left(b z^2\right) \cos^\nu(f z+g)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{(-1)^k}{\sqrt{b(m-2k)}} \binom{m}{k} \left(\cos\left(\frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) + S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(\frac{m\pi}{2}\right)\right) +$$

$$\frac{2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)}{f} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{\binom{\nu}{s}\sin((2s-\nu)(g+fz))}{2s-\nu} + 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{2bk-bm}}\left(\cos\left(-\frac{(f\nu-2fs)^2}{4(2bk-bm)} - 2gs + g\nu + \frac{m\pi}{2}\right) C\left(\frac{-2fs+f\nu+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right) -\right.\right.$$

$$\left. S\left(\frac{-2fs+f\nu+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right) \sin\left(-\frac{(f\nu-2fs)^2}{4(2bk-bm)} - 2gs + g\nu + \frac{m\pi}{2}\right)\right) +$$

$$\frac{1}{\sqrt{2bk-bm}}\left(\cos\left(-\frac{(2fs-f\nu)^2}{4(2bk-bm)} + 2gs - g\nu + \frac{m\pi}{2}\right) C\left(\frac{2fs-f\nu+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right) -\right.$$

$$\left.\left. S\left(\frac{2fs-f\nu+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right) \sin\left(-\frac{(2fs-f\nu)^2}{4(2bk-bm)} + 2gs - g\nu + \frac{m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.2122.01

$$\int \sin^m\left(b\sqrt{z}\right)\cos^\nu(g+f\,z)\,dz ==$$

$$2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+\frac{2^{-m-\nu+1}}{f}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\sin(g(\nu-2s)+f\,z(\nu-2s))}{\nu-2s}+$$

$$\frac{2^{-m-\nu+2}}{b^2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\left(\cos\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)+b(2k-m)\sqrt{z}\,\sin\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)\right)}{(m-2k)^2}+$$

$$2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(f\,\nu-2f\,s)^{3/2}}\right.$$

$$\left((b\,m-2b\,k)\sqrt{2\pi}\left(\cos\left(-\frac{(2b\,k-b\,m)^2}{4(f\,\nu-2f\,s)}-2g\,s+g\,\nu+\frac{m\pi}{2}\right)C\left(\frac{2b\,k-b\,m+2(f\,\nu-2f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{f\,\nu-2f\,s}}\right)-\right.\right.$$

$$\left.S\left(\frac{2b\,k-b\,m+2(f\,\nu-2f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{f\,\nu-2f\,s}}\right)\sin\left(-\frac{(2b\,k-b\,m)^2}{4(f\,\nu-2f\,s)}-2g\,s+g\,\nu+\frac{m\pi}{2}\right)\right)+$$

$$\left.2\sqrt{f\,\nu-2f\,s}\,\sin\left(\frac{\pi m}{2}-2g\,s+g\,\nu+(f\,\nu-2f\,s)z+(2b\,k-b\,m)\sqrt{z}\right)\right)+\frac{1}{(2f\,s-f\,\nu)^{3/2}}$$

$$\left((b\,m-2b\,k)\sqrt{2\pi}\left(\cos\left(-\frac{(2b\,k-b\,m)^2}{4(2f\,s-f\,\nu)}+2g\,s-g\,\nu+\frac{m\pi}{2}\right)C\left(\frac{2b\,k-b\,m+2(2f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2f\,s-f\,\nu}}\right)-\right.\right.$$

$$\left.S\left(\frac{2b\,k-b\,m+2(2f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2f\,s-f\,\nu}}\right)\sin\left(-\frac{(2b\,k-b\,m)^2}{4(2f\,s-f\,\nu)}+2g\,s-g\,\nu+\frac{m\pi}{2}\right)\right)+$$

$$\left.\left.2\sqrt{2f\,s-f\,\nu}\,\sin\left(\frac{\pi m}{2}+2g\,s-g\,\nu+(2f\,s-f\,\nu)z+(2b\,k-b\,m)\sqrt{z}\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r+e\right)\cos^\nu(f\,z+g)$

01.07.21.2123.01

$$\int \sin^m\left(b z^2+e\right)\cos^v(f z+g)\,dz = 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)+2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{b(m-2k)}}\left((-1)^k\binom{m}{k}\left(\cos\left(e(m-2k)-\frac{m\pi}{2}\right)C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)-S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)\sin\left(e(m-2k)-\frac{m\pi}{2}\right)\right)\right)\right)$$

$$(1-v \bmod 2)+\frac{2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{\binom{v}{s}\sin((2s-v)(g+fz))}{2s-v}}{f}+2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{\sqrt{2bk-bm}}\left(\cos\left(-\frac{(fv-2fs)^2}{4(2bk-bm)}+2ek-em-2gs+gv+\frac{m\pi}{2}\right)C\left(\frac{-2fs+fv+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right)-\right.\right.$$

$$\left.S\left(\frac{-2fs+fv+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(fv-2fs)^2}{4(2bk-bm)}+2ek-em-2gs+gv+\frac{m\pi}{2}\right)\right)+$$

$$\frac{1}{\sqrt{2bk-bm}}\left(\cos\left(-\frac{(2fs-fv)^2}{4(2bk-bm)}+2ek-em+2gs-gv+\frac{m\pi}{2}\right)\right.$$

$$C\left(\frac{2fs-fv+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right)-S\left(\frac{2fs-fv+2(2bk-bm)z}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right)$$

$$\left.\left.\sin\left(-\frac{(2fs-fv)^2}{4(2bk-bm)}+2ek-em+2gs-gv+\frac{m\pi}{2}\right)\right)\right)\ /;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.07.21.2124.01

$$\int \sin^m\left(\sqrt{z}\, b+e\right)\cos^v(f\, z+g)\, dz = 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)+\frac{1}{b^2}\left(2^{-m-v+2}\binom{v}{\frac{v}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left((-1)^k\binom{m}{k}\left(\cos\left(2ek-em+b(2k-m)\sqrt{z}+\frac{m\pi}{2}\right)+b(2k-m)\sqrt{z}\sin\left(2ek-em+b(2k-m)\sqrt{z}+\frac{m\pi}{2}\right)\right)\right)\right)(1-v \bmod 2)\right)+\frac{2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)}{f}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{\binom{v}{s}\sin(g(v-2s)+f\, z(v-2s))}{v-2s}+$$

$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{(f\, v-2f\, s)^{3/2}}\left((b\, m-2b\, k)\sqrt{2\pi}\left(\cos\left(-\frac{(2b\, k-b\, m)^2}{4(f\, v-2f\, s)}+2e\, k-e\, m-2g\, s+g\, v+\frac{m\pi}{2}\right)C\left(\frac{2b\, k-b\, m+2(f\, v-2f\, s)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\, v-2f\, s}}\right)-S\left(\frac{2b\, k-b\, m+2(f\, v-2f\, s)\sqrt{z}}{\sqrt{2\pi}\sqrt{f\, v-2f\, s}}\right)\sin\left(-\frac{(2b\, k-b\, m)^2}{4(f\, v-2f\, s)}+2e\, k-e\, m-2g\, s+g\, v+\frac{m\pi}{2}\right)\right)+2\sqrt{f\, v-2f\, s}\sin\left(2e\, k-e\, m-2g\, s+g\, v+(f\, v-2f\, s)z+(2b\, k-b\, m)\sqrt{z}+\frac{m\pi}{2}\right)\right)+\frac{1}{(2f\, s-f\, v)^{3/2}}\left((b\, m-2b\, k)\sqrt{2\pi}\left(\cos\left(-\frac{(2b\, k-b\, m)^2}{4(2f\, s-f\, v)}+2e\, k-e\, m+2g\, s-g\, v+\frac{m\pi}{2}\right)C\left(\frac{2b\, k-b\, m+2(2f\, s-f\, v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2f\, s-f\, v}}\right)-S\left(\frac{2b\, k-b\, m+2(2f\, s-f\, v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2f\, s-f\, v}}\right)\sin\left(-\frac{(2b\, k-b\, m)^2}{4(2f\, s-f\, v)}+2e\, k-e\, m+2g\, s-g\, v+\frac{m\pi}{2}\right)\right)+2\sqrt{2f\, s-f\, v}\sin\left(2e\, k-e\, m+2g\, s-g\, v+(2f\, s-f\, v)z+(2b\, k-b\, m)\sqrt{z}+\frac{m\pi}{2}\right)\right)\right)\, /;\, m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m\left(b\, z^r+d\, z\right)\cos^v(f\, z+g)$

01.07.21.2125.01

$$\int \sin^m\left(b z^2 + d z\right) \cos^\nu(g + f z)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\,(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{(m-2k) d^2}{4b} + \frac{m\pi}{2}\right) C\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + S\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{(m-2k) d^2}{4b} + \frac{m\pi}{2}\right)\right)\right) + \frac{2^{-m-\nu+1}}{f} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{\binom{\nu}{s} \sin((2s-\nu)(g+fz))}{2s-\nu} + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{2bk - bm}} \left(\cos\left(-\frac{(2dk - dm - 2fs + f\nu)^2}{4(2bk - bm)} - 2gs + g\nu + \frac{m\pi}{2}\right) C\left(\frac{2dk - dm - 2fs + f\nu + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}}\right) - S\left(\frac{2dk - dm - 2fs + f\nu + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}}\right) \sin\left(-\frac{(2dk - dm - 2fs + f\nu)^2}{4(2bk - bm)} - 2gs + g\nu + \frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{2bk - bm}} \left(\cos\left(-\frac{(2dk - dm + 2fs - f\nu)^2}{4(2bk - bm)} + 2gs - g\nu + \frac{m\pi}{2}\right) C\left(\frac{2dk - dm + 2fs - f\nu + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}}\right) - S\left(\frac{2dk - dm + 2fs - f\nu + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}}\right) \sin\left(-\frac{(2dk - dm + 2fs - f\nu)^2}{4(2bk - bm)} + 2gs - g\nu + \frac{m\pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2126.01

$$\int \sin^m\left(\sqrt{z}\, b + d z\right) \cos^\nu(f z + g)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\,(1 - \nu \bmod 2) + 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(d(2k-m))^{3/2}} \left((-1)^k \binom{m}{k} \left(2\sqrt{d(2k-m)} \sin\left(dz(2k-m) + b\sqrt{z}\,(2k-m) + \frac{m\pi}{2}\right) - b(2k-m)\sqrt{2\pi} \left(\cos\left(\frac{b^2(2k-m)}{4d} - \frac{m\pi}{2}\right) C\left(\frac{b(2k-m) + 2d\sqrt{z}\,(2k-m)}{\sqrt{d(2k-m)}\sqrt{2\pi}}\right) + S\left(\frac{b(2k-m) + 2d\sqrt{z}\,(2k-m)}{\sqrt{d(2k-m)}\sqrt{2\pi}}\right) \sin\left(\frac{b^2(2k-m)}{4d} - \frac{m\pi}{2}\right)\right)\right)\right)\right) (1 - \nu \bmod 2) + \frac{2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)}{f} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{\binom{\nu}{s} \sin(g(\nu-2s) + fz(\nu-2s))}{\nu-2s} + 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left((bm - 2bk)\sqrt{2\pi} \left(\cos\left(-\frac{(2bk - bm)^2}{4(2dk - dm - 2fs + f\nu)} - 2gs + g\nu + \frac{m\pi}{2}\right)\right.\right.\right.$$

$$C\left(\frac{2\,b\,k-b\,m+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)-$$

$$S\left(\frac{2\,b\,k-b\,m+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)\sin\left(-\frac{(2\,b\,k-b\,m)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}-\right.$$

$$\left.\left.\left.2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)\right)+2\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}\,\sin\left(\frac{\pi\,m}{2}-2\,g\,s+g\,v+\right.$$

$$\left.\left.(2\,d\,k-d\,m-2\,f\,s+f\,v)\,z+(2\,b\,k-b\,m)\,\sqrt{z}\right)\right)\Big/(2\,d\,k-d\,m-2\,f\,s+f\,v)^{3/2}+$$

$$\left((b\,m-2\,b\,k)\,\sqrt{2\,\pi}\,\left(\cos\left(-\frac{(2\,b\,k-b\,m)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)\right.\right.$$

$$C\left(\frac{2\,b\,k-b\,m+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)-$$

$$S\left(\frac{2\,b\,k-b\,m+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)\sin\left(-\frac{(2\,b\,k-b\,m)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,g\,s-g\,v+\right.$$

$$\left.\left.\left.\frac{m\,\pi}{2}\right)\right)+2\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}\,\sin\left(\frac{\pi\,m}{2}+2\,g\,s-g\,v+(2\,d\,k-d\,m+2\,f\,s-f\,v)\,z+\right.$$

$$\left.\left.\left.(2\,b\,k-b\,m)\,\sqrt{z}\right)\right)\Big/(2\,d\,k-d\,m+2\,f\,s-f\,v)^{3/2}\right)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r+d\,z+e\right)\cos^v(f\,z+g)$

01.07.21.2127.01

$$\int \sin^m\left(b z^2 + d z + e\right) \cos^\nu(f z + g)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{(m-2k)d^2}{4b} - e(m-2k) + \frac{m\pi}{2}\right) C\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + \right.\right.$$
$$\left.\left. S\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{(m-2k)d^2}{4b} - e(m-2k) + \frac{m\pi}{2}\right)\right)\right) +$$
$$\frac{2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)}{f} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{\binom{\nu}{s} \sin((2s-\nu)(g + fz))}{2s - \nu} + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi}$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{2bk - bm}} \left(\cos\left(-\frac{(2dk - dm - 2fs + f\nu)^2}{4(2bk - bm)} + 2ek - em - 2gs + g\nu + \frac{m\pi}{2}\right)\right.\right.$$
$$C\left(\frac{2dk - dm - 2fs + f\nu + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}}\right) - S\left(\frac{2dk - dm - 2fs + f\nu + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}}\right)$$
$$\left.\sin\left(-\frac{(2dk - dm - 2fs + f\nu)^2}{4(2bk - bm)} + 2ek - em - 2gs + g\nu + \frac{m\pi}{2}\right)\right) +$$
$$\frac{1}{\sqrt{2bk - bm}} \left(\cos\left(-\frac{(2dk - dm + 2fs - f\nu)^2}{4(2bk - bm)} + 2ek - em + 2gs - g\nu + \frac{m\pi}{2}\right)\right.$$
$$C\left(\frac{2dk - dm + 2fs - f\nu + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}}\right) - S\left(\frac{2dk - dm + 2fs - f\nu + 2(2bk - bm)z}{\sqrt{2bk - bm}\sqrt{2\pi}}\right)$$
$$\left.\left.\left.\sin\left(-\frac{(2dk - dm + 2fs - f\nu)^2}{4(2bk - bm)} + 2ek - em + 2gs - g\nu + \frac{m\pi}{2}\right)\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2128.01

$$\int \sin^m\left(\sqrt{z}\, b + d z + e\right) \cos^\nu(f z + g)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(d(2k-m))^{3/2}}\right.$$
$$\left((-1)^k \binom{m}{k} \left(-b(2k-m)\sqrt{2\pi} \left(\cos\left(\frac{(2k-m)b^2}{4d} + e(m-2k) - \frac{m\pi}{2}\right) C\left(\frac{b(2k-m) + 2d\sqrt{z}(2k-m)}{\sqrt{d(2k-m)}\sqrt{2\pi}}\right) + \right.\right.\right.$$
$$\left. S\left(\frac{b(2k-m) + 2d\sqrt{z}(2k-m)}{\sqrt{d(2k-m)}\sqrt{2\pi}}\right) \sin\left(\frac{(2k-m)b^2}{4d} + e(m-2k) - \frac{m\pi}{2}\right)\right) -$$
$$\left.\left.\left. 2\sqrt{d(2k-m)} \sin\left(-dz(2k-m) - b\sqrt{z}(2k-m) + e(m-2k) - \frac{m\pi}{2}\right)\right)\right)\right)$$

$$(1 - v \bmod 2) + \frac{2^{-m-v+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)}{f} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{\binom{v}{s} \sin(g (v - 2 s) + f z (v - 2 s))}{v - 2 s} +$$

$$2^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \Bigg(\Bigg((b m - 2 b k) \sqrt{2 \pi} \Bigg(\cos\left(-\frac{(2 b k - b m)^2}{4 (2 d k - d m - 2 f s + f v)} + 2 e k - e m - 2 g s + g v + \frac{m \pi}{2} \right)$$

$$C\left(\frac{2 b k - b m + 2 (2 d k - d m - 2 f s + f v) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 d k - d m - 2 f s + f v}} \right) -$$

$$S\left(\frac{2 b k - b m + 2 (2 d k - d m - 2 f s + f v) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 d k - d m - 2 f s + f v}} \right) \sin\Bigg(-\frac{(2 b k - b m)^2}{4 (2 d k - d m - 2 f s + f v)} +$$

$$2 e k - e m - 2 g s + g v + \frac{m \pi}{2} \Bigg) \Bigg) + 2 \sqrt{2 d k - d m - 2 f s + f v} \, \sin\Big(2 e k - e m - 2 g s + g v +$$

$$(2 d k - d m - 2 f s + f v) z + (2 b k - b m) \sqrt{z} + \frac{m \pi}{2} \Big) \Bigg) \Big/ (2 d k - d m - 2 f s + f v)^{3/2} +$$

$$\Bigg((b m - 2 b k) \sqrt{2 \pi} \Bigg(\cos\left(-\frac{(2 b k - b m)^2}{4 (2 d k - d m + 2 f s - f v)} + 2 e k - e m + 2 g s - g v + \frac{m \pi}{2} \right)$$

$$C\left(\frac{2 b k - b m + 2 (2 d k - d m + 2 f s - f v) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 d k - d m + 2 f s - f v}} \right) -$$

$$S\left(\frac{2 b k - b m + 2 (2 d k - d m + 2 f s - f v) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 d k - d m + 2 f s - f v}} \right)$$

$$\sin\left(-\frac{(2 b k - b m)^2}{4 (2 d k - d m + 2 f s - f v)} + 2 e k - e m + 2 g s - g v + \frac{m \pi}{2} \right) \Bigg) +$$

$$2 \sqrt{2 d k - d m + 2 f s - f v} \, \sin\Big(2 e k - e m + 2 g s - g v + (2 d k - d m + 2 f s - f v) z +$$

$$(2 b k - b m) \sqrt{z} + \frac{m \pi}{2} \Big) \Bigg) \Big/ (2 d k - d m + 2 f s - f v)^{3/2} \Bigg) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\sin(b z)^m \cos^v(c z^r)$

01.07.21.2129.01

$$\int \sin^m(b\,z)\cos^\nu(c\,z^2)\,dz = $$

$$2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) - \frac{2^{-m-\nu+1}(1-\nu \bmod 2)}{b}\binom{\nu}{\frac{\nu}{2}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\frac{(-1)^k \sin\left(\frac{m\pi}{2}-b(m-2k)z\right)}{m-2k}+$$

$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{c(\nu-2s)}}\binom{\nu}{s} C\left(\frac{c\sqrt{\frac{2}{\pi}}(\nu-2s)z}{\sqrt{c(\nu-2s)}}\right)+$$

$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\nu-2cs}}\left(\cos\left(\frac{m\pi}{2}-\frac{(2bk-bm)^2}{4(c\nu-2cs)}\right)C\left(\frac{2bk-bm+2(c\nu-2cs)z}{\sqrt{2\pi}\sqrt{c\nu-2cs}}\right)-\right.\right.$$

$$\left.S\left(\frac{2bk-bm+2(c\nu-2cs)z}{\sqrt{2\pi}\sqrt{c\nu-2cs}}\right)\sin\left(\frac{m\pi}{2}-\frac{(2bk-bm)^2}{4(c\nu-2cs)}\right)\right)+$$

$$\frac{1}{\sqrt{2cs-c\nu}}\left(\cos\left(\frac{m\pi}{2}-\frac{(2bk-bm)^2}{4(2cs-c\nu)}\right)C\left(\frac{2bk-bm+2(2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2cs-c\nu}}\right)-\right.$$

$$\left.\left.S\left(\frac{2bk-bm+2(2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2cs-c\nu}}\right)\sin\left(\frac{m\pi}{2}-\frac{(2bk-bm)^2}{4(2cs-c\nu)}\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.2130.01

$$\int \sin^m(b\,z)\cos^\nu\left(c\sqrt{z}\right)dz = 2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2) - \frac{2^{-m-\nu+1}\,(1-\nu \bmod 2)}{b}\binom{\nu}{\frac{\nu}{2}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\frac{(-1)^k\sin\left(\frac{m\pi}{2}-b\,(m-2\,k)\,z\right)}{m-2\,k} +$$
$$\frac{2^{-m-\nu+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\frac{\cos\left(c\,(\nu-2\,s)\sqrt{z}\right)+c\,(\nu-2\,s)\sqrt{z}\,\sin\left(c\,(\nu-2\,s)\sqrt{z}\right)}{(\nu-2\,s)^2} +$$
$$2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(2\,b\,k-b\,m)^{3/2}}\left(\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\cos\left(\frac{m\pi}{2}-\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,b\,k-b\,m)}\right)\right.\right.$$
$$C\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)$$
$$\left.\sin\left(\frac{m\pi}{2}-\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,b\,k-b\,m)}\right)+2\sqrt{2\,b\,k-b\,m}\,\sin\left(\frac{\pi\,m}{2}+(2\,b\,k-b\,m)\,z+(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)+$$
$$\frac{1}{(2\,b\,k-b\,m)^{3/2}}\left(\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cos\left(\frac{m\pi}{2}-\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,b\,k-b\,m)}\right)C\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)+\right.$$
$$\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)\sin\left(\frac{m\pi}{2}-\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,b\,k-b\,m)}\right)+$$
$$\left.\left.2\sqrt{2\,b\,k-b\,m}\,\sin\left(\frac{\pi\,m}{2}+(2\,b\,k-b\,m)\,z+(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\cos^\nu(c\,z^r)$

01.07.21.2131.01

$$\int \sin^m(d\,z+e)\cos^v\!\left(c\,z^2\right)dz = 2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)+$$
$$2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\frac{(-1)^k\sin\!\left(-\frac{\pi m}{2}+e\,(m-2k)+d\,(m-2k)\,z\right)}{d\,(m-2k)}+$$
$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{c\,(v-2s)}}\binom{v}{s}C\!\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2s)\,z}{\sqrt{c\,(v-2s)}}\right)+2^{-m-v+\frac{1}{2}}\sqrt{\pi}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{\sqrt{c\,v-2\,c\,s}}\left(\cos\!\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,v-2\,c\,s)}+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)C\!\left(\frac{2\,d\,k-d\,m+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,v-2\,c\,s}}\right)-\right.\right.$$
$$\left.S\!\left(\frac{2\,d\,k-d\,m+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,v-2\,c\,s}}\right)\sin\!\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,v-2\,c\,s)}+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)\right)+$$
$$\frac{1}{\sqrt{2\,c\,s-c\,v}}\left(\cos\!\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,v)}+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)C\!\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,v}}\right)-\right.$$
$$\left.\left.S\!\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,v}}\right)\sin\!\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,v)}+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.07.21.2132.01

$$\int \sin^m(d\,z+e)\cos^v\!\left(c\sqrt{z}\right)dz = 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)+$$
$$\frac{2^{-m-v+1}\,(1-v \bmod 2)}{d}\binom{v}{\frac{v}{2}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sin\!\left(-\frac{\pi m}{2}+e\,(m-2k)+d\,(m-2k)\,z\right)}{m-2k}+$$
$$\frac{2^{-m-v+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{\binom{v}{s}\left(\cos\!\left(c\,(v-2s)\sqrt{z}\right)+c\,(v-2s)\sqrt{z}\,\sin\!\left(c\,(v-2s)\sqrt{z}\right)\right)}{(v-2s)^2}+$$
$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{(2dk-dm)^{3/2}}\left(\sqrt{2\pi}\,(2cs-cv)\right.\right.$$
$$\cos\!\left(-\frac{(cv-2cs)^2}{4\,(2dk-dm)}+2ek-em+\frac{m\pi}{2}\right)C\!\left(\frac{2\sqrt{z}\,(2dk-dm)-2cs+cv}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}$$
$$(cv-2cs)\,S\!\left(\frac{2\sqrt{z}\,(2dk-dm)-2cs+cv}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)\sin\!\left(-\frac{(cv-2cs)^2}{4\,(2dk-dm)}+2ek-em+\frac{m\pi}{2}\right)+$$
$$\left.2\sqrt{2dk-dm}\,\sin\!\left(2ek-em+(2dk-dm)\,z+(cv-2cs)\sqrt{z}+\frac{m\pi}{2}\right)\right)+\frac{1}{(2dk-dm)^{3/2}}$$
$$\left(\sqrt{2\pi}\,(cv-2cs)\cos\!\left(-\frac{(2cs-cv)^2}{4\,(2dk-dm)}+2ek-em+\frac{m\pi}{2}\right)C\!\left(\frac{2\sqrt{z}\,(2dk-dm)+2cs-cv}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)+\right.$$
$$\sqrt{2\pi}\,(2cs-cv)\,S\!\left(\frac{2\sqrt{z}\,(2dk-dm)+2cs-cv}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)\sin\!\left(-\frac{(2cs-cv)^2}{4\,(2dk-dm)}+2ek-em+\frac{m\pi}{2}\right)+$$
$$\left.\left.2\sqrt{2dk-dm}\,\sin\!\left(2ek-em+(2dk-dm)\,z+(2cs-cv)\sqrt{z}+\frac{m\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m\!\left(b\,z^r\right)\cos^v\!\left(c\,z^r\right)$

01.07.21.2133.01

$$\int \sin^m(b z^r)\cos^\nu(c z^r)\,dz = 2^{-m-\nu} z \left(\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2 - 1)(\nu \bmod 2 - 1) + \frac{i^{-m}}{r}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2 - 1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\Gamma\left(\frac{1}{r}, -i\,b\,(m-2k)\,z^r\right)\right.\right.$$

$$\left.(-i\,b\,(m-2k)\,z^r)^{-1/r} + (-1)^m\,(i\,b\,(m-2k)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i\,b\,(m-2k)\,z^r\right)\right) + \frac{1}{r}\binom{m}{\frac{m}{2}}(m \bmod 2 - 1)$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(c^2(\nu-2s)^2 z^{2r}\right)^{-1/r}\binom{\nu}{s}\left(\Gamma\left(\frac{1}{r}, i\,c\,(2s-\nu)\,z^r\right)(-i\,c\,(2s-\nu)\,z^r)^{1/r} + (i\,c\,(2s-\nu)\,z^r)^{1/r}\,\Gamma\left(\frac{1}{r}, i\,c\,(\nu-2s)\,z^r\right)\right) -$$

$$\frac{i^{-m}}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left((-1)^m\,\Gamma\left(\frac{1}{r}, -i\,(2bk-bm-2cs+c\nu)\,z^r\right)(-i\,(2bk-bm-2cs+c\nu)\,z^r)^{-1/r} +\right.$$

$$(i\,(2bk-bm-2cs+c\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i\,(2bk-bm-2cs+c\nu)\,z^r\right) +$$

$$(-1)^m\,(-i\,(2bk-bm+2cs-c\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, -i\,(2bk-bm+2cs-c\nu)\,z^r\right) +$$

$$\left.\left.(i\,(2bk-bm+2cs-c\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, i\,(2bk-bm+2cs-c\nu)\,z^r\right)\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2134.01

$$\int \sin^m\left(b z^2\right)\cos^\nu\left(c z^2\right)dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{b\,(m-2k)}}\binom{m}{k}\left(\cos\left(\frac{m\pi}{2}\right)C\left(\frac{b\,(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b\,(m-2k)}}\right) + S\left(\frac{b\,(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b\,(m-2k)}}\right)\sin\left(\frac{m\pi}{2}\right)\right)\right)(1 - \nu \bmod 2) +$$

$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{c\,(\nu-2s)}}\binom{\nu}{s}C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2s)\,z}{\sqrt{c\,(\nu-2s)}}\right) + 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(\cos\left(\frac{m\pi}{2}\right)C\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm-2cs+c\nu}\;z\right) - S\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm-2cs+c\nu}\;z\right)\sin\left(\frac{m\pi}{2}\right)\right)\Big/\right.$$

$$\left(\sqrt{2bk-bm-2cs+c\nu}\right) + \left(\cos\left(\frac{m\pi}{2}\right)C\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm+2cs-c\nu}\;z\right) -\right.$$

$$\left.\left.S\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm+2cs-c\nu}\;z\right)\sin\left(\frac{m\pi}{2}\right)\right)\Big/\left(\sqrt{2bk-bm+2cs-c\nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2135.01

$$\int \sin^m\left(b\sqrt{z}\right)\cos^\nu\left(c\sqrt{z}\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) + \frac{1}{b^2}\left(2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\right.$$

$$\left.\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left((-1)^k\binom{m}{k}\left(\cos\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)+b(2k-m)\sqrt{z}\,\sin\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)\right)\right)\right)+$$

$$\frac{2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\left(\cos\left(c(2s-\nu)\sqrt{z}\right)+c(2s-\nu)\sqrt{z}\,\sin\left(c(2s-\nu)\sqrt{z}\right)\right)}{(\nu-2s)^2}}{c^2}+$$

$$2^{-m-\nu+2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(2bk-bm-2cs+c\nu)^2}\left(\cos\left(\frac{\pi m}{2}+(2bk-bm-2cs+c\nu)\sqrt{z}\right)+\right.\right.$$

$$\left.(2bk-bm-2cs+c\nu)\sqrt{z}\,\sin\left(\frac{\pi m}{2}+(2bk-bm-2cs+c\nu)\sqrt{z}\right)\right)+$$

$$\frac{1}{(2bk-bm+2cs-c\nu)^2}\left(\cos\left(\frac{\pi m}{2}+(2bk-bm+2cs-c\nu)\sqrt{z}\right)+\right.$$

$$\left.\left.(2bk-bm+2cs-c\nu)\sqrt{z}\,\sin\left(\frac{\pi m}{2}+(2bk-bm+2cs-c\nu)\sqrt{z}\right)\right)\right)\; /;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\sin^m(b z^r+e)\cos^\nu(c z^r)$

01.07.21.2136.01

$$\int \sin^m(b z^r+e)\cos^\nu(c z^r)\, dz = 2^{-m-\nu} z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)-$$

$$\frac{2^{-m-\nu}z}{r}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{i\left(\frac{m\pi}{2}-e(m-2k)\right)}\Gamma\left(\frac{1}{r},-i b(2k-m)z^r\right)(-i b(2k-m)z^r)^{-1/r}+\right.$$

$$\left.e^{-i\left(\frac{m\pi}{2}-e(m-2k)\right)}(i b(2k-m)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},i b(2k-m)z^r\right)\right)-\frac{2^{-m-\nu}z}{r}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\Gamma\left(\frac{1}{r},-i c(\nu-2s)z^r\right)(-i c(\nu-2s)z^r)^{-1/r}+(i c(\nu-2s)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},i c(\nu-2s)z^r\right)\right)-$$

$$\frac{2^{-m-\nu}z}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{i\left(2ek-em+\frac{m\pi}{2}\right)}\Gamma\left(\frac{1}{r},-i(2bk-bm-2cs+c\nu)z^r\right)(-i(2bk-bm-2cs+c\nu)z^r)^{-1/r}+\right.$$

$$e^{-i\left(2ek-em+\frac{m\pi}{2}\right)}(i(2bk-bm-2cs+c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},i(2bk-bm-2cs+c\nu)z^r\right)+$$

$$e^{i\left(2ek-em+\frac{m\pi}{2}\right)}(-i(2bk-bm+2cs-c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},-i(2bk-bm+2cs-c\nu)z^r\right)+$$

$$\left.e^{-i\left(2ek-em+\frac{m\pi}{2}\right)}(i(2bk-bm+2cs-c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},i(2bk-bm+2cs-c\nu)z^r\right)\right)\; /;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.2137.01

$$\int \sin^m(b z^2 + e) \cos^\nu(c z^2)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(e(m-2k) - \frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(e(m-2k) - \frac{m\pi}{2}\right) \right) \right) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{c(\nu-2s)}} \binom{\nu}{s} C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2s) z}{\sqrt{c(\nu-2s)}}\right) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\cos\left(2ek - em + \frac{m\pi}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm - 2cs + c\nu}\, z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm - 2cs + c\nu}\, z\right) \sin\left(2ek - em + \frac{m\pi}{2}\right) \right) \Big/ \left(\sqrt{2bk - bm - 2cs + c\nu}\right) + \left(\cos\left(2ek - em + \frac{m\pi}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm + 2cs - c\nu}\, z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm + 2cs - c\nu}\, z\right) \sin\left(2ek - em + \frac{m\pi}{2}\right) \right) \Big/ \left(\sqrt{2bk - bm + 2cs - c\nu}\right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2138.01

$$\int \sin^m\left(\sqrt{z}\, b + e\right) \cos^v\left(c \sqrt{z}\right) dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + \frac{1}{b^2} \left(2^{-m-v+2} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(m-2k)^2} \left((-1)^k \binom{m}{k} \left(\cos\left(2ek - em + b(2k-m)\sqrt{z} + \frac{m\pi}{2}\right) + b(2k-m)\sqrt{z} \sin\left(2ek - em + b(2k-m)\sqrt{z} + \frac{m\pi}{2}\right)\right)\right)\right) + \frac{2^{-m-v+2}}{c^2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{\binom{v}{s} \left(\cos\left(c(2s-v)\sqrt{z}\right) + c(2s-v)\sqrt{z} \sin\left(c(2s-v)\sqrt{z}\right)\right)}{(v-2s)^2} + 2^{-m-v+2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{(2bk - bm - 2cs + cv)^2} \left(\cos\left(2ek - em + (2bk - bm - 2cs + cv)\sqrt{z} + \frac{m\pi}{2}\right) + (2bk - bm - 2cs + cv)\sqrt{z} \sin\left(2ek - em + (2bk - bm - 2cs + cv)\sqrt{z} + \frac{m\pi}{2}\right)\right) + \frac{1}{(2bk - bm + 2cs - cv)^2} \left(\cos\left(2ek - em + (2bk - bm + 2cs - cv)\sqrt{z} + \frac{m\pi}{2}\right) + (2bk - bm + 2cs - cv) \sqrt{z} \sin\left(2ek - em + (2bk - bm + 2cs - cv)\sqrt{z} + \frac{m\pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z\right) \cos^v\left(c z^r\right)$

01.07.21.2139.01

$$\int \sin^m\left(b z^2 + d z\right) \cos^\nu\left(c z^2\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) +$$

$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{b(m-2k)}} \binom{m}{k} \left(\cos\left(\frac{(m-2k) d^2}{4b} + \frac{m\pi}{2} \right) C\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) + \right.$$

$$\left. S\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) \sin\left(\frac{(m-2k) d^2}{4b} + \frac{m\pi}{2} \right) \right) +$$

$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{c(\nu-2s)}} \binom{\nu}{s} C\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2s) z}{\sqrt{c(\nu-2s)}} \right) +$$

$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{2bk - bm - 2cs + c\nu}} \right.$$

$$\left(\cos\left(\frac{m\pi}{2} - \frac{(2dk - dm)^2}{4(2bk - bm - 2cs + c\nu)} \right) C\left(\frac{2dk - dm + 2(2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + c\nu}} \right) - \right.$$

$$\left. S\left(\frac{2dk - dm + 2(2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + c\nu}} \right) \sin\left(\frac{m\pi}{2} - \frac{(2dk - dm)^2}{4(2bk - bm - 2cs + c\nu)} \right) \right) +$$

$$\frac{1}{\sqrt{2bk - bm + 2cs - c\nu}} \left(\cos\left(\frac{m\pi}{2} - \frac{(2dk - dm)^2}{4(2bk - bm + 2cs - c\nu)} \right) \right.$$

$$C\left(\frac{2dk - dm + 2(2bk - bm + 2cs - c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - c\nu}} \right) - S\left(\frac{2dk - dm + 2(2bk - bm + 2cs - c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - c\nu}} \right)$$

$$\left. \left. \sin\left(\frac{m\pi}{2} - \frac{(2dk - dm)^2}{4(2bk - bm + 2cs - c\nu)} \right) \right) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2140.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z\right) \cos^\nu\left(c\sqrt{z}\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{(d(m-2k))^{3/2}} \binom{m}{k} \left(-b(m-2k)\sqrt{2\pi} \cos\left(\frac{(m-2k)b^2}{4d} + \frac{m\pi}{2}\right) C\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right) - \right.$$

$$b(m-2k)\sqrt{2\pi}\, S\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{(m-2k)b^2}{4d} + \frac{m\pi}{2}\right) -$$

$$\left. 2\sqrt{d(m-2k)}\, \sin\left(\frac{\pi m}{2} - d(m-2k)z - b(m-2k)\sqrt{z}\right)\right) +$$

$$\frac{2^{-m-\nu+2}}{c^2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{\binom{\nu}{s}\left(\cos\left(c(\nu-2s)\sqrt{z}\right) + c(\nu-2s)\sqrt{z}\, \sin\left(c(\nu-2s)\sqrt{z}\right)\right)}{(\nu-2s)^2} +$$

$$2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{(2dk-dm)^{3/2}} \left(\sqrt{2\pi}\, (-2bk + bm + 2cs - c\nu) \cos\left(\frac{m\pi}{2} - \frac{(2bk - bm - 2cs + c\nu)^2}{4(2dk - dm)}\right) \right.\right.$$

$$C\left(\frac{2bk - bm - 2cs + c\nu + 2(2dk - dm)\sqrt{z}}{\sqrt{2dk - dm}\sqrt{2\pi}}\right) + \sqrt{2\pi}\, (2bk - bm - 2cs + c\nu)$$

$$S\left(\frac{2bk - bm - 2cs + c\nu + 2(2dk - dm)\sqrt{z}}{\sqrt{2dk - dm}\sqrt{2\pi}}\right) \sin\left(\frac{m\pi}{2} - \frac{(2bk - bm - 2cs + c\nu)^2}{4(2dk - dm)}\right) +$$

$$\left. 2\sqrt{2dk - dm}\, \sin\left(\frac{\pi m}{2} + (2dk - dm)z + (2bk - bm - 2cs + c\nu)\sqrt{z}\right)\right) +$$

$$\frac{1}{(2dk-dm)^{3/2}} \left(\sqrt{2\pi}\, (-2bk + bm - 2cs + c\nu) \cos\left(\frac{m\pi}{2} - \frac{(2bk - bm + 2cs - c\nu)^2}{4(2dk - dm)}\right) \right.$$

$$C\left(\frac{2bk - bm + 2cs - c\nu + 2(2dk - dm)\sqrt{z}}{\sqrt{2dk - dm}\sqrt{2\pi}}\right) + \sqrt{2\pi}\, (2bk - bm + 2cs - c\nu)$$

$$S\left(\frac{2bk - bm + 2cs - c\nu + 2(2dk - dm)\sqrt{z}}{\sqrt{2dk - dm}\sqrt{2\pi}}\right) \sin\left(\frac{m\pi}{2} - \frac{(2bk - bm + 2cs - c\nu)^2}{4(2dk - dm)}\right) +$$

$$\left.\left.\left. 2\sqrt{2dk - dm}\, \sin\left(\frac{\pi m}{2} + (2dk - dm)z + (2bk - bm + 2cs - c\nu)\sqrt{z}\right)\right)\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z + e\right) \cos^\nu\left(c z^r\right)$

01.07.21.2141.01

$$\int \sin^m\left(b z^2 + d z + e\right) \cos^\nu\left(c z^2\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\,(1 - \nu \bmod 2) +$$
$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{b(m-2k)}} \binom{m}{k} \left(\cos\left(\frac{(m-2k)\,d^2}{4b} - e(m-2k) + \frac{m\pi}{2} \right) \right.$$
$$\left. C\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)}\,\sqrt{2\pi}} \right) + S\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)}\,\sqrt{2\pi}} \right) \sin\left(\frac{(m-2k)\,d^2}{4b} - e(m-2k) + \frac{m\pi}{2} \right) \right) +$$
$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{c(\nu-2s)}} \binom{\nu}{s} C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2s)\,z}{\sqrt{c(\nu-2s)}} \right) +$$
$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{2bk - bm - 2cs + c\nu}} \right.$$
$$\left(\cos\left(-\frac{(2dk - dm)^2}{4(2bk - bm - 2cs + c\nu)} + 2ek - em + \frac{m\pi}{2} \right) C\left(\frac{2dk - dm + 2(2bk - bm - 2cs + c\nu)z}{\sqrt{2\pi}\,\sqrt{2bk - bm - 2cs + c\nu}} \right) - \right.$$
$$\left. S\left(\frac{2dk - dm + 2(2bk - bm - 2cs + c\nu)z}{\sqrt{2\pi}\,\sqrt{2bk - bm - 2cs + c\nu}} \right) \sin\left(-\frac{(2dk - dm)^2}{4(2bk - bm - 2cs + c\nu)} + 2ek - em + \frac{m\pi}{2} \right) \right) +$$
$$\frac{1}{\sqrt{2bk - bm + 2cs - c\nu}} \left(\cos\left(-\frac{(2dk - dm)^2}{4(2bk - bm + 2cs - c\nu)} + 2ek - em + \frac{m\pi}{2} \right) \right.$$
$$C\left(\frac{2dk - dm + 2(2bk - bm + 2cs - c\nu)z}{\sqrt{2\pi}\,\sqrt{2bk - bm + 2cs - c\nu}} \right) - S\left(\frac{2dk - dm + 2(2bk - bm + 2cs - c\nu)z}{\sqrt{2\pi}\,\sqrt{2bk - bm + 2cs - c\nu}} \right)$$
$$\left. \left. \sin\left(-\frac{(2dk - dm)^2}{4(2bk - bm + 2cs - c\nu)} + 2ek - em + \frac{m\pi}{2} \right) \right) \right) \text{/; } m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2142.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \cos^\nu\left(c\sqrt{z}\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{(d(m-2k))^{3/2}} \binom{m}{k} \Bigg(-b(m-2k)\sqrt{2\pi} \cos\left(\frac{(m-2k)b^2}{4d} - e(m-2k) + \frac{m\pi}{2}\right) C\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right) -$$

$$b(m-2k)\sqrt{2\pi}\, S\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{(m-2k)b^2}{4d} - e(m-2k) + \frac{m\pi}{2}\right) +$$

$$2\sqrt{d(m-2k)} \sin\left(-\frac{\pi m}{2} + e(m-2k) + d(m-2k)z + b(m-2k)\sqrt{z}\right)\Bigg) +$$

$$\frac{2^{-m-\nu+2}}{c^2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{\binom{\nu}{s}\left(\cos\left(c(\nu-2s)\sqrt{z}\right) + c(\nu-2s)\sqrt{z}\sin\left(c(\nu-2s)\sqrt{z}\right)\right)}{(\nu-2s)^2} +$$

$$2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \Bigg(\frac{1}{(2dk-dm)^{3/2}} \Bigg(\sqrt{2\pi}\,(-2bk + bm + 2cs - c\nu) \cos\left(-\frac{(2bk - bm - 2cs + c\nu)^2}{4(2dk-dm)} + 2ek - em + \frac{m\pi}{2}\right)$$

$$C\left(\frac{2bk - bm - 2cs + c\nu + 2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right) + \sqrt{2\pi}\,(2bk - bm - 2cs + c\nu)\, S\Bigg($$

$$\frac{2bk - bm - 2cs + c\nu + 2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\Bigg) \sin\Bigg(-\frac{(2bk - bm - 2cs + c\nu)^2}{4(2dk-dm)} + 2ek - em +$$

$$\frac{m\pi}{2}\Bigg) + 2\sqrt{2dk-dm} \sin\left(2ek - em + (2dk-dm)z + (2bk - bm - 2cs + c\nu)\sqrt{z} + \frac{m\pi}{2}\right)\Bigg) +$$

$$\frac{1}{(2dk-dm)^{3/2}} \Bigg(\sqrt{2\pi}\,(-2bk + bm - 2cs + c\nu) \cos\Bigg(-\frac{(2bk - bm + 2cs - c\nu)^2}{4(2dk-dm)} + 2ek -$$

$$em + \frac{m\pi}{2}\Bigg) C\left(\frac{2bk - bm + 2cs - c\nu + 2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right) +$$

$$\sqrt{2\pi}\,(2bk - bm + 2cs - c\nu)\, S\left(\frac{2bk - bm + 2cs - c\nu + 2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)$$

$$\sin\left(-\frac{(2bk - bm + 2cs - c\nu)^2}{4(2dk-dm)} + 2ek - em + \frac{m\pi}{2}\right) + 2\sqrt{2dk-dm}$$

$$\sin\left(2ek - em + (2dk-dm)z + (2bk - bm + 2cs - c\nu)\sqrt{z} + \frac{m\pi}{2}\right)\Bigg)\Bigg) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\sin^m(d\, z) \cos^\nu(c\, z^r + g)$

01.07.21.2143.01

$$\int \sin^m(d\,z)\cos^v\left(c\,z^2+g\right)dz = 2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)+$$

$$\frac{2^{-m-v+1}\,(1-v \bmod 2)}{d}\binom{v}{\frac{v}{2}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sin\left(\frac{\pi\,m}{2}+d\,(2\,k-m)\,z\right)}{2\,k-m}+2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{c\,(v-2\,s)}}\binom{v}{s}\left(\cos(g\,(v-2\,s))\,C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2\,s)\,z}{\sqrt{c\,(v-2\,s)}}\right)-S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2\,s)\,z}{\sqrt{c\,(v-2\,s)}}\right)\sin(g\,(v-2\,s))\right)+2^{-m-v+\frac{1}{2}}\sqrt{\pi}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{\sqrt{c\,v-2\,c\,s}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,v-2\,c\,s)}-2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)C\left(\frac{2\,d\,k-d\,m+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{c\,v-2\,c\,s}}\right)-\right.\right.$$

$$\left.S\left(\frac{2\,d\,k-d\,m+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{c\,v-2\,c\,s}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,v-2\,c\,s)}-2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)\right)+$$

$$\frac{1}{\sqrt{2\,c\,s-c\,v}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,v)}+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)C\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,v}}\right)-\right.$$

$$\left.\left.S\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,c\,s-c\,v}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,v)}+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.07.21.2144.01

$$\int \sin^m(d\,z)\cos^v\left(\sqrt{z}\;c+g\right) dz = $$

$$2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2) + \frac{2^{-m-v+1}\,(1-v \bmod 2)}{d}\binom{v}{\frac{v}{2}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sin\left(\frac{\pi m}{2}+d\,(2\,k-m)\,z\right)}{2\,k-m}+$$

$$\frac{2^{-m-v+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{\binom{v}{s}\left(\cos\left((2\,s-v)\left(\sqrt{z}\;c+g\right)\right)+c\,(2\,s-v)\sqrt{z}\,\sin\left((2\,s-v)\left(\sqrt{z}\;c+g\right)\right)\right)}{(v-2\,s)^2}+$$

$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\right.$$

$$\left(\sqrt{2\pi}\,(2\,c\,s-c\,v)\left(\cos\left(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}-2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)-\right.\right.$$

$$\left.S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}-2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)\right)+$$

$$\left.2\sqrt{2\,d\,k-d\,m}\,\sin\left(\frac{\pi m}{2}-2\,g\,s+g\,v+(2\,d\,k-d\,m)\,z+(c\,v-2\,c\,s)\sqrt{z}\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}$$

$$\left(\sqrt{2\pi}\,(c\,v-2\,c\,s)\left(\cos\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m)}+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)-\right.\right.$$

$$\left.S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,v}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m)}+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)\right)+$$

$$\left.\left.2\sqrt{2\,d\,k-d\,m}\,\sin\left(\frac{\pi m}{2}+2\,g\,s-g\,v+(2\,d\,k-d\,m)\,z+(2\,c\,s-c\,v)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\cos^v\left(c\,z^r+g\right)$

01.07.21.2145.01

$$\int \sin^m(d z + e) \cos^v\left(c z^2 + g\right) dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + \frac{2^{-m-v+1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)}{d} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k \binom{m}{k} \sin\left(2 e k - e m + d (2 k - m) z + \frac{m \pi}{2}\right)}{2 k - m} + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{\sqrt{c (v - 2 s)}} \binom{v}{s} \left(\cos(g (v - 2 s)) C\left(\frac{c \sqrt{\frac{2}{\pi}} (v - 2 s) z}{\sqrt{c (v - 2 s)}} \right) - S\left(\frac{c \sqrt{\frac{2}{\pi}} (v - 2 s) z}{\sqrt{c (v - 2 s)}} \right) \sin(g (v - 2 s)) \right) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{\sqrt{c v - 2 c s}} \left(\cos\left(-\frac{(2 d k - d m)^2}{4 (c v - 2 c s)} + 2 e k - e m - 2 g s + g v + \frac{m \pi}{2} \right) C\left(\frac{2 d k - d m + 2 (c v - 2 c s) z}{\sqrt{2 \pi} \sqrt{c v - 2 c s}} \right) - S\left(\frac{2 d k - d m + 2 (c v - 2 c s) z}{\sqrt{2 \pi} \sqrt{c v - 2 c s}} \right) \sin\left(-\frac{(2 d k - d m)^2}{4 (c v - 2 c s)} + 2 e k - e m - 2 g s + g v + \frac{m \pi}{2} \right) \right) + \frac{1}{\sqrt{2 c s - c v}} \left(\cos\left(-\frac{(2 d k - d m)^2}{4 (2 c s - c v)} + 2 e k - e m + 2 g s - g v + \frac{m \pi}{2} \right) C\left(\frac{2 d k - d m + 2 (2 c s - c v) z}{\sqrt{2 \pi} \sqrt{2 c s - c v}} \right) - S\left(\frac{2 d k - d m + 2 (2 c s - c v) z}{\sqrt{2 \pi} \sqrt{2 c s - c v}} \right) \sin\left(-\frac{(2 d k - d m)^2}{4 (2 c s - c v)} + 2 e k - e m + 2 g s - g v + \frac{m \pi}{2} \right) \right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2146.01

$$\int \sin^m(d\,z+e)\cos^v\!\left(\sqrt{z}\,c+g\right)dz = 2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2) - \frac{2^{-m-v+1}(1-v \bmod 2)}{d}\binom{v}{\frac{v}{2}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sin\!\left(-\frac{\pi m}{2}+e\,(m-2k)-d\,(2k-m)\,z\right)}{2k-m} + \frac{2^{-m-v+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{\binom{v}{s}\left(\cos\!\left((2s-v)\left(\sqrt{z}\,c+g\right)\right)+c\,(2s-v)\sqrt{z}\,\sin\!\left((2s-v)\left(\sqrt{z}\,c+g\right)\right)\right)}{(v-2s)^2} + 2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{(2dk-dm)^{3/2}}\left(\sqrt{2\pi}\,(2cs-cv)\left(\cos\!\left(-\frac{(cv-2cs)^2}{4(2dk-dm)}+2ek-em-2gs+gv+\frac{m\pi}{2}\right)C\!\left(\frac{2\sqrt{z}\,(2dk-dm)-2cs+cv}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right) - S\!\left(\frac{2\sqrt{z}\,(2dk-dm)-2cs+cv}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)\sin\!\left(-\frac{(cv-2cs)^2}{4(2dk-dm)}+2ek-em-2gs+gv+\frac{m\pi}{2}\right)\right) + 2\sqrt{2dk-dm}\,\sin\!\left(2ek-em-2gs+gv+(2dk-dm)z+(cv-2cs)\sqrt{z}+\frac{m\pi}{2}\right)\right) + \frac{1}{(2dk-dm)^{3/2}}\left(\sqrt{2\pi}\,(cv-2cs)\left(\cos\!\left(-\frac{(2cs-cv)^2}{4(2dk-dm)}+2ek-em+2gs-gv+\frac{m\pi}{2}\right)C\!\left(\frac{2\sqrt{z}\,(2dk-dm)+2cs-cv}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right) - S\!\left(\frac{2\sqrt{z}\,(2dk-dm)+2cs-cv}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)\sin\!\left(-\frac{(2cs-cv)^2}{4(2dk-dm)}+2ek-em+2gs-gv+\frac{m\pi}{2}\right)\right) + 2\sqrt{2dk-dm}\,\sin\!\left(2ek-em+2gs-gv+(2dk-dm)z+(2cs-cv)\sqrt{z}+\frac{m\pi}{2}\right)\right)\right) /;\ m\in\mathbb{N}^+ \land v\in\mathbb{N}^+$$

Involving $\sin^m(b\,z^r)\cos^v(c\,z^r+g)$

01.07.21.2147.01

$$\int \sin^m(b z^r) \cos^\nu(c z^r + g)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - \frac{1}{r} 2^{-m-\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i m \pi}{2}} \Gamma\left(\frac{1}{r}, -i\, b (2k - m) z^r\right) (-i\, b (2k - m) z^r)^{-1/r} + e^{-\frac{1}{2} i m \pi} (i\, b (2k - m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i\, b (2k - m) z^r\right) \right) -$$
$$\frac{1}{r} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$
$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{i g (\nu - 2s)} \Gamma\left(\frac{1}{r}, -i\, c (\nu - 2s) z^r\right) (-i\, c (\nu - 2s) z^r)^{-1/r} + e^{-i g (\nu - 2s)} (i\, c (\nu - 2s) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i\, c (\nu - 2s) z^r\right) \right) - \frac{1}{r}$$
$$2^{-m-\nu} z \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{i \left(\frac{\pi m}{2} - 2 g s + g \nu\right)} \Gamma\left(\frac{1}{r}, -i (2 b k - b m - 2 c s + c \nu) z^r\right) (-i (2 b k - b m - 2 c s + c \nu) z^r)^{-1/r} + \right.$$
$$e^{-i \left(\frac{\pi m}{2} - 2 g s + g \nu\right)} (i (2 b k - b m - 2 c s + c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i (2 b k - b m - 2 c s + c \nu) z^r\right) +$$
$$e^{i \left(\frac{\pi m}{2} + 2 g s - g \nu\right)} (-i (2 b k - b m + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -i (2 b k - b m + 2 c s - c \nu) z^r\right) +$$
$$\left. e^{-i \left(\frac{\pi m}{2} + 2 g s - g \nu\right)} (i (2 b k - b m + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i (2 b k - b m + 2 c s - c \nu) z^r\right) \right) /;\; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2148.01

$$\int \sin^m(b z^2) \cos^\nu(c z^2 + g)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{b (m - 2k)}} \binom{m}{k} \left(\cos\left(\frac{m \pi}{2}\right) C\left(\frac{b (m - 2k) \sqrt{\frac{2}{\pi}}\, z}{\sqrt{b (m - 2k)}}\right) + S\left(\frac{b (m - 2k) \sqrt{\frac{2}{\pi}}\, z}{\sqrt{b (m - 2k)}}\right) \sin\left(\frac{m \pi}{2}\right) \right) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}}$$
$$(1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{c (\nu - 2s)}} \binom{\nu}{s} \left(\cos(g (\nu - 2s))\, C\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2s) z}{\sqrt{c (\nu - 2s)}}\right) - S\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2s) z}{\sqrt{c (\nu - 2s)}}\right) \sin(g (\nu - 2s)) \right) +$$
$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\cos\left(\frac{\pi m}{2} - 2 g s + g \nu\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2 b k - b m - 2 c s + c \nu}\; z\right) - \right.\right.$$
$$\left. S\left(\sqrt{\frac{2}{\pi}} \sqrt{2 b k - b m - 2 c s + c \nu}\; z\right) \sin\left(\frac{\pi m}{2} - 2 g s + g \nu\right) \right) \Big/ \left(\sqrt{2 b k - b m - 2 c s + c \nu}\right) +$$
$$\left(\cos\left(\frac{\pi m}{2} + 2 g s - g \nu\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2 b k - b m + 2 c s - c \nu}\; z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2 b k - b m + 2 c s - c \nu}\; z\right) \right.$$
$$\left.\left. \sin\left(\frac{\pi m}{2} + 2 g s - g \nu\right) \right) \Big/ \left(\sqrt{2 b k - b m + 2 c s - c \nu}\right) \right) /;\; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2149.01

$$\int \sin^m\left(b\sqrt{z}\right)\cos^v\left(\sqrt{z}\,c+g\right)dz = 2^{-m-v}z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)+$$
$$\frac{2^{-m-v+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{\binom{v}{s}\left(\cos\left((2s-v)\left(\sqrt{z}\,c+g\right)\right)+c(2s-v)\sqrt{z}\sin\left((2s-v)\left(\sqrt{z}\,c+g\right)\right)\right)}{(v-2s)^2}+$$
$$\frac{2^{-m-v+2}}{b^2}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\left(\cos\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)+b(2k-m)\sqrt{z}\sin\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)\right)}{(m-2k)^2}+$$
$$2^{-m-v+2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{(2bk-bm-2cs+cv)^2}\left(\cos\left(\frac{\pi m}{2}-2gs+gv+(2bk-bm-2cs+cv)\sqrt{z}\right)+\right.\right.$$
$$(2bk-bm-2cs+cv)\sqrt{z}\sin\left(\frac{\pi m}{2}-2gs+gv+(2bk-bm-2cs+cv)\sqrt{z}\right)\Big)+$$
$$\frac{1}{(2bk-bm+2cs-cv)^2}\left(\cos\left(\frac{\pi m}{2}+2gs-gv+(2bk-bm+2cs-cv)\sqrt{z}\right)+(2bk-bm+2cs-cv)\right.$$
$$\left.\left.\sqrt{z}\sin\left(\frac{\pi m}{2}+2gs-gv+(2bk-bm+2cs-cv)\sqrt{z}\right)\right)\right)/;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r+e\right)\cos^v\left(c\,z^r+g\right)$

01.07.21.2150.01

$$\int \sin^m(b z^r+e)\cos^v(c z^r+g)\,dz = 2^{-m-v}z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)-$$
$$\frac{2^{-m-v}z}{r}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{i\left(\frac{m\pi}{2}-e(m-2k)\right)}\Gamma\left(\frac{1}{r},-i\,b(2k-m)z^r\right)(-i\,b(2k-m)z^r)^{-1/r}+\right.$$
$$\left.e^{-i\left(\frac{m\pi}{2}-e(m-2k)\right)}(i\,b(2k-m)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},i\,b(2k-m)z^r\right)\right)-\frac{2^{-m-v}z}{r}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$
$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{i g(v-2s)}\Gamma\left(\frac{1}{r},-i\,c(v-2s)z^r\right)(-i\,c(v-2s)z^r)^{-1/r}+e^{-i g(v-2s)}(i\,c(v-2s)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},i\,c(v-2s)z^r\right)\right)-$$
$$\frac{2^{-m-v}z}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{i\left(2ek-em-2gs+gv+\frac{m\pi}{2}\right)}\Gamma\left(\frac{1}{r},-i(2bk-bm-2cs+cv)z^r\right)\right.$$
$$(-i(2bk-bm-2cs+cv)z^r)^{-1/r}+e^{-i\left(2ek-em-2gs+gv+\frac{m\pi}{2}\right)}(i(2bk-bm-2cs+cv)z^r)^{-1/r}$$
$$\Gamma\left(\frac{1}{r},i(2bk-bm-2cs+cv)z^r\right)+e^{i\left(2ek-em+2gs-gv+\frac{m\pi}{2}\right)}(-i(2bk-bm+2cs-cv)z^r)^{-1/r}$$
$$\Gamma\left(\frac{1}{r},-i(2bk-bm+2cs-cv)z^r\right)+e^{-i\left(2ek-em+2gs-gv+\frac{m\pi}{2}\right)}$$
$$\left.(i(2bk-bm+2cs-cv)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},i(2bk-bm+2cs-cv)z^r\right)\right)/;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.07.21.2151.01

$$\int \sin^m\left(b z^2 + e\right) \cos^\nu\left(c z^2 + g\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2) (1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b (m - 2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(e (m - 2k) - \frac{m\pi}{2}\right) C\left(\frac{b (m - 2k) \sqrt{\frac{2}{\pi}} z}{\sqrt{b (m - 2k)}}\right) - S\left(\frac{b (m - 2k) \sqrt{\frac{2}{\pi}} z}{\sqrt{b (m - 2k)}}\right) \sin\left(e (m - 2k) - \frac{m\pi}{2}\right)\right)\right) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{c (\nu - 2s)}} \binom{\nu}{s} \left(\cos(g (\nu - 2s)) C\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2s) z}{\sqrt{c (\nu - 2s)}}\right) - S\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2s) z}{\sqrt{c (\nu - 2s)}}\right) \sin(g (\nu - 2s))\right) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\cos\left(2ek - em - 2gs + g\nu + \frac{m\pi}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm - 2cs + c\nu}\, z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm - 2cs + c\nu}\, z\right) \sin\left(2ek - em - 2gs + g\nu + \frac{m\pi}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm - 2cs + c\nu}\right) + \left(\cos\left(2ek - em + 2gs - g\nu + \frac{m\pi}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm + 2cs - c\nu}\, z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm + 2cs - c\nu}\, z\right) \sin\left(2ek - em + 2gs - g\nu + \frac{m\pi}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm + 2cs - c\nu}\right)\right) /;\ m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.2152.01

$$\int \sin^m\left(\sqrt{z}\, b+e\right)\cos^\nu\left(\sqrt{z}\, c+g\right) dz =$$

$$2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) + \frac{2^{-m-\nu+2}}{b^2} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{(m-2k)^2}$$

$$\left((-1)^k \binom{m}{k} \left(\cos\left(2ek-em+b(2k-m)\sqrt{z}+\frac{m\pi}{2}\right)+b(2k-m)\sqrt{z}\sin\left(2ek-em+b(2k-m)\sqrt{z}+\frac{m\pi}{2}\right)\right)\right)+$$

$$\frac{2^{-m-\nu+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{\binom{\nu}{s}\left(\cos\left((2s-\nu)\left(\sqrt{z}\, c+g\right)\right)+c(2s-\nu)\sqrt{z}\sin\left((2s-\nu)\left(\sqrt{z}\, c+g\right)\right)\right)}{(\nu-2s)^2}+$$

$$2^{-m-\nu+2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(\cos\left(2ek-em-2gs+g\nu+(2bk-bm-2cs+c\nu)\sqrt{z}+\frac{m\pi}{2}\right)+\right.\right.$$

$$\left.(2bk-bm-2cs+c\nu)\sqrt{z}\sin\left(2ek-em-2gs+g\nu+(2bk-bm-2cs+c\nu)\sqrt{z}+\frac{m\pi}{2}\right)\right)\Big/$$

$$(2bk-bm-2cs+c\nu)^2+\left(\cos\left(2ek-em+2gs-g\nu+(2bk-bm+2cs-c\nu)\sqrt{z}+\frac{m\pi}{2}\right)+\right.$$

$$\left.(2bk-bm+2cs-c\nu)\sqrt{z}\sin\left(2ek-em+2gs-g\nu+(2bk-bm+2cs-c\nu)\sqrt{z}+\frac{m\pi}{2}\right)\right)\Big/$$

$$\left.(2bk-bm+2cs-c\nu)^2\right)\ /;\ m\in\mathbb{N}^+\bigwedge \nu\in\mathbb{N}^+$$

Involving $\sin^m\left(b z^r+d z\right)\cos^\nu\left(c z^r+g\right)$

01.07.21.2153.01

$$\int \sin^m\left(b z^2 + d z\right) \cos^\nu\left(c z^2 + g\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}}$$
$$(1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{(m-2k) d^2}{4b} + \frac{m\pi}{2} \right) C\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) + \right.\right.$$
$$\left.\left. S\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) \sin\left(\frac{(m-2k) d^2}{4b} + \frac{m\pi}{2} \right) \right) \right) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$
$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{c(\nu-2s)}} \binom{\nu}{s} \left(\cos(g(\nu-2s)) C\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu-2s) z}{\sqrt{c(\nu-2s)}} \right) - S\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu-2s) z}{\sqrt{c(\nu-2s)}} \right) \sin(g(\nu-2s)) \right) +$$
$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\cos\left(-\frac{(2dk - dm)^2}{4(2bk - bm - 2cs + c\nu)} - 2gs + g\nu + \frac{m\pi}{2} \right) \right.\right.$$
$$C\left(\frac{2dk - dm + 2(2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + c\nu}} \right) - S\left(\frac{2dk - dm + 2(2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + c\nu}} \right)$$
$$\left. \sin\left(-\frac{(2dk - dm)^2}{4(2bk - bm - 2cs + c\nu)} - 2gs + g\nu + \frac{m\pi}{2} \right) \right) \Big/ \left(\sqrt{2bk - bm - 2cs + c\nu} \right) +$$
$$\left(\cos\left(-\frac{(2dk - dm)^2}{4(2bk - bm + 2cs - c\nu)} + 2gs - g\nu + \frac{m\pi}{2} \right) C\left(\frac{2dk - dm + 2(2bk - bm + 2cs - c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - c\nu}} \right) - \right.$$
$$\left. S\left(\frac{2dk - dm + 2(2bk - bm + 2cs - c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - c\nu}} \right) \sin\left(-\frac{(2dk - dm)^2}{4(2bk - bm + 2cs - c\nu)} + 2gs - g\nu + \frac{m\pi}{2} \right) \right) \Big/$$
$$\left. \left(\sqrt{2bk - bm + 2cs - c\nu} \right) \right) /;\ m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.2154.01

$$\int \sin^m\left(\sqrt{z}\,b+d\,z\right)\cos^\nu\left(\sqrt{z}\,c+g\right)dz = 2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)+ 2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(d\,(2k-m))^{3/2}}\left((-1)^k\binom{m}{k}\left(-b\,(2k-m)\sqrt{2\pi}\left(\cos\left(\frac{b^2\,(2k-m)}{4d}-\frac{m\pi}{2}\right)C\left(\frac{b\,(2k-m)+2d\sqrt{z}\,(2k-m)}{\sqrt{d\,(2k-m)}\,\sqrt{2\pi}}\right)+S\left(\frac{b\,(2k-m)+2d\sqrt{z}\,(2k-m)}{\sqrt{d\,(2k-m)}\,\sqrt{2\pi}}\right)\sin\left(\frac{b^2\,(2k-m)}{4d}-\frac{m\pi}{2}\right)\right)-2\sqrt{d\,(2k-m)}\,\sin\left(-d\,z\,(2k-m)-b\sqrt{z}\,(2k-m)-\frac{m\pi}{2}\right)\right)\right)\right)(1-\nu \bmod 2)+\frac{1}{c^2}\left(2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\left(\cos\left((2s-\nu)\left(\sqrt{z}\,c+g\right)\right)+c\,(2s-\nu)\sqrt{z}\,\sin\left((2s-\nu)\left(\sqrt{z}\,c+g\right)\right)\right)}{(\nu-2s)^2}\right)+$$

$$2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\,(-2\,b\,k+b\,m+2\,c\,s-c\,\nu)\left(\cos\left(-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,\nu)^2}{4\,(2\,d\,k-d\,m)}-2\,g\,s+g\,\nu+\frac{m\pi}{2}\right)C\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,\nu+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)-S\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,\nu+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,\nu)^2}{4\,(2\,d\,k-d\,m)}-2\,g\,s+g\,\nu+\frac{m\pi}{2}\right)\right)+2\sqrt{2\,d\,k-d\,m}\,\sin\left(\frac{\pi m}{2}-2\,g\,s+g\,\nu+(2\,d\,k-d\,m)\,z+(2\,b\,k-b\,m-2\,c\,s+c\,\nu)\sqrt{z}\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\,(-2\,b\,k+b\,m-2\,c\,s+c\,\nu)\left(\cos\left(-\frac{(2\,b\,k-b\,m+2\,c\,s-c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,g\,s-g\,\nu+\frac{m\pi}{2}\right)C\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,\nu+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)-S\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,\nu+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,b\,k-b\,m+2\,c\,s-c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,g\,s-g\,\nu+\frac{m\pi}{2}\right)\right)+2\sqrt{2\,d\,k-d\,m}\,\sin\left(\frac{\pi m}{2}+2\,g\,s-g\,\nu+(2\,d\,k-d\,m)\,z+(2\,b\,k-b\,m+2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sin^m(b z^r + d z + e) \cos^v(c z^r + g)$

01.07.21.2155.01

$$\int \sin^m(b z^2 + d z + e) \cos^v(c z^2 + g)\, dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{(m-2k) d^2}{4b} - e(m-2k) + \frac{m\pi}{2} \right) C\left(\frac{d(m-2k) + 2 b z (m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) + S\left(\frac{d(m-2k) + 2 b z (m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) \sin\left(\frac{(m-2k) d^2}{4b} - e(m-2k) + \frac{m\pi}{2} \right) \right) \right) \right) (1 - v \bmod 2) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{\sqrt{c(v-2s)}} \binom{v}{s} \left(\cos(g(v-2s))\, C\left(\frac{c \sqrt{\frac{2}{\pi}} (v-2s) z}{\sqrt{c(v-2s)}} \right) - S\left(\frac{c \sqrt{\frac{2}{\pi}} (v-2s) z}{\sqrt{c(v-2s)}} \right) \sin(g(v-2s)) \right) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\left(\cos\left(-\frac{(2dk - dm)^2}{4(2bk - bm - 2cs + cv)} + 2ek - em - 2gs + gv + \frac{m\pi}{2} \right) C\left(\frac{2dk - dm + 2(2bk - bm - 2cs + cv) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + cv}} \right) - S\left(\frac{2dk - dm + 2(2bk - bm - 2cs + cv) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + cv}} \right) \sin\left(-\frac{(2dk - dm)^2}{4(2bk - bm - 2cs + cv)} + 2ek - em - 2gs + gv + \frac{m\pi}{2} \right) \right) \Big/ \left(\sqrt{2bk - bm - 2cs + cv} \right) + \left(\cos\left(-\frac{(2dk - dm)^2}{4(2bk - bm + 2cs - cv)} + 2ek - em + 2gs - gv + \frac{m\pi}{2} \right) C\left(\frac{2dk - dm + 2(2bk - bm + 2cs - cv) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - cv}} \right) - S\left(\frac{2dk - dm + 2(2bk - bm + 2cs - cv) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - cv}} \right) \sin\left(-\frac{(2dk - dm)^2}{4(2bk - bm + 2cs - cv)} + 2ek - em + 2gs - gv + \frac{m\pi}{2} \right) \right) \Big/ \left(\sqrt{2bk - bm + 2cs - cv} \right) \right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2156.01

$$\int \sin^m\left(\sqrt{z}\, b+d\,z+e\right)\cos^\nu\left(\sqrt{z}\, c+g\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(d(2k-m))^{3/2}}\left((-1)^k\binom{m}{k}\left(-b(2k-m)\sqrt{2\pi}\left(\cos\left(\frac{(2k-m)b^2}{4d}+e(m-2k)-\frac{m\pi}{2}\right)C\left(\frac{b(2k-m)+2d\sqrt{z}\,(2k-m)}{\sqrt{d(2k-m)}\sqrt{2\pi}}\right)+S\left(\frac{b(2k-m)+2d\sqrt{z}\,(2k-m)}{\sqrt{d(2k-m)}\sqrt{2\pi}}\right)\sin\left(\frac{(2k-m)b^2}{4d}+e(m-2k)-\frac{m\pi}{2}\right)\right)-2\sqrt{d(2k-m)}\sin\left(-d\,z(2k-m)-b\sqrt{z}\,(2k-m)+e(m-2k)-\frac{m\pi}{2}\right)\right)\right)\right)(1-\nu \bmod 2)+$$

$$\frac{2^{-m-\nu+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\left(\cos\left((2s-\nu)\left(\sqrt{z}\,c+g\right)\right)+c(2s-\nu)\sqrt{z}\sin\left((2s-\nu)\left(\sqrt{z}\,c+g\right)\right)\right)}{(\nu-2s)^2}+$$

$$2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(2dk-dm)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm+2cs-c\nu)\left(\cos\left(-\frac{(2bk-bm-2cs+c\nu)^2}{4(2dk-dm)}+2ek-em-2gs+g\nu+\frac{m\pi}{2}\right)C\left(\frac{2bk-bm-2cs+c\nu+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)-S\left(\frac{2bk-bm-2cs+c\nu+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)\sin\left(-\frac{(2bk-bm-2cs+c\nu)^2}{4(2dk-dm)}+2ek-em-2gs+g\nu+\frac{m\pi}{2}\right)\right)+2\sqrt{2dk-dm}\sin\left(2ek-em-2gs+g\nu+(2dk-dm)z+(2bk-bm-2cs+c\nu)\sqrt{z}+\frac{m\pi}{2}\right)\right)+\frac{1}{(2dk-dm)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm-2cs+c\nu)\left(\cos\left(-\frac{(2bk-bm+2cs-c\nu)^2}{4(2dk-dm)}+2ek-em+2gs-g\nu+\frac{m\pi}{2}\right)C\left(\frac{2bk-bm+2cs-c\nu+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)-S\left(\frac{2bk-bm+2cs-c\nu+2(2dk-dm)\sqrt{z}}{\sqrt{2dk-dm}\sqrt{2\pi}}\right)\sin\left(-\frac{(2bk-bm+2cs-c\nu)^2}{4(2dk-dm)}+2ek-em+2gs-g\nu+\frac{m\pi}{2}\right)\right)+2\sqrt{2dk-dm}\sin\left(2ek-em+2gs-g\nu+(2dk-dm)z+(2bk-bm+2cs-c\nu)\sqrt{z}+\frac{m\pi}{2}\right)\right)\right)\ /;\ m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sin^m(d\,z)\cos^v(c\,z^r + f\,z)$

01.07.21.2157.01

$$\int \sin^m(d\,z)\cos^v(c\,z^2 + f\,z)\,dz = 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1 - m \bmod 2)(1 - v \bmod 2) + \frac{2^{-m-v+1}\binom{v}{\frac{v}{2}}(1 - v \bmod 2)}{d}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sin\left(\frac{\pi m}{2} + d\,(2k-m)\,z\right)}{2k-m} +$$

$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{\binom{v}{s}\left(\cos\left(\frac{f^2(v-2s)}{4c}\right)C\left(\frac{f(v-2s)+2cz(v-2s)}{\sqrt{2\pi}\sqrt{c(v-2s)}}\right) + S\left(\frac{f(v-2s)+2cz(v-2s)}{\sqrt{2\pi}\sqrt{c(v-2s)}}\right)\sin\left(\frac{f^2(v-2s)}{4c}\right)\right)}{\sqrt{c\,(v-2s)}} +$$

$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{\sqrt{c\,v-2\,c\,s}}\left(\cos\left(\frac{m\pi}{2} - \frac{(2\,d\,k - d\,m - 2\,f\,s + f\,v)^2}{4\,(c\,v - 2\,c\,s)}\right)\right.\right.$$

$$C\left(\frac{2\,d\,k - d\,m - 2\,f\,s + f\,v + 2\,(c\,v - 2\,c\,s)\,z}{\sqrt{2\pi}\sqrt{c\,v-2\,c\,s}}\right) - S\left(\frac{2\,d\,k - d\,m - 2\,f\,s + f\,v + 2\,(c\,v - 2\,c\,s)\,z}{\sqrt{2\pi}\sqrt{c\,v-2\,c\,s}}\right)$$

$$\left.\sin\left(\frac{m\pi}{2} - \frac{(2\,d\,k - d\,m - 2\,f\,s + f\,v)^2}{4\,(c\,v - 2\,c\,s)}\right)\right) + \frac{1}{\sqrt{2\,c\,s - c\,v}}\left(\cos\left(\frac{m\pi}{2} - \frac{(2\,d\,k - d\,m + 2\,f\,s - f\,v)^2}{4\,(2\,c\,s - c\,v)}\right)\right.$$

$$C\left(\frac{2\,d\,k - d\,m + 2\,f\,s - f\,v + 2\,(2\,c\,s - c\,v)\,z}{\sqrt{2\pi}\sqrt{2\,c\,s - c\,v}}\right) - S\left(\frac{2\,d\,k - d\,m + 2\,f\,s - f\,v + 2\,(2\,c\,s - c\,v)\,z}{\sqrt{2\pi}\sqrt{2\,c\,s - c\,v}}\right)$$

$$\left.\left.\sin\left(\frac{m\pi}{2} - \frac{(2\,d\,k - d\,m + 2\,f\,s - f\,v)^2}{4\,(2\,c\,s - c\,v)}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2158.01

$$\int \sin^m(d\,z)\cos^v\left(\sqrt{z}\;c+f\,z\right)dz = 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2) + \frac{2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)}{d} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{(-1)^k \binom{m}{k} \sin\left(\frac{\pi m}{2}+d\,(2k-m)\,z\right)}{2k-m} +$$

$$2^{-m-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(f\,(v-2s))^{3/2}}\left(\binom{v}{s}\left(2\sqrt{f\,(v-2s)}\;\sin\left(f\,z\,(v-2s)+c\sqrt{z}\;(v-2s)\right)-c\sqrt{2\pi}\;(v-2s)\right.\right.$$

$$\left.\left.\left(\cos\left(\frac{c^2\,(v-2s)}{4f}\right)C\left(\frac{c\,(v-2s)+2f\sqrt{z}\;(v-2s)}{\sqrt{2\pi}\;\sqrt{f\,(v-2s)}}\right)+S\left(\frac{c\,(v-2s)+2f\sqrt{z}\;(v-2s)}{\sqrt{2\pi}\;\sqrt{f\,(v-2s)}}\right)\sin\left(\frac{c^2\,(v-2s)}{4f}\right)\right)\right)\right)+$$

$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left(\sqrt{2\pi}\;(2cs-cv)\left(\cos\left(\frac{m\pi}{2}-\frac{(cv-2cs)^2}{4\,(2dk-dm-2fs+fv)}\right)\right.\right.\right.$$

$$C\left(\frac{-2cs+cv+2\,(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{2dk-dm-2fs+fv}}\right)-$$

$$\left.S\left(\frac{-2cs+cv+2\,(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{2dk-dm-2fs+fv}}\right)\sin\left(\frac{m\pi}{2}-\frac{(cv-2cs)^2}{4\,(2dk-dm-2fs+fv)}\right)\right)+$$

$$\left.2\sqrt{2dk-dm-2fs+fv}\;\sin\left(\frac{\pi m}{2}+(2dk-dm-2fs+fv)\,z+(cv-2cs)\sqrt{z}\right)\right)\bigg/$$

$$(2dk-dm-2fs+fv)^{3/2}+\left(\sqrt{2\pi}\;(cv-2cs)\left(\cos\left(\frac{m\pi}{2}-\frac{(2cs-cv)^2}{4\,(2dk-dm+2fs-fv)}\right)\right.\right.$$

$$C\left(\frac{2cs-cv+2\,(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{2dk-dm+2fs-fv}}\right)-$$

$$\left.S\left(\frac{2cs-cv+2\,(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{2dk-dm+2fs-fv}}\right)\sin\left(\frac{m\pi}{2}-\frac{(2cs-cv)^2}{4\,(2dk-dm+2fs-fv)}\right)\right)+$$

$$\left.2\sqrt{2dk-dm+2fs-fv}\;\sin\left(\frac{\pi m}{2}+(2dk-dm+2fs-fv)\,z+(2cs-cv)\sqrt{z}\right)\right)\bigg/$$

$$\left.(2dk-dm+2fs-fv)^{3/2}\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\cos^v\left(c\,z^r+f\,z\right)$

01.07.21.2159.01

$$\int \sin^m(d z+e) \cos^v\left(c z^2+f z\right) dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2) + \frac{2^{-m-v+1} \binom{v}{\frac{v}{2}} (1-v \bmod 2)}{d} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k \binom{m}{k} \sin\left(2 e k - e m + d(2k-m) z + \frac{m\pi}{2}\right)}{2k-m} + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{\binom{v}{s} \left(\cos\left(\frac{f^2(v-2s)}{4c}\right) C\left(\frac{f(v-2s)+2 c z (v-2s)}{\sqrt{2\pi} \sqrt{c(v-2s)}}\right) + S\left(\frac{f(v-2s)+2 c z (v-2s)}{\sqrt{2\pi} \sqrt{c(v-2s)}}\right) \sin\left(\frac{f^2(v-2s)}{4c}\right)\right)}{\sqrt{c(v-2s)}} + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{1}{\sqrt{c v - 2 c s}} \left(\cos\left(-\frac{(2dk-dm-2fs+fv)^2}{4(cv-2cs)} + 2ek - em + \frac{m\pi}{2}\right) C\left(\frac{2dk-dm-2fs+fv+2(cv-2cs)z}{\sqrt{2\pi}\sqrt{cv-2cs}}\right) - S\left(\frac{2dk-dm-2fs+fv+2(cv-2cs)z}{\sqrt{2\pi}\sqrt{cv-2cs}}\right) \sin\left(-\frac{(2dk-dm-2fs+fv)^2}{4(cv-2cs)} + 2ek - em + \frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{2cs-cv}} \left(\cos\left(-\frac{(2dk-dm+2fs-fv)^2}{4(2cs-cv)} + 2ek - em + \frac{m\pi}{2}\right) C\left(\frac{2dk-dm+2fs-fv+2(2cs-cv)z}{\sqrt{2\pi}\sqrt{2cs-cv}}\right) - S\left(\frac{2dk-dm+2fs-fv+2(2cs-cv)z}{\sqrt{2\pi}\sqrt{2cs-cv}}\right) \sin\left(-\frac{(2dk-dm+2fs-fv)^2}{4(2cs-cv)} + 2ek - em + \frac{m\pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2160.01

$$\int \sin^m(d z+e) \cos^v\left(\sqrt{z}\, c+f z\right) dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2) - \frac{2^{-m-v+1} \binom{v}{\frac{v}{2}} (1-v \bmod 2)}{d} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k \binom{m}{k} \sin\left(-\frac{\pi m}{2} + e(m-2k) - d(2k-m) z\right)}{2k-m} + 2^{-m-v} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{(f(v-2s))^{3/2}} \left(\binom{v}{s} \left(2\sqrt{f(v-2s)} \sin\left(f z(v-2s) + c\sqrt{z}(v-2s)\right) - c\sqrt{2\pi}(v-2s) \left(\cos\left(\frac{c^2(v-2s)}{4f}\right) C\left(\frac{c(v-2s)+2f\sqrt{z}(v-2s)}{\sqrt{2\pi}\sqrt{f(v-2s)}}\right) + S\left(\frac{c(v-2s)+2f\sqrt{z}(v-2s)}{\sqrt{2\pi}\sqrt{f(v-2s)}}\right) \sin\left(\frac{c^2(v-2s)}{4f}\right)\right)\right)\right) + 2^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\left(\sqrt{2\pi}(2cs-cv) \left(\cos\left(-\frac{(cv-2cs)^2}{4(2dk-dm-2fs+fv)} + 2ek - em + \frac{m\pi}{2}\right)\right.\right.\right.$$

$$C\left(\frac{-2\,c\,s+c\,v+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)-$$

$$S\left(\frac{-2\,c\,s+c\,v+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)\sin\left(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}+\right.$$

$$\left.\left.2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)\right)+2\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}\,\sin\left(2\,e\,k-e\,m+\right.$$

$$\left.\left.(2\,d\,k-d\,m-2\,f\,s+f\,v)\,z+(c\,v-2\,c\,s)\sqrt{z}+\frac{m\,\pi}{2}\right)\right)\Big/(2\,d\,k-d\,m-2\,f\,s+f\,v)^{3/2}+$$

$$\left(\sqrt{2\,\pi}\,(c\,v-2\,c\,s)\left(\cos\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,e\,k-e\,m+\frac{m\,\pi}{2}\right)\right.\right.$$

$$C\left(\frac{2\,c\,s-c\,v+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)-$$

$$S\left(\frac{2\,c\,s-c\,v+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)\sin\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,e\,k-\right.$$

$$\left.\left.e\,m+\frac{m\,\pi}{2}\right)\right)+2\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}\,\sin\left(2\,e\,k-e\,m+(2\,d\,k-d\,m+2\,f\,s-f\,v)\,z+\right.$$

$$\left.\left.\left.(2\,c\,s-c\,v)\sqrt{z}+\frac{m\,\pi}{2}\right)\right)\Big/(2\,d\,k-d\,m+2\,f\,s-f\,v)^{3/2}\right)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m(b\,z^r)\cos^v(c\,z^r+f\,z)$

01.07.21.2161.01

$$\int \sin^m(b z^2)\cos^v(c z^2+f z)\,dz = 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)+2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{b(m-2k)}}\binom{m}{k}\left(\cos\left(\frac{m\pi}{2}\right)C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\;z}{\sqrt{b(m-2k)}}\right)+S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\;z}{\sqrt{b(m-2k)}}\right)\sin\left(\frac{m\pi}{2}\right)\right)+$$
$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{c(v-2s)}}$$
$$\left(\binom{v}{s}\left(\cos\left(\frac{f^2(v-2s)}{4c}\right)C\left(\frac{f(v-2s)+2cz(v-2s)}{\sqrt{2\pi}\sqrt{c(v-2s)}}\right)+S\left(\frac{f(v-2s)+2cz(v-2s)}{\sqrt{2\pi}\sqrt{c(v-2s)}}\right)\sin\left(\frac{f^2(v-2s)}{4c}\right)\right)\right)+2^{-m-v+\frac{1}{2}}$$
$$\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left(\cos\left(\frac{m\pi}{2}-\frac{(fv-2fs)^2}{4(2bk-bm-2cs+cv)}\right)C\left(\frac{-2fs+fv+2(2bk-bm-2cs+cv)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+cv}}\right)-\right.\right.$$
$$\left.S\left(\frac{-2fs+fv+2(2bk-bm-2cs+cv)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+cv}}\right)\sin\left(\frac{m\pi}{2}-\frac{(fv-2fs)^2}{4(2bk-bm-2cs+cv)}\right)\right)\Big/$$
$$\left(\sqrt{2bk-bm-2cs+cv}\right)+\left(\cos\left(\frac{m\pi}{2}-\frac{(2fs-fv)^2}{4(2bk-bm+2cs-cv)}\right)\right.$$
$$C\left(\frac{2fs-fv+2(2bk-bm+2cs-cv)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-cv}}\right)-S\left(\frac{2fs-fv+2(2bk-bm+2cs-cv)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-cv}}\right)$$
$$\left.\left.\sin\left(\frac{m\pi}{2}-\frac{(2fs-fv)^2}{4(2bk-bm+2cs-cv)}\right)\right)\Big/\left(\sqrt{2bk-bm+2cs-cv}\right)\right)\;/;\; m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.07.21.2162.01

$$\int \sin^m\left(b\sqrt{z}\right)\cos^\nu\left(\sqrt{z}\,c+f\,z\right)dz = 2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)+$$
$$2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(f\,(\nu-2\,s))^{3/2}}\left(\binom{\nu}{s}\left(2\sqrt{f\,(\nu-2\,s)}\,\sin\left(f\,z\,(\nu-2\,s)+c\sqrt{z}\,(\nu-2\,s)\right)-c\sqrt{2\pi}\,(\nu-2\,s)\right.\right.$$
$$\left.\left.\left(\cos\left(\frac{c^2\,(\nu-2\,s)}{4\,f}\right)C\left(\frac{c\,(\nu-2\,s)+2\,f\sqrt{z}\,(\nu-2\,s)}{\sqrt{2\pi}\,\sqrt{f\,(\nu-2\,s)}}\right)+S\left(\frac{c\,(\nu-2\,s)+2\,f\sqrt{z}\,(\nu-2\,s)}{\sqrt{2\pi}\,\sqrt{f\,(\nu-2\,s)}}\right)\sin\left(\frac{c^2\,(\nu-2\,s)}{4\,f}\right)\right)\right)\right)+$$
$$\frac{2^{-m-\nu+2}}{b^2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\left(\cos\left(b\sqrt{z}\,(2\,k-m)+\frac{m\pi}{2}\right)+b\,(2\,k-m)\sqrt{z}\,\sin\left(b\sqrt{z}\,(2\,k-m)+\frac{m\pi}{2}\right)\right)}{(2\,k-m)^2}+$$
$$2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(f\,\nu-2\,f\,s)^{3/2}}\left(\sqrt{2\pi}\,(-2\,b\,k+b\,m+2\,c\,s-c\,\nu)\right.\right.$$
$$\left(\cos\left(\frac{m\pi}{2}-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,\nu)^2}{4\,(f\,\nu-2\,f\,s)}\right)C\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,\nu+2\,(f\,\nu-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{f\,\nu-2\,f\,s}}\right)-\right.$$
$$\left.S\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,\nu+2\,(f\,\nu-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{f\,\nu-2\,f\,s}}\right)\sin\left(\frac{m\pi}{2}-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,\nu)^2}{4\,(f\,\nu-2\,f\,s)}\right)\right)+$$
$$\left.2\sqrt{f\,\nu-2\,f\,s}\,\sin\left(\frac{\pi\,m}{2}+(f\,\nu-2\,f\,s)\,z+(2\,b\,k-b\,m-2\,c\,s+c\,\nu)\sqrt{z}\right)\right)+$$
$$\frac{1}{(2\,f\,s-f\,\nu)^{3/2}}\left(\sqrt{2\pi}\,(-2\,b\,k+b\,m-2\,c\,s+c\,\nu)\left(\cos\left(\frac{m\pi}{2}-\frac{(2\,b\,k-b\,m+2\,c\,s-c\,\nu)^2}{4\,(2\,f\,s-f\,\nu)}\right)\right.\right.$$
$$C\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,\nu+2\,(2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,f\,s-f\,\nu}}\right)-$$
$$\left.S\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,\nu+2\,(2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,f\,s-f\,\nu}}\right)\sin\left(\frac{m\pi}{2}-\frac{(2\,b\,k-b\,m+2\,c\,s-c\,\nu)^2}{4\,(2\,f\,s-f\,\nu)}\right)\right)+$$
$$\left.\left.2\sqrt{2\,f\,s-f\,\nu}\,\sin\left(\frac{\pi\,m}{2}+(2\,f\,s-f\,\nu)\,z+(2\,b\,k-b\,m+2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\right)\,/;\,m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r+e\right)\cos^\nu\left(c\,z^r+f\,z\right)$

01.07.21.2163.01

$$\int \sin^m\left(b z^2 + e\right) \cos^\nu\left(c z^2 + f z\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(e(m-2k) - \frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(e(m-2k) - \frac{m\pi}{2}\right)\right)\right)\right)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{\binom{\nu}{s}\left(\cos\left(\frac{f^2(\nu-2s)}{4c}\right) C\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right) + S\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right) \sin\left(\frac{f^2(\nu-2s)}{4c}\right)\right)}{\sqrt{c(\nu-2s)}} + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\cos\left(-\frac{(f\nu - 2fs)^2}{4(2bk - bm - 2cs + c\nu)} + 2ek - em + \frac{m\pi}{2}\right) C\left(\frac{-2fs + f\nu + 2(2bk - bm - 2cs + c\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2cs + c\nu}}\right) - S\left(\frac{-2fs + f\nu + 2(2bk - bm - 2cs + c\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2cs + c\nu}}\right) \sin\left(-\frac{(f\nu - 2fs)^2}{4(2bk - bm - 2cs + c\nu)} + 2ek - em + \frac{m\pi}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm - 2cs + c\nu}\right) + \left(\cos\left(-\frac{(2fs - f\nu)^2}{4(2bk - bm + 2cs - c\nu)} + 2ek - em + \frac{m\pi}{2}\right) C\left(\frac{2fs - f\nu + 2(2bk - bm + 2cs - c\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2cs - c\nu}}\right) - S\left(\frac{2fs - f\nu + 2(2bk - bm + 2cs - c\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2cs - c\nu}}\right) \sin\left(-\frac{(2fs - f\nu)^2}{4(2bk - bm + 2cs - c\nu)} + 2ek - em + \frac{m\pi}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm + 2cs - c\nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2164.01

$$\int \sin^m\left(\sqrt{z}\, b + e\right) \cos^\nu\left(\sqrt{z}\, c + f z\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(f(\nu-2s))^{3/2}} \left(\binom{\nu}{s}\left(2\sqrt{f(\nu-2s)}\, \sin\left(fz(\nu-2s) + c\sqrt{z}\,(\nu-2s)\right) - c\sqrt{2\pi}\,(\nu-2s) \left(\cos\left(\frac{c^2(\nu-2s)}{4f}\right) C\left(\frac{c(\nu-2s) + 2f\sqrt{z}\,(\nu-2s)}{\sqrt{2\pi}\sqrt{f(\nu-2s)}}\right) + S\left(\frac{c(\nu-2s) + 2f\sqrt{z}\,(\nu-2s)}{\sqrt{2\pi}\sqrt{f(\nu-2s)}}\right) \sin\left(\frac{c^2(\nu-2s)}{4f}\right)\right)\right)\right) +$$

$$\frac{1}{b^2}\left(2^{-m-v+2}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(2k-m)^2}\left((-1)^k\binom{m}{k}\left(\cos\left(-b\sqrt{z}\,(2k-m)+e(m-2k)-\frac{m\pi}{2}\right)-\right.\right.\right.$$

$$\left.\left.\left. b(2k-m)\sqrt{z}\,\sin\left(-b\sqrt{z}\,(2k-m)+e(m-2k)-\frac{m\pi}{2}\right)\right)\right)\right)+$$

$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{(fv-2fs)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm+2cs-cv)\left(\cos\left(-\frac{(2bk-bm-2cs+cv)^2}{4(fv-2fs)}+\right.\right.\right.\right.$$

$$\left. 2ek-em+\frac{m\pi}{2}\right)C\left(\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{fv-2fs}}\right)-S\left(\right.$$

$$\left.\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{fv-2fs}}\right)\sin\left(\right.$$

$$\left.\left.-\frac{(2bk-bm-2cs+cv)^2}{4(fv-2fs)}+2ek-em+\frac{m\pi}{2}\right)\right)+$$

$$\left. 2\sqrt{fv-2fs}\,\sin\left(2ek-em+(fv-2fs)z+(2bk-bm-2cs+cv)\sqrt{z}+\frac{m\pi}{2}\right)\right)+$$

$$\frac{1}{(2fs-fv)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm-2cs+cv)\left(\cos\left(-\frac{(2bk-bm+2cs-cv)^2}{4(2fs-fv)}+2ek-em+\frac{m\pi}{2}\right)\right.\right.$$

$$C\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2fs-fv}}\right)-$$

$$S\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2fs-fv}}\right)$$

$$\left.\sin\left(-\frac{(2bk-bm+2cs-cv)^2}{4(2fs-fv)}+2ek-em+\frac{m\pi}{2}\right)\right)+2\sqrt{2fs-fv}$$

$$\left.\left.\left.\sin\left(2ek-em+(2fs-fv)z+(2bk-bm+2cs-cv)\sqrt{z}+\frac{m\pi}{2}\right)\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m\left(b z^r+d z\right)\cos^v\left(c z^r+f z\right)$

01.07.21.2165.01

$$\int \sin^m(b z^2 + d z) \cos^\nu(c z^2 + f z)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) +$$
$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{(m-2k) d^2}{4b} + \frac{m\pi}{2} \right) C\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) + \right.\right.\right.$$
$$\left.\left.\left. S\left(\frac{d(m-2k) + 2bz(m-2k)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) \sin\left(\frac{(m-2k) d^2}{4b} + \frac{m\pi}{2} \right) \right)\right)\right) (1 - \nu \bmod 2) +$$
$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{\binom{\nu}{s} \left(\cos\left(\frac{f^2 (\nu-2s)}{4c} \right) C\left(\frac{f(\nu-2s) + 2cz(\nu-2s)}{\sqrt{2\pi} \sqrt{c(\nu-2s)}} \right) + S\left(\frac{f(\nu-2s) + 2cz(\nu-2s)}{\sqrt{2\pi} \sqrt{c(\nu-2s)}} \right) \sin\left(\frac{f^2(\nu-2s)}{4c} \right) \right)}{\sqrt{c(\nu-2s)}} +$$
$$2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$
$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\cos\left(\frac{m\pi}{2} - \frac{(2dk - dm - 2fs + f\nu)^2}{4(2bk - bm - 2cs + c\nu)} \right) C\left(\frac{2dk - dm - 2fs + f\nu + 2(2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + c\nu}} \right) - \right.\right.$$
$$S\left(\frac{2dk - dm - 2fs + f\nu + 2(2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2cs + c\nu}} \right)$$
$$\left. \sin\left(\frac{m\pi}{2} - \frac{(2dk - dm - 2fs + f\nu)^2}{4(2bk - bm - 2cs + c\nu)} \right) \right) \Big/ \left(\sqrt{2bk - bm - 2cs + c\nu} \right) +$$
$$\left(\cos\left(\frac{m\pi}{2} - \frac{(2dk - dm + 2fs - f\nu)^2}{4(2bk - bm + 2cs - c\nu)} \right) C\left(\frac{2dk - dm + 2fs - f\nu + 2(2bk - bm + 2cs - c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - c\nu}} \right) - \right.$$
$$\left. S\left(\frac{2dk - dm + 2fs - f\nu + 2(2bk - bm + 2cs - c\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2cs - c\nu}} \right) \sin\left(\frac{m\pi}{2} - \frac{(2dk - dm + 2fs - f\nu)^2}{4(2bk - bm + 2cs - c\nu)} \right) \right) \Big/$$
$$\left. \left(\sqrt{2bk - bm + 2cs - c\nu} \right) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2166.01

$$\int \sin^m(\sqrt{z}\, b + d z) \cos^\nu(\sqrt{z}\, c + f z)\, dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) +$$
$$2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(d(2k-m))^{3/2}} \left((-1)^k \binom{m}{k} \left(2\sqrt{d(2k-m)} \sin\left(dz(2k-m) + b\sqrt{z}\,(2k-m) + \frac{m\pi}{2} \right) - \right.\right.\right.$$
$$b(2k-m)\sqrt{2\pi} \left(\cos\left(\frac{b^2 (2k-m)}{4d} - \frac{m\pi}{2} \right) C\left(\frac{b(2k-m) + 2d\sqrt{z}\,(2k-m)}{\sqrt{d(2k-m)} \sqrt{2\pi}} \right) + \right.$$

$$S\left(\frac{b(2k-m)+2d\sqrt{z}\,(2k-m)}{\sqrt{d(2k-m)}\,\sqrt{2\pi}}\right)\sin\left(\frac{b^2(2k-m)}{4d}-\frac{m\pi}{2}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)(1-v\bmod 2)+$$

$$2^{-m-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(f(v-2s))^{3/2}}\left(\binom{v}{s}\left(2\sqrt{f(v-2s)}\,\sin\left(fz(v-2s)+c\sqrt{z}\,(v-2s)\right)-c\sqrt{2\pi}\,(v-2s)\right.\right.$$

$$\left.\left.\left(\cos\left(\frac{c^2(v-2s)}{4f}\right)C\left(\frac{c(v-2s)+2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\,\sqrt{f(v-2s)}}\right)+S\left(\frac{c(v-2s)+2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\,\sqrt{f(v-2s)}}\right)\sin\left(\frac{c^2(v-2s)}{4f}\right)\right)\right)\right)+$$

$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\Bigg(\sqrt{2\pi}\,(-2bk+bm+2cs-cv)\left(\cos\left(\frac{m\pi}{2}-\frac{(2bk-bm-2cs+cv)^2}{4(2dk-dm-2fs+fv)}\right)\right.$$

$$C\left(\frac{2bk-bm-2cs+cv+2(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm-2fs+fv}}\right)-$$

$$S\left(\frac{2bk-bm-2cs+cv+2(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm-2fs+fv}}\right)$$

$$\left.\sin\left(\frac{m\pi}{2}-\frac{(2bk-bm-2cs+cv)^2}{4(2dk-dm-2fs+fv)}\right)\right)+2\sqrt{2dk-dm-2fs+fv}\,\sin\Bigg(\frac{\pi m}{2}+$$

$$(2dk-dm-2fs+fv)z+(2bk-bm-2cs+cv)\sqrt{z}\Bigg)\Bigg)\Bigg/(2dk-dm-2fs+fv)^{3/2}+$$

$$\Bigg(\sqrt{2\pi}\,(-2bk+bm-2cs+cv)\left(\cos\left(\frac{m\pi}{2}-\frac{(2bk-bm+2cs-cv)^2}{4(2dk-dm+2fs-fv)}\right)\right.$$

$$C\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm+2fs-fv}}\right)-$$

$$S\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm+2fs-fv}}\right)$$

$$\left.\sin\left(\frac{m\pi}{2}-\frac{(2bk-bm+2cs-cv)^2}{4(2dk-dm+2fs-fv)}\right)\right)+2\sqrt{2dk-dm+2fs-fv}$$

$$\sin\left(\frac{\pi m}{2}+(2dk-dm+2fs-fv)z+(2bk-bm+2cs-cv)\sqrt{z}\right)\Bigg)\Bigg/$$

$$(2dk-dm+2fs-fv)^{3/2}\Bigg)\Bigg)\ /;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m(b z^r + d z + e)\cos^\nu(c z^r + f z)$

01.07.21.2167.01

$$\int \sin^m(b z^2 + d z + e)\cos^\nu(c z^2 + f z)\,dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}$$
$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{b(m-2k)}}\left((-1)^k\binom{m}{k}\left(\cos\left(\frac{(m-2k)d^2}{4b} - e(m-2k) + \frac{m\pi}{2}\right)C\left(\frac{d(m-2k)+2bz(m-2k)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + \right.\right.\right.$$
$$\left.\left.\left.S\left(\frac{d(m-2k)+2bz(m-2k)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right)\sin\left(\frac{(m-2k)d^2}{4b} - e(m-2k) + \frac{m\pi}{2}\right)\right)\right)\right)(1 - \nu \bmod 2) +$$
$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\binom{\nu}{s}\left(\cos\left(\frac{f^2(\nu-2s)}{4c}\right)C\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right) + S\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)\sin\left(\frac{f^2(\nu-2s)}{4c}\right)\right)}{\sqrt{c(\nu-2s)}} +$$
$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(\cos\left(-\frac{(2dk - dm - 2fs + f\nu)^2}{4(2bk - bm - 2cs + c\nu)} + 2ek - em + \frac{m\pi}{2}\right)\right.\right.$$
$$C\left(\frac{2dk - dm - 2fs + f\nu + 2(2bk - bm - 2cs + c\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2cs + c\nu}}\right) -$$
$$S\left(\frac{2dk - dm - 2fs + f\nu + 2(2bk - bm - 2cs + c\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2cs + c\nu}}\right)\sin\left(-\frac{(2dk - dm - 2fs + f\nu)^2}{4(2bk - bm - 2cs + c\nu)} + \right.$$
$$\left.\left.2ek - em + \frac{m\pi}{2}\right)\right)\Big/\left(\sqrt{2bk - bm - 2cs + c\nu}\right) + \left(\cos\left(-\frac{(2dk - dm + 2fs - f\nu)^2}{4(2bk - bm + 2cs - c\nu)} + \right.\right.$$
$$\left.2ek - em + \frac{m\pi}{2}\right)C\left(\frac{2dk - dm + 2fs - f\nu + 2(2bk - bm + 2cs - c\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2cs - c\nu}}\right) -$$
$$S\left(\frac{2dk - dm + 2fs - f\nu + 2(2bk - bm + 2cs - c\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2cs - c\nu}}\right)\sin\left(-\frac{(2dk - dm + 2fs - f\nu)^2}{4(2bk - bm + 2cs - c\nu)} + \right.$$
$$\left.\left.\left.2ek - em + \frac{m\pi}{2}\right)\right)\Big/\left(\sqrt{2bk - bm + 2cs - c\nu}\right)\right)\ /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2168.01

$$\int \sin^m(\sqrt{z}\,b + d z + e)\cos^\nu(\sqrt{z}\,c + f z)\,dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(d(2k-m))^{3/2}}\right.$$
$$\left((-1)^k\binom{m}{k}\left(-b(2k-m)\sqrt{2\pi}\left(\cos\left(\frac{(2k-m)b^2}{4d} + e(m-2k) - \frac{m\pi}{2}\right)C\left(\frac{b(2k-m)+2d\sqrt{z}\,(2k-m)}{\sqrt{d(2k-m)}\sqrt{2\pi}}\right) + \right.\right.\right.$$
$$\left.S\left(\frac{b(2k-m)+2d\sqrt{z}\,(2k-m)}{\sqrt{d(2k-m)}\sqrt{2\pi}}\right)\sin\left(\frac{(2k-m)b^2}{4d} + e(m-2k) - \frac{m\pi}{2}\right)\right) -$$

$$2\sqrt{d(2k-m)}\,\sin\left(-d z(2k-m)-b\sqrt{z}\,(2k-m)+e(m-2k)-\frac{m\pi}{2}\right)\Bigg)\Bigg)\Bigg)\Bigg)(1-v \bmod 2)+$$

$$2^{-m-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(f(v-2s))^{3/2}}\left(\binom{v}{s}\left(2\sqrt{f(v-2s)}\,\sin\left(f z(v-2s)+c\sqrt{z}\,(v-2s)\right)-c\sqrt{2\pi}\,(v-2s)\right.\right.$$

$$\left.\left.\left(\cos\left(\frac{c^2(v-2s)}{4f}\right)C\left(\frac{c(v-2s)+2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\,\sqrt{f(v-2s)}}\right)+S\left(\frac{c(v-2s)+2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\,\sqrt{f(v-2s)}}\right)\sin\left(\frac{c^2(v-2s)}{4f}\right)\right)\right)\right)+$$

$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\Bigg(\sqrt{2\pi}\,(-2bk+bm+2cs-cv)\left(\cos\left(-\frac{(2bk-bm-2cs+cv)^2}{4(2dk-dm-2fs+fv)}+2ek-em+\frac{m\pi}{2}\right)\right.$$

$$C\left(\frac{2bk-bm-2cs+cv+2(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm-2fs+fv}}\right)-$$

$$S\left(\frac{2bk-bm-2cs+cv+2(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm-2fs+fv}}\right)$$

$$\left.\sin\left(-\frac{(2bk-bm-2cs+cv)^2}{4(2dk-dm-2fs+fv)}+2ek-em+\frac{m\pi}{2}\right)\right)+2\sqrt{2dk-dm-2fs+fv}$$

$$\sin\left(2ek-em+(2dk-dm-2fs+fv)z+(2bk-bm-2cs+cv)\sqrt{z}+\frac{m\pi}{2}\right)\Bigg)\Bigg/$$

$$(2dk-dm-2fs+fv)^{3/2}+\Bigg(\sqrt{2\pi}\,(-2bk+bm-2cs+cv)\left(\cos\left(-\frac{(2bk-bm+2cs-cv)^2}{4(2dk-dm+2fs-fv)}+\right.\right.$$

$$\left.2ek-em+\frac{m\pi}{2}\right)C\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm+2fs-fv}}\right)-$$

$$S\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk-dm+2fs-fv}}\right)$$

$$\left.\sin\left(-\frac{(2bk-bm+2cs-cv)^2}{4(2dk-dm+2fs-fv)}+2ek-em+\frac{m\pi}{2}\right)\right)+$$

$$2\sqrt{2dk-dm+2fs-fv}\,\sin\left(2ek-em+(2dk-dm+2fs-fv)z+\right.$$

$$\left.(2bk-bm+2cs-cv)\sqrt{z}+\frac{m\pi}{2}\right)\Bigg)\Bigg/(2dk-dm+2fs-fv)^{3/2}\Bigg)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m(d\,z)\cos^v(c\,z^r+f\,z+g)$

01.07.21.2169.01

$$\int \sin^m(d\,z)\cos^v(c\,z^2+f\,z+g)\,dz = 2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)+\frac{2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)}{d}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sin\left(\frac{\pi m}{2}+d\,(2k-m)\,z\right)}{2k-m}+$$
$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{c\,(v-2s)}}\left(\binom{v}{s}\left(\cos\left(\frac{f^2\,(v-2s)}{4c}-g\,(v-2s)\right)C\left(\frac{f\,(v-2s)+2\,c\,z\,(v-2s)}{\sqrt{2\pi}\,\sqrt{c\,(v-2s)}}\right)+\right.\right.$$
$$\left.\left.S\left(\frac{f\,(v-2s)+2\,c\,z\,(v-2s)}{\sqrt{2\pi}\,\sqrt{c\,(v-2s)}}\right)\sin\left(\frac{f^2\,(v-2s)}{4c}-g\,(v-2s)\right)\right)\right)+$$
$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{\sqrt{c\,v-2\,c\,s}}\left(\cos\left(-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{4\,(c\,v-2\,c\,s)}-2\,g\,s+g\,v+\frac{m\pi}{2}\right)\right.\right.$$
$$C\left(\frac{2\,d\,k-d\,m-2\,f\,s+f\,v+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,v-2\,c\,s}}\right)-$$
$$\left.S\left(\frac{2\,d\,k-d\,m-2\,f\,s+f\,v+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{c\,v-2\,c\,s}}\right)\sin\left(-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{4\,(c\,v-2\,c\,s)}-2\,g\,s+g\,v+\frac{m\pi}{2}\right)\right)+$$
$$\frac{1}{\sqrt{2\,c\,s-c\,v}}\left(\cos\left(-\frac{(2\,d\,k-d\,m+2\,f\,s-f\,v)^2}{4\,(2\,c\,s-c\,v)}+2\,g\,s-g\,v+\frac{m\pi}{2}\right)\right.$$
$$C\left(\frac{2\,d\,k-d\,m+2\,f\,s-f\,v+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,v}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,f\,s-f\,v+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\pi}\,\sqrt{2\,c\,s-c\,v}}\right)$$
$$\left.\left.\sin\left(-\frac{(2\,d\,k-d\,m+2\,f\,s-f\,v)^2}{4\,(2\,c\,s-c\,v)}+2\,g\,s-g\,v+\frac{m\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.07.21.2170.01

$$\int \sin^m(d\,z)\cos^v\left(\sqrt{z}\;c+f\,z+g\right)dz = 2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)+\frac{2^{-m-v+1}\,(1-v\bmod 2)}{d}\binom{v}{\frac{v}{2}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sin\left(\frac{\pi m}{2}+d\,(2k-m)\,z\right)}{2k-m}+$$
$$2^{-m-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(f\,(v-2s))^{3/2}}\left(\binom{v}{s}\left(2\sqrt{f\,(v-2s)}\,\sin\left(g\,(v-2s)+f\,z\,(v-2s)+c\sqrt{z}\,(v-2s)\right)-\right.\right.$$
$$c\sqrt{2\pi}\,(v-2s)\left(\cos\left(\frac{c^2\,(v-2s)}{4f}-g\,(v-2s)\right)C\left(\frac{c\,(v-2s)+2\,f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\,\sqrt{f\,(v-2s)}}\right)+\right.$$

$$S\left(\frac{c\,(v-2\,s)+2\,f\,\sqrt{z}\,(v-2\,s)}{\sqrt{2\,\pi}\,\sqrt{f\,(v-2\,s)}}\right)\sin\left(\frac{c^2\,(v-2\,s)}{4\,f}-g\,(v-2\,s)\right)\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\Bigg(\Bigg(\sqrt{2\,\pi}\,(2\,c\,s-c\,v)\Bigg(\cos\left(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}-2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)$$

$$C\left(\frac{-2\,c\,s+c\,v+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)-$$

$$S\left(\frac{-2\,c\,s+c\,v+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)\sin\Bigg(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}-$$

$$2\,g\,s+g\,v+\frac{m\,\pi}{2}\Bigg)\Bigg)+2\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}\,\sin\Bigg(\frac{\pi\,m}{2}-2\,g\,s+g\,v+$$

$$(2\,d\,k-d\,m-2\,f\,s+f\,v)\,z+(c\,v-2\,c\,s)\,\sqrt{z}\Bigg)\Bigg)\Bigg/(2\,d\,k-d\,m-2\,f\,s+f\,v)^{3/2}+$$

$$\Bigg(\sqrt{2\,\pi}\,(c\,v-2\,c\,s)\Bigg(\cos\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)$$

$$C\left(\frac{2\,c\,s-c\,v+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)-$$

$$S\left(\frac{2\,c\,s-c\,v+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)\sin\Bigg(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,g\,s-g\,v+$$

$$\frac{m\,\pi}{2}\Bigg)\Bigg)+2\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}\,\sin\Bigg(\frac{\pi\,m}{2}+2\,g\,s-g\,v+(2\,d\,k-d\,m+2\,f\,s-f\,v)\,z+$$

$$(2\,c\,s-c\,v)\,\sqrt{z}\Bigg)\Bigg)\Bigg/(2\,d\,k-d\,m+2\,f\,s-f\,v)^{3/2}\Bigg)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\cos^v\left(c\,z^r+f\,z+g\right)$

01.07.21.2171.01

$$\int \sin^m(d z+e)\cos^\nu\left(c z^2+f z+g\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+\frac{2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sin\left(2 e k-e m+d(2k-m)z+\frac{m\pi}{2}\right)}{2k-m}\right)(1-\nu \bmod 2)}{d}+$$
$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{c(\nu-2s)}}\left(\binom{\nu}{s}\left(\cos\left(\frac{f^2(\nu-2s)}{4c}-g(\nu-2s)\right)C\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)+\right.\right.$$
$$\left.\left.S\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)\sin\left(\frac{f^2(\nu-2s)}{4c}-g(\nu-2s)\right)\right)\right)+$$
$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{\sqrt{c\nu-2cs}}\left(\cos\left(-\frac{(2dk-dm-2fs+f\nu)^2}{4(c\nu-2cs)}+2ek-em-2gs+g\nu+\frac{m\pi}{2}\right)\right.\right.$$
$$C\left(\frac{2dk-dm-2fs+f\nu+2(c\nu-2cs)z}{\sqrt{2\pi}\sqrt{c\nu-2cs}}\right)-S\left(\frac{2dk-dm-2fs+f\nu+2(c\nu-2cs)z}{\sqrt{2\pi}\sqrt{c\nu-2cs}}\right)$$
$$\left.\sin\left(-\frac{(2dk-dm-2fs+f\nu)^2}{4(c\nu-2cs)}+2ek-em-2gs+g\nu+\frac{m\pi}{2}\right)\right)+$$
$$\frac{1}{\sqrt{2cs-c\nu}}\left(\cos\left(-\frac{(2dk-dm+2fs-f\nu)^2}{4(2cs-c\nu)}+2ek-em+2gs-g\nu+\frac{m\pi}{2}\right)\right.$$
$$C\left(\frac{2dk-dm+2fs-f\nu+2(2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2cs-c\nu}}\right)-S\left(\frac{2dk-dm+2fs-f\nu+2(2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2cs-c\nu}}\right)$$
$$\left.\left.\left.\sin\left(-\frac{(2dk-dm+2fs-f\nu)^2}{4(2cs-c\nu)}+2ek-em+2gs-g\nu+\frac{m\pi}{2}\right)\right)\right)\right) /; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.2172.01

$$\int \sin^m(d z+e)\cos^\nu\left(\sqrt{z}\, c+f z+g\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)-\frac{2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sin\left(-\frac{\pi m}{2}+e(m-2k)-d(2k-m)z\right)}{2k-m}\right)(1-\nu \bmod 2)}{d}+$$
$$2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(f(\nu-2s))^{3/2}}\left(\binom{\nu}{s}\left(2\sqrt{f(\nu-2s)}\sin\left(g(\nu-2s)+fz(\nu-2s)+c\sqrt{z}(\nu-2s)\right)-\right.\right.$$
$$c\sqrt{2\pi}(\nu-2s)\left(\cos\left(\frac{c^2(\nu-2s)}{4f}-g(\nu-2s)\right)C\left(\frac{c(\nu-2s)+2f\sqrt{z}(\nu-2s)}{\sqrt{2\pi}\sqrt{f(\nu-2s)}}\right)+\right.$$

$$S\left(\frac{c\,(v-2\,s)+2\,f\,\sqrt{z}\,\,(v-2\,s)}{\sqrt{2\,\pi}\,\,\sqrt{f\,(v-2\,s)}}\right)\sin\left(\frac{c^2\,(v-2\,s)}{4\,f}-g\,(v-2\,s)\right)\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\Bigg(\Bigg(\sqrt{2\,\pi}\,\,(2\,c\,s-c\,v)\Bigg(\cos\Bigg(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}+2\,e\,k-e\,m-$$

$$2\,g\,s+g\,v+\frac{m\,\pi}{2}\Bigg)\,C\left(\frac{-2\,c\,s+c\,v+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)-$$

$$S\left(\frac{-2\,c\,s+c\,v+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)\sin\Bigg(-\frac{(c\,v-2\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}+$$

$$2\,e\,k-e\,m-2\,g\,s+g\,v+\frac{m\,\pi}{2}\Bigg)\Bigg)+2\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}\,\,\sin\Bigg(2\,e\,k-e\,m-2\,g\,s+g\,v+$$

$$(2\,d\,k-d\,m-2\,f\,s+f\,v)\,z+(c\,v-2\,c\,s)\,\sqrt{z}\,+\frac{m\,\pi}{2}\Bigg)\Bigg)\Bigg/(2\,d\,k-d\,m-2\,f\,s+f\,v)^{3/2}+$$

$$\Bigg(\sqrt{2\,\pi}\,\,(c\,v-2\,c\,s)\Bigg(\cos\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,e\,k-e\,m+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)$$

$$C\left(\frac{2\,c\,s-c\,v+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)-$$

$$S\left(\frac{2\,c\,s-c\,v+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)$$

$$\sin\left(-\frac{(2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,e\,k-e\,m+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)\Bigg)+$$

$$2\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}\,\,\sin\Bigg(2\,e\,k-e\,m+2\,g\,s-g\,v+(2\,d\,k-d\,m+2\,f\,s-f\,v)\,z+$$

$$(2\,c\,s-c\,v)\,\sqrt{z}\,+\frac{m\,\pi}{2}\Bigg)\Bigg)\Bigg/(2\,d\,k-d\,m+2\,f\,s-f\,v)^{3/2}\Bigg)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m(b\,z^r)\cos^v(c\,z^r+f\,z+g)$

01.07.21.2173.01

$$\int \sin^m(b z^2) \cos^v(c z^2 + f z + g)\, dz = 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{b(m-2k)}} \binom{m}{k} \left(\cos\left(\frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) + S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(\frac{m\pi}{2}\right) \right) +$$
$$2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{\sqrt{c(v-2s)}} \left(\binom{v}{s} \left(\cos\left(\frac{f^2(v-2s)}{4c} - g(v-2s)\right) C\left(\frac{f(v-2s) + 2cz(v-2s)}{\sqrt{2\pi}\sqrt{c(v-2s)}}\right) + S\left(\frac{f(v-2s) + 2cz(v-2s)}{\sqrt{2\pi}\sqrt{c(v-2s)}}\right) \sin\left(\frac{f^2(v-2s)}{4c} - g(v-2s)\right) \right) \right) +$$
$$2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\left(\cos\left(-\frac{(f v - 2 f s)^2}{4(2bk - bm - 2cs + cv)} - 2gs + gv + \frac{m\pi}{2}\right) C\left(\frac{-2fs + fv + 2(2bk - bm - 2cs + cv) z}{\sqrt{2\pi}\sqrt{2bk - bm - 2cs + cv}}\right) - S\left(\frac{-2fs + fv + 2(2bk - bm - 2cs + cv) z}{\sqrt{2\pi}\sqrt{2bk - bm - 2cs + cv}}\right) \sin\left(-\frac{(f v - 2 f s)^2}{4(2bk - bm - 2cs + cv)} - 2gs + gv + \frac{m\pi}{2}\right) \right) \Big/ \left(\sqrt{2bk - bm - 2cs + cv}\right) + \left(\cos\left(-\frac{(2fs - fv)^2}{4(2bk - bm + 2cs - cv)} + 2gs - gv + \frac{m\pi}{2}\right) C\left(\frac{2fs - fv + 2(2bk - bm + 2cs - cv) z}{\sqrt{2\pi}\sqrt{2bk - bm + 2cs - cv}}\right) - S\left(\frac{2fs - fv + 2(2bk - bm + 2cs - cv) z}{\sqrt{2\pi}\sqrt{2bk - bm + 2cs - cv}}\right) \sin\left(-\frac{(2fs - fv)^2}{4(2bk - bm + 2cs - cv)} + 2gs - gv + \frac{m\pi}{2}\right) \right) \Big/ \left(\sqrt{2bk - bm + 2cs - cv}\right) \right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2174.01

$$\int \sin^m(\sqrt{z}\, b) \cos^v(\sqrt{z}\, c + f z + g)\, dz =$$
$$2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + 2^{-m-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{(f(v-2s))^{3/2}} \left(\binom{v}{s} \left(2\sqrt{f(v-2s)} \sin\left(g(v-2s) + f z(v-2s) + c\sqrt{z}\,(v-2s)\right) - c\sqrt{2\pi}\,(v-2s) \left(\cos\left(\frac{c^2(v-2s)}{4f} - g(v-2s)\right) C\left(\frac{c(v-2s) + 2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\sqrt{f(v-2s)}}\right) + S\left(\frac{c(v-2s) + 2f\sqrt{z}\,(v-2s)}{\sqrt{2\pi}\sqrt{f(v-2s)}}\right) \sin\left(\frac{c^2(v-2s)}{4f} - g(v-2s)\right) \right) \right) \right) +$$

$$\frac{1}{b^2}\left(2^{-m-v+2}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(2k-m)^2}\left((-1)^k\binom{m}{k}\left(\cos\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)+\right.\right.\right.$$

$$\left.\left.\left.b(2k-m)\sqrt{z}\,\sin\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)\right)\right)\right)+$$

$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{(fv-2fs)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm+2cs-cv)\left(\cos\left(-\frac{(2bk-bm-2cs+cv)^2}{4(fv-2fs)}-\right.\right.\right.\right.$$

$$\left.2gs+gv+\frac{m\pi}{2}\right)C\left(\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{fv-2fs}}\right)-S\left(\right.$$

$$\left.\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{fv-2fs}}\right)\sin\left(\right.$$

$$\left.\left.-\frac{(2bk-bm-2cs+cv)^2}{4(fv-2fs)}-2gs+gv+\frac{m\pi}{2}\right)\right)+$$

$$\left.2\sqrt{fv-2fs}\,\sin\left(\frac{\pi m}{2}-2gs+gv+(fv-2fs)z+(2bk-bm-2cs+cv)\sqrt{z}\right)\right)+$$

$$\frac{1}{(2fs-fv)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm-2cs+cv)\left(\cos\left(-\frac{(2bk-bm+2cs-cv)^2}{4(2fs-fv)}+2gs-gv+\frac{m\pi}{2}\right)\right.\right.$$

$$C\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2fs-fv}}\right)-$$

$$S\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2fs-fv}}\right)$$

$$\left.\sin\left(-\frac{(2bk-bm+2cs-cv)^2}{4(2fs-fv)}+2gs-gv+\frac{m\pi}{2}\right)\right)+2\sqrt{2fs-fv}$$

$$\left.\left.\left.\sin\left(\frac{\pi m}{2}+2gs-gv+(2fs-fv)z+(2bk-bm+2cs-cv)\sqrt{z}\right)\right)\right)\right)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m(b z^r + e)\cos^v(c z^r + f z + g)$

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$$\int \sin^m\left(b z^2+e\right) \cos^\nu\left(c z^2+f z+g\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(e(m-2k)-\frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(e(m-2k)-\frac{m\pi}{2}\right)\right)\right)\right) (1-\nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{c(\nu-2s)}} \left(\binom{\nu}{s} \left(\cos\left(\frac{f^2(\nu-2s)}{4c}-g(\nu-2s)\right) C\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right) + S\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right) \sin\left(\frac{f^2(\nu-2s)}{4c}-g(\nu-2s)\right)\right)\right) + 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{2bk-bm-2cs+c\nu}} \left(\cos\left(-\frac{(f\nu-2fs)^2}{4(2bk-bm-2cs+c\nu)}+2ek-em-2gs+g\nu+\frac{m\pi}{2}\right) C\left(\frac{-2fs+f\nu+2(2bk-bm-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+c\nu}}\right) - S\left(\frac{-2fs+f\nu+2(2bk-bm-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+c\nu}}\right) \sin\left(-\frac{(f\nu-2fs)^2}{4(2bk-bm-2cs+c\nu)}+2ek-em-2gs+g\nu+\frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{2bk-bm+2cs-c\nu}} \left(\cos\left(-\frac{(2fs-f\nu)^2}{4(2bk-bm+2cs-c\nu)}+2ek-em+2gs-g\nu+\frac{m\pi}{2}\right) C\left(\frac{2fs-f\nu+2(2bk-bm+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-c\nu}}\right) - S\left(\frac{2fs-f\nu+2(2bk-bm+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-c\nu}}\right) \sin\left(-\frac{(2fs-f\nu)^2}{4(2bk-bm+2cs-c\nu)}+2ek-em+2gs-g\nu+\frac{m\pi}{2}\right)\right)\right) /;\, m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

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$$\int \sin^m\left(\sqrt{z}\, b+e\right) \cos^\nu\left(\sqrt{z}\, c+f z+g\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) + \frac{1}{b^2} \left(2^{-m-\nu+2} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(2k-m)^2} \left((-1)^k \binom{m}{k} \left(\cos\left(-b\sqrt{z}\,(2k-m)+e(m-2k)-\frac{m\pi}{2}\right) - \right.\right.\right.\right.$$

$$b\,(2\,k-m)\,\sqrt{z}\,\sin\left(-b\,\sqrt{z}\,(2\,k-m)+e\,(m-2\,k)-\frac{m\,\pi}{2}\right)\Bigg)\Bigg)\Bigg)\Bigg)(1-v\bmod 2)\Bigg)+$$

$$2^{-m-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(f\,(v-2\,s))^{3/2}}\left(\binom{v}{s}\left(2\,\sqrt{f\,(v-2\,s)}\,\sin\left(g\,(v-2\,s)+f\,z\,(v-2\,s)+c\,\sqrt{z}\,(v-2\,s)\right)-\right.\right.$$

$$c\,\sqrt{2\,\pi}\,(v-2\,s)\left(\cos\left(\frac{c^2\,(v-2\,s)}{4\,f}-g\,(v-2\,s)\right)C\left(\frac{c\,(v-2\,s)+2\,f\,\sqrt{z}\,(v-2\,s)}{\sqrt{2\,\pi}\,\sqrt{f\,(v-2\,s)}}\right)+\right.$$

$$\left.\left.\left.S\left(\frac{c\,(v-2\,s)+2\,f\,\sqrt{z}\,(v-2\,s)}{\sqrt{2\,\pi}\,\sqrt{f\,(v-2\,s)}}\right)\sin\left(\frac{c^2\,(v-2\,s)}{4\,f}-g\,(v-2\,s)\right)\right)\right)\right)+$$

$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{(f\,v-2\,f\,s)^{3/2}}\left(\sqrt{2\,\pi}\,(-2\,b\,k+b\,m+2\,c\,s-c\,v)\left(\cos\left(-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,(f\,v-2\,f\,s)}+\right.\right.\right.\right.$$

$$\left.2\,e\,k-e\,m-2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)C\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,v+2\,(f\,v-2\,f\,s)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{f\,v-2\,f\,s}}\right)-$$

$$S\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,v+2\,(f\,v-2\,f\,s)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{f\,v-2\,f\,s}}\right)\sin\left(-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,(f\,v-2\,f\,s)}+\right.$$

$$\left.\left.2\,e\,k-e\,m-2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)\right)+2\,\sqrt{f\,v-2\,f\,s}$$

$$\left.\sin\left(2\,e\,k-e\,m-2\,g\,s+g\,v+(f\,v-2\,f\,s)\,z+(2\,b\,k-b\,m-2\,c\,s+c\,v)\,\sqrt{z}+\frac{m\,\pi}{2}\right)\right)+$$

$$\frac{1}{(2\,f\,s-f\,v)^{3/2}}\left(\sqrt{2\,\pi}\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\left(\cos\left(-\frac{(2\,b\,k-b\,m+2\,c\,s-c\,v)^2}{4\,(2\,f\,s-f\,v)}+2\,e\,k-\right.\right.\right.$$

$$\left.e\,m+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)C\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,v+2\,(2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,f\,s-f\,v}}\right)-$$

$$S\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,v+2\,(2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,f\,s-f\,v}}\right)\sin\left(-\frac{(2\,b\,k-b\,m+2\,c\,s-c\,v)^2}{4\,(2\,f\,s-f\,v)}+\right.$$

$$\left.\left.2\,e\,k-e\,m+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)\right)+2\,\sqrt{2\,f\,s-f\,v}\,\sin\left(2\,e\,k-e\,m+2\,g\,s-\right.$$

$$\left.\left.\left.g\,v+(2\,f\,s-f\,v)\,z+(2\,b\,k-b\,m+2\,c\,s-c\,v)\,\sqrt{z}+\frac{m\,\pi}{2}\right)\right)\right)\bigg/;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m(b z^r + d z)\cos^\nu(c z^r + f z + g)$

01.07.21.2177.01

$$\int \sin^m(b z^2 + d z)\cos^\nu(c z^2 + f z + g)\,dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{b(m-2k)}}\left((-1)^k\binom{m}{k}\left(\cos\left(\frac{(m-2k)d^2}{4b}+\frac{m\pi}{2}\right)C\left(\frac{d(m-2k)+2bz(m-2k)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right)+ S\left(\frac{d(m-2k)+2bz(m-2k)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right)\sin\left(\frac{(m-2k)d^2}{4b}+\frac{m\pi}{2}\right)\right)\right)\right)(1-\nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{c(\nu-2s)}}\left(\binom{\nu}{s}\left(\cos\left(\frac{f^2(\nu-2s)}{4c}-g(\nu-2s)\right)C\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)+ S\left(\frac{f(\nu-2s)+2cz(\nu-2s)}{\sqrt{2\pi}\sqrt{c(\nu-2s)}}\right)\sin\left(\frac{f^2(\nu-2s)}{4c}-g(\nu-2s)\right)\right)\right)+ 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(\cos\left(-\frac{(2dk-dm-2fs+f\nu)^2}{4(2bk-bm-2cs+c\nu)}-2gs+g\nu+\frac{m\pi}{2}\right) C\left(\frac{2dk-dm-2fs+f\nu+2(2bk-bm-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+c\nu}}\right)- S\left(\frac{2dk-dm-2fs+f\nu+2(2bk-bm-2cs+c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2cs+c\nu}}\right)\sin\left(-\frac{(2dk-dm-2fs+f\nu)^2}{4(2bk-bm-2cs+c\nu)}- 2gs+g\nu+\frac{m\pi}{2}\right)\right)\Big/\left(\sqrt{2bk-bm-2cs+c\nu}\right)+\left(\cos\left(-\frac{(2dk-dm+2fs-f\nu)^2}{4(2bk-bm+2cs-c\nu)}+ 2gs-g\nu+\frac{m\pi}{2}\right)C\left(\frac{2dk-dm+2fs-f\nu+2(2bk-bm+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-c\nu}}\right)- S\left(\frac{2dk-dm+2fs-f\nu+2(2bk-bm+2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2cs-c\nu}}\right)\sin\left(-\frac{(2dk-dm+2fs-f\nu)^2}{4(2bk-bm+2cs-c\nu)}+ 2gs-g\nu+\frac{m\pi}{2}\right)\right)\Big/\left(\sqrt{2bk-bm+2cs-c\nu}\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.2178.01

$$\int \sin^m\left(\sqrt{z}\,b + d z\right)\cos^\nu\left(\sqrt{z}\,c + f z + g\right)dz = 2^{-m-\nu} z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + 2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(d(2k-m))^{3/2}}\left((-1)^k\binom{m}{k}\left(2\sqrt{d(2k-m)}\,\sin\left(dz(2k-m)+b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)-\right.\right.\right.$$

$$b\,(2\,k-m)\,\sqrt{2\,\pi}\,\left(\cos\!\left(\frac{b^2\,(2\,k-m)}{4\,d}-\frac{m\,\pi}{2}\right)C\!\left(\frac{b\,(2\,k-m)+2\,d\,\sqrt{z}\,(2\,k-m)}{\sqrt{d\,(2\,k-m)}\,\sqrt{2\,\pi}}\right)+\right.$$

$$\left.\left.S\!\left(\frac{b\,(2\,k-m)+2\,d\,\sqrt{z}\,(2\,k-m)}{\sqrt{d\,(2\,k-m)}\,\sqrt{2\,\pi}}\right)\sin\!\left(\frac{b^2\,(2\,k-m)}{4\,d}-\frac{m\,\pi}{2}\right)\right)\right)\right)\right)(1-v\bmod 2)+$$

$$2^{-m-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(f\,(v-2\,s))^{3/2}}\left(\binom{v}{s}\left(2\,\sqrt{f\,(v-2\,s)}\,\sin\!\left(g\,(v-2\,s)+f\,z\,(v-2\,s)+c\,\sqrt{z}\,(v-2\,s)\right)-\right.\right.$$

$$c\,\sqrt{2\,\pi}\,(v-2\,s)\left(\cos\!\left(\frac{c^2\,(v-2\,s)}{4\,f}-g\,(v-2\,s)\right)C\!\left(\frac{c\,(v-2\,s)+2\,f\,\sqrt{z}\,(v-2\,s)}{\sqrt{2\,\pi}\,\sqrt{f\,(v-2\,s)}}\right)+\right.$$

$$\left.\left.\left.\left.S\!\left(\frac{c\,(v-2\,s)+2\,f\,\sqrt{z}\,(v-2\,s)}{\sqrt{2\,\pi}\,\sqrt{f\,(v-2\,s)}}\right)\sin\!\left(\frac{c^2\,(v-2\,s)}{4\,f}-g\,(v-2\,s)\right)\right)\right)\right)\right)+$$

$$2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left(\left(\sqrt{2\,\pi}\,(-2\,b\,k+b\,m+2\,c\,s-c\,v)\left(\cos\!\left(-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}-\right.\right.\right.\right.\right.$$

$$\left.2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)C\!\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,v+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)-$$

$$S\!\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,v+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}}\right)\sin\!\left(-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}-\right.$$

$$\left.\left.\left.2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)\right)+2\,\sqrt{2\,d\,k-d\,m-2\,f\,s+f\,v}\,\sin\!\left(\frac{\pi\,m}{2}-2\,g\,s+g\,v+\right.$$

$$\left.\left.(2\,d\,k-d\,m-2\,f\,s+f\,v)\,z+(2\,b\,k-b\,m-2\,c\,s+c\,v)\,\sqrt{z}\right)\right)\Big/(2\,d\,k-d\,m-2\,f\,s+f\,v)^{3/2}+$$

$$\left(\sqrt{2\,\pi}\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\left(\cos\!\left(-\frac{(2\,b\,k-b\,m+2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)\right.\right.$$

$$C\!\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,v+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)-$$

$$S\!\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,v+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}}\right)$$

$$\sin\left(-\frac{(2\,b\,k-b\,m+2\,c\,s-c\,v)^2}{4\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)\Bigg)+$$
$$2\,\sqrt{2\,d\,k-d\,m+2\,f\,s-f\,v}\,\sin\left(\frac{\pi\,m}{2}+2\,g\,s-g\,v+(2\,d\,k-d\,m+2\,f\,s-f\,v)\,z+\right.$$
$$\left.\left.(2\,b\,k-b\,m+2\,c\,s-c\,v)\,\sqrt{z}\right)\Bigg)\Big/(2\,d\,k-d\,m+2\,f\,s-f\,v)^{3/2}\right)/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m(b\,z^r+d\,z+e)\cos^v(c\,z^r+f\,z+g)$

01.07.21.2179.01

$$\int\sin^m(b\,z^2+d\,z+e)\cos^v(c\,z^2+f\,z+g)\,dz=2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)+$$
$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{b\,(m-2\,k)}}\binom{m}{k}\left(\cos\left(\frac{(m-2\,k)\,d^2}{4\,b}-(m-2\,k)\,e+\frac{m\,\pi}{2}\right)\right.$$
$$C\left(\frac{(m-2\,k)\,d+2\,b\,(m-2\,k)\,z}{\sqrt{b\,(m-2\,k)}\,\sqrt{2\,\pi}}\right)+S\left(\frac{(m-2\,k)\,d+2\,b\,(m-2\,k)\,z}{\sqrt{b\,(m-2\,k)}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(m-2\,k)\,d^2}{4\,b}-(m-2\,k)\,e+\frac{m\,\pi}{2}\right)\Bigg)+$$
$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{c\,(v-2\,s)}}\binom{v}{s}\left(\cos\left(\frac{f^2\,(v-2\,s)}{4\,c}-g\,(v-2\,s)\right)C\left(\frac{f\,(v-2\,s)+2\,c\,z\,(v-2\,s)}{\sqrt{2\,\pi}\,\sqrt{c\,(v-2\,s)}}\right)+\right.$$
$$\left.S\left(\frac{f\,(v-2\,s)+2\,c\,z\,(v-2\,s)}{\sqrt{2\,\pi}\,\sqrt{c\,(v-2\,s)}}\right)\sin\left(\frac{f^2\,(v-2\,s)}{4\,c}-g\,(v-2\,s)\right)\right)+$$
$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{\sqrt{2\,b\,k-b\,m-2\,c\,s+c\,v}}\left(\cos\left(-\frac{(2\,k\,d-m\,d-2\,f\,s+f\,v)^2}{4\,(2\,b\,k-b\,m-2\,c\,s+c\,v)}+2\,k\,e-\right.\right.\right.$$
$$\left.m\,e-2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)C\left(\frac{2\,k\,d-m\,d-2\,f\,s+f\,v+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,b\,k-b\,m-2\,c\,s+c\,v}}\right)-$$
$$S\left(\frac{2\,k\,d-m\,d-2\,f\,s+f\,v+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,b\,k-b\,m-2\,c\,s+c\,v}}\right)\sin\left(-\frac{(2\,k\,d-m\,d-2\,f\,s+f\,v)^2}{4\,(2\,b\,k-b\,m-2\,c\,s+c\,v)}+\right.$$
$$\left.\left.2\,k\,e-m\,e-2\,g\,s+g\,v+\frac{m\,\pi}{2}\right)\right)+\frac{1}{\sqrt{2\,b\,k-b\,m+2\,c\,s-c\,v}}\left(\cos\left(-\frac{(2\,k\,d-m\,d+2\,f\,s-f\,v)^2}{4\,(2\,b\,k-b\,m+2\,c\,s-c\,v)}+\right.\right.$$
$$\left.2\,k\,e-m\,e+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)C\left(\frac{2\,k\,d-m\,d+2\,f\,s-f\,v+2\,(2\,b\,k-b\,m+2\,c\,s-c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,b\,k-b\,m+2\,c\,s-c\,v}}\right)-$$
$$S\left(\frac{2\,k\,d-m\,d+2\,f\,s-f\,v+2\,(2\,b\,k-b\,m+2\,c\,s-c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,b\,k-b\,m+2\,c\,s-c\,v}}\right)\sin\left(-\frac{(2\,k\,d-m\,d+2\,f\,s-f\,v)^2}{4\,(2\,b\,k-b\,m+2\,c\,s-c\,v)}+\right.$$
$$\left.\left.\left.\left.2\,k\,e-m\,e+2\,g\,s-g\,v+\frac{m\,\pi}{2}\right)\right)\right)/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.07.21.2180.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \cos^\nu\left(\sqrt{z}\, c + f\, z + g\right) dz = 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(d(2k-m))^{3/2}} \left((-1)^k \binom{m}{k} \left(-b(2k-m)\sqrt{2\pi} \left(\cos\left(\frac{(2k-m)b^2}{4d} + e(m-2k) - \frac{m\pi}{2} \right) C\left(\frac{b(2k-m) + 2d\sqrt{z}\,(2k-m)}{\sqrt{d(2k-m)}\,\sqrt{2\pi}} \right) + S\left(\frac{b(2k-m) + 2d\sqrt{z}\,(2k-m)}{\sqrt{d(2k-m)}\,\sqrt{2\pi}} \right) \sin\left(\frac{(2k-m)b^2}{4d} + e(m-2k) - \frac{m\pi}{2} \right) \right) - 2\sqrt{d(2k-m)}\, \sin\left(-d\,z(2k-m) - b\sqrt{z}\,(2k-m) + e(m-2k) - \frac{m\pi}{2} \right) \right) \right) \right) (1 - \nu \bmod 2) + 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(f(\nu-2s))^{3/2}} \left(\binom{\nu}{s} \left(2\sqrt{f(\nu-2s)}\, \sin\left(g(\nu-2s) + f\,z(\nu-2s) + c\sqrt{z}\,(\nu-2s) \right) - c\sqrt{2\pi}\,(\nu-2s) \left(\cos\left(\frac{c^2(\nu-2s)}{4f} - g(\nu-2s) \right) C\left(\frac{c(\nu-2s) + 2f\sqrt{z}\,(\nu-2s)}{\sqrt{2\pi}\,\sqrt{f(\nu-2s)}} \right) + S\left(\frac{c(\nu-2s) + 2f\sqrt{z}\,(\nu-2s)}{\sqrt{2\pi}\,\sqrt{f(\nu-2s)}} \right) \sin\left(\frac{c^2(\nu-2s)}{4f} - g(\nu-2s) \right) \right) \right) \right) + 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\sqrt{2\pi}\,(-2bk + bm + 2cs - c\nu) \left(\cos\left(-\frac{(2bk - bm - 2cs + c\nu)^2}{4(2dk - dm - 2fs + f\nu)} + 2ek - em - 2gs + g\nu + \frac{m\pi}{2} \right) C\left(\frac{2bk - bm - 2cs + c\nu + 2(2dk - dm - 2fs + f\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk - dm - 2fs + f\nu}} \right) - S\left(\frac{2bk - bm - 2cs + c\nu + 2(2dk - dm - 2fs + f\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2dk - dm - 2fs + f\nu}} \right) \sin\left(-\frac{(2bk - bm - 2cs + c\nu)^2}{4(2dk - dm - 2fs + f\nu)} + 2ek - em - 2gs + g\nu + \frac{m\pi}{2} \right) \right) + 2\sqrt{2dk - dm - 2fs + f\nu}\, \sin\left(2ek - em - 2gs + g\nu + (2dk - dm - 2fs + f\nu)z + (2bk - bm - 2cs + c\nu)\sqrt{z} + \frac{m\pi}{2} \right) \right) \Big/ (2dk - dm - 2fs + f\nu)^{3/2} +$$

$$\left(\sqrt{2\pi}\,(-2bk+bm-2cs+cv)\left(\cos\left(-\frac{(2bk-bm+2cs-cv)^2}{4(2dk-dm+2fs-fv)}+2ek-em+2gs-gv+\frac{m\pi}{2}\right)\right.\right.$$

$$C\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2dk-dm+2fs-fv}}\right)-$$

$$S\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2dk-dm+2fs-fv}}\right)$$

$$\left.\sin\left(-\frac{(2bk-bm+2cs-cv)^2}{4(2dk-dm+2fs-fv)}+2ek-em+2gs-gv+\frac{m\pi}{2}\right)\right)+$$

$$2\sqrt{2dk-dm+2fs-fv}\,\sin\left(2ek-em+2gs-gv+(2dk-dm+2fs-fv)z+\right.$$

$$\left.\left.(2bk-bm+2cs-cv)\sqrt{z}+\frac{m\pi}{2}\right)\right)\Big/(2dk-dm+2fs-fv)^{3/2}\Bigg)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving sin and rational functions of cos

Involving $\frac{\sin(d\,z)}{a+b\cos(c\,z)}$

01.07.21.2181.01

$$\int\frac{\sin(dz)}{a+b\cos(cz)}\,dz=$$

$$-\frac{1}{2b\sqrt{a^2-b^2}}\left(i\,e^{i(c-d)z}\left(\frac{1}{c-d}\left(i\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(1-\frac{d}{c},1;2-\frac{d}{c};\frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right)\right.\right.\right.\right.$$

$$\left.\left.\left.{}_2F_1\left(1-\frac{d}{c},1;2-\frac{d}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-\frac{1}{c+d}\left(i\,e^{2idz}\left(\left(a+\sqrt{a^2-b^2}\right)\right.\right.$$

$$\left.\left.\left.\left.{}_2F_1\left(\frac{c+d}{c},1;\frac{d}{c}+2;\frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d}{c},1;\frac{d}{c}+2;-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)$$

01.07.21.2182.01

$$\int\frac{\sin(cz)}{a+b\cos(cz)}\,dz=-\frac{\log(a+b\cos(cz))}{bc}$$

01.07.21.2183.01

$$\int\frac{\sin(z)}{\cos(z)+1}\,dz=-2\log\left(\cos\left(\frac{z}{2}\right)\right)$$

01.07.21.2184.01

$$\int \frac{\sin(z)}{1-\cos(z)}\,dz = 2\log\left(\sin\left(\frac{z}{2}\right)\right)$$

01.07.21.2185.01

$$\int \frac{A+B\sin(c\,z)}{a+b\cos(c\,z)}\,dz = -\frac{1}{c}\left(\frac{2\,A\tanh^{-1}\left(\frac{(a-b)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right)}{\sqrt{b^2-a^2}} + \frac{B\log(a+b\cos(c\,z))}{b}\right)$$

01.07.21.2186.01

$$\int \frac{\sin(2\,c\,z)}{a+b\cos(c\,z)}\,dz = \frac{2\,a\log(a+b\cos(c\,z)) - 2\,b\cos(c\,z)}{b^2\,c}$$

01.07.21.2187.01

$$\int \frac{\sin(c\,z)}{a+b\cos(2\,c\,z)}\,dz = \frac{\tanh^{-1}\left(\frac{2\sqrt{b}\,\cos(c\,z)}{\sqrt{2\,b-2\,a}}\right)}{\sqrt{b}\,\sqrt{4\,b-2\,(a+b)}\,c}$$

01.07.21.2188.01

$$\int \frac{A+C\cos(z)+B\sin(z)}{1-\cos(z)}\,dz = \frac{2\sin\left(\frac{z}{2}\right)\left((A+C)\cos\left(\frac{z}{2}\right) + \left(C\,z - 2\,B\log\left(\sin\left(\frac{z}{2}\right)\right)\right)\sin\left(\frac{z}{2}\right)\right)}{\cos(z)-1}$$

01.07.21.2189.01

$$\int \frac{A+C\cos(z)+B\sin(z)}{\cos(z)+1}\,dz = \frac{2\cos\left(\frac{z}{2}\right)\left(\cos\left(\frac{z}{2}\right)\left(C\,z - 2\,B\log\left(\cos\left(\frac{z}{2}\right)\right)\right) + (A-C)\sin\left(\frac{z}{2}\right)\right)}{\cos(z)+1}$$

Involving $\sin(d\,z)\,(a+b\cos(c\,z))^{-n}$

01.07.21.2190.01

$$\int \frac{\sin(d\,z)}{(a+b\cos(c\,z))^2}\,dz = -\frac{1}{2\,b\,(a^2-b^2)^{3/2}}\Bigg(i\Bigg(\frac{1}{c-d}\Bigg(i\,e^{i(c-d)z}\Bigg(-{}_2F_1\Bigg(1-\frac{d}{c},2;2-\frac{d}{c};\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\Bigg)a^2+{}_2F_1\Bigg(1-\frac{d}{c},2;2-\frac{d}{c};-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}}\Bigg)a^2+$$
$$\Big(a+\sqrt{a^2-b^2}\Big)\,{}_2F_1\Bigg(1-\frac{d}{c},1;2-\frac{d}{c};\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\Bigg)a+$$
$$\Big(\sqrt{a^2-b^2}-a\Big)\,{}_2F_1\Bigg(1-\frac{d}{c},1;2-\frac{d}{c};-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}}\Bigg)a-$$
$$\sqrt{a^2-b^2}\;{}_2F_1\Bigg(1-\frac{d}{c},2;2-\frac{d}{c};\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\Bigg)a-\sqrt{a^2-b^2}\;{}_2F_1\Bigg(1-\frac{d}{c},2;2-\frac{d}{c};-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}}\Bigg)a+$$
$$b^2\,{}_2F_1\Bigg(1-\frac{d}{c},2;2-\frac{d}{c};\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\Bigg)-b^2\,{}_2F_1\Bigg(1-\frac{d}{c},2;2-\frac{d}{c};-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}}\Bigg)\Bigg)\Bigg)-$$
$$\frac{1}{c+d}\Bigg(i\,e^{i(c+d)z}\Bigg(-{}_2F_1\Bigg(\frac{c+d}{c},2;\frac{d}{c}+2;\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\Bigg)a^2+{}_2F_1\Bigg(\frac{c+d}{c},2;\frac{d}{c}+2;-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}}\Bigg)a^2+$$
$$\Big(a+\sqrt{a^2-b^2}\Big)\,{}_2F_1\Bigg(\frac{c+d}{c},1;\frac{d}{c}+2;\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\Bigg)a+$$
$$\Big(\sqrt{a^2-b^2}-a\Big)\,{}_2F_1\Bigg(\frac{c+d}{c},1;\frac{d}{c}+2;-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}}\Bigg)a-$$
$$\sqrt{a^2-b^2}\;{}_2F_1\Bigg(\frac{c+d}{c},2;\frac{d}{c}+2;\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\Bigg)a-\sqrt{a^2-b^2}\;{}_2F_1\Bigg(\frac{c+d}{c},2;\frac{d}{c}+2;-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}}\Bigg)a+$$
$$b^2\,{}_2F_1\Bigg(\frac{c+d}{c},2;\frac{d}{c}+2;\frac{b\,e^{i c z}}{\sqrt{a^2-b^2}-a}\Bigg)-b^2\,{}_2F_1\Bigg(\frac{c+d}{c},2;\frac{d}{c}+2;-\frac{b\,e^{i c z}}{a+\sqrt{a^2-b^2}}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)$$

01.07.21.2191.01

$$\int \frac{A+B\sin(z)}{(a+b\cos(z))^2}\,dz = \frac{b^2\,B-a^2\,B+A\,b^2\sin(z)}{b\,(b^2-a^2)\,(a+b\cos(z))}-\frac{2\,a\,A\tanh^{-1}\Bigg(\frac{(a-b)\tan\left(\frac{z}{2}\right)}{\sqrt{b^2-a^2}}\Bigg)}{(a^2-b^2)\sqrt{b^2-a^2}}$$

01.07.21.2192.01

$$\int \frac{A+B\sin(z)}{(\cos(z)+1)^2}\,dz = \frac{1}{12}\sec^3\Big(\frac{z}{2}\Big)\Big(6\,B\cos\Big(\frac{z}{2}\Big)+A\Big(3\sin\Big(\frac{z}{2}\Big)+\sin\Big(\frac{3\,z}{2}\Big)\Big)\Big)$$

01.07.21.2193.01

$$\int \frac{A+B\sin(z)}{(1-\cos(z))^2}\,dz = \frac{1}{12}\csc^3\left(\frac{z}{2}\right)\left(-3A\cos\left(\frac{z}{2}\right)+A\cos\left(\frac{3z}{2}\right)-6B\sin\left(\frac{z}{2}\right)\right)$$

01.07.21.2194.01

$$\int \frac{A+B\sin(z)}{(a+b\cos(z))^3}\,dz = \frac{1}{2}\left(\frac{A\left(-4a^2-3b\cos(z)\,a+b^2\right)\sin(z)\,b^2+\left(a^2-b^2\right)^2 B}{b\left(a^2-b^2\right)^2(a+b\cos(z))^2}-\frac{2A\left(2a^2+b^2\right)\tanh^{-1}\left(\frac{(a-b)\tan\left(\frac{z}{2}\right)}{\sqrt{b^2-a^2}}\right)}{\left(b^2-a^2\right)^{5/2}}\right)$$

01.07.21.2195.01

$$\int \frac{A+B\sin(z)}{(\cos(z)+1)^3}\,dz = \frac{1}{120}\sec^5\left(\frac{z}{2}\right)\left(15B\cos\left(\frac{z}{2}\right)+A\left(10\sin\left(\frac{z}{2}\right)+5\sin\left(\frac{3z}{2}\right)+\sin\left(\frac{5z}{2}\right)\right)\right)$$

01.07.21.2196.01

$$\int \frac{A+B\sin(z)}{(1-\cos(z))^3}\,dz = -\frac{1}{120}\csc^5\left(\frac{z}{2}\right)\left(10A\cos\left(\frac{z}{2}\right)-5A\cos\left(\frac{3z}{2}\right)+A\cos\left(\frac{5z}{2}\right)+15B\sin\left(\frac{z}{2}\right)\right)$$

01.07.21.2197.01

$$\int \frac{A+B\sin(z)+C\sin^2(z)}{(a+b\cos(z))^3}\,dz = \frac{1}{2}$$
$$\left(-\frac{2\left((2A+C)a^2+b^2(A-C)\right)\tanh^{-1}\left(\frac{(a-b)\tan\left(\frac{z}{2}\right)}{\sqrt{b^2-a^2}}\right)}{\left(b^2-a^2\right)^{5/2}}+\frac{a\left(\left(b^2-a^2\right)C-3Ab^2\right)\sin(z)}{b\left(a^2-b^2\right)^2(a+b\cos(z))}+\frac{\left(b^2-a^2\right)B+\left(Ab^2+\left(b^2-a^2\right)C\right)\sin(z)}{\left(b^3-a^2b\right)(a+b\cos(z))^2}\right)$$

Involving $\frac{\sin(d\,z)}{a+b\cos^2(c\,z)}$

01.07.21.2198.01

$$\int \frac{\sin(d\,z)}{a+b\cos^2(c\,z)}\,dz =$$
$$-\frac{1}{2\sqrt{a}\,b\sqrt{a+b}}\Bigg(i\Bigg(\frac{1}{2c+d}\Bigg(i\,e^{i(2c+d)z}\Bigg(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right)\,{}_2F_1\left(\frac{d}{2c}+1,1;\frac{d}{2c}+2;-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-$$
$$\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)\,{}_2F_1\left(\frac{d}{2c}+1,1;\frac{d}{2c}+2;-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)-$$
$$\frac{1}{2c-d}\Bigg(i\,e^{i(2c-d)z}\Bigg(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right)\,{}_2F_1\left(1-\frac{d}{2c},1;2-\frac{d}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-$$
$$\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)\,{}_2F_1\left(1-\frac{d}{2c},1;2-\frac{d}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

01.07.21.2199.01

$$\int \frac{\sin(2cz)}{a+b\cos^2(cz)}\,dz = -\frac{\log(2a+b+b\cos(2cz))}{bc}$$

Involving $\sin(d\,z)\left(a+b\cos^2(c\,z)\right)^{-n}$

01.07.21.2200.01

$$\int \frac{\sin(d\,z)}{\left(a+b\cos^2(c\,z)\right)^2}\,dz = -\frac{1}{4\,a^{3/2}\,b\,(a+b)^{3/2}}$$
$$\Bigg(i\Bigg(\frac{1}{2\,c+d}\Bigg(i\,e^{i\,(2\,c+d)\,z}\Bigg(-(2\,a+b)\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(\frac{d}{2\,c}+1,1;\frac{d}{2\,c}+2;-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-$$
$$(2\,a+b)\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(\frac{d}{2\,c}+1,1;\frac{d}{2\,c}+2;-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\,\Bigg(\left(-2\,a^{3/2}+2\sqrt{a+b}\,a-2\,b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1$$
$$\left(\frac{d}{2\,c}+1,2;\frac{d}{2\,c}+2;-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\Big(2\,a^{3/2}+2\sqrt{a+b}\,a+$$
$$2\,b\sqrt{a}+b\sqrt{a+b}\Big){}_2F_1\!\left(\frac{d}{2\,c}+1,2;\frac{d}{2\,c}+2;-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg)-$$
$$\frac{1}{2\,c-d}\Bigg(i\,e^{i\,(2\,c-d)\,z}\Bigg(-(2\,a+b)\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1-\frac{d}{2\,c},1;2-\frac{d}{2\,c};-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-$$
$$(2\,a+b)\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{d}{2\,c},1;2-\frac{d}{2\,c};-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\,\Bigg(\left(-2\,a^{3/2}+2\sqrt{a+b}\,a-2\,b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1$$
$$\left(1-\frac{d}{2\,c},2;2-\frac{d}{2\,c};-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\Big(2\,a^{3/2}+2\sqrt{a+b}\,a+$$
$$2\,b\sqrt{a}+b\sqrt{a+b}\Big){}_2F_1\!\left(1-\frac{d}{2\,c},2;2-\frac{d}{2\,c};-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

Involving rational functions of sin

Involving $\frac{1}{a+b\sin(c\,z)}$

01.07.21.2201.01

$$\int \frac{\cos^{\frac{1}{2}}(2\,c\,z)}{a+b\sin(c\,z)}\,dz = \frac{1}{b\,c}\left(\frac{\sqrt{b^2-2\,a^2}\,\tan^{-1}\left(\frac{\sqrt{b^2-2\,a^2}\,\cos(c\,z)}{\sqrt{a^2-b^2}\,\cos^{\frac{1}{2}}(2\,c\,z)}\right)}{\sqrt{a^2-b^2}} + \frac{2\,a\,F(c\,z\,|\,2)}{b} + \left(\frac{b}{a}-\frac{2\,a}{b}\right)\Pi\left(\frac{b^2}{a^2};\,c\,z\,\middle|\,2\right) + \sqrt{2}\,\sqrt{\cos^2(c\,z)}\,\log\left(\cos^{\frac{1}{2}}(2\,c\,z)+\sqrt{\cos(2\,c\,z)+1}\right)\sec(c\,z)\right)$$

01.07.21.2202.01

$$\int \frac{1}{\cos^{\frac{1}{2}}(2\,c\,z)\,(a+b\sin(c\,z))}\,dz = \frac{1}{b\,c}\left(\frac{b\,\Pi\left(\frac{b^2}{a^2};\,c\,z\,\middle|\,2\right)}{a} - \frac{1}{\sqrt{1-\frac{2\,a^2}{b^2}}\,\sqrt{1-\frac{a^2}{b^2}}}\tanh^{-1}\left(\frac{\sqrt{1-\frac{2\,a^2}{b^2}}\,\cos(c\,z)}{\sqrt{1-\frac{a^2}{b^2}}\,\cos^{\frac{1}{2}}(2\,c\,z)}\right)\right)$$

Involving algebraic functions of sin

01.07.21.2203.01

$$\int \sqrt{a+b\sin(c\,z)}\,\cos^2(c\,z)\,dz = \frac{1}{30\,b^2\,c\,\sqrt{a+b\sin(c\,z)}}\left(-8\sqrt{\frac{a+b\sin(c\,z)}{a+b}}\,\left(a^3+b\,a^2+3\,b^2\,a+3\,b^3\right)E\left(\frac{1}{4}(\pi-2\,c\,z)\,\middle|\,\frac{2\,b}{a+b}\right) + 8\,a\sqrt{\frac{a+b\sin(c\,z)}{a+b}}\,\left(a^2-b^2\right)F\left(\frac{1}{4}(\pi-2\,c\,z)\,\middle|\,\frac{2\,b}{a+b}\right) + 2\,b\cos(c\,z)\left(2\,a^2+8\,b\sin(c\,z)\,a+3\,b^2-3\,b^2\cos(2\,c\,z)\right)\right)$$

01.07.21.2204.01

$$\int \frac{\cos^2(c\,z)}{\sin^{\frac{1}{2}}(c\,z)\,(\sin(c\,z)+1)^2}\,dz = -\frac{2\left(\sin^{\frac{1}{2}}(c\,z)\left(\sin\left(\frac{c\,z}{2}\right)-\cos\left(\frac{c\,z}{2}\right)\right)+E\left(\frac{1}{4}(\pi-2\,c\,z)\,\middle|\,2\right)\left(\cos\left(\frac{c\,z}{2}\right)+\sin\left(\frac{c\,z}{2}\right)\right)\right)}{c\left(\cos\left(\frac{c\,z}{2}\right)+\sin\left(\frac{c\,z}{2}\right)\right)}$$

01.07.21.2205.01

$$\int \frac{\cos^2(z)}{\sqrt{a+b\sin(z)}\,(c+b\sin(z))^2}\,dz = \frac{1}{4\,b\,(a-c)}\left(\frac{1}{b^2\sqrt{-\frac{1}{a+b}}\,(a-c)}\left(8\,i\,a\left((a-c)\,F\left(i\sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\sin(z)}\right)\middle|\,\frac{a+b}{a-b}\right)+\right.\right.\right.$$

$$\left.c\,\Pi\left(\frac{a+b}{a-c};\,i\sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\sin(z)}\right)\middle|\,\frac{a+b}{a-b}\right)\right)\sec(z)\sqrt{\frac{b\,(\sin(z)+1)}{b-a}}\,\sqrt{\frac{b-b\sin(z)}{a+b}}\Bigg)-$$

$$\frac{1}{b^2\sqrt{-\frac{1}{a+b}}\,(a-c)}\left(i\,(\cos(z)+\cos(3\,z))\left(2\,(a-b)\,(a-c)\,E\left(i\sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\sin(z)}\right)\middle|\,\frac{a+b}{a-b}\right)+\right.\right.$$

$$2\,(a-c)\,(b+c)\,F\left(i\sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\sin(z)}\right)\middle|\,\frac{a+b}{a-b}\right)-$$

$$\left.\left(b^2-2\,c^2\right)\Pi\left(\frac{a+b}{a-c};\,i\sinh^{-1}\left(\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\sin(z)}\right)\middle|\,\frac{a+b}{a-b}\right)\right)\sec^2(z)\sec(2\,z)$$

$$\left.\left.\sqrt{\frac{b\,(\sin(z)+1)}{b-a}}\,\sqrt{\frac{b-b\sin(z)}{a+b}}\right)+\frac{6\,b\sqrt{\frac{a+b\sin(z)}{a+b}}\;\Pi\left(\frac{2\,b}{b+c};\,\frac{1}{4}\,(\pi-2\,z)\,\middle|\,\frac{2\,b}{a+b}\right)}{(b+c)\sqrt{a+b\sin(z)}}-\frac{4\cos(z)\sqrt{a+b\sin(z)}}{c+b\sin(z)}\right)$$

Involving products of the direct function and trigonometric functions

Involving sin

Involving $\sin(a\,z)\cos(b\,z)\cos(c\,z)$

01.07.21.2206.01

$$\int \sin(a\,z)\cos(b\,z)\cos(c\,z)\,dz = -\frac{1}{4}\left(\frac{\cos((a-b-c)\,z)}{a-b-c}+\frac{\cos(a\,z+b\,z+c\,z)}{a+b+c}+\frac{\cos(a\,z-b\,z+c\,z)}{a-b+c}+\frac{\cos(a\,z+b\,z-c\,z)}{a+b-c}\right)$$

Involving rational functions of sin

Involving $\frac{\cos(e\,z)\cos(d\,z)}{a+b\sin(c\,z)}$

01.07.21.2207.01

$$\int \frac{\cos(e\,z)\cos(d\,z)}{a+b\sin(c\,z)}\,dz = -\frac{1}{4\,b\sqrt{a^2-b^2}}\left(\frac{1}{c+d-e}\left(e^{i\,(c+d-e)\,z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d-e}{c},1;\frac{2\,c+d-e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d-e}{c},1;\frac{2\,c+d-e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)+\frac{1}{c-d+e}\left(e^{i\,(c-d+e)\,z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c-d+e}{c},1;\frac{2\,c-d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c-d+e}{c},1;\frac{2\,c-d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)+\frac{1}{c+d+e}\left(e^{i\,(c+d+e)\,z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d+e}{c},1;\frac{2\,c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d+e}{c},1;\frac{2\,c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)+\frac{1}{c-d-e}\left(e^{i\,(c-d-e)\,z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{-c+d+e}{c},1;-\frac{-2\,c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{-c+d+e}{c},1;-\frac{-2\,c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)$$

Involving $\cos(e\,z)\cos(d\,z)\,(a+b\sin(c\,z))^{-n}$

01.07.21.2208.01

$$\int \frac{\cos(e\,z)\cos(d\,z)}{(a+b\sin(c\,z))^2}\,dz = \frac{1}{4\,b\left(a^2-b^2\right)^{3/2}}\left(\frac{1}{c+d-e}\left(e^{i\,(c+d-e)\,z}\left(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d-e}{c},1;\frac{2\,c+d-e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d-e}{c},1;\frac{2\,c+d-e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+\left(a^2+\sqrt{a^2-b^2}\,a-b^2\right){}_2F_1\left(\frac{c+d-e}{c},2;\frac{2\,c+d-e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+\right.\right.\right.$$

$$\left(-a^2+\sqrt{a^2-b^2}\,a+b^2\right){}_2F_1\left(\frac{c+d-e}{c},2;\frac{2c+d-e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{c-d+e}\left(e^{i(c-d+e)z}\left(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c-d+e}{c},1;\frac{2c-d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+\right.\right.$$

$$a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c-d+e}{c},1;\frac{2c-d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\,a-b^2\right){}_2F_1\left(\frac{c-d+e}{c},2;\frac{2c-d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$\left(-a^2+\sqrt{a^2-b^2}\,a+b^2\right){}_2F_1\left(\frac{c-d+e}{c},2;\frac{2c-d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)+$$

$$\frac{1}{c+d+e}\left(e^{i(c+d+e)z}\left(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d+e}{c},1;\frac{2c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+\right.\right.$$

$$a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d+e}{c},1;\frac{2c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\,a-b^2\right){}_2F_1\left(\frac{c+d+e}{c},2;\frac{2c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$\left(-a^2+\sqrt{a^2-b^2}\,a+b^2\right){}_2F_1\left(\frac{c+d+e}{c},2;\frac{2c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)+$$

$$\frac{1}{c-d-e}\left(e^{i(c-d-e)z}\left(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{-c+d+e}{c},1;-\frac{-2c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+\right.\right.$$

$$a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{-c+d+e}{c},1;-\frac{-2c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\,a-b^2\right){}_2F_1\left(-\frac{-c+d+e}{c},2;-\frac{-2c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$\left(-a^2+\sqrt{a^2-b^2}\,a+b^2\right){}_2F_1\left(-\frac{-c+d+e}{c},2;-\frac{-2c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

Involving $\frac{\cos(e\,z)\cos(d\,z)}{a+b\sin^2(c\,z)}$

01.07.21.2209.01

$$\int \frac{\cos(e\,z)\cos(d\,z)}{a+b\sin^2(c\,z)}\,dz = -\frac{1}{4\sqrt{a}\;b\sqrt{a+b}} \left(i\left(\frac{1}{2c+d-e}\left(e^{-i(2c+d-e)z}\left(\left(-2a+2\sqrt{a+b}\;\sqrt{a}-b\right){}_2F_1\left(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};\frac{b\,e^{-2icz}}{2a+2\sqrt{a+b}\;\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\;\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};\frac{b\,e^{-2icz}}{2a-2\sqrt{a+b}\;\sqrt{a}+b}\right)\right)\right)+\frac{1}{2c-d+e}\left(e^{-i(2c-d+e)z}\left(\left(-2a+2\sqrt{a+b}\;\sqrt{a}-b\right){}_2F_1\left(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};\frac{b\,e^{-2icz}}{2a+2\sqrt{a+b}\;\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\;\sqrt{a}+b\right){}_2F_1\left(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};\frac{b\,e^{-2icz}}{2a-2\sqrt{a+b}\;\sqrt{a}+b}\right)\right)\right)+\frac{1}{2c+d+e}\left(e^{-i(2c+d+e)z}\left(\left(-2a+2\sqrt{a+b}\;\sqrt{a}-b\right){}_2F_1\left(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};\frac{b\,e^{-2icz}}{2a+2\sqrt{a+b}\;\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\;\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};\frac{b\,e^{-2icz}}{2a-2\sqrt{a+b}\;\sqrt{a}+b}\right)\right)\right)-\frac{1}{-2c+d+e}\left(e^{-i(2c-d-e)z}\left(\left(-2a+2\sqrt{a+b}\;\sqrt{a}-b\right){}_2F_1\left(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};\frac{b\,e^{-2icz}}{2a+2\sqrt{a+b}\;\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\;\sqrt{a}+b\right){}_2F_1\left(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};\frac{b\,e^{-2icz}}{2a-2\sqrt{a+b}\;\sqrt{a}+b}\right)\right)\right)\right)\right)$$

Involving $\cos(e\,z)\cos(d\,z)\left(a+b\sin^2(c\,z)\right)^{-n}$

01.07.21.2210.01

$$\int \frac{\cos(e\,z)\cos(d\,z)}{\left(a+b\sin^2(c\,z)\right)^2}\,dz = \frac{1}{8a^{3/2}\,b\,(a+b)^{3/2}}\left(i\left(\frac{1}{2c+d-e}\left(e^{i(2c+d-e)z}\left((2a+b)\left(-2a+2\sqrt{a+b}\;\sqrt{a}-b\right){}_2F_1\left(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\;\sqrt{a}+b}\right)+(2a+b)\left(2a+2\sqrt{a+b}\;\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\;\sqrt{a}+b}\right)+2\sqrt{a}\left(\left(2a^{3/2}-2\sqrt{a+b}\;a+2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(\frac{2c+d-e}{2c},2;\frac{4c+d-e}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\;\sqrt{a}+b}\right)-\left(2a^{3/2}+2\sqrt{a+b}\;a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(\frac{2c+d-e}{2c},2;\frac{4c+d-e}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\;\sqrt{a}+b}\right)\right)\right)\right)+\frac{1}{2c-d+e}\right.$$

$$\left(e^{i(2c-d+e)z}\left((2a+b)\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\right.\right.$$
$$(2a+b)\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(\frac{2c-d+e}{2c},2;\frac{4c-d+e}{2c};\right.\right.$$
$$\left.\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1$$
$$\left.\left.\left.\left.\left(\frac{2c-d+e}{2c},2;\frac{4c-d+e}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)+\frac{1}{2c+d+e}$$
$$\left(e^{i(2c+d+e)z}\left((2a+b)\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\right.\right.$$
$$(2a+b)\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(\frac{2c+d+e}{2c},2;\frac{4c+d+e}{2c};\right.\right.$$
$$\left.\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1$$
$$\left.\left.\left.\left.\left(\frac{2c+d+e}{2c},2;\frac{4c+d+e}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)-\frac{1}{-2c+d+e}\left(e^{i(2c-d-e)z}\right.$$
$$\left((2a+b)\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\right.$$
$$(2a+b)\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(-\frac{-2c+d+e}{2c},2;-\frac{-4c+d+e}{2c};\right.\right.$$
$$\left.\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1$$
$$\left.\left.\left.\left.\left.\left(-\frac{-2c+d+e}{2c},2;-\frac{-4c+d+e}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)\right)\right)$$

Involving algebraic functions of sin

Involving $\cos(d\,z)\cos(e\,z)\,(a+b\sin(c\,z))^{\beta}$

01.07.21.2211.01

$$\int \cos(d\,z)\cos(e\,z)\,(a+b\sin(c\,z))^{\beta}\,dz = \frac{1}{4}\,i\left(1+\frac{i\,b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)^{-\beta}\left(1-\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)^{-\beta}$$

$$(a+b\sin(c\,z))^{\beta}\left(\frac{e^{i\,(d-e)\,z}}{-d+e+c\,\beta}\,F_1\!\left(\frac{d-e-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c+d-e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)-\right.$$

$$\frac{e^{i\,(d+e)\,z}}{d+e-c\,\beta}\,F_1\!\left(\frac{d+e-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c+d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$\frac{e^{-i\,(d-e)\,z}}{d-e+c\,\beta}\,F_1\!\left(-\frac{d-e+c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c-d+e}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)+$$

$$\left.\frac{e^{-i\,(d+e)\,z}}{d+e+c\,\beta}\,F_1\!\left(-\frac{d+e+c\,\beta}{c};-\beta,-\beta;-\frac{d+e+c\,(\beta-1)}{c};\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{i\,c\,z}}{a-\sqrt{a^2-b^2}}\right)\right)$$

Involving $\cos(d\,z)\cos(e\,z)\left(a+b\sin^2(c\,z)\right)^{\beta}$

01.07.21.2212.01

$$\int \cos(d\,z)\cos(e\,z)\left(a+b\sin^2(c\,z)\right)^{\beta}dz =$$

$$-\frac{1}{4}\,i\left(1-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)^{-\beta}\left(1-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b+2\sqrt{a\,(a+b)}}\right)^{-\beta}\left(a-\frac{1}{4}\,b\,e^{-2\,i\,c\,z}\left(-1+e^{2\,i\,c\,z}\right)^2\right)^{\beta}$$

$$\left(\frac{e^{i\,(d-e)\,z}}{d-e-2\,c\,\beta}\,F_1\!\left(\frac{d-e-2\,c\,\beta}{2\,c};-\beta,-\beta;\frac{-2\,\beta\,c+2\,c+d-e}{2\,c};\frac{b\,e^{2\,i\,c\,z}}{2\,a+b+2\sqrt{a\,(a+b)}},\frac{b\,e^{2\,i\,c\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)+\right.$$

$$\frac{e^{i\,(d+e)\,z}}{d+e-2\,c\,\beta}\,F_1\!\left(\frac{d+e-2\,c\,\beta}{2\,c};-\beta,-\beta;\frac{-2\,\beta\,c+2\,c+d+e}{2\,c};\frac{b\,e^{2\,i\,c\,z}}{2\,a+b+2\sqrt{a\,(a+b)}},\frac{b\,e^{2\,i\,c\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)-$$

$$\frac{e^{-i\,(d-e)\,z}}{d-e+2\,c\,\beta}\,F_1\!\left(-\frac{d-e+2\,c\,\beta}{2\,c};-\beta,-\beta;\frac{-2\,\beta\,c+2\,c-d+e}{2\,c};\frac{b\,e^{2\,i\,c\,z}}{2\,a+b+2\sqrt{a\,(a+b)}},\frac{b\,e^{2\,i\,c\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)-$$

$$\left.\frac{e^{-i\,(d+e)\,z}}{d+e+2\,c\,\beta}\,F_1\!\left(-\frac{d+e+2\,c\,\beta}{2\,c};-\beta,-\beta;-\frac{d+e+2\,c\,(\beta-1)}{2\,c};\frac{b\,e^{2\,i\,c\,z}}{2\,a+b+2\sqrt{a\,(a+b)}},\frac{b\,e^{2\,i\,c\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)\right)$$

Involving $\cos(d\,z)\cos(e\,z)\left(\left(a+b\sin^2(c\,z)\right)^n\right)^{\beta}$ TO ADD

01.07.21.2213.01

$$\int \frac{\cos(z)\cos(2z)}{\sqrt{\left(a+b\sin^2(z)\right)^3}}\,dz = \frac{\frac{b\sin^3(z)}{a}+\sin(z)+\frac{\left(\frac{\sqrt{2}\,(4a+b)\sin(z)}{a\sqrt{2a+b-b\cos(2z)}}-\frac{4\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{-b}\,\sin(z)}{\sqrt{2a+b-b\cos(2z)}}\right)}{\sqrt{-b}}\right)\left(b\sin^2(z)+a\right)^{3/2}}{b}}{2\sqrt{\left(b\sin^2(z)+a\right)^3}}$$

01.07.21.2214.01

$$\int \frac{\sin(3z)\cos(z)\cos(2z)}{\sqrt{\left(b\sin^2(z)+a\right)^5}}\,dz = -\frac{1}{6b^3\sqrt{\left(b\sin^2(z)+a\right)^5}}\Bigg((2a+b-b\cos(2z))$$
$$\left(24\sqrt{1-\frac{b\cos(2z)}{2a+b}}\,a^2-64a^2-68ba+48b\cos(2z)\,a+24b\sqrt{1-\frac{b\cos(2z)}{2a+b}}\,a-12b\cos(2z)\sqrt{1-\frac{b\cos(2z)}{2a+b}}\,a-\right.$$
$$\left.21b^2+27b^2\cos(2z)-3b^2\cos(4z)+6b^2\sqrt{1-\frac{b\cos(2z)}{2a+b}}-6b^2\cos(2z)\sqrt{1-\frac{b\cos(2z)}{2a+b}}\right)\Bigg)$$

Involving rational functions of the direct function and trigonometric functions

Involving sin

Involving $\frac{\sin(d\,z)}{a+b\cos(c\,z)}$

01.07.21.2215.01

$$\int \frac{\sin(d\,z)}{a+b\cos(c\,z)}\,dz = -\frac{i\,e^{i(c-d)z}}{2b\sqrt{a^2-b^2}}$$
$$\left(\frac{i}{c-d}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(1-\frac{d}{c},1;2-\frac{d}{c};\frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(1-\frac{d}{c},1;2-\frac{d}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)\right)-\right.$$
$$\frac{i}{c+d}\,e^{2idz}$$
$$\left.\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d}{c},1;\frac{d}{c}+2;\frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d}{c},1;\frac{d}{c}+2;-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)\right)\right)$$

01.07.21.2216.01

$$\int \frac{\sin(c\,z)}{a+b\cos(c\,z)}\,dz = -\frac{\log(a+b\cos(c\,z))}{b\,c}$$

Involving $e^{p\,z}\sin(d\,z)\,(a+b\cos(c\,z))^{-n}$

01.07.21.2217.01

$$\int \frac{\sin(d\,z)}{(a+b\cos(c\,z))^2}\,dz = -\frac{1}{2\,b\,(a^2-b^2)^{3/2}}\Bigg(\frac{1}{c+d}\Bigg(e^{i\,(c+d)\,z}\Bigg(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(\frac{c+d}{c},1;\frac{d}{c}+2;\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+a\left(\sqrt{a^2-b^2}-a\right)$$

$$ {}_2F_1\!\left(\frac{c+d}{c},1;\frac{d}{c}+2;-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\!\left(\frac{c+d}{c},2;\frac{d}{c}+2;\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)-{}_2F_1\!\left(\frac{c+d}{c},2;\frac{d}{c}+2;-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)-$$

$$a\sqrt{a^2-b^2}\left({}_2F_1\!\left(\frac{c+d}{c},2;\frac{d}{c}+2;\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\!\left(\frac{c+d}{c},2;\frac{d}{c}+2;-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\Bigg)\Bigg)-$$

$$\frac{1}{c-d}\Bigg(e^{i\,(c-d)\,z}\Bigg(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(1-\frac{d}{c},1;2-\frac{d}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+$$

$$a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\!\left(1-\frac{d}{c},1;2-\frac{d}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\!\left(1-\frac{d}{c},2;2-\frac{d}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)-{}_2F_1\!\left(1-\frac{d}{c},2;2-\frac{d}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)-$$

$$a\sqrt{a^2-b^2}\left({}_2F_1\!\left(1-\frac{d}{c},2;2-\frac{d}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\!\left(1-\frac{d}{c},2;2-\frac{d}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\Bigg)\Bigg)\Bigg)$$

01.07.21.2218.01

$$\int \frac{\sin(c\,z)}{(a+b\cos(c\,z))^n}\,dz = \frac{(a+b\cos(c\,z))^{1-n}}{b\,c\,(n-1)}$$

Involving $\frac{\sin(d\,z)}{a+b\cos^2(c\,z)}$

01.07.21.2219.01

$$\int \frac{\sin(d\,z)}{a+b\cos^2(c\,z)}\,dz = -\frac{1}{2\sqrt{a}\,b\sqrt{a+b}}\left(i\left(\frac{1}{2c+d}\left(i\,e^{i(2c+d)z}\left(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(\frac{d}{2c}+1,1;\frac{d}{2c}+2;-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(\frac{d}{2c}+1,1;\frac{d}{2c}+2;-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)-\frac{1}{2c-d}\left(i\,e^{i(2c-d)z}\left(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{d}{2c},1;2-\frac{d}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{d}{2c},1;2-\frac{d}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)\right)$$

01.07.21.2220.01

$$\int \frac{\sin(c\,z)}{b\cos^2(c\,z)+a}\,dz = -\frac{\tan^{-1}\!\left(\frac{\sqrt{b}\,\cos(c\,z)}{\sqrt{a}}\right)}{\sqrt{a}\,\sqrt{b}\,c}$$

Involving $\sin(d\,z)\left(a+b\cos^2(c\,z)\right)^{-n}$

01.07.21.2221.01

$$\int \frac{\sin(d\,z)}{\left(a+b\cos^2(c\,z)\right)^2}\,dz = -\frac{1}{4\,a^{3/2}\,b\,(a+b)^{3/2}}\left(i\left(\frac{1}{2\,c+d}\left(i\,e^{i\,(2\,c+d)\,z}\left(-(2\,a+b)\left(-2\,a+2\,\sqrt{a+b}\,\sqrt{a}-b\right)\,{}_2F_1\!\left(\frac{d}{2\,c}+1,\,1;\,\frac{d}{2\,c}+2;\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}+b}\right)-\right.\right.\right.\right.$$
$$(2\,a+b)\left(2\,a+2\,\sqrt{a+b}\,\sqrt{a}+b\right)\,{}_2F_1\!\left(\frac{d}{2\,c}+1,\,1;\,\frac{d}{2\,c}+2;\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\,\sqrt{a}\left(\left(-2\,a^{3/2}+2\,\sqrt{a+b}\,a-2\,b\,\sqrt{a}+b\,\sqrt{a+b}\right)\,{}_2F_1$$
$$\left(\frac{d}{2\,c}+1,\,2;\,\frac{d}{2\,c}+2;\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}+b}\right)+\left(2\,a^{3/2}+2\,\sqrt{a+b}\,a+\right.$$
$$\left.\left.\left.\left.2\,b\,\sqrt{a}+b\,\sqrt{a+b}\right)\,{}_2F_1\!\left(\frac{d}{2\,c}+1,\,2;\,\frac{d}{2\,c}+2;\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)-$$
$$\frac{1}{2\,c-d}\left(i\,e^{i\,(2\,c-d)\,z}\left(-(2\,a+b)\left(-2\,a+2\,\sqrt{a+b}\,\sqrt{a}-b\right)\,{}_2F_1\!\left(1-\frac{d}{2\,c},\,1;\,2-\frac{d}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}+b}\right)-\right.\right.$$
$$(2\,a+b)\left(2\,a+2\,\sqrt{a+b}\,\sqrt{a}+b\right)\,{}_2F_1\!\left(1-\frac{d}{2\,c},\,1;\,2-\frac{d}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\,\sqrt{a}\left(\left(-2\,a^{3/2}+2\,\sqrt{a+b}\,a-2\,b\,\sqrt{a}+b\,\sqrt{a+b}\right)\,{}_2F_1$$
$$\left(1-\frac{d}{2\,c},\,2;\,2-\frac{d}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}+b}\right)+\left(2\,a^{3/2}+2\,\sqrt{a+b}\,a+\right.$$
$$\left.\left.\left.\left.\left.2\,b\,\sqrt{a}+b\,\sqrt{a+b}\right)\,{}_2F_1\!\left(1-\frac{d}{2\,c},\,2;\,2-\frac{d}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)\right)\right)$$

01.07.21.2222.01

$$\int \frac{\sin(c\,z)}{\left(a+b\cos^2(c\,z)\right)^2}\,dz = -\frac{1}{2\,c}\left(\frac{\tan^{-1}\!\left(\frac{\sqrt{b}\,\cos(c\,z)}{\sqrt{a}}\right)}{a^{3/2}\,\sqrt{b}}+\frac{\cos(c\,z)}{a\left(b\cos^2(c\,z)+a\right)}\right)$$

Involving $\frac{\sin(d\,z)\cos(e\,z)}{a+b\cos(c\,z)}$

01.07.21.2223.01

$$\int \frac{\sin(d z)\cos(e z)}{a+b\cos(c z)}\,dz = -\frac{1}{4 b \sqrt{a^2-b^2}} \left(\frac{1}{c+d-e} \left(e^{i(c+d-e)z} \left(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(\frac{c+d-e}{c}, 1; \frac{2c+d-e}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(\frac{c+d-e}{c}, 1; \frac{2c+d-e}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right) - \frac{1}{c-d+e} \left(e^{i(c-d+e)z} \left(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(\frac{c-d+e}{c}, 1; \frac{2c-d+e}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(\frac{c-d+e}{c}, 1; \frac{2c-d+e}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right) + \frac{1}{c+d+e} \left(e^{i(c+d+e)z} \left(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(\frac{c+d+e}{c}, 1; \frac{2c+d+e}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(\frac{c+d+e}{c}, 1; \frac{2c+d+e}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right) - \frac{1}{c-d-e} \left(e^{i(c-d-e)z} \left(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(-\frac{-c+d+e}{c}, 1; -\frac{-2c+d+e}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(-\frac{-c+d+e}{c}, 1; -\frac{-2c+d+e}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)$$

Involving $\sin(d z)\cos(e z)(a+b\cos(c z))^{-n}$

01.07.21.2224.01

$$\int \frac{\sin(d z)\cos(e z)}{(a+b\cos(c z))^2}\,dz = -\frac{1}{4 b \left(a^2-b^2\right)^{3/2}} \left(\frac{1}{c+d-e} \left(e^{i(c+d-e)z} \left(-{}_2F_1\left(\frac{c+d-e}{c}, 2; \frac{2c+d-e}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) a^2 + {}_2F_1\left(\frac{c+d-e}{c}, 2; \frac{2c+d-e}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right) a^2 + \left(a+\sqrt{a^2-b^2}\right) {}_2F_1\left(\frac{c+d-e}{c}, 1; \frac{2c+d-e}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) a + \left(\sqrt{a^2-b^2}-a\right) {}_2F_1\left(\frac{c+d-e}{c}, 1; \frac{2c+d-e}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right) a - \right.\right.\right.$$

$$\sqrt{a^2-b^2}\ {}_2F_1\left(\frac{c+d-e}{c}, 2; \frac{2c+d-e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)a-\sqrt{a^2-b^2}$$

$$ {}_2F_1\left(\frac{c+d-e}{c}, 2; \frac{2c+d-e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a+b^2\,{}_2F_1\left(\frac{c+d-e}{c}, 2; \frac{2c+d-e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)-$$

$$b^2\,{}_2F_1\left(\frac{c+d-e}{c}, 2; \frac{2c+d-e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)+\frac{1}{c-d+e}$$

$$\Bigg(e^{i(c-d+e)z}\Bigg({}_2F_1\left(\frac{c-d+e}{c}, 2; \frac{2c-d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)a^2-{}_2F_1\left(\frac{c-d+e}{c}, 2; \frac{2c-d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a^2+$$

$$\left(a-\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c-d+e}{c}, 1; \frac{2c-d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a+$$

$$\sqrt{a^2-b^2}\ {}_2F_1\left(\frac{c-d+e}{c}, 2; \frac{2c-d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)a+$$

$$\sqrt{a^2-b^2}\ {}_2F_1\left(\frac{c-d+e}{c}, 2; \frac{2c-d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a-a\left(a+\sqrt{a^2-b^2}\right)$$

$$ {}_2F_1\left(\frac{c-d+e}{c}, 1; \frac{2c-d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)-b^2\,{}_2F_1\left(\frac{c-d+e}{c}, 2; \frac{2c-d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)+$$

$$b^2\,{}_2F_1\left(\frac{c-d+e}{c}, 2; \frac{2c-d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)+\frac{1}{c+d+e}$$

$$\Bigg(e^{i(c+d+e)z}\Bigg(-{}_2F_1\left(\frac{c+d+e}{c}, 2; \frac{2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)a^2+{}_2F_1\left(\frac{c+d+e}{c}, 2; \frac{2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a^2+$$

$$\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d+e}{c}, 1; \frac{2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)a+$$

$$\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d+e}{c}, 1; \frac{2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a-$$

$$\sqrt{a^2-b^2}\ {}_2F_1\left(\frac{c+d+e}{c}, 2; \frac{2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)a-$$

$$\sqrt{a^2-b^2}\ {}_2F_1\left(\frac{c+d+e}{c}, 2; \frac{2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a +$$

$$b^2\ {}_2F_1\left(\frac{c+d+e}{c}, 2; \frac{2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right) - b^2\ {}_2F_1\left(\frac{c+d+e}{c}, 2; \frac{2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg) +$$

$$\frac{1}{c-d-e}\left(e^{i(c-d-e)z}\left({}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)a^2 -\right.\right.$$

$${}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a^2 +$$

$$\left(a-\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{-c+d+e}{c}, 1; -\frac{-2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a +$$

$$\sqrt{a^2-b^2}\ {}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)a +$$

$$\sqrt{a^2-b^2}\ {}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)a -$$

$$a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{-c+d+e}{c}, 1; -\frac{-2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right) -$$

$$b^2\ {}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; \frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right) +$$

$$\left.\left.b^2\ {}_2F_1\left(-\frac{-c+d+e}{c}, 2; -\frac{-2c+d+e}{c}; -\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\Bigg)\Bigg)$$

Involving $\frac{\sin(d\,z)\cos(e\,z)}{a+b\cos^2(c\,z)}$

01.07.21.2225.01

$$\int \frac{\sin(d z)\cos(e z)}{a+b\cos^2(c z)}\,dz = \frac{1}{4\sqrt{a}\,b\sqrt{a+b}}\left(\frac{1}{2c+d-e}\left(e^{i(2c+d-e)z}\left(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\right.\right.\right.$$
$$\left.\left.\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)-$$
$$\frac{1}{2c-d+e}\left(e^{i(2c-d+e)z}\left(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\right.\right.$$
$$\left.\left.\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)+$$
$$\frac{1}{2c+d+e}\left(e^{i(2c+d+e)z}\left(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\right.\right.$$
$$\left.\left.\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)+\frac{1}{-2c+d+e}$$
$$\left(e^{i(2c-d-e)z}\left(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\right.\right.$$
$$\left.\left.\left.\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)$$

Involving $\sin(d z)\cos(e z)\left(a+b\cos^2(c z)\right)^{-n}$

01.07.21.2226.01

$$\int \frac{\sin(d z)\cos(e z)}{\left(a+b\cos^2(c z)\right)^2}\,dz = \frac{1}{8a^{3/2}\,b\,(a+b)^{3/2}}\left(\frac{1}{2c+d-e}\right.$$
$$\left(e^{i(2c+d-e)z}\left(-(2a+b)\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\right.\right.$$
$$(2a+b)\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d-e}{2c},1;\frac{4c+d-e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(-2a^{3/2}+2\sqrt{a+b}\,a-2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(\frac{2c+d-e}{2c},2;\frac{4c+d-e}{2c};\right.\right.$$
$$\left.-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right)$$
$$\left.\left.\left.{}_2F_1\left(\frac{2c+d-e}{2c},2;\frac{4c+d-e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)-\frac{1}{2c-d+e}$$
$$\left(e^{i(2c-d+e)z}\left(-(2a+b)\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\right.\right.$$

$$(2a+b)\left(2a+2\sqrt{a+b}\ \sqrt{a}\ +b\right){}_2F_1\left(\frac{2c-d+e}{2c},1;\frac{4c-d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}\ +b}\right)+$$
$$2\sqrt{a}\left(\left(-2a^{3/2}+2\sqrt{a+b}\ a-2b\sqrt{a}\ +b\sqrt{a+b}\right){}_2F_1\left(\frac{2c-d+e}{2c},2;\frac{4c-d+e}{2c};\right.\right.$$
$$\left.-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}\ +b}\right)+\left(2a^{3/2}+2\sqrt{a+b}\ a+2b\sqrt{a}\ +b\sqrt{a+b}\right)$$
$$\left.\left.\left.\left.{}_2F_1\left(\frac{2c-d+e}{2c},2;\frac{4c-d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}\ +b}\right)\right)\right)\right)\right)+\frac{1}{2c+d+e}$$
$$\left(e^{i(2c+d+e)z}\left(-(2a+b)\left(-2a+2\sqrt{a+b}\ \sqrt{a}\ -b\right){}_2F_1\left(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}\ +b}\right)-\right.\right.$$
$$(2a+b)\left(2a+2\sqrt{a+b}\ \sqrt{a}\ +b\right){}_2F_1\left(\frac{2c+d+e}{2c},1;\frac{4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}\ +b}\right)+$$
$$2\sqrt{a}\left(\left(-2a^{3/2}+2\sqrt{a+b}\ a-2b\sqrt{a}\ +b\sqrt{a+b}\right){}_2F_1\left(\frac{2c+d+e}{2c},2;\frac{4c+d+e}{2c};\right.\right.$$
$$\left.-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}\ +b}\right)+\left(2a^{3/2}+2\sqrt{a+b}\ a+2b\sqrt{a}\ +b\sqrt{a+b}\right)$$
$$\left.\left.\left.\left.{}_2F_1\left(\frac{2c+d+e}{2c},2;\frac{4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}\ +b}\right)\right)\right)\right)\right)+\frac{1}{-2c+d+e}\left(e^{i(2c-d-e)z}\right.$$
$$\left(-(2a+b)\left(-2a+2\sqrt{a+b}\ \sqrt{a}\ -b\right){}_2F_1\left(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}\ +b}\right)-\right.$$
$$(2a+b)\left(2a+2\sqrt{a+b}\ \sqrt{a}\ +b\right){}_2F_1\left(-\frac{-2c+d+e}{2c},1;-\frac{-4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}\ +b}\right)+$$
$$2\sqrt{a}\left(\left(-2a^{3/2}+2\sqrt{a+b}\ a-2b\sqrt{a}\ +b\sqrt{a+b}\right){}_2F_1\left(-\frac{-2c+d+e}{2c},2;-\frac{-4c+d+e}{2c};\right.\right.$$
$$\left.-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}\ +b}\right)+\left(2a^{3/2}+2\sqrt{a+b}\ a+2b\sqrt{a}\ +b\sqrt{a+b}\right)$$
$$\left.\left.\left.\left.\left.{}_2F_1\left(-\frac{-2c+d+e}{2c},2;-\frac{-4c+d+e}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}\ +b}\right)\right)\right)\right)\right)\right)$$

Involving rational functions of sin

Involving $(a\sin(e\,z)+b\cos(e\,z))^{-n}$

01.07.21.2227.01

$$\int\frac{1}{a\sin(e\,z)+b\cos(e\,z)}\,dz=-\frac{2}{\sqrt{a^2+b^2}\ e}\tanh^{-1}\left(\frac{a-b\tan\left(\frac{e\,z}{2}\right)}{\sqrt{a^2+b^2}}\right)$$

01.07.21.2228.01

$$\int \frac{1}{\cos(e\,z)+\sin(e\,z)}\,dz = -\frac{(1+i)\,(-1)^{3/4}\tanh^{-1}\left(\frac{\tan\left(\frac{e\,z}{2}\right)-1}{\sqrt{2}}\right)}{e}$$

01.07.21.2229.01

$$\int \frac{1}{\sin(e\,z)-\cos(e\,z)}\,dz = -\frac{(1-i)\,\sqrt[4]{-1}\,\tanh^{-1}\left(\frac{\tan\left(\frac{e\,z}{2}\right)+1}{\sqrt{2}}\right)}{e}$$

01.07.21.2230.01

$$\int \frac{1}{(a\sin(e\,z)+b\cos(e\,z))^2}\,dz = \frac{\sin(e\,z)}{e\cos(e\,z)\,b^2+a\,e\sin(e\,z)\,b}$$

Involving $\sin(d\,z)\,(a\sin(e\,z)+b\cos(e\,z))^{-n}$

01.07.21.2231.01

$$\int \frac{\sin(d\,z)}{a\sin(e\,z)+b\cos(e\,z)}\,dz = \left(e^{-i\,(d-e)\,z}\left(-(d+e)\,{}_2F_1\left(\frac{e-d}{2\,e},1;\frac{3}{2}-\frac{d}{2\,e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)-(d-e)\,e^{2\,i\,d\,z}\,{}_2F_1\left(\frac{d+e}{2\,e},1;\frac{d+3\,e}{2\,e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right)\right)\Big/ ((b+i\,a)\,(d-e)\,(d+e))$$

01.07.21.2232.01

$$\int \frac{\sin(e\,z)}{a\sin(e\,z)+b\cos(e\,z)}\,dz = \frac{a\,e\,z-b\log(b\cos(e\,z)+a\sin(e\,z))}{e\,a^2+b^2\,e}$$

01.07.21.2233.01

$$\int \frac{\sin(d\,z)}{(a\sin(e\,z)+b\cos(e\,z))^2}\,dz = \left(2\,e^{-i\,(d-2\,e)\,z}\left((d-2\,e)\,e^{2\,i\,d\,z}\,{}_2F_1\left(\frac{d}{2\,e}+1,2;\frac{d}{2\,e}+2;\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)+(d+2\,e)\,{}_2F_1\left(1-\frac{d}{2\,e},2;2-\frac{d}{2\,e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right)\right)\Big/ \left((a-i\,b)^2\left(d^2-4\,e^2\right)\right)$$

01.07.21.2234.01

$$\int \frac{\sin(e\,z)}{(a\sin(e\,z)+b\cos(e\,z))^2}\,dz = \left(b\left(a^2+b^2\right)-2\,a\sqrt{a^2+b^2}\,\tanh^{-1}\left(\frac{a-b\tan\left(\frac{e\,z}{2}\right)}{\sqrt{a^2+b^2}}\right)(b\cos(e\,z)+a\sin(e\,z))\right)\Big/ \left(\left(a^2+b^2\right)^2 e\,(b\cos(e\,z)+a\sin(e\,z))\right)$$

Involving $\cos(d\,z)\,(a\sin(e\,z)+b\cos(e\,z))^{-n}$

01.07.21.2235.01

$$\int \frac{\cos(d\,z)}{a\sin(e\,z)+b\cos(e\,z)}\,dz = \left(e^{-i(d-e)z}\left((d+e)\,{}_2F_1\left(\frac{e-d}{2e},1;\frac{3}{2}-\frac{d}{2e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)-(d-e)\,e^{2\,i\,d\,z}\,{}_2F_1\left(\frac{d+e}{2e},1;\frac{d+3e}{2e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right)\right)\Big/((a-i\,b)(d-e)(d+e))$$

01.07.21.2236.01

$$\int \frac{\cos(e\,z)}{a\sin(e\,z)+b\cos(e\,z)}\,dz = \frac{b\,e\,z+a\log(b\cos(e\,z)+a\sin(e\,z))}{e\,a^2+b^2\,e}$$

01.07.21.2237.01

$$\int \frac{A\sin(e\,z)+B\cos(e\,z)}{a\sin(e\,z)+b\cos(e\,z)}\,dz = \frac{(a\,A+b\,B)\,e\,z+(a\,B-A\,b)\log(b\cos(e\,z)+a\sin(e\,z))}{(a^2+b^2)\,e}$$

01.07.21.2238.01

$$\int \frac{A+B\sin(e\,z)+C\cos(e\,z)}{a\sin(e\,z)+b\cos(e\,z)}\,dz = \frac{1}{(a^2+b^2)^{3/2}\,e}\left(\sqrt{a^2+b^2}\,((a\,B+b\,C)\,e\,z+(a\,C-b\,B)\log(b\cos(e\,z)+a\sin(e\,z)))-2\,A\,(a^2+b^2)\tanh^{-1}\left(\frac{a-b\tan\left(\frac{e\,z}{2}\right)}{\sqrt{a^2+b^2}}\right)\right)$$

01.07.21.2239.01

$$\int \frac{\cos(d\,z)}{(a\sin(e\,z)+b\cos(e\,z))^2}\,dz = -\left(2\,i\,e^{-i(d-2e)z}\left((d+2\,e)\,{}_2F_1\left(1-\frac{d}{2e},2;2-\frac{d}{2e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)-(d-2\,e)\,e^{2\,i\,d\,z}\,{}_2F_1\left(\frac{d}{2e}+1,2;\frac{d}{2e}+2;\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right)\right)\Big/\left((a-i\,b)^2\,(d^2-4\,e^2)\right)$$

01.07.21.2240.01

$$\int \frac{\cos(e\,z)}{(a\sin(e\,z)+b\cos(e\,z))^2}\,dz = -\left(a\,(a^2+b^2)+2\,b\tanh^{-1}\left(\frac{a-b\tan\left(\frac{e\,z}{2}\right)}{\sqrt{a^2+b^2}}\right)(b\cos(e\,z)+a\sin(e\,z))\sqrt{a^2+b^2}\right)\Big/\left((a^2+b^2)^2\,e\,(b\cos(e\,z)+a\sin(e\,z))\right)$$

Involving $(a+b\sin(e\,z)+c\cos(e\,z))^{-n}$

01.07.21.2241.01

$$\int \frac{1}{a+c\cos(e\,z)+b\sin(e\,z)}\,dz = -\frac{2}{\sqrt{-a^2+b^2+c^2}\;e}\tanh^{-1}\left(\frac{b+(a-c)\tan\left(\frac{e\,z}{2}\right)}{\sqrt{-a^2+b^2+c^2}}\right)$$

01.07.21.2242.01

$$\int \frac{A + B\sin(e\,z) + C\cos(e\,z)}{a + b\sin(e\,z) + c\cos(e\,z)}\,dz = \frac{1}{b^2+c^2}\left((b\,B + c\,C)\,z + \frac{2\left(a\,(b\,B + c\,C) - A\left(b^2+c^2\right)\right)\tanh^{-1}\left(\frac{b+(a-c)\tan\left(\frac{e\,z}{2}\right)}{\sqrt{-a^2+b^2+c^2}}\right)}{\sqrt{-a^2+b^2+c^2}\;e} + \frac{(b\,C - B\,c)\log(a + c\cos(e\,z) + b\sin(e\,z))}{e}\right)$$

01.07.21.2243.01

$$\int \frac{A + B\sin(e\,z) + C\cos(e\,z)}{b\sin(e\,z) + c\cos(e\,z)}\,dz = \frac{1}{\left(b^2+c^2\right)^{3/2}\,e}\left(\sqrt{b^2+c^2}\;((b\,B + c\,C)\,e\,z + (b\,C - B\,c)\log(c\cos(e\,z) + b\sin(e\,z))) - 2\,A\left(b^2+c^2\right)\tanh^{-1}\left(\frac{b - c\tan\left(\frac{e\,z}{2}\right)}{\sqrt{b^2+c^2}}\right)\right)$$

01.07.21.2244.01

$$\int \frac{A + B\sin(e\,z) + C\cos(e\,z)}{a + b\sin(e\,z) + b\cos(e\,z)}\,dz = \frac{1}{2\,b}\left((B + C)\,z + \frac{(C - B)\log(a + b\cos(e\,z) + b\sin(e\,z))}{e} - \frac{(1-i)\sqrt[4]{-1}\;\sqrt{2}\;(a\,(B + C) - 2\,A\,b)\tan^{-1}\left(\frac{b+(a-b)\tan\left(\frac{e\,z}{2}\right)}{\sqrt{a^2-2\,b^2}}\right)}{\sqrt{a^2-2\,b^2}\;e}\right)$$

01.07.21.2245.01

$$\int \frac{A + B\sin(e\,z) + C\cos(e\,z)}{a + b\sin(e\,z) - b\cos(e\,z)}\,dz = \frac{1}{2\,b}\left((B - C)\,z + \frac{(1+i)\,(-1)^{3/4}\sqrt{2}\;(2\,A\,b + a\,(C - B))\tan^{-1}\left(\frac{-b-(a+b)\tan\left(\frac{e\,z}{2}\right)}{\sqrt{a^2-2\,b^2}}\right)}{\sqrt{a^2-2\,b^2}\;e} + \frac{(B + C)\log(a - b\cos(e\,z) + b\sin(e\,z))}{e}\right)$$

01.07.21.2246.01

$$\int \frac{1}{(a + b\sin(e\,z) + c\cos(e\,z))^2}\,dz = -\frac{1}{\left(a^2-b^2-c^2\right)e}\left(\frac{2\,a}{\sqrt{-a^2+b^2+c^2}}\tanh^{-1}\left(\frac{b + (a-c)\tan\left(\frac{e\,z}{2}\right)}{\sqrt{-a^2+b^2+c^2}}\right) + \frac{a\,b + \left(b^2+c^2\right)\sin(e\,z)}{c\,(a + c\cos(e\,z) + b\sin(e\,z))}\right)$$

01.07.21.2247.01

$$\int \frac{A + C\cos(z) + B\sin(z)}{(a + b\sin(z) + c\cos(z))\,(d + e\sin(z) + f\cos(z))}\,dz = \left(-\frac{1}{\sqrt{-a^2+b^2+c^2}}\left(2\left((B\,e + C\,f)\,a^2 - a\,(b\,B + c\,C)\,d - (B\,c - b\,C)\,(c\,e - b\,f) + A\left(d\,b^2 - a\,e\,b + c\,(c\,d - a\,f)\right)\right)\tanh^{-1}\left(\frac{b + (a-c)\tan\left(\frac{z}{2}\right)}{\sqrt{-a^2+b^2+c^2}}\right)\right) - \frac{1}{\sqrt{-d^2+e^2+f^2}}\left(2\left(c\left(C\left(d^2-e^2\right) - A\,d\,f + B\,e\,f\right) + b\left(-A\,d\,e + C\,f\,e + B\left(d^2-f^2\right)\right) + a\left(-B\,d\,e - C\,d\,f + A\left(e^2+f^2\right)\right)\right)\tanh^{-1}\left(\frac{e + (d-f)\tan\left(\frac{z}{2}\right)}{\sqrt{-d^2+e^2+f^2}}\right)\right) - (B\,c\,d - b\,C\,d - A\,c\,e + a\,C\,e + A\,b\,f - a\,B\,f)\log(a + c\cos(z) + b\sin(z)) + (B\,c\,d - b\,C\,d - A\,c\,e + a\,C\,e + A\,b\,f - a\,B\,f)\log(d + f\cos(z) + e\sin(z))\right) \Big/ \left(\left(e^2+f^2\right)a^2 - 2\,c\,d\,f\,a + c^2\left(d^2-e^2\right) + b\,(2\,c\,e\,f - 2\,a\,d\,e) + b^2\left(d^2-f^2\right)\right)$$

Involving $\sin(d\,z)\,(a + b\sin(e\,z) + c\cos(e\,z))^{-n}$

01.07.21.2248.01

$$\int \frac{\sin(d\,z)}{a + b\sin(e\,z) + c\cos(e\,z)}\,dz = -\left(\frac{1}{d-e}\left(e^{-i(d-e)z}\left(\left(a + \sqrt{a^2-b^2-c^2}\right){}_2F_1\left(1 - \frac{d}{e}, 1; 2 - \frac{d}{e}; \frac{(c - i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2} - a}\right) + \left(\sqrt{a^2-b^2-c^2} - a\right){}_2F_1\left(1 - \frac{d}{e}, 1; 2 - \frac{d}{e}; \frac{i\,(b + i\,c)\,e^{i\,e\,z}}{a + \sqrt{a^2-b^2-c^2}}\right)\right)\right) + \frac{1}{d+e}\left(e^{i(d+e)z}\left(\left(a + \sqrt{a^2-b^2-c^2}\right){}_2F_1\left(\frac{d+e}{e}, 1; \frac{d}{e} + 2; \frac{(c - i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2} - a}\right) + \left(\sqrt{a^2-b^2-c^2} - a\right){}_2F_1\left(\frac{d+e}{e}, 1; \frac{d}{e} + 2; \frac{i\,(b + i\,c)\,e^{i\,e\,z}}{a + \sqrt{a^2-b^2-c^2}}\right)\right)\right)\right) \Big/ \left(2\,(c + i\,b)\sqrt{a^2-b^2-c^2}\right)$$

01.07.21.2249.01

$$\int \frac{\sin(e\,z)}{a + c\cos(e\,z) + b\sin(e\,z)}\,dz = \frac{b\,e\,z + \frac{2\,a\,b\tanh^{-1}\left(\frac{b + (a-c)\tan\left(\frac{e\,z}{2}\right)}{\sqrt{-a^2+b^2+c^2}}\right)}{\sqrt{-a^2+b^2+c^2}} - c\log(a + c\cos(e\,z) + b\sin(e\,z))}{\left(b^2+c^2\right)e}$$

01.07.21.2250.01

$$\int \frac{\sin(d\,z)}{(a+b\sin(e\,z)+c\cos(e\,z))^2}\,dz = \left(\frac{1}{d-e}\left(e^{-i(d-e)z}\left({}_2F_1\left(1-\frac{d}{e},2;2-\frac{d}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)a^2-{}_2F_1\left(1-\frac{d}{e},2;2-\frac{d}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a^2+\right.\right.\right.$$

$$\left(a-\sqrt{a^2-b^2-c^2}\right){}_2F_1\left(1-\frac{d}{e},1;2-\frac{d}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a+\sqrt{a^2-b^2-c^2}$$

$${}_2F_1\left(1-\frac{d}{e},2;2-\frac{d}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)a+\sqrt{a^2-b^2-c^2}\;{}_2F_1\left(1-\frac{d}{e},2;2-\frac{d}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a-$$

$$a\left(a+\sqrt{a^2-b^2-c^2}\right){}_2F_1\left(1-\frac{d}{e},1;2-\frac{d}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)-$$

$$b^2\,{}_2F_1\left(1-\frac{d}{e},2;2-\frac{d}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)-c^2\,{}_2F_1\left(1-\frac{d}{e},2;2-\frac{d}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+$$

$$\left.\left.b^2\,{}_2F_1\left(1-\frac{d}{e},2;2-\frac{d}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)+c^2\,{}_2F_1\left(1-\frac{d}{e},2;2-\frac{d}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)+$$

$$\frac{1}{d+e}\left(e^{i(d+e)z}\left({}_2F_1\left(\frac{d+e}{e},2;\frac{d}{e}+2;\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)a^2-{}_2F_1\left(\frac{d+e}{e},2;\frac{d}{e}+2;\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a^2+\right.\right.$$

$$\left(a-\sqrt{a^2-b^2-c^2}\right){}_2F_1\left(\frac{d+e}{e},1;\frac{d}{e}+2;\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a+$$

$$\sqrt{a^2-b^2-c^2}\;{}_2F_1\left(\frac{d+e}{e},2;\frac{d}{e}+2;\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)a+$$

$$\sqrt{a^2-b^2-c^2}\;{}_2F_1\left(\frac{d+e}{e},2;\frac{d}{e}+2;\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a-a\left(a+\sqrt{a^2-b^2-c^2}\right)$$

$${}_2F_1\left(\frac{d+e}{e},1;\frac{d}{e}+2;\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)-b^2\,{}_2F_1\left(\frac{d+e}{e},2;\frac{d}{e}+2;\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)-$$

$$c^2\,{}_2F_1\left(\frac{d+e}{e},2;\frac{d}{e}+2;\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+b^2\,{}_2F_1\left(\frac{d+e}{e},2;\frac{d}{e}+2;\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)+$$

$$\left.\left.\left.c^2\,{}_2F_1\left(\frac{d+e}{e},2;\frac{d}{e}+2;\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)\right)\Big/\left(2\,(c+i\,b)\left(a^2-b^2-c^2\right)^{3/2}\right)$$

01.07.21.2251.01

$$\int \frac{\sin(e z)}{(a + c\cos(e z) + b\sin(e z))^2} \, dz = \left(-2 b c \tanh^{-1}\left(\frac{b + (a - c)\tan\left(\frac{e z}{2}\right)}{\sqrt{-a^2 + b^2 + c^2}}\right)(a + c\cos(e z) + b\sin(e z)) - \sqrt{-a^2 + b^2 + c^2}\left(a^2 + b\sin(e z)\, a - c^2\right)\right) \Big/ \left(c\left(-a^2 + b^2 + c^2\right)^{3/2} e\,(a + c\cos(e z) + b\sin(e z))\right)$$

Involving $\cos(d z)\,(a + b\sin(e z) + c\cos(e z))^{-n}$

01.07.21.2252.01

$$\int \frac{\cos(d z)}{a + b\sin(e z) + c\cos(e z)} \, dz = -\left(\frac{1}{d + e}\left(i\, e^{i(d+e)z}\left(\left(a + \sqrt{a^2 - b^2 - c^2}\right) {}_2F_1\left(\frac{d + e}{e}, 1; \frac{d}{e} + 2; \frac{(c - i b)\, e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) + \left(\sqrt{a^2 - b^2 - c^2} - a\right) {}_2F_1\left(\frac{d + e}{e}, 1; \frac{d}{e} + 2; \frac{i(b + i c)\, e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}\right)\right)\right) - \frac{1}{d - e}\left(i\, e^{-i(d-e)z}\left(\left(a + \sqrt{a^2 - b^2 - c^2}\right) {}_2F_1\left(1 - \frac{d}{e}, 1; 2 - \frac{d}{e}; \frac{(c - i b)\, e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) + \left(\sqrt{a^2 - b^2 - c^2} - a\right) {}_2F_1\left(1 - \frac{d}{e}, 1; 2 - \frac{d}{e}; \frac{i(b + i c)\, e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}\right)\right)\right)\right) \Big/ \left(2(c + i b)\sqrt{a^2 - b^2 - c^2}\right)$$

01.07.21.2253.01

$$\int \frac{\cos(e z)}{a + c\cos(e z) + b\sin(e z)} \, dz = \frac{c e z + \frac{2 a c \tanh^{-1}\left(\frac{b + (a - c)\tan\left(\frac{e z}{2}\right)}{\sqrt{-a^2 + b^2 + c^2}}\right)}{\sqrt{-a^2 + b^2 + c^2}} + b\log(a + c\cos(e z) + b\sin(e z))}{\left(b^2 + c^2\right) e}$$

01.07.21.2254.01

$$\int \frac{\cos(d z)}{(a + b\sin(e z) + c\cos(e z))^2} \, dz = -\left(\frac{1}{d + e}\left(i\, e^{i(d+e)z}\left(-{}_2F_1\left(\frac{d + e}{e}, 2; \frac{d}{e} + 2; \frac{(c - i b)\, e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) a^2 + {}_2F_1\left(\frac{d + e}{e}, 2; \frac{d}{e} + 2; \frac{i(b + i c)\, e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}\right) a^2 + \left(a + \sqrt{a^2 - b^2 - c^2}\right) {}_2F_1\left(\frac{d + e}{e}, 1; \frac{d}{e} + 2; \frac{(c - i b)\, e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) a + \left(\sqrt{a^2 - b^2 - c^2} - a\right) {}_2F_1\left(\frac{d + e}{e}, 1; \frac{d}{e} + 2; \frac{i(b + i c)\, e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}\right) a - \sqrt{a^2 - b^2 - c^2}\; {}_2F_1\right.\right.\right.$$

$$\left(\frac{d+e}{e}, 2; \frac{d}{e}+2; \frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right) a - \sqrt{a^2-b^2-c^2}\;{}_2F_1\!\left(\frac{d+e}{e}, 2; \frac{d}{e}+2; \frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right) a +$$

$$b^2\,{}_2F_1\!\left(\frac{d+e}{e}, 2; \frac{d}{e}+2; \frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right) + c^2\,{}_2F_1\!\left(\frac{d+e}{e}, 2; \frac{d}{e}+2; \frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right) -$$

$$b^2\,{}_2F_1\!\left(\frac{d+e}{e}, 2; \frac{d}{e}+2; \frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right) - c^2\,{}_2F_1\!\left(\frac{d+e}{e}, 2; \frac{d}{e}+2; \frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\Bigg)\Bigg)\Bigg) -$$

$$\frac{1}{d-e}\Bigg(i\,e^{-i\,(d-e)\,z}\Bigg(-{}_2F_1\!\left(1-\frac{d}{e}, 2; 2-\frac{d}{e}; \frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right) a^2 + {}_2F_1\!\left(1-\frac{d}{e}, 2; 2-\frac{d}{e}; \frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right) a^2 +$$

$$\left(a+\sqrt{a^2-b^2-c^2}\right){}_2F_1\!\left(1-\frac{d}{e}, 1; 2-\frac{d}{e}; \frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right) a +$$

$$\left(\sqrt{a^2-b^2-c^2}-a\right){}_2F_1\!\left(1-\frac{d}{e}, 1; 2-\frac{d}{e}; \frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right) a -$$

$$\sqrt{a^2-b^2-c^2}\;{}_2F_1\!\left(1-\frac{d}{e}, 2; 2-\frac{d}{e}; \frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right) a - \sqrt{a^2-b^2-c^2}$$

$${}_2F_1\!\left(1-\frac{d}{e}, 2; 2-\frac{d}{e}; \frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right) a + b^2\,{}_2F_1\!\left(1-\frac{d}{e}, 2; 2-\frac{d}{e}; \frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right) +$$

$$c^2\,{}_2F_1\!\left(1-\frac{d}{e}, 2; 2-\frac{d}{e}; \frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right) - b^2\,{}_2F_1\!\left(1-\frac{d}{e}, 2; 2-\frac{d}{e}; \frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right) -$$

$$c^2\,{}_2F_1\!\left(1-\frac{d}{e}, 2; 2-\frac{d}{e}; \frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg) \Big/ \left(2\,(c+i\,b)\left(a^2-b^2-c^2\right)^{3/2}\right)$$

01.07.21.2255.01

$$\int \frac{\cos(e\,z)}{(a+b\sin(e\,z)+c\cos(e\,z))^2}\,dz = $$

$$-\left(\sqrt{-a^2+b^2+c^2}\,(b+a\sin(e\,z)) + 2\,c\tanh^{-1}\!\left(\frac{b+(a-c)\tan\left(\frac{e\,z}{2}\right)}{\sqrt{-a^2+b^2+c^2}}\right)(a+c\cos(e\,z)+b\sin(e\,z))\right) \Big/$$

$$\left(\left(-a^2+b^2+c^2\right)^{3/2} e\,(a+c\cos(e\,z)+b\sin(e\,z))\right)$$

Involving $\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{-n}$

01.07.21.2256.01

$$\int \frac{1}{a\sin^2(e\,z)+b\cos^2(e\,z)}\,dz = \frac{\tan^{-1}\left(\frac{\sqrt{a}\,\tan(e\,z)}{\sqrt{b}}\right)}{\sqrt{a}\,\sqrt{b}\,e}$$

01.07.21.2257.01

$$\int \frac{1}{\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^2}\,dz = \frac{(a+b)\tan^{-1}\left(\frac{\sqrt{a}\,\tan(e\,z)}{\sqrt{b}}\right)+\frac{\sqrt{a}\,(a-b)\sqrt{b}\,\sin(2\,e\,z)}{a+b+(b-a)\cos(2\,e\,z)}}{2\,a^{3/2}\,b^{3/2}\,e}$$

01.07.21.2258.01

$$\int \frac{1}{\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^3}\,dz = \frac{1}{8\,a^{5/2}\,b^{5/2}\,e}\left(\left(3\,a^2+2\,b\,a+3\,b^2\right)\tan^{-1}\left(\frac{\sqrt{a}\,\tan(e\,z)}{\sqrt{b}}\right)-\right.$$
$$\left.\left(\sqrt{a}\,(a-b)\sqrt{b}\,\left(-3\,a^2-10\,b\,a-3\,b^2+3\left(a^2-b^2\right)\cos(2\,e\,z)\right)\sin(2\,e\,z)\right)\Big/\left(a+b+(b-a)\cos(2\,e\,z)\right)^2\right)$$

Involving $\sin(d\,z)\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{-n}$

01.07.21.2259.01

$$\int \frac{\sin(d\,z)}{a\sin^2(e\,z)+b\cos^2(e\,z)}\,dz =$$
$$-\left(a\,i\left(\frac{1}{d+2\,e}\left(e^{i\,(d+2\,e)\,z}\left(\left(\sqrt{-a}+i\sqrt{b}\right)^2\,{}_2F_1\left(\frac{d}{2\,e}+1,1;\frac{d}{2\,e}+2;\frac{(b-a)\,e^{2\,i\,e\,z}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-\left(\sqrt{-a}-i\sqrt{b}\right)^2\right.\right.\right.\right.$$
$$\left.\left.\left.{}_2F_1\left(\frac{d}{2\,e}+1,1;\frac{d}{2\,e}+2;\frac{(b-a)\,e^{2\,i\,e\,z}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\right)\right)+$$
$$\frac{1}{d-2\,e}\left(e^{-i\,(d-2\,e)\,z}\left(\left(\sqrt{-a}+i\sqrt{b}\right)^2\,{}_2F_1\left(1-\frac{d}{2\,e},1;2-\frac{d}{2\,e};\frac{(b-a)\,e^{2\,i\,e\,z}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-\right.\right.$$
$$\left.\left.\left.\left.\left(\sqrt{-a}-i\sqrt{b}\right)^2\,{}_2F_1\left(1-\frac{d}{2\,e},1;2-\frac{d}{2\,e};\frac{(b-a)\,e^{2\,i\,e\,z}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\right)\right)\right)\right)\Big/\left(2\,(-a)^{3/2}\sqrt{b}\,(b-a)\right)$$

01.07.21.2260.01

$$\int \frac{\sin(e\,z)}{a\sin^2(e\,z)+b\cos^2(e\,z)}\,dz = \frac{\tanh^{-1}\left(\frac{\sqrt{b-a}\,\cos(e\,z)}{\sqrt{-a}}\right)}{\sqrt{-a}\,\sqrt{b-a}\,e}$$

01.07.21.2261.01

$$\int \frac{\sin(d\,z)}{\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^2}\,dz = \left(i\left(\frac{1}{d+2e}\left(e^{i(d+2e)z}\left(\left(\sqrt{-a}-i\sqrt{b}\right)^2(a+b)\,{}_2F_1\!\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)-\left(\sqrt{-a}+i\sqrt{b}\right)^2(a+b)\,{}_2F_1\!\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-2i\sqrt{-a}\sqrt{b}\left({}_2F_1\!\left(\frac{d}{2e}+1,2;\frac{d}{2e}+2;\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)\left(\sqrt{-a}+i\sqrt{b}\right)^2+\left(\sqrt{-a}-i\sqrt{b}\right)^2{}_2F_1\!\left(\frac{d}{2e}+1,2;\frac{d}{2e}+2;\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\right)\right)\right)+\frac{1}{d-2e}\left(e^{-i(d-2e)z}\left(\left(\sqrt{-a}-i\sqrt{b}\right)^2(a+b)\,{}_2F_1\!\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)-\left(\sqrt{-a}+i\sqrt{b}\right)^2(a+b)\,{}_2F_1\!\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-2i\sqrt{-a}\sqrt{b}\left({}_2F_1\!\left(1-\frac{d}{2e},2;2-\frac{d}{2e};\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)\left(\sqrt{-a}+i\sqrt{b}\right)^2+\left(\sqrt{-a}-i\sqrt{b}\right)^2{}_2F_1\!\left(1-\frac{d}{2e},2;2-\frac{d}{2e};\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\right)\right)\right)\right)\right) \Big/ \left(4\,(-a)^{3/2}\,b^{3/2}\,(b-a)\right)$$

01.07.21.2262.01

$$\int \frac{\sin(e\,z)}{\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^2}\,dz = \frac{-\frac{\tanh^{-1}\left(\frac{\sqrt{a-b}\,\cos(e\,z)}{\sqrt{a}}\right)}{\sqrt{a-b}}-\frac{2\sqrt{a}\,\cos(e\,z)}{a+b+(b-a)\cos(2\,e\,z)}}{2\,a^{3/2}\,e}$$

Involving $e^{p\,z}\cos(d\,z)\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{-n}$

01.07.21.2263.01

$$\int \frac{\cos(d\,z)}{a\sin^2(e\,z)+b\cos^2(e\,z)}\,dz = \frac{1}{2\sqrt{-a}\,\sqrt{b}\,(b-a)}\Bigg(\frac{1}{d-2e}\Bigg(e^{-i(d-2e)z}\Bigg(\left(\sqrt{-a}+i\sqrt{b}\right)^2{}_2F_1\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b-a)e^{2iez}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-$$
$$\left(\sqrt{-a}-i\sqrt{b}\right)^2{}_2F_1\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b-a)e^{2iez}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\Bigg)\Bigg)-$$
$$\frac{1}{d+2e}\Bigg(e^{i(d+2e)z}\Bigg(\left(\sqrt{-a}+i\sqrt{b}\right)^2{}_2F_1\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b-a)e^{2iez}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-$$
$$\left(\sqrt{-a}-i\sqrt{b}\right)^2{}_2F_1\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b-a)e^{2iez}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\Bigg)\Bigg)\Bigg)$$

01.07.21.2264.01

$$\int \frac{\cos(e\,z)}{a\sin^2(e\,z)+b\cos^2(e\,z)}\,dz = \frac{\tan^{-1}\left(\frac{\sqrt{a-b}\,\sin(e\,z)}{\sqrt{b}}\right)}{\sqrt{a-b}\,\sqrt{b}\,e}$$

01.07.21.2265.01

$$\int \frac{\cos(d\,z)}{\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^2}\,dz = \left(\frac{1}{d-2e}\left(e^{-i(d-2e)z}\left(\left(\sqrt{-a}-i\sqrt{b}\right)^2(a+b)\,{}_2F_1\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)-\left(\sqrt{-a}+i\sqrt{b}\right)^2(a+b)\,{}_2F_1\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-2i\sqrt{-a}\sqrt{b}\left({}_2F_1\left(1-\frac{d}{2e},2;2-\frac{d}{2e};\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)\left(\sqrt{-a}+i\sqrt{b}\right)^2+\left(\sqrt{-a}-i\sqrt{b}\right)^2{}_2F_1\left(1-\frac{d}{2e},2;2-\frac{d}{2e};\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\right)\right)\right)-\frac{1}{d+2e}\left(e^{i(d+2e)z}\left(\left(\sqrt{-a}-i\sqrt{b}\right)^2(a+b)\,{}_2F_1\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)-\left(\sqrt{-a}+i\sqrt{b}\right)^2(a+b)\,{}_2F_1\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-2i\sqrt{-a}\sqrt{b}\left({}_2F_1\left(\frac{d}{2e}+1,2;\frac{d}{2e}+2;\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)\left(\sqrt{-a}+i\sqrt{b}\right)^2+\left(\sqrt{-a}-i\sqrt{b}\right)^2{}_2F_1\left(\frac{d}{2e}+1,2;\frac{d}{2e}+2;\frac{(b-a)\,e^{2iez}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\right)\right)\right)\right)\Big/\left(4(-a)^{3/2}\,b^{3/2}\,(b-a)\right)$$

01.07.21.2266.01

$$\int \frac{\cos(e\,z)}{\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^2}\,dz = \frac{\frac{\tan^{-1}\left(\frac{\sqrt{a-b}\,\sin(e\,z)}{\sqrt{b}}\right)}{\sqrt{a-b}}+\frac{2\sqrt{b}\,\sin(e\,z)}{a+b+(b-a)\cos(2\,e\,z)}}{2\,b^{3/2}\,e}$$

Involving $\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^{-n}$

01.07.21.2267.01

$$\int \frac{1}{a+b\sin^2(e\,z)+c\cos^2(e\,z)}\,dz = \frac{1}{\sqrt{a+b}\,\sqrt{a+c}\,e}\tan^{-1}\left(\frac{\sqrt{a+b}\,\tan(e\,z)}{\sqrt{a+c}}\right)$$

01.07.21.2268.01

$$\int \frac{1}{\left(a+b\sin^2(e z)+c\cos^2(e z)\right)^2}\,dz = \frac{1}{2e}\left(\frac{(2a+b+c)\tan^{-1}\left(\frac{\sqrt{a+b}\,\tan(e z)}{\sqrt{a+c}}\right)}{(a+b)^{3/2}(a+c)^{3/2}} + \frac{(b-c)\sin(2ez)}{(a+b)(a+c)(2a+b+c+(c-b)\cos(2ez))}\right)$$

01.07.21.2269.01

$$\int \frac{1}{\left(a+b\sin^2(e z)+c\cos^2(e z)\right)^3}\,dz = \frac{1}{8e}\left(\frac{\left(8a^2+8(b+c)a+3b^2+3c^2+2bc\right)\tan^{-1}\left(\frac{\sqrt{a+b}\,\tan(e z)}{\sqrt{a+c}}\right)}{(a+b)^{5/2}(a+c)^{5/2}} + \frac{3(b-c)(2a+b+c)\sin(2ez)}{(a+b)^2(a+c)^2(2a+b+c+(c-b)\cos(2ez))} + \frac{4(b-c)\sin(2ez)}{(a+b)(a+c)(2a+b+c+(c-b)\cos(2ez))^2}\right)$$

Involving $\sin(d z)\left(a+b\sin^2(e z)+c\cos^2(e z)\right)^{-n}$

01.07.21.2270.01

$$\int \frac{\sin(d z)}{a+b\sin^2(e z)+c\cos^2(e z)}\,dz = -\left(\frac{1}{d+2e}\left(e^{i(d+2e)z}\left(\left(-2a-b-c+2\sqrt{(a+b)(a+c)}\right){}_2F_1\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b-c)e^{2iez}}{2a+b+c+2\sqrt{(a+b)(a+c)}}\right)+\left(2a+b+c+2\sqrt{(a+b)(a+c)}\right){}_2F_1\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b-c)e^{2iez}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)\right)+\frac{1}{d-2e}\left(e^{-i(d-2e)z}\left(\left(-2a-b-c+2\sqrt{(a+b)(a+c)}\right){}_2F_1\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b-c)e^{2iez}}{2a+b+c+2\sqrt{(a+b)(a+c)}}\right)+\left(2a+b+c+2\sqrt{(a+b)(a+c)}\right){}_2F_1\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b-c)e^{2iez}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)\right)\right)\Big/\left(2\sqrt{(a+b)(a+c)}\,(c-b)\right)$$

01.07.21.2271.01

$$\int \frac{\sin(e z)}{a+b\sin^2(e z)+c\cos^2(e z)}\,dz = \frac{\tanh^{-1}\left(\frac{\sqrt{c-b}\,\cos(e z)}{\sqrt{-a-b}}\right)}{\sqrt{-a-b}\,\sqrt{c-b}\,e}$$

01.07.21.2272.01

$$\int \frac{\sin(d\,z)}{\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^2}\,dz = \frac{1}{4\,((a+b)\,(a+c))^{3/2}}\Bigg((c-b)\Bigg(\frac{1}{d+2\,e}\Bigg(e^{i\,(d+2\,e)\,z}\Bigg(2\sqrt{(a+b)\,(a+c)}\Bigg(\frac{{}_2F_1\left(\frac{d}{2\,e}+1,\,2;\,\frac{d}{2\,e}+2;\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}\right)}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}+\frac{{}_2F_1\left(\frac{d}{2\,e}+1,\,2;\,\frac{d}{2\,e}+2;\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\right)}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\Bigg)+\left((2\,a+b+c)\,{}_2F_1\left(\frac{d}{2\,e}+1,\,1;\,\frac{d}{2\,e}+2;\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}\right)\right)\Big/\left(2\,a+b+c+2\sqrt{(a+b)\,(a+c)}\right)-\left((2\,a+b+c)\,{}_2F_1\left(\frac{d}{2\,e}+1,\,1;\,\frac{d}{2\,e}+2;\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\right)\right)\Big/\left(2\,a+b+c-2\sqrt{(a+b)\,(a+c)}\right)\Bigg)\Bigg)+\frac{1}{d-2\,e}\Bigg(e^{-i\,(d-2\,e)\,z}\Bigg(2\sqrt{(a+b)\,(a+c)}\Bigg(\frac{{}_2F_1\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}\right)}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}+\frac{{}_2F_1\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\right)}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\Bigg)+\left((2\,a+b+c)\,{}_2F_1\left(1-\frac{d}{2\,e},\,1;\,2-\frac{d}{2\,e};\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}\right)\right)\Big/\left(2\,a+b+c+2\sqrt{(a+b)\,(a+c)}\right)-\left((2\,a+b+c)\,{}_2F_1\left(1-\frac{d}{2\,e},\,1;\,2-\frac{d}{2\,e};\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\right)\right)\Big/\left(2\,a+b+c-2\sqrt{(a+b)\,(a+c)}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

01.07.21.2273.01

$$\int \frac{\sin(e\,z)}{\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^2}\,dz = \frac{1}{2\,(a+b)\,e}\left(\frac{\tanh^{-1}\left(\frac{\sqrt{c-b}\,\cos(e\,z)}{\sqrt{-a-b}}\right)}{\sqrt{-a-b}\,\sqrt{c-b}}-\frac{2\cos(e\,z)}{2\,a+b+c+(c-b)\cos(2\,e\,z)}\right)$$

Involving $\cos(d\,z)\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^{-n}$

01.07.21.2274.01

$$\int \frac{\cos(d\,z)}{a+b\sin^2(e\,z)+c\cos^2(e\,z)}\,dz = \left(i\left(\frac{1}{d-2e}\left(e^{-i(d-2e)z}\left(\left(-2a-b-c+2\sqrt{(a+b)(a+c)}\right)\,{}_2F_1\!\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b-c)\,e^{2iez}}{2a+b+c+2\sqrt{(a+b)(a+c)}}\right)+\left(2a+b+c+2\sqrt{(a+b)(a+c)}\right)\,{}_2F_1\!\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b-c)\,e^{2iez}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)\right)-\frac{1}{d+2e}\left(e^{i(d+2e)z}\left(\left(-2a-b-c+2\sqrt{(a+b)(a+c)}\right)\,{}_2F_1\!\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b-c)\,e^{2iez}}{2a+b+c+2\sqrt{(a+b)(a+c)}}\right)+\left(2a+b+c+2\sqrt{(a+b)(a+c)}\right)\,{}_2F_1\!\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b-c)\,e^{2iez}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)\right)\right)\right)\Big/\left(2\sqrt{(a+b)(a+c)}\,(c-b)\right)$$

01.07.21.2275.01

$$\int \frac{\cos(e\,z)}{a+b\sin^2(e\,z)+c\cos^2(e\,z)}\,dz = \frac{\tan^{-1}\!\left(\frac{\sqrt{b-c}\,\sin(e\,z)}{\sqrt{a+c}}\right)}{\sqrt{b-c}\,\sqrt{a+c}\,e}$$

01.07.21.2276.01

$$\int \frac{\cos(d\,z)}{\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^2}\,dz = -\left(i\,(c-b)\left(\frac{1}{d-2\,e}\left(e^{-i\,(d-2\,e)\,z}\left(2\sqrt{(a+b)\,(a+c)}\left(\frac{1}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}\,{}_2F_1\!\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}\right)+{}_2F_1\!\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\right)\Big/\left(2\,a+b+c-2\sqrt{(a+b)\,(a+c)}\right)\right)+\left((2\,a+b+c)\,{}_2F_1\!\left(1-\frac{d}{2\,e},\,1;\,2-\frac{d}{2\,e};\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}\right)\right)\Big/\left(2\,a+b+c+2\sqrt{(a+b)\,(a+c)}\right)-\left((2\,a+b+c)\,{}_2F_1\!\left(1-\frac{d}{2\,e},\,1;\,2-\frac{d}{2\,e};\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\right)\right)\Big/\left(2\,a+b+c-2\sqrt{(a+b)\,(a+c)}\right)\right)\right)-\frac{1}{d+2\,e}\left(e^{i\,(d+2\,e)\,z}\left(2\sqrt{(a+b)\,(a+c)}\left(\frac{{}_2F_1\!\left(\frac{d}{2\,e}+1,\,2;\,\frac{d}{2\,e}+2;\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}\right)}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}+{}_2F_1\!\left(\frac{d}{2\,e}+1,\,2;\,\frac{d}{2\,e}+2;\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\right)\Big/\left(2\,a+b+c-2\sqrt{(a+b)\,(a+c)}\right)\right)+\left((2\,a+b+c)\,{}_2F_1\!\left(\frac{d}{2\,e}+1,\,1;\,\frac{d}{2\,e}+2;\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}\right)\right)\Big/\left(2\,a+b+c+2\sqrt{(a+b)\,(a+c)}\right)-\left((2\,a+b+c)\,{}_2F_1\!\left(\frac{d}{2\,e}+1,\,1;\,\frac{d}{2\,e}+2;\,\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\right)\right)\Big/\left(2\,a+b+c-2\sqrt{(a+b)\,(a+c)}\right)\right)\right)\right)\Big/\left(4\,((a+b)\,(a+c))^{3/2}\right)$$

01.07.21.2277.01

$$\int \frac{\cos(e\,z)}{\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^2}\,dz = \frac{1}{2\,e}\left(\frac{\tan^{-1}\left(\frac{\sqrt{b-c}\,\sin(e\,z)}{\sqrt{a+c}}\right)}{\sqrt{b-c}\,(a+c)^{3/2}}+\frac{2\sin(e\,z)}{(a+c)\,(2\,a+b+c+(c-b)\cos(2\,e\,z))}\right)$$

Involving $\left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^{-n}$

01.07.21.2278.01

$$\int \frac{1}{a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)}\,dz = -\frac{\tan^{-1}\left(\frac{-b-a\tan(e\,z)}{\sqrt{a\,c-b^2}}\right)}{\sqrt{a\,c-b^2}\,e}$$

01.07.21.2279.01

$$\int \frac{C\cos^2(z)+A\sin^2(z)+D+B\sin(2\,z)}{c\cos^2(z)+a\sin^2(z)+b\sin(2\,z)}\,dz = \frac{1}{a^2-2\,c\,a+4\,b^2+c^2}\left((4\,b\,B+a\,(A-C)+c\,(C-A))\,z-\frac{1}{\sqrt{a\,c-b^2}}\left(\left((C+D)\,a^2-(2\,b\,B+c\,C+2\,c\,D)\,a-2\,b\,B\,c+A\left(2\,b^2+c\,(c-a)\right)+2\,b^2\,C+4\,b^2\,D+c^2\,D\right)\tan^{-1}\left(\frac{-b-a\tan(z)}{\sqrt{a\,c-b^2}}\right)\right)+(-A\,b+C\,b+a\,B-B\,c)\log(a+c+(c-a)\cos(2\,z)+2\,b\sin(2\,z))\right)$$

01.07.21.2280.01

$$\int \frac{C\cos^2(z)+A\sin^2(z)+B\sin(2\,z)}{c\cos^2(z)+a\sin^2(z)+b\sin(2\,z)}\,dz = \frac{1}{a^2-2\,c\,a+4\,b^2+c^2}\left((4\,b\,B+a\,(A-C)+c\,(C-A))\,z-\frac{\left(C\,a^2-(2\,b\,B+c\,C)\,a+A\left(2\,b^2+c\,(c-a)\right)+2\,b\,(b\,C-B\,c)\right)\tan^{-1}\left(\frac{-b-a\tan(z)}{\sqrt{a\,c-b^2}}\right)}{\sqrt{a\,c-b^2}}+(-A\,b+C\,b+a\,B-B\,c)\log(a+c+(c-a)\cos(2\,z)+2\,b\sin(2\,z))\right)$$

01.07.21.2281.01

$$\int \frac{1}{\left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^2}\,dz = -\frac{\frac{(a+c)\tan^{-1}\left(\frac{-b-a\tan(e\,z)}{\sqrt{a\,c-b^2}}\right)}{\left(a\,c-b^2\right)^{3/2}}-\frac{2\,b\,(a+c)+\left(a^2-2\,c\,a+4\,b^2+c^2\right)\sin(2\,e\,z)}{(a-c)\left(a\,c-b^2\right)(a+c+(c-a)\cos(2\,e\,z)+2\,b\sin(2\,e\,z))}}{2\,e}$$

Involving $\sin(d\,z)\left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^{-n}$

01.07.21.2282.01

$$\int \frac{\sin(d\,z)}{a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)}\,dz = -\left((-a-2\,i\,b+c)\left(\frac{1}{d+2\,e}\left(e^{i\,(d+2\,e)\,z}\left(\left(-a-c+2\sqrt{a\,c-b^2}\right){}_2F_1\left(\frac{d}{2\,e}+1,1;\frac{d}{2\,e}+2;\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\sqrt{a\,c-b^2}}\right)+\left(a+c+2\sqrt{a\,c-b^2}\right){}_2F_1\left(\frac{d}{2\,e}+1,1;\frac{d}{2\,e}+2;-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)\right)\right)+\frac{1}{d-2\,e}\left(e^{-i\,(d-2\,e)\,z}\left(\left(-a-c+2\sqrt{a\,c-b^2}\right){}_2F_1\left(1-\frac{d}{2\,e},1;2-\frac{d}{2\,e};\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\sqrt{a\,c-b^2}}\right)+\left(a+c+2\sqrt{a\,c-b^2}\right){}_2F_1\left(1-\frac{d}{2\,e},1;2-\frac{d}{2\,e};-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)\right)\right)\right)\right)\Big/\left(2\sqrt{a\,c-b^2}\left(a^2-2\,c\,a+4\,b^2+c^2\right)\right)$$

01.07.21.2283.01

$$\int \frac{\sin(e\,z)}{a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)}\,dz = \left(\sqrt{a-c+2\,i\,b}\left(c-i\,b-\sqrt{a\,c-b^2}\right)\sqrt{a+c+2\sqrt{a\,c-b^2}}\tan^{-1}\left(\frac{\sqrt{-a-2\,i\,b+c}\;e^{i\,e\,z}}{\sqrt{a+c-2\sqrt{a\,c-b^2}}}\right)+\sqrt{-a-2\,i\,b+c}\sqrt{a+c-2\sqrt{a\,c-b^2}}\left(b+\left(c+\sqrt{a\,c-b^2}\right)i\right)i\tanh^{-1}\left(\frac{\sqrt{a-c+2\,i\,b}\;e^{i\,e\,z}}{\sqrt{a+c+2\sqrt{a\,c-b^2}}}\right)\right)\Big/\left(\sqrt{-(a-c+2\,i\,b)^2}\sqrt{a\,c-b^2}\sqrt{a+c-2\sqrt{a\,c-b^2}}\sqrt{a+c+2\sqrt{a\,c-b^2}}\;e\right)$$

01.07.21.2284.01

$$\int \frac{\sin(d\,z)}{\left(c\cos^2(e\,z)+a\sin^2(e\,z)+b\sin(2\,e\,z)\right)^2}\,dz = -\left((-a-2\,i\,b+c)\left(\frac{1}{d+2\,e}\left(e^{i\,(d+2\,e)\,z}\left(-4\,{}_2F_1\left(\frac{d}{2\,e}+1,2;\frac{d}{2\,e}+2;\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\sqrt{a\,c-b^2}}\right)b^2+4\,{}_2F_1\left(\frac{d}{2\,e}+1,2;\frac{d}{2\,e}+2;-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)b^2+(a+c)\left(-a-c+2\sqrt{a\,c-b^2}\right)\right.\right.\right.\right.$$

$$ {}_2F_1\left(\frac{d}{2e}+1,\,1;\,\frac{d}{2e}+2;\,\frac{(a-c+2\,i\,b)\,e^{2iez}}{a+c+2\sqrt{a\,c-b^2}}\right)+(a+c)\left(a+c+2\sqrt{a\,c-b^2}\right){}_2F_1 $$

$$ \left(\frac{d}{2e}+1,\,1;\,\frac{d}{2e}+2;\,-\frac{(-a-2\,i\,b+c)\,e^{2iez}}{a+c-2\sqrt{a\,c-b^2}}\right)+4\,a\,c\,{}_2F_1\left(\frac{d}{2e}+1,\,2;\,\frac{d}{2e}+2;\,\frac{(a-c+2\,i\,b)\,e^{2iez}}{a+c+2\sqrt{a\,c-b^2}}\right)- $$

$$ 2\,a\sqrt{a\,c-b^2}\;{}_2F_1\left(\frac{d}{2e}+1,\,2;\,\frac{d}{2e}+2;\,\frac{(a-c+2\,i\,b)\,e^{2iez}}{a+c+2\sqrt{a\,c-b^2}}\right)-2\,c\sqrt{a\,c-b^2}\;{}_2F_1 $$

$$ \left(\frac{d}{2e}+1,\,2;\,\frac{d}{2e}+2;\,\frac{(a-c+2\,i\,b)\,e^{2iez}}{a+c+2\sqrt{a\,c-b^2}}\right)-4\,a\,c\,{}_2F_1\left(\frac{d}{2e}+1,\,2;\,\frac{d}{2e}+2;\,-\frac{(-a-2\,i\,b+c)\,e^{2iez}}{a+c-2\sqrt{a\,c-b^2}}\right)- $$

$$ 2\,a\sqrt{a\,c-b^2}\;{}_2F_1\left(\frac{d}{2e}+1,\,2;\,\frac{d}{2e}+2;\,-\frac{(-a-2\,i\,b+c)\,e^{2iez}}{a+c-2\sqrt{a\,c-b^2}}\right)- $$

$$ \left.\left.\left. 2\,c\sqrt{a\,c-b^2}\;{}_2F_1\left(\frac{d}{2e}+1,\,2;\,\frac{d}{2e}+2;\,-\frac{(-a-2\,i\,b+c)\,e^{2iez}}{a+c-2\sqrt{a\,c-b^2}}\right)\right)\right)\right)+ $$

$$ \frac{1}{d-2e}\left(e^{-i(d-2e)z}\left(-4\,{}_2F_1\left(1-\frac{d}{2e},\,2;\,2-\frac{d}{2e};\,\frac{(a-c+2\,i\,b)\,e^{2iez}}{a+c+2\sqrt{a\,c-b^2}}\right)b^2+\right.\right. $$

$$ 4\,{}_2F_1\left(1-\frac{d}{2e},\,2;\,2-\frac{d}{2e};\,-\frac{(-a-2\,i\,b+c)\,e^{2iez}}{a+c-2\sqrt{a\,c-b^2}}\right)b^2+ $$

$$ (a+c)\left(-a-c+2\sqrt{a\,c-b^2}\right){}_2F_1\left(1-\frac{d}{2e},\,1;\,2-\frac{d}{2e};\,\frac{(a-c+2\,i\,b)\,e^{2iez}}{a+c+2\sqrt{a\,c-b^2}}\right)+ $$

$$ (a+c)\left(a+c+2\sqrt{a\,c-b^2}\right){}_2F_1\left(1-\frac{d}{2e},\,1;\,2-\frac{d}{2e};\,-\frac{(-a-2\,i\,b+c)\,e^{2iez}}{a+c-2\sqrt{a\,c-b^2}}\right)+ $$

$$ 4\,a\,c\,{}_2F_1\left(1-\frac{d}{2e},\,2;\,2-\frac{d}{2e};\,\frac{(a-c+2\,i\,b)\,e^{2iez}}{a+c+2\sqrt{a\,c-b^2}}\right)- $$

$$ 2\,a\sqrt{a\,c-b^2}\;{}_2F_1\left(1-\frac{d}{2e},\,2;\,2-\frac{d}{2e};\,\frac{(a-c+2\,i\,b)\,e^{2iez}}{a+c+2\sqrt{a\,c-b^2}}\right)-2\,c\sqrt{a\,c-b^2}\;{}_2F_1 $$

$$\left(1-\frac{d}{2e}, 2; 2-\frac{d}{2e}; \frac{(a-c+2ib)\,e^{2iez}}{a+c+2\sqrt{ac-b^2}}\right) - 4ac\,{}_2F_1\left(1-\frac{d}{2e}, 2; 2-\frac{d}{2e}; -\frac{(-a-2ib+c)\,e^{2iez}}{a+c-2\sqrt{ac-b^2}}\right) -$$
$$2a\sqrt{ac-b^2}\;{}_2F_1\left(1-\frac{d}{2e}, 2; 2-\frac{d}{2e}; -\frac{(-a-2ib+c)\,e^{2iez}}{a+c-2\sqrt{ac-b^2}}\right) - 2c\sqrt{ac-b^2}$$
$$\left.\left.\left.\left.\left.{}_2F_1\left(1-\frac{d}{2e}, 2; 2-\frac{d}{2e}; -\frac{(-a-2ib+c)\,e^{2iez}}{a+c-2\sqrt{ac-b^2}}\right)\right)\right)\right)\right)\right/\left(4\left(ac-b^2\right)^{3/2}\left(a^2-2ca+4b^2+c^2\right)\right)$$

Involving $\cos(d\,z)\left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^{-n}$

01.07.21.2285.01

$$\int\frac{\cos(dz)}{a\sin^2(ez)+b\sin(2ez)+c\cos^2(ez)}\,dz =$$
$$-\left((-a-2ib+c)\left(\frac{1}{d+2e}\left(i\,e^{i(d+2e)z}\left(\left(-a-c+2\sqrt{ac-b^2}\right){}_2F_1\left(\frac{d}{2e}+1, 1; \frac{d}{2e}+2; \frac{(a-c+2ib)\,e^{2iez}}{a+c+2\sqrt{ac-b^2}}\right)+\right.\right.\right.\right.$$
$$\left.\left.\left.\left(a+c+2\sqrt{ac-b^2}\right){}_2F_1\left(\frac{d}{2e}+1, 1; \frac{d}{2e}+2; -\frac{(-a-2ib+c)\,e^{2iez}}{a+c-2\sqrt{ac-b^2}}\right)\right)\right)-\frac{1}{d-2e}$$
$$\left(i\,e^{-i(d-2e)z}\left(\left(-a-c+2\sqrt{ac-b^2}\right){}_2F_1\left(1-\frac{d}{2e}, 1; 2-\frac{d}{2e}; \frac{(a-c+2ib)\,e^{2iez}}{a+c+2\sqrt{ac-b^2}}\right)+\left(a+c+2\sqrt{ac-b^2}\right)\right.\right.$$
$$\left.\left.\left.\left.\left.{}_2F_1\left(1-\frac{d}{2e}, 1; 2-\frac{d}{2e}; -\frac{(-a-2ib+c)\,e^{2iez}}{a+c-2\sqrt{ac-b^2}}\right)\right)\right)\right)\right)\right/\left(2\sqrt{ac-b^2}\left(a^2-2ca+4b^2+c^2\right)\right)$$

01.07.21.2286.01

$$\int \frac{\cos(e\,z)}{a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)}\,dz = \left(\sqrt{a-c+2\,i\,b}\left(a+i\,b-\sqrt{a\,c-b^2}\right)\sqrt{a+c+2\sqrt{a\,c-b^2}}\;i\tan^{-1}\left(\frac{\sqrt{-a-2\,i\,b+c}\;e^{i\,e\,z}}{\sqrt{a+c-2\sqrt{a\,c-b^2}}}\right)+\sqrt{-a-2\,i\,b+c}\;\sqrt{a+c-2\sqrt{a\,c-b^2}}\left(b-i\,a-i\sqrt{a\,c-b^2}\right)\tanh^{-1}\left(\frac{\sqrt{a-c+2\,i\,b}\;e^{i\,e\,z}}{\sqrt{a+c+2\sqrt{a\,c-b^2}}}\right)\right)\Bigg/\left(\sqrt{-(a-c+2\,i\,b)^2}\;\sqrt{a\,c-b^2}\;\sqrt{a+c-2\sqrt{a\,c-b^2}}\;\sqrt{a+c+2\sqrt{a\,c-b^2}}\;e\right)$$

01.07.21.2287.01

$$\int \frac{\cos(d\,z)}{\left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^2}\,dz =$$

$$-\Bigg((-a-2\,i\,b+c)\Bigg(\frac{1}{d+2\,e}\Bigg(i\,e^{i\,(d+2\,e)\,z}\Bigg(-4\,{}_2F_1\left(\frac{d}{2\,e}+1,2;\frac{d}{2\,e}+2;\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\sqrt{a\,c-b^2}}\right)b^2+$$
$$4\,{}_2F_1\left(\frac{d}{2\,e}+1,2;\frac{d}{2\,e}+2;-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)b^2+(a+c)\left(-a-c+2\sqrt{a\,c-b^2}\right)$$
$${}_2F_1\left(\frac{d}{2\,e}+1,1;\frac{d}{2\,e}+2;\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\sqrt{a\,c-b^2}}\right)+(a+c)\left(a+c+2\sqrt{a\,c-b^2}\right){}_2F_1$$
$$\left(\frac{d}{2\,e}+1,1;\frac{d}{2\,e}+2;-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)+4\,a\,c\,{}_2F_1\left(\frac{d}{2\,e}+1,2;\frac{d}{2\,e}+2;\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\sqrt{a\,c-b^2}}\right)-$$
$$2\,a\sqrt{a\,c-b^2}\;{}_2F_1\left(\frac{d}{2\,e}+1,2;\frac{d}{2\,e}+2;\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\sqrt{a\,c-b^2}}\right)-2\,c\sqrt{a\,c-b^2}\;{}_2F_1$$
$$\left(\frac{d}{2\,e}+1,2;\frac{d}{2\,e}+2;\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\sqrt{a\,c-b^2}}\right)-4\,a\,c\,{}_2F_1\left(\frac{d}{2\,e}+1,2;\frac{d}{2\,e}+2;-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)-$$
$$2\,a\sqrt{a\,c-b^2}\;{}_2F_1\left(\frac{d}{2\,e}+1,2;\frac{d}{2\,e}+2;-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)-$$

$$2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(\frac{d}{2\,e}+1,\,2;\;\frac{d}{2\,e}+2;\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)\Bigg)\Bigg)\Bigg)-$$

$$\frac{1}{d-2\,e}\Bigg(i\,e^{-i\,(d-2\,e)\,z}\Bigg(-4\,{}_2F_1\!\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)b^2+$$

$$4\,{}_2F_1\!\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)b^2+$$

$$(a+c)\left(-a-c+2\,\sqrt{a\,c-b^2}\right){}_2F_1\!\left(1-\frac{d}{2\,e},\,1;\,2-\frac{d}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)+$$

$$(a+c)\left(a+c+2\,\sqrt{a\,c-b^2}\right){}_2F_1\!\left(1-\frac{d}{2\,e},\,1;\,2-\frac{d}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)+$$

$$4\,a\,c\,{}_2F_1\!\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1$$

$$\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-4\,a\,c\,{}_2F_1\!\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)-$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)-2\,c\,\sqrt{a\,c-b^2}$$

$${}_2F_1\!\left(1-\frac{d}{2\,e},\,2;\,2-\frac{d}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)\Bigg)\Bigg)\Bigg/\left(4\left(a\,c-b^2\right)^{3/2}\left(a^2-2\,c\,a+4\,b^2+c^2\right)\right)$$

Involving $\frac{1}{f(z)+b\cos^2(z)}$

01.07.21.2288.01

$$\int\frac{1}{a\sin^2(z)+b\sin(z)\cos(z)+c\cos^2(z)}\,dz=-\frac{2\tanh^{-1}\!\left(\frac{b+2\,a\tan(z)}{\sqrt{b^2-4\,a\,c}}\right)}{\sqrt{b^2-4\,a\,c}}$$

Involving algebraic functions of the direct function and trigonometric functions

Involving sin

Involving $\sin(d\,z)\,(a+b\cos(c\,z))^{\beta}$

01.07.21.2289.01

$$\int \sin(d\,z)\,(a+b\cos(c\,z))^{\beta}\,dz = -\frac{1}{2\left(d^2-c^2\beta^2\right)}\left(e^{-i\,d\,z}\left(\frac{e^{i\,c\,z}\,b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(\frac{e^{i\,c\,z}\,b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2}\,b\,e^{-i\,c\,z}\left(1+e^{2\,i\,c\,z}\right)\right)^{\beta}\right.$$
$$\left((d-c\,\beta)\,F_1\left(-\frac{d+c\,\beta}{c};-\beta,-\beta;-\frac{d}{c}-\beta+1;-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.$$
$$\left.\left.e^{2\,i\,d\,z}\,(d+c\,\beta)\,F_1\left(\frac{d}{c}-\beta;-\beta,-\beta;\frac{d}{c}-\beta+1;-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)\right)\right)$$

01.07.21.2290.01

$$\int \sin(c\,z)\,(a+b\cos(c\,z))^{\beta}\,dz = -\frac{(a+b\cos(c\,z))^{\beta+1}}{b\,c\,(\beta+1)}$$

01.07.21.2291.01

$$\int \sin(c\,z)\,\sqrt{a+b\cos(c\,z)}\,dz = -\frac{2\,(a+b\cos(c\,z))^{3/2}}{3\,b\,c}$$

01.07.21.2292.01

$$\int \frac{\sin(c\,z)}{\sqrt{a+b\cos(c\,z)}}\,dz = -\frac{2\sqrt{a+b\cos(c\,z)}}{b\,c}$$

01.07.21.2293.01

$$\int \frac{\sin(c\,z)}{(a+b\cos(c\,z))^{3/2}}\,dz = \frac{2}{b\,c\sqrt{a+b\cos(c\,z)}}$$

01.07.21.2294.01

$$\int \sin(c\,z)\sqrt{(a+b\cos(2\,c\,z))^5}\,dz = \frac{1}{32\,c}\left(\sqrt{(a+b\cos(2\,c\,z))^5}\left(-\frac{5\sqrt{2}\,\log\left(\sqrt{2}\,\sqrt{b}\,\cos(c\,z)+\sqrt{a+b\cos(2\,c\,z)}\right)(a-b)^3}{\sqrt{b}\,(a+b\cos(2\,c\,z))^{5/2}}-\right.\right.$$
$$\left.\left.\frac{2\cos(c\,z)\left(33\,a^2-40\,b\,a+19\,b^2+2\,b\,(13\,a-5\,b)\cos(2\,c\,z)+4\,b^2\cos(4\,c\,z)\right)}{3\,(a+b\cos(2\,c\,z))^2}\right)\right)$$

01.07.21.2295.01

$$\int \sin(c\,z)\,(a+b\cos(2\,c\,z))^{3/2}\,dz =$$
$$-\frac{1}{16\,c}\left(\frac{3\sqrt{2}\,\log\left(\sqrt{2}\,\sqrt{b}\,\cos(c\,z)+\sqrt{a+b\cos(2\,c\,z)}\right)(a-b)^2}{\sqrt{b}}+2\cos(c\,z)\sqrt{a+b\cos(2\,c\,z)}\,(5\,a-3\,b+2\,b\cos(2\,c\,z))\right)$$

01.07.21.2296.01

$$\int \sin(c\,z)\sqrt{(a+b\cos(2\,c\,z))^3}\,dz = \frac{1}{16\,c}\left(\sqrt{(a+b\cos(2\,c\,z))^3}\left(-\frac{3\sqrt{2}\log\left(\sqrt{2}\sqrt{b}\cos(c\,z)+\sqrt{a+b\cos(2\,c\,z)}\right)(a-b)^2}{\sqrt{b}\,(a+b\cos(2\,c\,z))^{3/2}} - \frac{2\cos(c\,z)\,(5\,a-3\,b+2\,b\cos(2\,c\,z))}{a+b\cos(2\,c\,z)}\right)\right)$$

01.07.21.2297.01

$$\int \sin(c\,z)\sqrt{a+b\cos(2\,c\,z)}\,dz = \frac{\sqrt{2}\,(b-a)\log\left(\sqrt{2}\sqrt{b}\cos(c\,z)+\sqrt{a+b\cos(2\,c\,z)}\right)-2\sqrt{b}\cos(c\,z)\sqrt{a+b\cos(2\,c\,z)}}{4\sqrt{b}\,c}$$

01.07.21.2298.01

$$\int \frac{\sin(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\,dz = -\frac{\log\left(\sqrt{2}\sqrt{b}\cos(c\,z)+\sqrt{a+b\cos(2\,c\,z)}\right)}{\sqrt{2}\sqrt{b}\,c}$$

01.07.21.2299.01

$$\int \frac{\sin(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = -\frac{\cos(c\,z)}{(a-b)\,c\sqrt{a+b\cos(2\,c\,z)}}$$

01.07.21.2300.01

$$\int \frac{\sin(c\,z)}{\sqrt{(a+b\cos(2\,c\,z))^3}}\,dz = -\frac{\cos(c\,z)\,(a+b\cos(2\,c\,z))}{(a-b)\,c\sqrt{(a+b\cos(2\,c\,z))^3}}$$

01.07.21.2301.01

$$\int \frac{\sin(c\,z)}{\sqrt{(a+b\cos(2\,c\,z))^5}}\,dz = -\frac{\cos(c\,z)\,(a+b\cos(2\,c\,z))\,(3\,a-b+2\,b\cos(2\,c\,z))}{3\,(a-b)^2\,c\sqrt{(a+b\cos(2\,c\,z))^5}}$$

01.07.21.2302.01

$$\int \frac{\sin(c\,z)}{\sqrt{(a+b\cos(2\,c\,z))^7}}\,dz = -\frac{\cos(c\,z)\,(a+b\cos(2\,c\,z))\left(15\,a^2-10\,b\,a+7\,b^2+4\,(5\,a-b)\,b\cos(2\,c\,z)+4\,b^2\cos(4\,c\,z)\right)}{15\,(a-b)^3\,c\sqrt{(a+b\cos(2\,c\,z))^7}}$$

01.07.21.2303.01

$$\int \frac{\sin(5\,c\,z)}{\sqrt{(a+b\cos(2\,c\,z))^5}}\,dz = \left(\frac{1}{(a-b)^2}\left(\sqrt{b}\cos(c\,z)\,(a+b\cos(2\,c\,z))\left(12\,a^3-20\,b\,a^2+7\,b^2\,a-b^3+2\,b\left(8\,a^2-13\,b\,a+4\,b^2\right)\cos(2\,c\,z)\right)\right) - 6\sqrt{2}\,(a+b\cos(2\,c\,z))^{5/2}\log\left(\sqrt{2}\sqrt{b}\cos(c\,z)+\sqrt{a+b\cos(2\,c\,z)}\right)\right)\Big/\left(3\,b^{5/2}\,c\sqrt{(a+b\cos(2\,c\,z))^5}\right)$$

Involving $\sin^n(c\,z)\,(a+b\cos(2\,c\,z))^\beta$

01.07.21.2304.01

$$\int \sin^2(c\,z)\,(a+b\cos(2\,c\,z))^{3/2}\,dz = \frac{1}{60\,b\,c\,\sqrt{a+b\cos(2\,c\,z)}}\left(-2\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\left(3\,a^3-17\,b\,a^2-11\,b^2\,a+9\,b^3\right)E\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)+2\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\left(3\,a^3-5\,b\,a^2-3\,b^2\,a+5\,b^3\right) F\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)-b\left(12\,a^2-10\,b\,a+3\,b^2+2\,b\,(9\,a-5\,b)\cos(2\,c\,z)+3\,b^2\cos(4\,c\,z)\right)\sin(2\,c\,z)\right)$$

01.07.21.2305.01

$$\int \sin^3(c\,z)\,(a+b\cos(2\,c\,z))^{3/2}\,dz = \frac{1}{64\,c}\left(\frac{1}{3\,b}\left(2\cos(c\,z)\sqrt{a+b\cos(2\,c\,z)}\left(3\,a^2-52\,b\,a+37\,b^2+2\,b\,(7\,a-11\,b)\cos(2\,c\,z)+4\,b^2\cos(4\,c\,z)\right)\right)- \frac{\sqrt{2}\,(a-b)^2\,(a+11\,b)\log\left(\sqrt{2}\,\sqrt{b}\,\cos(c\,z)+\sqrt{a+b\cos(2\,c\,z)}\right)}{b^{3/2}}\right)$$

01.07.21.2306.01

$$\int \sin^4(c\,z)\,(a+b\cos(2\,c\,z))^{3/2}\,dz = \left(-8\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\left(a^4+8\,b\,a^3-30\,b^2\,a^2-16\,b^3\,a+21\,b^4\right)E\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)+ 8\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\left(a^4+7\,b\,a^3-11\,b^2\,a^2-7\,b^3\,a+10\,b^4\right)F\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)+ b\left(4\,a^3-112\,b\,a^2+106\,b^2\,a-28\,b^3+b\left(36\,a^2-168\,b\,a+95\,b^2\right)\cos(2\,c\,z)+2\,b^2\,(13\,a-14\,b)\cos(4\,c\,z)+5\,b^3\cos(6\,c\,z)\right) \sin(2\,c\,z)\right)\Big/\left(560\,b^2\,c\sqrt{a+b\cos(2\,c\,z)}\right)$$

01.07.21.2307.01

$$\int \sin^2(c\,z)\sqrt{a+b\cos(2\,c\,z)}\,dz = \frac{1}{12\,b\,c\sqrt{a+b\cos(2\,c\,z)}}\left(-2\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\left(a^2-2\,b\,a-3\,b^2\right)E\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)+ 2\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\left(a^2-b^2\right)F\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)-2\,b\,(a+b\cos(2\,c\,z))\sin(2\,c\,z)\right)$$

01.07.21.2308.01

$$\int \sin^3(c\,z)\sqrt{a+b\cos(2\,c\,z)}\,dz = \frac{1}{32\,c}\left(\frac{2\cos(c\,z)\sqrt{a+b\cos(2\,c\,z)}\,(a-7\,b+2\,b\cos(2\,c\,z))}{b}+\frac{\sqrt{2}\,(b-a)\,(a+7\,b)\log\left(\sqrt{2}\,\sqrt{b}\,\cos(c\,z)+\sqrt{a+b\cos(2\,c\,z)}\right)}{b^{3/2}}\right)$$

01.07.21.2309.01

$$\int \sin^4(c z)\sqrt{a+b\cos(2 c z)}\, dz = \left(-8\sqrt{\frac{a+b\cos(2 c z)}{a+b}}\left(a^3+6 b a^2-7 b^2 a-12 b^3\right) E\left(c z \,\middle|\, \frac{2 b}{a+b}\right)+ 8\sqrt{\frac{a+b\cos(2 c z)}{a+b}}\left(a^3+5 b a^2-b^2 a-5 b^3\right) F\left(c z \,\middle|\, \frac{2 b}{a+b}\right)+ 2 b\left(2 a^2-20 b a+3 b^2+4 b(2 a-5 b)\cos(2 c z)+3 b^2\cos(4 c z)\right)\sin(2 c z)\right) \Big/ \left(240 b^2 c\sqrt{a+b\cos(2 c z)}\right)$$

01.07.21.2310.01

$$\int \frac{\sin^2(c z)}{\sqrt{a+b\cos(2 c z)}}\, dz = \frac{\sqrt{a+b\cos(2 c z)}\left(F\left(c z \,\middle|\, \frac{2 b}{a+b}\right)-E\left(c z \,\middle|\, \frac{2 b}{a+b}\right)\right)}{2 b c\sqrt{\frac{a+b\cos(2 c z)}{a+b}}}$$

01.07.21.2311.01

$$\int \frac{\sin^3(c z)}{\sqrt{a+b\cos(2 c z)}}\, dz = \frac{2\sqrt{b}\cos(c z)\sqrt{a+b\cos(2 c z)}-\sqrt{2}(a+3 b)\log\left(\sqrt{2}\sqrt{b}\cos(c z)+\sqrt{a+b\cos(2 c z)}\right)}{8 b^{3/2} c}$$

01.07.21.2312.01

$$\int \frac{\sin^4(c z)}{\sqrt{a+b\cos(2 c z)}}\, dz = \frac{1}{12 b^2 c\sqrt{a+b\cos(2 c z)}}\left(-2\sqrt{\frac{a+b\cos(2 c z)}{a+b}}\left(a^2+4 b a+3 b^2\right) E\left(c z \,\middle|\, \frac{2 b}{a+b}\right)+ 2\sqrt{\frac{a+b\cos(2 c z)}{a+b}}\left(a^2+3 b a+2 b^2\right) F\left(c z \,\middle|\, \frac{2 b}{a+b}\right)+b(a+b\cos(2 c z))\sin(2 c z)\right)$$

01.07.21.2313.01

$$\int \frac{\sin^2(c z)}{(a+b\cos(2 c z))^{3/2}}\, dz = \frac{\sqrt{\frac{a+b\cos(2 c z)}{a+b}}(a+b) E\left(c z \,\middle|\, \frac{2 b}{a+b}\right)-(a-b)\sqrt{\frac{a+b\cos(2 c z)}{a+b}} F\left(c z \,\middle|\, \frac{2 b}{a+b}\right)-b\sin(2 c z)}{2(a-b) b c\sqrt{a+b\cos(2 c z)}}$$

01.07.21.2314.01

$$\int \frac{\sin^3(c z)}{(a+b\cos(2 c z))^{3/2}}\, dz = \frac{\sqrt{2}\log\left(\sqrt{2}\sqrt{b}\cos(c z)+\sqrt{a+b\cos(2 c z)}\right)-\frac{2\sqrt{b}(a+b)\cos(c z)}{(a-b)\sqrt{a+b\cos(2 c z)}}}{4 b^{3/2} c}$$

01.07.21.2315.01

$$\int \frac{\sin^4(c z)}{(a+b\cos(2 c z))^{3/2}} \, dz = \left((a+b)\left(2 a \sqrt{\frac{a+b\cos(2 c z)}{a+b}} \, E\left(c z \,\middle|\, \frac{2 b}{a+b}\right) - 2 (a-b) \sqrt{\frac{a+b\cos(2 c z)}{a+b}} \, F\left(c z \,\middle|\, \frac{2 b}{a+b}\right) - b\sin(2 c z)\right)\right) \Big/ \left(4 (a-b) b^2 c \sqrt{a+b\cos(2 c z)}\right)$$

Involving $\sin^m(c z) \cos^m(c z) (a+b\cos(2 c z))^\beta$

01.07.21.2316.01

$$\int \sin(c z)\cos^2(c z) (a+b\cos(2 c z))^{3/2} \, dz = \frac{1}{192 b^{3/2} c} \Big(-2 (7 a+3 b) \sqrt{a+b\cos(2 c z)} \cos(3 c z) b^{3/2} - 4 \sqrt{a+b\cos(2 c z)} \cos(5 c z) b^{5/2} - 3 \sqrt{2} \log\left(\sqrt{2} \sqrt{b} \cos(c z) + \sqrt{a+b\cos(2 c z)}\right) b^3 + 9 \sqrt{2} \, a \log\left(\sqrt{2} \sqrt{b} \cos(c z) + \sqrt{a+b\cos(2 c z)}\right) b^2 - 9 \sqrt{2} \, a^2 \log\left(\sqrt{2} \sqrt{b} \cos(c z) + \sqrt{a+b\cos(2 c z)}\right) b - 2 \left(3 a^2 + 15 b a + 2 b^2\right) \cos(c z) \sqrt{a+b\cos(2 c z)} \sqrt{b} + 3 \sqrt{2} \, a^3 \log\left(\sqrt{2} \sqrt{b} \cos(c z) + \sqrt{a+b\cos(2 c z)}\right)\Big)$$

01.07.21.2317.01

$$\int \sin^2(c z)\cos(c z) (a+b\cos(2 c z))^{3/2} \, dz = \frac{1}{192 b^{3/2} c} \left(3 \sqrt{2} (a+b)^3 \tan^{-1}\left(\frac{\sqrt{2} \sqrt{b} \sin(c z)}{\sqrt{a+b\cos(2 c z)}}\right) - 2 \sqrt{b} \sqrt{a+b\cos(2 c z)} \left(3 a^2 - 8 b a + b^2 + 2 (7 a-b) b \cos(2 c z) + 4 b^2 \cos(4 c z)\right) \sin(c z)\right)$$

01.07.21.2318.01

$$\int \sin(c z)\cos^2(c z) \sqrt{a+b\cos(2 c z)} \, dz = \frac{1}{32 b^{3/2} c} \left(-2 \sqrt{a+b\cos(2 c z)} \cos(3 c z) b^{3/2} - 2 (a+2 b) \cos(c z) \sqrt{a+b\cos(2 c z)} \sqrt{b} + \sqrt{2} (a-b)^2 \log\left(\sqrt{2} \sqrt{b} \cos(c z) + \sqrt{a+b\cos(2 c z)}\right)\right)$$

01.07.21.2319.01

$$\int \sin(c z)\cos^3(c z) \sqrt{a+b\cos(2 c z)} \, dz = \left(-8 \sqrt{\frac{b\cos(2 c z)}{a}+1} \, a^3 + 8 a^3 - 20 b a^2 + 6 \sqrt{\frac{b\cos(2 c z)}{a}+1} \, b^2 a - 8 b^2 a - 10 b^3 + b \left(4 a^2 - 40 b a - 9 b^2\right) \cos(2 c z) - 2 b^2 (4 a + 5 b) \cos(4 c z) - 3 b^3 \cos(6 c z)\right) \Big/ \left(240 b^2 c \sqrt{a+b\cos(2 c z)}\right)$$

01.07.21.2320.01

$$\int \sin(c z) \cos^4(c z) \sqrt{a + b \cos(2 c z)} \, dz = \frac{1}{384 b^{5/2} c} \Big(-2 (a + 9 b) \sqrt{a + b \cos(2 c z)} \cos(3 c z) b^{3/2} - 4 \sqrt{a + b \cos(2 c z)} \cos(5 c z) b^{5/2} + 3 \sqrt{2} \log\left(\sqrt{2} \sqrt{b} \cos(c z) + \sqrt{a + b \cos(2 c z)}\right) b^3 - 9 \sqrt{2} a \log\left(\sqrt{2} \sqrt{b} \cos(c z) + \sqrt{a + b \cos(2 c z)}\right) b^2 + 9 \sqrt{2} a^2 \log\left(\sqrt{2} \sqrt{b} \cos(c z) + \sqrt{a + b \cos(2 c z)}\right) b - 2 \left(-3 a^2 + 9 b a + 14 b^2\right) \cos(c z) \sqrt{a + b \cos(2 c z)} \sqrt{b} - 3 \sqrt{2} a^3 \log\left(\sqrt{2} \sqrt{b} \cos(c z) + \sqrt{a + b \cos(2 c z)}\right)\Big)$$

01.07.21.2321.01

$$\int \sin^2(c z) \cos(c z) \sqrt{a + b \cos(2 c z)} \, dz = \frac{1}{32 b^{3/2} c} \left(\sqrt{2} (a + b)^2 \tan^{-1}\left(\frac{\sqrt{2} \sqrt{b} \sin(c z)}{\sqrt{a + b \cos(2 c z)}}\right) - 2 \sqrt{b} \sqrt{a + b \cos(2 c z)} (a - b + 2 b \cos(2 c z)) \sin(c z) \right)$$

01.07.21.2322.01

$$\int \sin^2(c z) \cos^2(c z) \sqrt{a + b \cos(2 c z)} \, dz = \left(8 \sqrt{\frac{a + b \cos(2 c z)}{a + b}} \left(a^3 + b a^2 + 3 b^2 a + 3 b^3\right) E\left(c z \,\middle|\, \frac{2 b}{a + b}\right) - 8 a \left(a^2 - b^2\right) \sqrt{\frac{a + b \cos(2 c z)}{a + b}} F\left(c z \,\middle|\, \frac{2 b}{a + b}\right) - 2 b \left(2 a^2 + 8 b \cos(2 c z) a + 3 b^2 + 3 b^2 \cos(4 c z)\right) \sin(2 c z) \right) \Big/ \left(240 b^2 c \sqrt{a + b \cos(2 c z)}\right)$$

01.07.21.2323.01

$$\int \sin^2(c z) \cos^3(c z) \sqrt{a + b \cos(2 c z)} \, dz = \frac{1}{384 b^{5/2} c} \left(-3 \sqrt{2} (a - 3 b) \tan^{-1}\left(\frac{\sqrt{2} \sqrt{b} \sin(c z)}{\sqrt{a + b \cos(2 c z)}}\right) (a + b)^2 - 2 \sqrt{b} \sqrt{a + b \cos(2 c z)} \left(-3 a^2 + 4 b a - 5 b^2 + 2 b (a + 5 b) \cos(2 c z) + 4 b^2 \cos(4 c z)\right) \sin(c z) \right)$$

01.07.21.2324.01

$$\int \sin^2(c z) \cos^4(c z) \sqrt{a + b \cos(2 c z)} \, dz = \left(-8 \sqrt{\frac{a + b \cos(2 c z)}{a + b}} \left(4 a^4 - 3 b a^3 - 15 b^2 a^2 - 29 b^3 a - 21 b^4\right) E\left(c z \,\middle|\, \frac{2 b}{a + b}\right) + 8 \sqrt{\frac{a + b \cos(2 c z)}{a + b}} \left(4 a^4 - 7 b a^3 - 9 b^2 a^2 + 7 b^3 a + 5 b^4\right) F\left(c z \,\middle|\, \frac{2 b}{a + b}\right) - b \left(-16 a^3 + 28 b a^2 - 4 b^2 a + 42 b^3 + b \left(-4 a^2 + 112 b a + 5 b^2\right) \cos(2 c z) + 6 b^2 (6 a + 7 b) \cos(4 c z) + 15 b^3 \cos(6 c z)\right) \sin(2 c z) \right) \Big/ \left(3360 b^3 c \sqrt{a + b \cos(2 c z)}\right)$$

01.07.21.2325.01

$$\int \sin^3(c z)\cos(c z)\sqrt{a+b\cos(2 c z)}\,dz = \left(8\sqrt{\frac{b\cos(2 c z)}{a}+1}\;a^3-8a^3-20\,b\,a^2+8\,b^2\,a-6\,b^2\sqrt{\frac{b\cos(2 c z)}{a}+1}\;a-10\,b^3+b\left(-4a^2-40\,b\,a+9\,b^2\right)\cos(2 c z)+2\,b^2\,(4a-5b)\cos(4 c z)+3\,b^3\cos(6 c z)\right)\Big/\left(240\,b^2\,c\sqrt{a+b\cos(2 c z)}\right)$$

01.07.21.2326.01

$$\int \sin^3(c z)\cos^2(c z)\sqrt{a+b\cos(2 c z)}\,dz = \frac{1}{384\,b^{5/2}\,c}\Bigg(2\,(a-3b)\sqrt{a+b\cos(2 c z)}\;\cos(3 c z)\,b^{3/2}+4\sqrt{a+b\cos(2 c z)}\;\cos(5 c z)\,b^{5/2}+9\sqrt{2}\,\log\left(\sqrt{2}\sqrt{b}\,\cos(c z)+\sqrt{a+b\cos(2 c z)}\right)b^3-15\sqrt{2}\,a\log\left(\sqrt{2}\sqrt{b}\,\cos(c z)+\sqrt{a+b\cos(2 c z)}\right)b^2+3\sqrt{2}\,a^2\log\left(\sqrt{2}\sqrt{b}\,\cos(c z)+\sqrt{a+b\cos(2 c z)}\right)b-2\left(3a^2+3\,b\,a+10\,b^2\right)\cos(c z)\sqrt{a+b\cos(2 c z)}\;\sqrt{b}+3\sqrt{2}\,a^3\log\left(\sqrt{2}\sqrt{b}\,\cos(c z)+\sqrt{a+b\cos(2 c z)}\right)\Bigg)$$

01.07.21.2327.01

$$\int \sin^4(c z)\cos(c z)\sqrt{a+b\cos(2 c z)}\,dz = \frac{1}{384\,b^{5/2}\,c}\left(3\sqrt{2}\,\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\,\sin(c z)}{\sqrt{a+b\cos(2 c z)}}\right)(a+b)^3+2\sqrt{b}\,\sqrt{a+b\cos(2 c z)}\,\left(-3a^2-8\,b\,a+7\,b^2+2\,b\,(a-7b)\cos(2 c z)+4\,b^2\cos(4 c z)\right)\sin(c z)\right)$$

01.07.21.2328.01

$$\int \frac{\sin(c z)\cos^2(c z)}{\sqrt{a+b\cos(2 c z)}}\,dz = \frac{\sqrt{2}\,(a-b)\log\left(\sqrt{2}\sqrt{b}\,\cos(c z)+\sqrt{a+b\cos(2 c z)}\right)-2\sqrt{b}\,\cos(c z)\sqrt{a+b\cos(2 c z)}}{8\,b^{3/2}\,c}$$

01.07.21.2329.01

$$\int \frac{\sin(c z)\cos^3(c z)}{\sqrt{a+b\cos(2 c z)}}\,dz = \frac{-b^2\cos^2(2 c z)+b\,(a-3b)\cos(2 c z)+\left(-2\left(\sqrt{\frac{b\cos(2 c z)}{a}+1}-1\right)a-3\,b\right)a}{12\,b^2\,c\sqrt{a+b\cos(2 c z)}}$$

01.07.21.2330.01

$$\int \frac{\sin(c z)\cos^4(c z)}{\sqrt{a+b\cos(2 c z)}}\,dz = \frac{1}{64\,b^{5/2}\,c}\left(-2\sqrt{a+b\cos(2 c z)}\;\cos(3 c z)\,b^{3/2}+6\,(a-2b)\cos(c z)\sqrt{a+b\cos(2 c z)}\;\sqrt{b}-3\sqrt{2}\,(a-b)^2\log\left(\sqrt{2}\sqrt{b}\,\cos(c z)+\sqrt{a+b\cos(2 c z)}\right)\right)$$

01.07.21.2331.01

$$\int \frac{\sin^2(c z)\cos(c z)}{\sqrt{a+b\cos(2 c z)}}\,dz = \frac{\sqrt{2}\,(a+b)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\,\sin(c z)}{\sqrt{a+b\cos(2 c z)}}\right)-2\sqrt{b}\,\sqrt{a+b\cos(2 c z)}\,\sin(c z)}{8\,b^{3/2}\,c}$$

01.07.21.2332.01

$$\int \frac{\sin^2(c\,z)\cos^2(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\,dz = \frac{1}{12\,b^2\,c\,\sqrt{a+b\cos(2\,c\,z)}} \left(2\,a\,\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,(a+b)\,E\!\left(c\,z \,\middle|\, \frac{2\,b}{a+b}\right) - 2\left(a^2-b^2\right)\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,F\!\left(c\,z \,\middle|\, \frac{2\,b}{a+b}\right) - b\,(a+b\cos(2\,c\,z))\sin(2\,c\,z)\right)$$

01.07.21.2333.01

$$\int \frac{\sin^2(c\,z)\cos^3(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\,dz = \frac{1}{64\,b^{5/2}\,c}\left(-\sqrt{2}\left(3\,a^2-2\,b\,a-5\,b^2\right)\tan^{-1}\!\left(\frac{\sqrt{2}\,\sqrt{b}\,\sin(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\right) - 2\,\sqrt{b}\,\sqrt{a+b\cos(2\,c\,z)}\,(-3\,a+3\,b+2\,b\cos(2\,c\,z))\sin(c\,z)\right)$$

01.07.21.2334.01

$$\int \frac{\sin^2(c\,z)\cos^4(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\,dz = \left(-4\,\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\left(4\,a^3-b\,a^2-8\,b^2\,a-3\,b^3\right)E\!\left(c\,z \,\middle|\, \frac{2\,b}{a+b}\right) + 4\,\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\left(4\,a^3-5\,b\,a^2-4\,b^2\,a+5\,b^3\right)F\!\left(c\,z \,\middle|\, \frac{2\,b}{a+b}\right) - b\left(-8\,a^2+10\,b\,a+3\,b^2-2\,(a-5\,b)\,b\cos(2\,c\,z)+3\,b^2\cos(4\,c\,z)\right)\sin(2\,c\,z)\right) \Big/ \left(240\,b^3\,c\,\sqrt{a+b\cos(2\,c\,z)}\right)$$

01.07.21.2335.01

$$\int \frac{\sin^3(c\,z)\cos(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\,dz = \frac{b^2\cos^2(2\,c\,z) - b\,(a+3\,b)\cos(2\,c\,z) + \left(2\,a\left(\sqrt{\frac{b\cos(2\,c\,z)}{a}+1}-1\right)-3\,b\right)a}{12\,b^2\,c\,\sqrt{a+b\cos(2\,c\,z)}}$$

01.07.21.2336.01

$$\int \frac{\sin^3(c\,z)\cos^2(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\,dz = \frac{1}{64\,b^{5/2}\,c}\left(2\,\sqrt{a+b\cos(2\,c\,z)}\,\cos(3\,c\,z)\,b^{3/2} - 2\,(3\,a+2\,b)\cos(c\,z)\,\sqrt{a+b\cos(2\,c\,z)}\,\sqrt{b} + \sqrt{2}\left(3\,a^2+2\,b\,a-5\,b^2\right)\log\!\left(\sqrt{2}\,\sqrt{b}\,\cos(c\,z)+\sqrt{a+b\cos(2\,c\,z)}\right)\right)$$

01.07.21.2337.01

$$\int \frac{\sin^3(c\,z)\cos^3(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\,dz = \left(-32\,\sqrt{\frac{b\cos(2\,c\,z)}{a}+1}\;a^3 + 32\,a^3 + 9\,\sqrt{\frac{b\cos(2\,c\,z)}{a}+1}\;b^2\,a - 62\,b^2\,a - 2\,b^2\cos(4\,c\,z)\,a + b\left(16\,a^2-51\,b^2\right)\cos(2\,c\,z) + 3\,b^3\cos(6\,c\,z)\right) \Big/ \left(480\,b^3\,c\,\sqrt{a+b\cos(2\,c\,z)}\right)$$

01.07.21.2338.01

$$\int \frac{\sin^3(c z)\cos^4(c z)}{\sqrt{a+b\cos(2 c z)}}\,dz = \frac{1}{768 b^{7/2} c}\Big(-2(5a-3b)\sqrt{a+b\cos(2cz)}\cos(3cz)\,b^{3/2} + 4\sqrt{a+b\cos(2cz)}\cos(5cz)\,b^{5/2} - 21\sqrt{2}\log\left(\sqrt{2}\sqrt{b}\cos(cz)+\sqrt{a+b\cos(2cz)}\right)b^3 + 27\sqrt{2}\,a\log\left(\sqrt{2}\sqrt{b}\cos(cz)+\sqrt{a+b\cos(2cz)}\right)b^2 + 9\sqrt{2}\,a^2\log\left(\sqrt{2}\sqrt{b}\cos(cz)+\sqrt{a+b\cos(2cz)}\right)b - 2\left(-15a^2+9ba+22b^2\right)\cos(cz)\sqrt{a+b\cos(2cz)}\sqrt{b} - 15\sqrt{2}\,a^3\log\left(\sqrt{2}\sqrt{b}\cos(cz)+\sqrt{a+b\cos(2cz)}\right)\Big)$$

01.07.21.2339.01

$$\int \frac{\sin^4(c z)\cos(c z)}{\sqrt{a+b\cos(2 c z)}}\,dz = \frac{1}{64 b^{5/2} c}\left(3\sqrt{2}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(cz)}{\sqrt{a+b\cos(2cz)}}\right)(a+b)^2 + 2\sqrt{b}\sqrt{a+b\cos(2cz)}\,(-3a-5b+2b\cos(2cz))\sin(cz)\right)$$

01.07.21.2340.01

$$\int \frac{\sin^4(c z)\cos^2(c z)}{\sqrt{a+b\cos(2 c z)}}\,dz = \left(4\sqrt{\frac{a+b\cos(2cz)}{a+b}}\left(4a^3+9ba^2+2b^2a-3b^3\right)E\left(cz\,\middle|\,\frac{2b}{a+b}\right) - 4\left(4a^3+5ba^2-4b^2a-5b^3\right)\sqrt{\frac{a+b\cos(2cz)}{a+b}}\,F\left(cz\,\middle|\,\frac{2b}{a+b}\right) + b\left(-8a^2-10ba+3b^2-2b(a+5b)\cos(2cz)+3b^2\cos(4cz)\right)\sin(2cz)\right)\Big/\left(240 b^3 c\sqrt{a+b\cos(2cz)}\right)$$

01.07.21.2341.01

$$\int \frac{\sin^4(c z)\cos^3(c z)}{\sqrt{a+b\cos(2 c z)}}\,dz = \frac{1}{768 b^{7/2} c}\left(2\sqrt{b}\sqrt{a+b\cos(2cz)}\left(15a^2+4ba-23b^2-2b(5a+b)\cos(2cz)+4b^2\cos(4cz)\right)\sin(cz) - 3\sqrt{2}\,(5a-7b)(a+b)^2\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(cz)}{\sqrt{a+b\cos(2cz)}}\right)\right)$$

01.07.21.2342.01

$$\int \frac{\sin(c z)\cos^2(c z)}{(a+b\cos(2 c z))^{3/2}}\,dz = \frac{\frac{2\sqrt{b}\cos(cz)}{\sqrt{a+b\cos(2cz)}} - \sqrt{2}\log\left(\sqrt{2}\sqrt{b}\cos(cz)+\sqrt{a+b\cos(2cz)}\right)}{4 b^{3/2} c}$$

01.07.21.2343.01

$$\int \frac{\sin(c z)\cos^3(c z)}{(a+b\cos(2 c z))^{3/2}}\,dz = \frac{\left(\sqrt{\frac{b\cos(2cz)}{a}+1}-2\right)a+b-b\cos(2cz)}{4 b^2 c\sqrt{a+b\cos(2cz)}}$$

01.07.21.2344.01

$$\int \frac{\sin(c\,z)\cos^4(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = \left(-\cos(3\,c\,z)\,b^{3/2}+3\,(b-2\,a)\cos(c\,z)\sqrt{b}+3\sqrt{2}\,(a-b)\sqrt{a+b\cos(2\,c\,z)}\,\log\left(\sqrt{2}\sqrt{b}\cos(c\,z)+\sqrt{a+b\cos(2\,c\,z)}\right)\right)\Big/\left(16\,b^{5/2}\,c\sqrt{a+b\cos(2\,c\,z)}\right)$$

01.07.21.2345.01

$$\int \frac{\sin^2(c\,z)\cos(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = \frac{\frac{2\sqrt{b}\sin(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}-\sqrt{2}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\right)}{4\,b^{3/2}\,c}$$

01.07.21.2346.01

$$\int \frac{\sin^2(c\,z)\cos^2(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = \frac{-2\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,(a+b)\,E\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)+2\,a\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,F\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)+b\sin(2\,c\,z)}{4\,b^2\,c\sqrt{a+b\cos(2\,c\,z)}}$$

01.07.21.2347.01

$$\int \frac{\sin^2(c\,z)\cos^3(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = \left(\sqrt{2}\,(3\,a-b)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(c\,z)}{\sqrt{a+b\cos(2\,c\,z)}}\right)\sqrt{a+b\cos(2\,c\,z)}-2\sqrt{b}\,(3\,a-2\,b+b\cos(2\,c\,z))\sin(c\,z)\right)\Big/\left(16\,b^{5/2}\,c\sqrt{a+b\cos(2\,c\,z)}\right)$$

01.07.21.2348.01

$$\int \frac{\sin^2(c\,z)\cos^4(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = \frac{1}{24\,b^3\,c\sqrt{a+b\cos(2\,c\,z)}}\left(2\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,(4\,a^2+b\,a-3\,b^2)\,E\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)-2\,(4\,a^2-3\,b\,a-b^2)\sqrt{\frac{a+b\cos(2\,c\,z)}{a+b}}\,F\left(c\,z\,\middle|\,\frac{2\,b}{a+b}\right)-b\,(4\,a-3\,b+b\cos(2\,c\,z))\sin(2\,c\,z)\right)$$

01.07.21.2349.01

$$\int \frac{\sin^3(c\,z)\cos(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = \frac{-\left(\sqrt{\frac{b\cos(2\,c\,z)}{a}+1}-2\right)a+b+b\cos(2\,c\,z)}{4\,b^2\,c\sqrt{a+b\cos(2\,c\,z)}}$$

01.07.21.2350.01

$$\int \frac{\sin^3(c\,z)\cos^2(c\,z)}{(a+b\cos(2\,c\,z))^{3/2}}\,dz = \left(\cos(3\,c\,z)\,b^{3/2}+(6\,a+5\,b)\cos(c\,z)\sqrt{b}-\sqrt{2}\,(3\,a+b)\sqrt{a+b\cos(2\,c\,z)}\,\log\left(\sqrt{2}\sqrt{b}\cos(c\,z)+\sqrt{a+b\cos(2\,c\,z)}\right)\right)\Big/\left(16\,b^{5/2}\,c\sqrt{a+b\cos(2\,c\,z)}\right)$$

01.07.21.2351.01

$$\int \frac{\sin^3(c z)\cos^3(c z)}{(a+b\cos(2 c z))^{3/2}}\,dz = \frac{\left(5\sqrt{\frac{b\cos(2 c z)}{a}+1}-8\right)a^2 - 4 b\cos(2 c z)\,a + 3 b^2 + b^2\cos^2(2 c z)}{24 b^3 c\sqrt{a+b\cos(2 c z)}}$$

01.07.21.2352.01

$$\int \frac{\sin^3(c z)\cos^4(c z)}{(a+b\cos(2 c z))^{3/2}}\,dz = \left((2 b-5 a)\cos(3 c z)\,b^{3/2}+\cos(5 c z)\,b^{5/2}-9\sqrt{2}\sqrt{a+b\cos(2 c z)}\log\left(\sqrt{2}\sqrt{b}\cos(c z)+\sqrt{a+b\cos(2 c z)}\right)b^2 - 6\sqrt{2}\,a\sqrt{a+b\cos(2 c z)}\log\left(\sqrt{2}\sqrt{b}\cos(c z)+\sqrt{a+b\cos(2 c z)}\right)b+\left(-30 a^2-3 b a+19 b^2\right)\cos(c z)\sqrt{b} + 15\sqrt{2}\,a^2\sqrt{a+b\cos(2 c z)}\log\left(\sqrt{2}\sqrt{b}\cos(c z)+\sqrt{a+b\cos(2 c z)}\right)\right)\Big/\left(128 b^{7/2} c\sqrt{a+b\cos(2 c z)}\right)$$

01.07.21.2353.01

$$\int \frac{\sin^4(c z)\cos(c z)}{(a+b\cos(2 c z))^{3/2}}\,dz = \left(2\sqrt{b}\,(3 a+2 b+b\cos(2 c z))\sin(c z)-3\sqrt{2}\,(a+b)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(c z)}{\sqrt{a+b\cos(2 c z)}}\right)\sqrt{a+b\cos(2 c z)}\right)\Big/ \left(16 b^{5/2} c\sqrt{a+b\cos(2 c z)}\right)$$

01.07.21.2354.01

$$\int \frac{\sin^4(c z)\cos^2(c z)}{(a+b\cos(2 c z))^{3/2}}\,dz = \frac{1}{24 b^3 c\sqrt{a+b\cos(2 c z)}}\left(-2\sqrt{\frac{a+b\cos(2 c z)}{a+b}}\left(4 a^2+7 b a+3 b^2\right)E\left(c z\,\middle|\,\frac{2 b}{a+b}\right)+ 2\sqrt{\frac{a+b\cos(2 c z)}{a+b}}\left(4 a^2+3 b a-b^2\right)F\left(c z\,\middle|\,\frac{2 b}{a+b}\right)+b\,(4 a+3 b+b\cos(2 c z))\sin(2 c z)\right)$$

01.07.21.2355.01

$$\int \frac{\sin^4(c z)\cos^3(c z)}{(a+b\cos(2 c z))^{3/2}}\,dz = \left(3\sqrt{2}\left(5 a^2+2 b a-3 b^2\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{b}\sin(c z)}{\sqrt{a+b\cos(2 c z)}}\right)\sqrt{a+b\cos(2 c z)} - 2\sqrt{b}\left(15 a^2+b a-9 b^2+b\,(5 a+b)\cos(2 c z)-b^2\cos(4 c z)\right)\sin(c z)\right)\Big/\left(128 b^{7/2} c\sqrt{a+b\cos(2 c z)}\right)$$

Involving $\sin(d z)\cos(e z)(a+b\cos(c z))^{\beta}$

01.07.21.2356.01

$$\int \sin(d\,z)\cos(e\,z)\,(a+b\cos(c\,z))^{\beta}\,dz = -\frac{1}{4}\left(\frac{e^{i\,c\,z}\,b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(\frac{e^{i\,c\,z}\,b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2}\,b\,e^{-i\,c\,z}\left(1+e^{2\,i\,c\,z}\right)\right)^{\beta}$$
$$\left(\frac{e^{i\,(d-e)\,z}}{d-e-c\,\beta}\,F_1\!\left(\frac{d-e-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c+d-e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.$$
$$\frac{e^{i\,(d+e)\,z}}{d+e-c\,\beta}\,F_1\!\left(\frac{d+e-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c+d+e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+$$
$$\frac{e^{-i\,(d-e)\,z}}{d-e+c\,\beta}\,F_1\!\left(-\frac{d-e+c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c-d+e}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+$$
$$\left.\frac{e^{-i\,(d+e)\,z}}{d+e+c\,\beta}\,F_1\!\left(-\frac{d+e+c\,\beta}{c};-\beta,-\beta;-\frac{d+e+c\,(\beta-1)}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)\right)$$

Involving $f(z)\,(a+b\cos(c\,z))^{\beta}$

01.07.21.2357.01

$$\int \frac{\sin(e\,z)\,\sqrt{a+b\cos(e\,z)}}{p+q\cos(e\,z)}\,dz = \frac{1}{e}\left(\frac{2\sqrt{a\,q-b\,p}\,\tanh^{-1}\!\left(\frac{\sqrt{q}\,\sqrt{a+b\cos(e\,z)}}{\sqrt{a\,q-b\,p}}\right)}{q^{3/2}}-\frac{2\sqrt{a+b\cos(e\,z)}}{q}\right)$$

Involving $\sin(d\,z)\left(a+b\cos^2(c\,z)\right)^{\beta}$

01.07.21.2358.01

$$\int \sin(d\,z)\left(a+b\cos^2(c\,z)\right)^{\beta}\,dz =$$
$$-\frac{1}{\left(-1+e^{2\,i\,d\,z}\right)\left(d^2-4\,c^2\,\beta^2\right)}\left(i\left(\frac{2\,e^{2\,i\,c\,z}\,b}{2\,a+b-2\sqrt{a\,(a+b)}}+2\right)^{-\beta}\left(\frac{e^{2\,i\,c\,z}\,b}{2\,a+b+2\sqrt{a\,(a+b)}}+1\right)^{-\beta}\right.$$
$$\left((d-2\,c\,\beta)\,F_1\!\left(-\frac{d+2\,c\,\beta}{2\,c};-\beta,-\beta;-\frac{d}{2\,c}-\beta+1;-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b+2\sqrt{a\,(a+b)}},-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)+\right.$$
$$e^{2\,i\,d\,z}\,(d+2\,c\,\beta)\,F_1\!\left(\frac{d}{2\,c}-\beta;-\beta,-\beta;\frac{d}{2\,c}-\beta+1;-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b+2\sqrt{a\,(a+b)}},\right.$$
$$\left.\left.\left.-\frac{b\,e^{2\,i\,c\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)\right)(2\,a+b+b\cos(2\,c\,z))^{\beta}\sin(d\,z)\right)$$

01.07.21.2359.01

$$\int \sin(2\,c\,z)\left(b\cos^2(c\,z)+a\right)^{\beta}\,dz = -\frac{\left(b\cos^2(c\,z)+a\right)^{\beta}\,(2\,a+b+b\cos(2\,c\,z))}{2\,b\,c\,(\beta+1)}$$

01.07.21.2360.01

$$\int \frac{\sin(c\,z)}{\sqrt{a+b\cos^2(c\,z)}}\,dz = -\frac{\log\left(2\left(\sqrt{b}\,\cos(c\,z)+\sqrt{b\cos^2(c\,z)+a}\right)\right)}{\sqrt{b}\,c}$$

01.07.21.2361.01

$$\int \frac{\sin(c\,z)}{\sqrt{a-\cos^2(c\,z)}}\,dz = -\frac{\tan^{-1}\left(\frac{\cos(c\,z)}{\sqrt{a-\cos^2(c\,z)}}\right)}{c}$$

Involving $\sin(d\,z)\cos(e\,z)\left(a+b\cos^2(c\,z)\right)^\beta$

01.07.21.2362.01

$$\int \sin(d\,z)\cos(e\,z)\left(a+b\cos^2(c\,z)\right)^\beta\,dz =$$

$$-\frac{1}{4}\left(\frac{e^{2icz}\,b}{2a+b-2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{e^{2icz}\,b}{2a+b+2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{1}{4}\,b\,e^{-2icz}\left(1+e^{2icz}\right)^2+a\right)^\beta$$
$$\left(\frac{e^{i(d-e)z}}{d-e-2c\beta}\,F_1\left(\frac{d-e-2c\beta}{2c};-\beta,-\beta;\frac{-2\beta c+2c+d-e}{2c};-\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)+\right.$$
$$\frac{e^{i(d+e)z}}{d+e-2c\beta}\,F_1\left(\frac{d+e-2c\beta}{2c};-\beta,-\beta;\frac{-2\beta c+2c+d+e}{2c};-\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)+$$
$$\frac{e^{-i(d-e)z}}{d-e+2c\beta}\,F_1\left(-\frac{d-e+2c\beta}{2c};-\beta,-\beta;\frac{-2\beta c+2c-d+e}{2c};-\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)+$$
$$\left.\frac{e^{-i(d+e)z}}{d+e+2c\beta}\,F_1\left(-\frac{d+e+2c\beta}{2c};-\beta,-\beta;-\frac{d+e+2c(\beta-1)}{2c};-\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)\right)$$

Involving $f(z)\left(a+b\cos^n(c\,z)\right)^\beta$

01.07.21.2363.01

$$\int \sin(z)\cos^{n-1}(z)\left((b\cos^n(z)+a)^{1/c}\right)^r\,dz = -\frac{c\,(b\cos^n(z)+a)\left((b\cos^n(z)+a)^{1/c}\right)^r}{b\,n\,(c+r)}$$

Involving rational functions of sin

Involving $f(z)\,(a+b\cos(c\,z))^\beta$

01.07.21.2364.01

$$\int \frac{\sqrt{a+b\cos(2ez)}}{c+d\sin(ez)}\,dz = \frac{1}{de}\left(-\frac{\left(2bc^2-ad^2-bd^2\right)\tan^{-1}\left(\frac{\sqrt{ad^2+b\left(d^2-2c^2\right)}\cos(ez)}{\sqrt{c^2-d^2}\sqrt{a+b\cos(2ez)}}\right)}{\sqrt{c^2-d^2}\sqrt{ad^2+b\left(d^2-2c^2\right)}}+\right.$$

$$\frac{\sqrt{\frac{a+b\cos(2ez)}{a+b}}\left(2bF\left(ez\,\middle|\,\frac{2b}{a+b}\right)c^2+\left((a+b)d^2-2bc^2\right)\Pi\left(\frac{d^2}{c^2};ez\,\middle|\,\frac{2b}{a+b}\right)\right)}{cd\sqrt{a+b\cos(2ez)}}+$$

$$\left.\sqrt{2}\sqrt{b\cos^2(ez)}\log\left(\sqrt{a+b\cos(2ez)}+\sqrt{\cos(2ez)b+b}\right)\sec(ez)\right)$$

01.07.21.2365.01

$$\int \frac{1}{(c+d\sin(ez))\sqrt{a+b\cos(2ez)}}\,dz ==$$

$$\frac{\sqrt{\frac{a+b\cos(2ez)}{a+b}}}{de\sqrt{a+b\cos(2ez)}}\left(\frac{d\,\Pi\left(\frac{d^2}{c^2};ez\,\middle|\,\frac{2b}{a+b}\right)}{c}-\frac{1}{\sqrt{1-\frac{c^2}{d^2}}\sqrt{1-\frac{2bc^2}{(a+b)d^2}}}\tanh^{-1}\left(\frac{\sqrt{1-\frac{2bc^2}{(a+b)d^2}}\cos(ez)}{\sqrt{1-\frac{c^2}{d^2}}\sqrt{\frac{a+b\cos(2ez)}{a+b}}}\right)\right)$$

01.07.21.2366.01

$$\int \frac{\cos(ez)}{(c\cos(ez)+d\sin(ez))\sqrt{a+b\cos(2ez)}}\,dz ==$$

$$\frac{1}{e}\left(\frac{\sqrt{\frac{a+b\cos(2ez)}{a+b}}\left(F\left(ez\,\middle|\,\frac{2b}{a+b}\right)c^2+d^2\,\Pi\left(\frac{d^2}{c^2}+1;ez\,\middle|\,\frac{2b}{a+b}\right)\right)}{c\left(c^2+d^2\right)\sqrt{a+b\cos(2ez)}}-\frac{d\tanh^{-1}\left(\frac{\sqrt{c^2+d^2}\sqrt{a+b\cos(2ez)}}{\sqrt{(a-b)c^2+(a+b)d^2}}\right)}{\sqrt{c^2+d^2}\sqrt{(a-b)c^2+(a+b)d^2}}\right)$$

Involving algebraic functions of sin

Involving $(a\sin(ez)+b\cos(ez))^\beta$

01.07.21.2367.01

$$\int (a\sin(ez)+b\cos(ez))^\beta\,dz ==$$

$$-\frac{1}{2e}\left({}_2F_1\left(\frac{1}{2},\frac{1-\beta}{2};\frac{3}{2};\cos^2\left(ez+\tan^{-1}\left(\frac{b}{a}\right)\right)\right)(b\cos(ez)+a\sin(ez))^\beta\sin^2\left(ez+\tan^{-1}\left(\frac{b}{a}\right)\right)^{\frac{1}{2}(-\beta-1)}\sin\left(2\left(ez+\tan^{-1}\left(\frac{b}{a}\right)\right)\right)\right)$$

01.07.21.2368.01

$$\int \sqrt{a \sin(e z) + b \cos(e z)} \, dz = \left(\sqrt{\sin^2\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right)} \left(2 \sqrt{\frac{a^2}{b^2} + 1} \cos(e z) \, b^3 - 2\left(a^2 + b^2\right) \cos\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right) b + a \left(2 \sqrt{\frac{a^2}{b^2} + 1} \sin(e z) \, b^2 + \left(a^2 + b^2\right) \sin\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right) \right) \right) - a\left(a^2 + b^2\right) {}_2F_1\left(-\frac{1}{2}, -\frac{1}{4}; \frac{3}{4}; \cos^2\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right)\right) \sin\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right) \right) \Big/ \left(a \sqrt{\frac{a^2}{b^2} + 1} \, b \, e \sqrt{b \cos(e z) + a \sin(e z)} \sqrt{\sin^2\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right)} \right)$$

01.07.21.2369.01

$$\int \frac{1}{\sqrt{a \sin(e z) + b \cos(e z)}} \, dz = \frac{1}{a \sqrt{\frac{b^2}{a^2} + 1} \, e} \left(2 \sqrt{\cos^2\left(e z + \tan^{-1}\left(\frac{b}{a}\right)\right)} \, {}_2F_1\left(\frac{1}{4}, \frac{1}{2}; \frac{5}{4}; \sin^2\left(e z + \tan^{-1}\left(\frac{b}{a}\right)\right)\right) \sec\left(e z + \tan^{-1}\left(\frac{b}{a}\right)\right) \sqrt{b \cos(e z) + a \sin(e z)} \right)$$

01.07.21.2370.01

$$\int \frac{1}{(a \sin(e z) + b \cos(e z))^{3/2}} \, dz = \left(a \, {}_2F_1\left(-\frac{1}{2}, -\frac{1}{4}; \frac{3}{4}; \cos^2\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right)\right) \sin\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right) + \sqrt{\sin^2\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right)} \left(-2 b \sqrt{\frac{a^2}{b^2} + 1} \cos(e z) + 2 b \cos\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right) - a \sin\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right) \right) \right) \Big/ \left(a \sqrt{\frac{a^2}{b^2} + 1} \, b \, e \sqrt{b \cos(e z) + a \sin(e z)} \sqrt{\sin^2\left(e z - \tan^{-1}\left(\frac{a}{b}\right)\right)} \right)$$

01.07.21.2371.01

$$\int \frac{1}{\sqrt{(a\sin(e z)+b\cos(e z))^3}}\,dz = \left((b\cos(e z)+a\sin(e z))\left(a\,{}_2F_1\left(-\frac{1}{2},-\frac{1}{4};\frac{3}{4};\cos^2\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)\right)\sin\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)+\sqrt{\sin^2\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)}\left(-2b\sqrt{\frac{a^2}{b^2}+1}\cos(e z)+2b\cos\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)-a\sin\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)\right)\right)\right)\Big/\left(a\sqrt{\frac{a^2}{b^2}+1}\,b\,e\sqrt{(b\cos(e z)+a\sin(e z))^3}\sqrt{\sin^2\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)}\right)$$

01.07.21.2372.01

$$\int \frac{1}{(a\sin(e z)+b\cos(e z))^{5/2}}\,dz = \left(2\left(\sqrt{\cos^2\left(e z+\tan^{-1}\left(\frac{b}{a}\right)\right)}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};\sin^2\left(e z+\tan^{-1}\left(\frac{b}{a}\right)\right)\right)\sec\left(e z+\tan^{-1}\left(\frac{b}{a}\right)\right)(b\cos(e z)+a\sin(e z))^2+a\sqrt{\frac{b^2}{a^2}+1}\,(b\sin(e z)-a\cos(e z))\right)\right)\Big/\left(3a\left(a^2+b^2\right)\sqrt{\frac{b^2}{a^2}+1}\,e\,(b\cos(e z)+a\sin(e z))^{3/2}\right)$$

01.07.21.2373.01

$$\int \frac{1}{\sqrt{(a\sin(e z)+b\cos(e z))^5}}\,dz = \left(2\sec\left(e z+\tan^{-1}\left(\frac{b}{a}\right)\right)(b\cos(e z)+a\sin(e z))\left(\sqrt{\cos^2\left(e z+\tan^{-1}\left(\frac{b}{a}\right)\right)}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};\sin^2\left(e z+\tan^{-1}\left(\frac{b}{a}\right)\right)\right)(b\cos(e z)+a\sin(e z))^2-(a\cos(e z)-b\sin(e z))^2\right)\right)\Big/\left(3a\left(a^2+b^2\right)\sqrt{\frac{b^2}{a^2}+1}\,e\sqrt{(b\cos(e z)+a\sin(e z))^5}\right)$$

01.07.21.2374.01

$$\int \frac{\sin(e z)}{\sqrt{a\sin(e z)+b\cos(e z)}}\,dz = \left(\sqrt{\sin^2\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)}\left(a\sin\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)-2b\cos\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)\right)-a\,{}_2F_1\left(-\frac{1}{2},-\frac{1}{4};\frac{3}{4};\cos^2\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)\right)\sin\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)\right)\Big/\left(\sqrt{\frac{a^2}{b^2}+1}\,b\,e\sqrt{b\cos(e z)+a\sin(e z)}\sqrt{\sin^2\left(e z-\tan^{-1}\left(\frac{a}{b}\right)\right)}\right)$$

01.07.21.2375.01

$$\int \frac{\cos(e\,z)}{\sqrt{a\sin(e\,z)+b\cos(e\,z)}}\,dz = \left(\sqrt{\sin^2\left(e\,z-\tan^{-1}\left(\frac{a}{b}\right)\right)}\left(2\,b\sqrt{\frac{a^2}{b^2}+1}\,\cos(e\,z)-2\,b\cos\left(e\,z-\tan^{-1}\left(\frac{a}{b}\right)\right)+2\,a\sqrt{\frac{a^2}{b^2}+1}\,\sin(e\,z)+a\sin\left(e\,z-\tan^{-1}\left(\frac{a}{b}\right)\right)\right)-a\,{}_2F_1\left(-\frac{1}{2},-\frac{1}{4};\frac{3}{4};\cos^2\left(e\,z-\tan^{-1}\left(\frac{a}{b}\right)\right)\right)\sin\left(e\,z-\tan^{-1}\left(\frac{a}{b}\right)\right)\right)\Big/\left(a\sqrt{\frac{a^2}{b^2}+1}\;e\sqrt{b\cos(e\,z)+a\sin(e\,z)}\sqrt{\sin^2\left(e\,z-\tan^{-1}\left(\frac{a}{b}\right)\right)}\right)$$

01.07.21.2376.01

$$\int \frac{\sin(e\,z)}{(a\sin(e\,z)+b\cos(e\,z))^{3/2}}\,dz = \left(2\left(\sqrt{\frac{b^2}{a^2}+1}\;b+\sqrt{\cos^2\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)}\;{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};\sin^2\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)\right)\sec\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)(b\cos(e\,z)+a\sin(e\,z))\right)\right)\Big/\left((a^2+b^2)\sqrt{\frac{b^2}{a^2}+1}\;e\sqrt{b\cos(e\,z)+a\sin(e\,z)}\right)$$

01.07.21.2377.01

$$\int \frac{\sin(e\,z)}{\sqrt{(a\sin(e\,z)+b\cos(e\,z))^3}}\,dz = \left(2\sec\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)(b\cos(e\,z)+a\sin(e\,z))\left(a\sqrt{\cos^2\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)}\;{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};\sin^2\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)\right)(b\cos(e\,z)+a\sin(e\,z))+b\,(a\cos(e\,z)-b\sin(e\,z))\right)\right)\Big/\left(a\,(a^2+b^2)\sqrt{\frac{b^2}{a^2}+1}\;e\sqrt{(b\cos(e\,z)+a\sin(e\,z))^3}\right)$$

01.07.21.2378.01

$$\int \frac{\cos(e\,z)}{(a\sin(e\,z)+b\cos(e\,z))^{3/2}}\,dz = \left(2\left(b\sqrt{\cos^2\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)}\;{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};\sin^2\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)\right)\sec\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)(b\cos(e\,z)+a\sin(e\,z))-a^2\sqrt{\frac{b^2}{a^2}+1}\right)\right)\Big/\left(a\,(a^2+b^2)\sqrt{\frac{b^2}{a^2}+1}\;e\sqrt{b\cos(e\,z)+a\sin(e\,z)}\right)$$

01.07.21.2379.01

$$\int \frac{\cos(e\,z)}{\sqrt{(a\sin(e\,z)+b\cos(e\,z))^3}}\,dz = \left(2\sec\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)(b\cos(e\,z)+a\sin(e\,z))\right.$$
$$\left.\left(b\sqrt{\cos^2\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)}\;{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};\sin^2\left(e\,z+\tan^{-1}\left(\frac{b}{a}\right)\right)\right)(b\cos(e\,z)+a\sin(e\,z))+a\,(b\sin(e\,z)-a\cos(e\,z))\right)\right)\Big/$$
$$\left(a\left(a^2+b^2\right)\sqrt{\frac{b^2}{a^2}+1}\;e\sqrt{(b\cos(e\,z)+a\sin(e\,z))^3}\right)$$

Involving $\sin(d\,z)\,(a\sin(e\,z)+b\cos(e\,z))^\beta$

01.07.21.2380.01

$$\int \sin(d\,z)\,(b\cos(e\,z)+a\sin(e\,z))^\beta\,dz =$$
$$-\frac{1}{(d-e\,\beta)(d+e\,\beta)}\left(2^{-\beta-1}\,e^{-i\,d\,z}\left(\frac{e^{2\,i\,e\,z}\,(b-i\,a)}{b+i\,a}+1\right)^{-\beta}\left(e^{-i\,e\,z}\left(b\left(1+e^{2\,i\,e\,z}\right)-i\,a\left(-1+e^{2\,i\,e\,z}\right)\right)\right)^\beta\right.$$
$$\left(e^{2\,i\,d\,z}\,(d+e\,\beta)\,{}_2F_1\left(\frac{d-e\,\beta}{2\,e},-\beta;\frac{1}{2}\left(\frac{d}{e}-\beta+2\right);\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)+\right.$$
$$\left.\left.(d-e\,\beta)\,{}_2F_1\left(-\frac{d+e\,\beta}{2\,e},-\beta;-\frac{d+e\,(\beta-2)}{2\,e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right)\right)$$

Involving $\cos(d\,z)\,(a\sin(e\,z)+b\cos(e\,z))^\beta$

01.07.21.2381.01

$$\int \cos(d\,z)\,(b\cos(e\,z)+a\sin(e\,z))^\beta\,dz =$$
$$-\frac{1}{(d-e\,\beta)(d+e\,\beta)}\left(i\,2^{-\beta-1}\,e^{-i\,d\,z}\left(\frac{e^{2\,i\,e\,z}\,(b-i\,a)}{b+i\,a}+1\right)^{-\beta}\left(e^{-i\,e\,z}\left(b\left(1+e^{2\,i\,e\,z}\right)-i\,a\left(-1+e^{2\,i\,e\,z}\right)\right)\right)^\beta\right.$$
$$\left(e^{2\,i\,d\,z}\,(d+e\,\beta)\,{}_2F_1\left(\frac{d-e\,\beta}{2\,e},-\beta;\frac{1}{2}\left(\frac{d}{e}-\beta+2\right);\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)+\right.$$
$$\left.\left.(e\,\beta-d)\,{}_2F_1\left(-\frac{d+e\,\beta}{2\,e},-\beta;-\frac{d+e\,(\beta-2)}{2\,e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right)\right)$$

Involving $(a+b\sin(e\,z)+c\cos(e\,z))^\beta$

01.07.21.2382.01

$$\int (a+b\sin(e\,z)+c\cos(e\,z))^{\beta}\,dz = \frac{1}{b\sqrt{\frac{c^2}{b^2}+1}\;e\,(\beta+1)}\left(F_1\!\left(\beta+1;\frac{1}{2},\frac{1}{2};\beta+2;\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-b\sqrt{\frac{c^2}{b^2}+1}},\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+b\sqrt{\frac{c^2}{b^2}+1}}\right)\sec\!\left(e\,z+\tan^{-1}\!\left(\frac{c}{b}\right)\right)\right.$$

$$\left.\sqrt{\frac{b\left(\sqrt{\frac{c^2}{b^2}+1}-\sin(e\,z)\right)-c\cos(e\,z)}{a+b\sqrt{\frac{c^2}{b^2}+1}}}\,(a+c\cos(e\,z)+b\sin(e\,z))^{\beta+1}\sqrt{\frac{c\cos(e\,z)+b\left(\sin(e\,z)+\sqrt{\frac{c^2}{b^2}+1}\right)}{b\sqrt{\frac{c^2}{b^2}+1}-a}}\right)$$

01.07.21.2383.01

$$\int (a+c\cos(e\,z)+b\sin(e\,z))^{\beta}\,(A+C\cos(e\,z)+B\sin(e\,z))\,dz = -\frac{1}{b\,e}\left(C\,(a+c\cos(e\,z)+b\sin(e\,z))^{\beta}\left(\frac{(a+c\cos(e\,z)+b\sin(e\,z))\,b^2}{(-b^2-c^2)\,(\beta+1)}+\frac{c\cos\left(e\,z+\tan^{-1}\left(\frac{c}{b}\right)\right)}{\sqrt{\frac{c^2}{b^2}+1}}-\right.\right.$$

$$\left(c\,F_1\!\left(\beta;-\frac{1}{2},-\frac{1}{2};\beta+1;\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+b\sqrt{\frac{c^2}{b^2}+1}},\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-b\sqrt{\frac{c^2}{b^2}+1}}\right)\cos\!\left(e\,z+\tan^{-1}\!\left(\frac{c}{b}\right)\right)\right)\Bigg/$$

$$\left.\left.\left(\sqrt{\frac{c^2}{b^2}+1}\,\sqrt{\frac{b\left(\sqrt{\frac{c^2}{b^2}+1}-\sin(e\,z)\right)-c\cos(e\,z)}{a+b\sqrt{\frac{c^2}{b^2}+1}}}\,\sqrt{\frac{c\cos(e\,z)+b\left(\sin(e\,z)+\sqrt{\frac{c^2}{b^2}+1}\right)}{b\sqrt{\frac{c^2}{b^2}+1}-a}}\right)\right)\right)+$$

$$\frac{B\,(a+c\cos(e\,z)+b\sin(e\,z))^{\beta}\left(\frac{b\sin\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)}{\sqrt{\frac{b^2}{c^2}+1}\;c}-\frac{c\,(a+c\cos(e\,z)+b\sin(e\,z))}{(b^2+c^2)\,(\beta+1)}\right)}{e}-$$

$$\left(b\,B\,F_1\!\left(\beta;-\frac{1}{2},-\frac{1}{2};\beta+1;\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}},\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-\sqrt{\frac{b^2}{c^2}+1}\;c}\right)\right.$$

$$\left.(a + c\cos(e\,z) + b\sin(e\,z))^{\beta}\sin\left(e\,z - \tan^{-1}\left(\frac{b}{c}\right)\right)\right) \Big/$$

$$\left(\sqrt{\frac{b^2}{c^2}+1}\;c\,e\,\sqrt{\frac{\sqrt{\frac{b^2}{c^2}+1}\;c\left(\cos\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)+1\right)}{\sqrt{\frac{b^2}{c^2}+1}\;c-a}}\;\sqrt{\frac{-\cos(e\,z)\,c+\sqrt{\frac{b^2}{c^2}+1}\;c-b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}}}\right)+$$

$$\frac{1}{b\sqrt{\frac{c^2}{b^2}+1}\;e\,(\beta+1)}\left(A F_1\left(\beta+1;\frac{1}{2},\frac{1}{2};\beta+2;\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+b\sqrt{\frac{c^2}{b^2}+1}},\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-b\sqrt{\frac{c^2}{b^2}+1}}\right)\sec\left(e\,z+\tan^{-1}\left(\frac{c}{b}\right)\right)\right.$$

$$\left.\sqrt{\frac{b\left(\sqrt{\frac{c^2}{b^2}+1}-\sin(e\,z)\right)-c\cos(e\,z)}{a+b\sqrt{\frac{c^2}{b^2}+1}}}\;(a+c\cos(e\,z)+b\sin(e\,z))^{\beta+1}\sqrt{\frac{c\cos(e\,z)+b\left(\sin(e\,z)+\sqrt{\frac{c^2}{b^2}+1}\right)}{b\sqrt{\frac{c^2}{b^2}+1}-a}}\right)$$

01.07.21.2384.01

$$\int\sqrt{a+b\sin(e\,z)+c\cos(e\,z)}\;dz == \left(\sqrt{-\frac{\left(b^2+c\left(\sqrt{\frac{b^2}{c^2}+1}\;a+c\right)\right)\left(\cos\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)+1\right)}{a^2-b^2-c^2}}\right.$$

$$\sqrt{\left(-\frac{1}{a^2-b^2-c^2}\left(b^2+\left(a-\sqrt{\frac{b^2}{c^2}+1}\;c\right)\sin(e\,z)\,b+c^2-a\sqrt{\frac{b^2}{c^2}+1}\;c+c\left(a-\sqrt{\frac{b^2}{c^2}+1}\;c\right)\cos(e\,z)\right)\right)}$$

$$\left(\sqrt{\frac{c^2}{b^2}+1}\left(2\sqrt{\frac{b^2}{c^2}+1}\;\cos(e\,z)\,c^3-2\left(b^2+c^2\right)\cos\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)c+\right.\right.$$

$$\left.\left.b\left(2\sqrt{\frac{b^2}{c^2}+1}\;\sin(e\,z)\,c^2+\left(b^2+c^2\right)\sin\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)\right)\right)+2\,a\,c\sqrt{\frac{b^2}{c^2}+1}\;F_1\left(\frac{1}{2};\frac{1}{2},\frac{1}{2};\frac{3}{2};\right.\right.$$

$$\left.\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+b\sqrt{\frac{c^2}{b^2}+1}},\ \frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-b\sqrt{\frac{c^2}{b^2}+1}}\right)\sec\left(e\,z+\tan^{-1}\left(\frac{c}{b}\right)\right)(a+c\cos(e\,z)+b\sin(e\,z))$$

$$\sqrt{\left(-\frac{1}{a^2-b^2-c^2}\left(b^2+\left(a-b\sqrt{\frac{c^2}{b^2}+1}\right)\sin(e\,z)\,b-a\sqrt{\frac{c^2}{b^2}+1}\,b+c^2+\left(a-b\sqrt{\frac{c^2}{b^2}+1}\right)c\cos(e\,z)\right)\right)}$$

$$\left.\sqrt{\left(-\frac{1}{a^2-b^2-c^2}\left(\left(b^2+a\sqrt{\frac{c^2}{b^2}+1}\,b+c^2\right)\left(\cos\left(\frac{1}{2}\left(e\,z+\tan^{-1}\left(\frac{c}{b}\right)\right)\right)+\sin\left(\frac{1}{2}\left(e\,z+\tan^{-1}\left(\frac{c}{b}\right)\right)\right)\right)^2\right)\right)}\right)-$$

$$\left.b\left(b^2+c^2\right)\sqrt{\frac{c^2}{b^2}+1}\;F_1\left(-\frac{1}{2};-\frac{1}{2},-\frac{1}{2};\frac{1}{2};\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}},\ \frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-\sqrt{\frac{b^2}{c^2}+1}\,c}\right)\sin\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)\right)\Big/$$

$$\left(b\sqrt{\frac{b^2}{c^2}+1}\,c\sqrt{\frac{c^2}{b^2}+1}\,e\sqrt{\frac{-\cos(e\,z)\,c+\sqrt{\frac{b^2}{c^2}+1}\,c-b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}}}\right.$$

$$\left.\sqrt{a+c\cos(e\,z)+b\sin(e\,z)}\sqrt{\frac{\cos(e\,z)\,c+\sqrt{\frac{b^2}{c^2}+1}\,c+b\sin(e\,z)}{\sqrt{\frac{b^2}{c^2}+1}\,c-a}}\right)$$

01.07.21.2385.01

$$\int \frac{1}{\sqrt{a+b\sin(e\,z)+c\cos(e\,z)}}\,dz = \frac{1}{b\sqrt{\frac{c^2}{b^2}+1}\;e}\left(2\,F_1\left(\frac{1}{2};\frac{1}{2},\frac{1}{2};\frac{3}{2};\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+b\sqrt{\frac{c^2}{b^2}+1}},\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-b\sqrt{\frac{c^2}{b^2}+1}}\right)\sec\left(e\,z+\tan^{-1}\left(\frac{c}{b}\right)\right)\right.$$

$$\left.\sqrt{\frac{b\left(\sqrt{\frac{c^2}{b^2}+1}-\sin(e\,z)\right)-c\cos(e\,z)}{a+b\sqrt{\frac{c^2}{b^2}+1}}}\;\sqrt{a+c\cos(e\,z)+b\sin(e\,z)}\;\sqrt{\frac{c\cos(e\,z)+b\left(\sin(e\,z)+\sqrt{\frac{c^2}{b^2}+1}\right)}{b\sqrt{\frac{c^2}{b^2}+1}-a}}\right)$$

01.07.21.2386.01

$$\int \frac{1}{(a+b\sin(e\,z)+c\cos(e\,z))^{3/2}}\,dz = \left(-\frac{\left(\left(b^2+2\,c^2\right)\cos(e\,z)+c\,(2\,a+b\sin(e\,z))\right)b}{b^2+c^2}+\right.$$

$$\frac{1}{b\sqrt{\frac{c^2}{b^2}+1}}\left(2\,a\,F_1\left(\frac{1}{2};\frac{1}{2},\frac{1}{2};\frac{3}{2};\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+b\sqrt{\frac{c^2}{b^2}+1}},\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-b\sqrt{\frac{c^2}{b^2}+1}}\right)\sec\left(e\,z+\tan^{-1}\left(\frac{c}{b}\right)\right)\right.$$

$$\left.\sqrt{\frac{b\left(\sqrt{\frac{c^2}{b^2}+1}-\sin(e\,z)\right)-c\cos(e\,z)}{a+b\sqrt{\frac{c^2}{b^2}+1}}}\;(a+c\cos(e\,z)+b\sin(e\,z))\;\sqrt{\frac{c\cos(e\,z)+b\left(\sin(e\,z)+\sqrt{\frac{c^2}{b^2}+1}\right)}{b\sqrt{\frac{c^2}{b^2}+1}-a}}\right)-$$

$$\frac{b^2\sin\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)}{\sqrt{\frac{b^2}{c^2}+1}\;c\sqrt{\frac{-\cos(e\,z)\,c+\sqrt{\frac{b^2}{c^2}+1}\;c-b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}}}\sqrt{\frac{\cos(e\,z)\,c+\sqrt{\frac{b^2}{c^2}+1}\;c+b\sin(e\,z)}{\sqrt{\frac{b^2}{c^2}+1}\;c-a}}}\,F_1\left(-\frac{1}{2};-\frac{1}{2},-\frac{1}{2};\frac{1}{2};\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}},\right.$$

$$\left.\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-\sqrt{\frac{b^2}{c^2}+1}\;c}\right)-\frac{c\sin\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)}{\sqrt{\frac{b^2}{c^2}+1}\;\sqrt{\frac{-\cos(e\,z)\,c+\sqrt{\frac{b^2}{c^2}+1}\;c-b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}}}\;\sqrt{\frac{\cos(e\,z)\,c+\sqrt{\frac{b^2}{c^2}+1}\;c+b\sin(e\,z)}{\sqrt{\frac{b^2}{c^2}+1}\;c-a}}}$$

$$F_1\left(-\frac{1}{2};-\frac{1}{2},-\frac{1}{2};\frac{1}{2};\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}},\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-\sqrt{\frac{b^2}{c^2}+1}\;c}\right)-$$

$$\left(c\left(2\,a\sqrt{\frac{b^2}{c^2}+1}\;c^2+2\left(b^2+c^2\right)\cos\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)c-b\left(b^2+c^2\right)\sin\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)\right)\right)\Big/\left(b\sqrt{\frac{b^2}{c^2}+1}\;\left(b^2+c^2\right)\right)+$$

$$\left.\frac{2\left(a\,c+\left(b^2+c^2\right)\cos(e\,z)\right)}{b}\right)\Big/\left(\left(a^2-b^2-c^2\right)e\sqrt{a+c\cos(e\,z)+b\sin(e\,z)}\right)$$

01.07.21.2387.01

$$\int\frac{\sin(e\,z)}{\sqrt{a+b\sin(e\,z)+c\cos(e\,z)}}\,dz=-\left(\frac{2\,(a+c\cos(e\,z)+b\sin(e\,z))\,c^2}{b^2+c^2}+\right.$$

$$\left(b\,F_1\left(-\frac{1}{2};-\frac{1}{2},-\frac{1}{2};\frac{1}{2};\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}},\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-\sqrt{\frac{b^2}{c^2}+1}\;c}\right)\sin\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)\right)\Big/$$

$$\left(\sqrt{\frac{b^2}{c^2}+1}\;\sqrt{\frac{-\cos(e\,z)\,c+\sqrt{\frac{b^2}{c^2}+1}\;c-b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}}}\;\sqrt{\frac{\cos(e\,z)\,c+\sqrt{\frac{b^2}{c^2}+1}\;c+b\sin(e\,z)}{\sqrt{\frac{b^2}{c^2}+1}\;c-a}}\right)-$$

$$\left.\frac{b\sin\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)}{\sqrt{\frac{b^2}{c^2}+1}}\right)\Big/\left(c\,e\sqrt{a+c\cos(e\,z)+b\sin(e\,z)}\right)$$

01.07.21.2388.01

$$\int \frac{\cos(e\,z)}{\sqrt{a+b\sin(e\,z)+c\cos(e\,z)}}\,dz = \left(\frac{2\,(a+c\cos(e\,z)+b\sin(e\,z))}{b} - \frac{\sin\left(e\,z-\tan^{-1}\left(\frac{b}{c}\right)\right)}{\sqrt{\frac{b^2}{c^2}+1}\,\sqrt{\frac{-\cos(e\,z)\,c+\sqrt{\frac{b^2}{c^2}+1}\,c-b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}}}\,\sqrt{\frac{\cos(e\,z)\,c+\sqrt{\frac{b^2}{c^2}+1}\,c+b\sin(e\,z)}{\sqrt{\frac{b^2}{c^2}+1}\,c-a}}}\right.$$
$$F_1\left(-\frac{1}{2};-\frac{1}{2},-\frac{1}{2};\frac{1}{2};\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a+c\sqrt{\frac{b^2}{c^2}+1}},\frac{a+c\cos(e\,z)+b\sin(e\,z)}{a-\sqrt{\frac{b^2}{c^2}+1}\,c}\right)-$$
$$\left.\frac{c\left(\left(b^2+2\,c^2\right)\cos(e\,z)+c\,(2\,a+b\sin(e\,z))\right)}{b\left(b^2+c^2\right)}\right)\Bigg/\left(e\sqrt{a+c\cos(e\,z)+b\sin(e\,z)}\right)$$

Involving $\sin(d\,z)\,(a+b\sin(e\,z)+c\cos(e\,z))^{\beta}$

01.07.21.2389.01

$$\int \sin(d\,z)\,(a+b\sin(e\,z)+c\cos(e\,z))^{\beta}\,dz = -\frac{1}{(d-e\,\beta)\,(d+e\,\beta)}$$
$$\left(2^{-\beta-1}\,e^{-i\,d\,z}\left(1+\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)^{-\beta}\left(\frac{e^{i\,e\,z}\,(c-i\,b)}{a+\sqrt{a^2-b^2-c^2}}+1\right)^{-\beta}\left(e^{-i\,e\,z}\left(2\,e^{i\,e\,z}\,a+c\,e^{2\,i\,e\,z}+c-i\,b\left(-1+e^{2\,i\,e\,z}\right)\right)\right)^{\beta}\right.$$
$$\left((d-e\,\beta)\,F_1\left(-\frac{d+e\,\beta}{e};-\beta,-\beta;-\frac{d}{e}-\beta+1;\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}},\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+\right.$$
$$\left.\left.e^{2\,i\,d\,z}\,(d+e\,\beta)\,F_1\left(\frac{d}{e}-\beta;-\beta,-\beta;\frac{d}{e}-\beta+1;\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}},\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)\right)\right)$$

Involving $\cos(d\,z)\,(a+b\sin(e\,z)+c\cos(e\,z))^{\beta}$

01.07.21.2390.01

$$\int \cos(d\,z)\,(a+b\sin(e\,z)+c\cos(e\,z))^{\beta}\,dz = -\frac{1}{(d-e\,\beta)\,(d+e\,\beta)} \left(i\,2^{-\beta-1}\,e^{-i\,d\,z}\left(1+\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)^{-\beta}\left(\frac{e^{i\,e\,z}\,(c-i\,b)}{a+\sqrt{a^2-b^2-c^2}}+1\right)^{-\beta}\left(e^{-i\,e\,z}\left(2\,e^{i\,e\,z}\,a+c\,e^{2\,i\,e\,z}+c-i\,b\left(-1+e^{2\,i\,e\,z}\right)\right)\right)^{\beta}\right.$$
$$\left((e\,\beta-d)\,F_1\left(-\frac{d+e\,\beta}{e};-\beta,-\beta;-\frac{d}{e}-\beta+1;\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}},\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+\right.$$
$$\left.\left.e^{2\,i\,d\,z}\,(d+e\,\beta)\,F_1\left(\frac{d}{e}-\beta;-\beta,-\beta;\frac{d}{e}-\beta+1;\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}},\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)\right)\right)$$

Involving $\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{\beta}$

01.07.21.2391.01

$$\int\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{\beta}dz =$$
$$\frac{1}{e\,\beta}\left(i\,2^{-2\,\beta-1}\left(1-\frac{(b-a)\,e^{2\,i\,e\,z}}{-a-b+2\sqrt{a\,b}}\right)^{-\beta}\left(\frac{e^{2\,i\,e\,z}\,(b-a)}{a+b+2\sqrt{a\,b}}+1\right)^{-\beta}\left(e^{-2\,i\,e\,z}\left(b\left(1+e^{2\,i\,e\,z}\right)^2-a\left(-1+e^{2\,i\,e\,z}\right)^2\right)\right)^{\beta}\right.$$
$$\left.F_1\left(-\beta;-\beta,-\beta;1-\beta;-\frac{(b-a)\,e^{2\,i\,e\,z}}{a+b+2\sqrt{a\,b}},\frac{(b-a)\,e^{2\,i\,e\,z}}{-a-b+2\sqrt{a\,b}}\right)\right)$$

01.07.21.2392.01

$$\int\left(b\cos^2(e\,z)+a\sin^2(e\,z)\right)^{5/2}dz =$$
$$\frac{1}{15\sqrt{2}\,e}\left(\left(\sqrt{2}\left(-8\,a^3+b\,a^2-b^2\,a+8\,b^3\right)(\cos(e\,z)+1)\sqrt{\frac{-\cos(2\,e\,z)\,a+a+b+b\cos(2\,e\,z)}{(\cos(e\,z)+1)^2}}\right.\right.$$
$$\left(-\frac{1}{2}\,(a+b+(b-a)\cos(2\,e\,z))\tan\left(\frac{e\,z}{2}\right)\sec^2\left(\frac{e\,z}{2}\right)+\left(i\left(-2\,a+2\sqrt{a-b}\,\sqrt{a}+b\right)\right.\right.$$
$$\left(E\left(i\sinh^{-1}\left(\sqrt{\frac{b}{2\,a+2\sqrt{a-b}\,\sqrt{a}-b}}\,\tan\left(\frac{e\,z}{2}\right)\right)\middle|\frac{-2\,a-2\sqrt{a-b}\,\sqrt{a}+b}{-2\,a+2\sqrt{a-b}\,\sqrt{a}+b}\right)-F\left(\right.\right.$$
$$\left.\left.i\sinh^{-1}\left(\sqrt{\frac{b}{2\,a+2\sqrt{a-b}\,\sqrt{a}-b}}\,\tan\left(\frac{e\,z}{2}\right)\right)\middle|\frac{-2\,a-2\sqrt{a-b}\,\sqrt{a}+b}{-2\,a+2\sqrt{a-b}\,\sqrt{a}+b}\right)\right)$$
$$\left.\sqrt{\frac{b\tan^2\left(\frac{e\,z}{2}\right)}{2\,a+2\sqrt{a-b}\,\sqrt{a}-b}+1}\,\sqrt{1-\frac{b\tan^2\left(\frac{e\,z}{2}\right)}{-2\,a+2\sqrt{a-b}\,\sqrt{a}+b}}\right)\Bigg/$$

$$\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\,\sqrt{a}-b}}\right)-\left(i\,a\,F\left(i\sinh^{-1}\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\,\sqrt{a}-b}}\,\tan\left(\frac{e\,z}{2}\right)\right)\middle|\right.\right.$$

$$\left.\frac{-2a-2\sqrt{a-b}\,\sqrt{a}+b}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)\sqrt{\frac{b\tan^2\left(\frac{e\,z}{2}\right)}{2a+2\sqrt{a-b}\,\sqrt{a}-b}+1}$$

$$\left.\left.\sqrt{1-\frac{b\tan^2\left(\frac{e\,z}{2}\right)}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}}\right)\middle/\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\,\sqrt{a}-b}}\right)\right)\right)\bigg/$$

$$\left(\left((a-b)\sqrt{4\,a\tan^2\left(\frac{e\,z}{2}\right)+b\left(\tan^2\left(\frac{e\,z}{2}\right)-1\right)^2}\right)\sqrt{a+b+(b-a)\cos(2\,e\,z)}\right)-$$

$$\left(4\,i\left(8a^3+7\,b\,a^2+7\,b^2\,a+8\,b^3\right)\sqrt{a+b+(b-a)\cos(2\,e\,z)}\,\sqrt{\frac{a+b+(b-a)\cos(2\,e\,z)}{(\cos(e\,z)+1)^2}}\right.$$

$$F\left(i\sinh^{-1}\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\,\sqrt{a}-b}}\,\tan\left(\frac{e\,z}{2}\right)\right)\middle|\frac{-2a-2\sqrt{a-b}\,\sqrt{a}+b}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)$$

$$\left.\sec^2\left(\frac{e\,z}{2}\right)\sqrt{\frac{b\tan^2\left(\frac{e\,z}{2}\right)}{2a+2\sqrt{a-b}\,\sqrt{a}-b}+1}\,\sqrt{1-\frac{b\tan^2\left(\frac{e\,z}{2}\right)}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}}\right)\bigg/$$

$$\left(\sqrt{-\frac{-2a+2\sqrt{a-b}\,\sqrt{a}+b}{b}}\,\left((a+b+(b-a)\cos(2\,e\,z))\sec^4\left(\frac{e\,z}{2}\right)\right)^{3/2}\right)\Bigg)+$$

$$\frac{1}{e\left(60\sqrt{2}\right)}\Big((a-b)\,(3\,(a-b)\cos(2\,e\,z)-11\,(a+b))\sqrt{a+b+(b-a)\cos(2\,e\,z)}$$

$$\sin(2\,e\,z)\Big)$$

01.07.21.2393.01

$$\int \left(a \sin^2(e z) + b \cos^2(e z)\right)^{3/2} \, dz = \left((b-a)(a+b+(b-a)\cos(2 e z))\sin(2 e z) + \left(4\sqrt{2}\,(\cos(e z)+1)\sqrt{\frac{a+b+(b-a)\cos(2 e z)}{(\cos(e z)+1)^2}} \right.\right.$$

$$\left(\frac{1}{a-b}\left((b^2-a^2)\left(-\left(-\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right)(-a-b+(a-b)\cos(2 e z))\tan\left(\frac{e z}{2}\right)\sec^2\left(\frac{e z}{2}\right) - \right.\right.\right.\right.$$

$$2 i b \sqrt{-\frac{-2a+2\sqrt{a-b}\,\sqrt{a}+b}{b}}\left(-a+2\sqrt{a-b}\,\sqrt{a}+b\right)$$

$$F\left(i \sinh^{-1}\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\,\sqrt{a}-b}}\,\tan\left(\frac{e z}{2}\right)\right) \middle| \frac{-2a-2\sqrt{a-b}\,\sqrt{a}+b}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)$$

$$\left.\sqrt{\frac{b\tan^2\left(\frac{e z}{2}\right)}{2a+2\sqrt{a-b}\,\sqrt{a}-b}+1}\,\sqrt{1-\frac{b\tan^2\left(\frac{e z}{2}\right)}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}}\right) \Big/$$

$$\left(2\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right)\right) - i\sqrt{\frac{b\tan^2\left(\frac{e z}{2}\right)}{2a+2\sqrt{a-b}\,\sqrt{a}-b}+1}$$

$$\sqrt{-\frac{-2a+2\sqrt{a-b}\,\sqrt{a}+b}{b}}\; b\sqrt{1-\frac{b\tan^2\left(\frac{e z}{2}\right)}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}}\; E\left(\right.$$

$$\left.\left.i \sinh^{-1}\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\,\sqrt{a}-b}}\,\tan\left(\frac{e z}{2}\right)\right) \middle| \frac{-2a-2\sqrt{a-b}\,\sqrt{a}+b}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)\right) -$$

$$\left(i\left(a^2+b a+b^2\right)F\left(i \sinh^{-1}\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\,\sqrt{a}-b}}\,\tan\left(\frac{e z}{2}\right)\right) \middle| \frac{-2a-2\sqrt{a-b}\,\sqrt{a}+b}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)\right.$$

$$\sqrt{\frac{b\tan^2\left(\frac{e z}{2}\right)}{2a+2\sqrt{a-b}\,\sqrt{a}-b}+1}$$

$$\left.\left.\left.\sqrt{1-\frac{b\tan^2\left(\frac{e z}{2}\right)}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}}\right) \Big/ \left(\sqrt{-\frac{-2a+2\sqrt{a-b}\,\sqrt{a}+b}{b}}\right)\right)\right) \Big/$$

$$\left.\left.\left(\sqrt{4a\tan^2\left(\frac{e z}{2}\right)+b\left(\tan^2\left(\frac{e z}{2}\right)-1\right)^2}\right)\right) \Big/ \left(6\sqrt{2}\, e\sqrt{a+b+(b-a)\cos(2 e z)}\right)$$

01.07.21.2394.01

$$\int \sqrt{a \sin^2(e z) + b \cos^2(e z)}\, dz = \left((\cos(e z) + 1) \sqrt{\frac{a + b + (b - a)\cos(2 e z)}{(\cos(e z) + 1)^2}} \left(\sqrt{-\frac{-2 a + 2\sqrt{a - b}\sqrt{a} + b}{b}}\, (a + b + (b - a)\cos(2 e z)) \tan\left(\frac{e z}{2}\right) \sec^2\left(\frac{e z}{2}\right) + 4\sqrt{a}\left(\sqrt{a - b} - \sqrt{a}\right) \sqrt{\frac{\left(2 a + 2\sqrt{a - b}\sqrt{a} - b\right)\tan^2\left(\frac{e z}{2}\right) + b}{b}} \sqrt{\frac{b - \left(-2 a + 2\sqrt{a - b}\sqrt{a} + b\right)\tan^2\left(\frac{e z}{2}\right)}{b}}\, i\, F\left(i \sinh^{-1}\left(\sqrt{\frac{b}{2 a + 2\sqrt{a - b}\sqrt{a} - b}} \tan\left(\frac{e z}{2}\right)\right) \middle| \frac{-2 a - 2\sqrt{a - b}\sqrt{a} + b}{-2 a + 2\sqrt{a - b}\sqrt{a} + b}\right) - 2 i \left(-2 a + 2\sqrt{a - b}\sqrt{a} + b\right) E\left(i \sinh^{-1}\left(\sqrt{\frac{b}{2 a + 2\sqrt{a - b}\sqrt{a} - b}} \tan\left(\frac{e z}{2}\right)\right) \middle| \frac{-2 a - 2\sqrt{a - b}\sqrt{a} + b}{-2 a + 2\sqrt{a - b}\sqrt{a} + b}\right) \sqrt{\frac{\left(2 a + 2\sqrt{a - b}\sqrt{a} - b\right)\tan^2\left(\frac{e z}{2}\right) + b}{b}} \sqrt{\frac{b - \left(-2 a + 2\sqrt{a - b}\sqrt{a} + b\right)\tan^2\left(\frac{e z}{2}\right)}{b}} \right)\right) \Big/ \left(2 \sqrt{-\frac{-2 a + 2\sqrt{a - b}\sqrt{a} + b}{b}}\, e \sqrt{a + b + (b - a)\cos(2 e z)} \sqrt{4 a \tan^2\left(\frac{e z}{2}\right) + b\left(\tan^2\left(\frac{e z}{2}\right) - 1\right)^2} \right)$$

01.07.21.2395.01

$$\int \frac{1}{\sqrt{a \sin^2(e z) + b \cos^2(e z)}}\, dz = -\left(2 i (\cos(e z) + 1) \sqrt{\frac{a + b + (b - a)\cos(2 e z)}{(\cos(e z) + 1)^2}}\, F\left(i \sinh^{-1}\left(\sqrt{\frac{b}{2 a + 2\sqrt{a - b}\sqrt{a} - b}} \tan\left(\frac{e z}{2}\right)\right) \middle| \frac{-2 a - 2\sqrt{a - b}\sqrt{a} + b}{-2 a + 2\sqrt{a - b}\sqrt{a} + b}\right) \sqrt{\frac{b \tan^2\left(\frac{e z}{2}\right)}{2 a + 2\sqrt{a - b}\sqrt{a} - b} + 1} \sqrt{1 - \frac{b \tan^2\left(\frac{e z}{2}\right)}{-2 a + 2\sqrt{a - b}\sqrt{a} + b}} \right) \Big/ \left(\sqrt{\frac{b}{2 a + 2\sqrt{a - b}\sqrt{a} - b}}\, e \sqrt{a + b + (b - a)\cos(2 e z)} \sqrt{4 a \tan^2\left(\frac{e z}{2}\right) + b\left(\tan^2\left(\frac{e z}{2}\right) - 1\right)^2} \right)$$

01.07.21.2396.01

$$\int \frac{1}{\left(a \sin^2(e z) + b \cos^2(e z)\right)^{3/2}} \, dz = \left(\sqrt{2}\, a \sin(2 e z) - \sqrt{2}\, b \sin(2 e z) + \left((\cos(e z)+1) \sqrt{\frac{a+b+(b-a)\cos(2 e z)}{(\cos(e z)+1)^2}} \left(\sqrt{-\frac{-2a+2\sqrt{a-b}\sqrt{a}+b}{b}} (a+b+(b-a)\cos(2 e z)) \tan\left(\frac{e z}{2}\right) \sec^2\left(\frac{e z}{2}\right) + 4\sqrt{a}\left(\sqrt{a-b}-\sqrt{a}\right) \sqrt{\frac{\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)\tan^2\left(\frac{e z}{2}\right)+b}{b}} \sqrt{\frac{b-\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)\tan^2\left(\frac{e z}{2}\right)}{b}} \, i\, F\left(i \sinh^{-1}\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\sqrt{a}-b}} \tan\left(\frac{e z}{2}\right)\right) \middle| \frac{-2a-2\sqrt{a-b}\sqrt{a}+b}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right) - 2 i \left(-2a+2\sqrt{a-b}\sqrt{a}+b\right) E\left(i \sinh^{-1}\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\sqrt{a}-b}} \tan\left(\frac{e z}{2}\right)\right) \middle| \frac{-2a-2\sqrt{a-b}\sqrt{a}+b}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right) \sqrt{\frac{\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)\tan^2\left(\frac{e z}{2}\right)+b}{b}} \sqrt{\frac{b-\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)\tan^2\left(\frac{e z}{2}\right)}{b}}\right)\right) \Bigg/ \left(\sqrt{-\frac{-2a+2\sqrt{a-b}\sqrt{a}+b}{b}} \sqrt{4 a \tan^2\left(\frac{e z}{2}\right) + b\left(\tan^2\left(\frac{e z}{2}\right)-1\right)^2}\right)\right) \Bigg/ \left(2 a b e \sqrt{a+b+(b-a)\cos(2 e z)}\right)$$

01.07.21.2397.01

$$\int \frac{1}{\left(a \sin^2(e z) + b \cos^2(e z)\right)^{5/2}} \, dz =$$

$$\left(\left(2(\cos(e z)+1)^3 \left(\frac{a+b+(b-a)\cos(2 e z)}{(\cos(e z)+1)^2}\right)^{3/2} \left(\frac{1}{a-b}\left((b^2-a^2)\left(-\left(-\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)(-a-b+(a-b)\cos(2 e z)) \tan\left(\frac{e z}{2}\right) \sec^2\left(\frac{e z}{2}\right) - 2 i b \sqrt{-\frac{-2a+2\sqrt{a-b}\sqrt{a}+b}{b}} \left(-a+2\sqrt{a-b}\sqrt{a}+b\right) F\left(i \sinh^{-1}\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\sqrt{a}-b}} \tan\left(\frac{e z}{2}\right)\right) \middle| \frac{-2a-2\sqrt{a-b}\sqrt{a}+b}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right) \sqrt{\frac{b \tan^2\left(\frac{e z}{2}\right)}{2a+2\sqrt{a-b}\sqrt{a}-b}+1} \sqrt{1-\frac{b \tan^2\left(\frac{e z}{2}\right)}{-2a+2\sqrt{a-b}\sqrt{a}+b}}\right) \Bigg/ \right.\right.\right.\right.$$

$$\left(2\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)\right)-i\sqrt{\frac{b\tan^2\left(\frac{ez}{2}\right)}{2a+2\sqrt{a-b}\sqrt{a}-b}+1}$$

$$\sqrt{-\frac{-2a+2\sqrt{a-b}\sqrt{a}+b}{b}}\;b\sqrt{1-\frac{b\tan^2\left(\frac{ez}{2}\right)}{-2a+2\sqrt{a-b}\sqrt{a}+b}}\;E\Bigg($$

$$i\sinh^{-1}\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\sqrt{a}-b}}\tan\left(\frac{ez}{2}\right)\right)\Bigg|\frac{-2a-2\sqrt{a-b}\sqrt{a}+b}{-2a+2\sqrt{a-b}\sqrt{a}+b}\Bigg)\Bigg)\Bigg)-$$

$$\Bigg(i\left(a^2+b\,a+b^2\right)F\left(i\sinh^{-1}\left(\sqrt{\frac{b}{2a+2\sqrt{a-b}\sqrt{a}-b}}\tan\left(\frac{ez}{2}\right)\right)\Bigg|\frac{-2a-2\sqrt{a-b}\sqrt{a}+b}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)$$

$$\sqrt{\frac{b\tan^2\left(\frac{ez}{2}\right)}{2a+2\sqrt{a-b}\sqrt{a}-b}+1}$$

$$\sqrt{1-\frac{b\tan^2\left(\frac{ez}{2}\right)}{-2a+2\sqrt{a-b}\sqrt{a}+b}}\Bigg)\Bigg/\left(\sqrt{-\frac{-2a+2\sqrt{a-b}\sqrt{a}+b}{b}}\right)\Bigg)\Bigg)\Bigg/$$

$$\left(\sqrt{4a\tan^2\left(\frac{ez}{2}\right)+b\left(\tan^2\left(\frac{ez}{2}\right)-1\right)^2}\right)-\sqrt{2}\,(a-b)\left(-a^2-3\,b\,a-b^2+\left(a^2-b^2\right)\cos(2\,e\,z)\right)$$

$$\sin($$

$$2\,e\,z)\Bigg)\Bigg/(3$$

$$a^2\,b^2\,e\,(a+b+(b-a)\cos(2\,e\,z))^{3/2})$$

01.07.21.2398.01

$$\int\sin(e\,z)\left(b\cos^2(e\,z)+a\sin^2(e\,z)\right)^{\beta}\,dz = \frac{\cos(e\,z)\left(b-(b-a)\sin^2(e\,z)\right)^{\beta+1}}{2\,a\,e\,(\beta+1)\sqrt{-\frac{(b-a)\cos^2(e\,z)}{a}}}\,{}_2F_1\left(\beta+1,\frac{1}{2};\beta+2;\frac{b-(b-a)\sin^2(e\,z)}{a}\right)$$

01.07.21.2399.01

$$\int\sin(e\,z)\sqrt{a\sin^2(e\,z)+b\cos^2(e\,z)}\,dz =$$

$$-\frac{1}{4\,e\left((a-b)\sin^2(e\,z)\right)^{3/2}}\Bigg(\sin(e\,z)\Bigg(\sqrt{2}\sqrt{a+b+(b-a)\cos(2\,e\,z)}\cot^2(e\,z)\left((a-b)\sin^2(e\,z)\right)^{3/2}-$$

$$a\tan^{-1}\left(\frac{\sqrt{a+b+(b-a)\cos(2\,e\,z)}\sqrt{(a-b)^2\sin^2(2\,e\,z)}\tan^2(e\,z)}{2\sqrt{2}\left((a-b)\sin^2(e\,z)\right)^{3/2}}\right)\sqrt{(a-b)^2\sin^2(2\,e\,z)}\Bigg)\tan(e\,z)\Bigg)$$

01.07.21.2400.01

$$\int \frac{\sin(e\,z)}{\sqrt{a\sin^2(e\,z)+b\cos^2(e\,z)}}\,dz = \frac{\tan^{-1}\left(\frac{\sqrt{a+b+(b-a)\cos(2\,e\,z)}\,\sqrt{(a-b)^2\sin^2(2\,e\,z)}\,\tan^2(e\,z)}{2\sqrt{2}\,\left((a-b)\sin^2(e\,z)\right)^{3/2}}\right)\sin(e\,z)\sqrt{(a-b)^2\sin^2(2\,e\,z)}\,\tan(e\,z)}{2\,e\left((a-b)\sin^2(e\,z)\right)^{3/2}}$$

01.07.21.2401.01

$$\int \cos(e\,z)\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{\beta}dz = -\left(\left((b-a)\cos^2(e\,z)+a\right){}_2F_1\left(\beta+1,\frac{1}{2};\beta+2;\frac{(b-a)\cos^2(e\,z)+a}{b}\right)\sin(e\,z)\left(b\cos^2(e\,z)+a\sin^2(e\,z)\right)^{\beta}\right)\Big/\left(2\,b\,e\,(\beta+1)\sqrt{\frac{(b-a)\sin^2(e\,z)}{b}}\right)$$

01.07.21.2402.01

$$\int \cos(e\,z)\sqrt{a\sin^2(e\,z)+b\cos^2(e\,z)}\,dz = \frac{1}{4\sqrt{2}\,(a-b)\,e}\left(\csc(e\,z)\left(-\cos(2\,e\,z)\sqrt{a+b+(b-a)\cos(2\,e\,z)}\,(a-b)+\sqrt{a+b+(b-a)\cos(2\,e\,z)}\,(a-b)+2\sqrt{2}\,b\log\left(\sqrt{a+b+(b-a)\cos(2\,e\,z)}+\sqrt{2}\sqrt{(a-b)\sin^2(e\,z)}\right)\sqrt{(a-b)\sin^2(e\,z)}\right)\right)$$

01.07.21.2403.01

$$\int \frac{\cos(e\,z)}{\sqrt{a\sin^2(e\,z)+b\cos^2(e\,z)}}\,dz = \frac{\log\left(\sqrt{a+b+(b-a)\cos(2\,e\,z)}+\sqrt{2}\sqrt{(a-b)\sin^2(e\,z)}\right)\sin(e\,z)}{e\sqrt{(a-b)\sin^2(e\,z)}}$$

01.07.21.2404.01

$$\int \sin(2\,z)\left(\left(a\cos^2(z)+b\sin^2(z)\right)^{1/n}\right)^{r}dz = -\frac{n\,(a+b+(a-b)\cos(2\,z))\left(\left(a\cos^2(z)+b\sin^2(z)\right)^{1/n}\right)^{r}}{2\,(a-b)\,(n+r)}$$

Involving $\sin(d\,z)\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{\beta}$

01.07.21.2405.01

$$\int \sin(d\,z)\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{\beta}dz = -\frac{1}{d^2-4\,e^2\,\beta^2}\left(2^{-2\beta-1}\,e^{-i\,d\,z}\left(\frac{e^{2\,i\,e\,z}\,(b-a)}{a+b-2\sqrt{a\,b}}+1\right)^{-\beta}\left(\frac{e^{2\,i\,e\,z}\,(b-a)}{a+b+2\sqrt{a\,b}}+1\right)^{-\beta}\left(e^{-2\,i\,e\,z}\left(b\left(1+e^{2\,i\,e\,z}\right)^2-a\left(-1+e^{2\,i\,e\,z}\right)^2\right)\right)^{\beta}\left((d-2\,e\,\beta)\,F_1\left(-\frac{d+2\,e\,\beta}{2\,e};-\beta,-\beta;-\frac{d}{2\,e}-\beta+1;\frac{(a-b)\,e^{2\,i\,e\,z}}{a+b+2\sqrt{a\,b}},\frac{(a-b)\,e^{2\,i\,e\,z}}{a+b-2\sqrt{a\,b}}\right)+e^{2\,i\,d\,z}\,(d+2\,e\,\beta)\,F_1\left(\frac{d}{2\,e}-\beta;-\beta,-\beta;\frac{d}{2\,e}-\beta+1;\frac{(a-b)\,e^{2\,i\,e\,z}}{a+b+2\sqrt{a\,b}},\frac{(a-b)\,e^{2\,i\,e\,z}}{a+b-2\sqrt{a\,b}}\right)\right)\right)$$

Involving $\cos(d\,z)\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^\beta$

01.07.21.2406.01

$$\int\cos(d\,z)\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^\beta\,dz = -\frac{1}{d^2-4e^2\beta^2}\left(i\,2^{-2\beta-1}e^{-i\,d\,z}\left(\frac{e^{2iez}(b-a)}{a+b-2\sqrt{a\,b}}+1\right)^{-\beta}\left(\frac{e^{2iez}(b-a)}{a+b+2\sqrt{a\,b}}+1\right)^{-\beta}\left(e^{-2iez}\left(b\left(1+e^{2iez}\right)^2-a\left(-1+e^{2iez}\right)^2\right)\right)^\beta\right.$$
$$\left(e^{2idz}(d+2e\beta)F_1\left(\frac{d}{2e}-\beta;-\beta,-\beta;\frac{d}{2e}-\beta+1;\frac{(a-b)e^{2iez}}{a+b+2\sqrt{a\,b}},\frac{(a-b)e^{2iez}}{a+b-2\sqrt{a\,b}}\right)-\right.$$
$$\left.\left.(d-2e\beta)F_1\left(-\frac{d+2e\beta}{2e};-\beta,-\beta;-\frac{d}{2e}-\beta+1;\frac{(a-b)e^{2iez}}{a+b+2\sqrt{a\,b}},\frac{(a-b)e^{2iez}}{a+b-2\sqrt{a\,b}}\right)\right)\right)$$

Involving $\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^\beta$

01.07.21.2407.01

$$\int\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^\beta\,dz = \frac{1}{e}\left(F_1\left(\frac{1}{2};\frac{1}{2},-\beta;\frac{3}{2};\sin^2(e\,z),\frac{(c-b)\sin^2(e\,z)}{a+c}\right)\sqrt{\cos^2(e\,z)}\left((b-c)\sin^2(e\,z)+a+c\right)^\beta\left(\frac{(b-c)\sin^2(e\,z)}{a+c}+1\right)^{-\beta}\tan(e\,z)\right)$$

01.07.21.2408.01

$$\int\sqrt{a+b\sin^2(e\,z)+c\cos^2(e\,z)}\,dz = \frac{\cos(e\,z)\,E\left(\sin^{-1}(\sin(e\,z))\,\middle|\,\frac{c-b}{a+c}\right)\sqrt{(b-c)\sin^2(e\,z)+a+c}}{e\sqrt{\cos^2(e\,z)}\sqrt{\frac{(b-c)\sin^2(e\,z)+a+c}{a+c}}}$$

01.07.21.2409.01

$$\int\frac{1}{\sqrt{a+b\sin^2(e\,z)+c\cos^2(e\,z)}}\,dz = \frac{\cos(e\,z)\,F\left(\sin^{-1}(\sin(e\,z))\,\middle|\,\frac{c-b}{a+c}\right)\sqrt{\frac{(b-c)\sin^2(e\,z)+a+c}{a+c}}}{e\sqrt{\cos^2(e\,z)}\sqrt{(b-c)\sin^2(e\,z)+a+c}}$$

01.07.21.2410.01

$$\int\sin(e\,z)\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^\beta\,dz = -\frac{\cos(e\,z)\left((c-b)\cos^2(e\,z)+a+b\right)^\beta}{e}\left(\frac{(c-b)\cos^2(e\,z)}{a+b}+1\right)^{-\beta}{}_2F_1\left(\frac{1}{2},-\beta;\frac{3}{2};\frac{(b-c)\cos^2(e\,z)}{a+b}\right)$$

01.07.21.2411.01

$$\int\sin(e\,z)\sqrt{a+b\sin^2(e\,z)+c\cos^2(e\,z)}\,dz = -\frac{\sqrt{c\cos^2(e\,z)+b\sin^2(e\,z)+a}\,\cos(e\,z)+\frac{(a+b)\log\left(2\left(\sqrt{c-b}\,\cos(e\,z)+\sqrt{c\cos^2(e\,z)+b\sin^2(e\,z)+a}\right)\right)}{\sqrt{c-b}}}{2e}$$

01.07.21.2412.01

$$\int \frac{\sin(e\,z)}{\sqrt{a+b\sin^2(e\,z)+c\cos^2(e\,z)}}\,dz = -\frac{\log\left(2\left(\sqrt{c-b}\,\cos(e\,z)+\sqrt{c\cos^2(e\,z)+b\sin^2(e\,z)+a}\right)\right)}{\sqrt{c-b}\,e}$$

01.07.21.2413.01

$$\int \cos(e\,z)\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^\beta\,dz = \frac{1}{e}\left({}_2F_1\left(\frac{1}{2},-\beta;\frac{3}{2};\frac{(c-b)\sin^2(e\,z)}{a+c}\right)\sin(e\,z)\left((b-c)\sin^2(e\,z)+a+c\right)^\beta\left(\frac{(b-c)\sin^2(e\,z)}{a+c}+1\right)^{-\beta}\right)$$

01.07.21.2414.01

$$\int \cos(e\,z)\sqrt{a+b\sin^2(e\,z)+c\cos^2(e\,z)}\,dz = \frac{1}{2\sqrt{c-b}\,e}\left(\sqrt{c-b}\,\sin(e\,z)\sqrt{(b-c)\sin^2(e\,z)+a+c}-i\,(a+c)\log\left(2\left(\sqrt{c-b}\,i\sin(e\,z)+\sqrt{(b-c)\sin^2(e\,z)+a+c}\right)\right)\right)$$

01.07.21.2415.01

$$\int \frac{\cos(e\,z)}{\sqrt{a+b\sin^2(e\,z)+c\cos^2(e\,z)}}\,dz = \frac{1}{2\,e\left((b-c)\cos^2(e\,z)\right)^{3/2}}\Bigg(\cos(e\,z)\cot(e\,z)\Bigg(\log\left(-2\,(b-c)\cos^2(e\,z)\right)-\log\Big(-b\sqrt{2\,a+b+c+(c-b)\cos(2\,e\,z)}+ c\sqrt{2\,a+b+c+(c-b)\cos(2\,e\,z)}-(b-c)\cos(2\,e\,z)\sqrt{2\,a+b+c+(c-b)\cos(2\,e\,z)}+ \sqrt{2}\sqrt{(b-c)\cos^2(e\,z)}\sqrt{(b-c)^2\sin^2(2\,e\,z)}\Big)\Bigg)\sqrt{(b-c)^2\sin^2(2\,e\,z)}\Bigg)$$

Involving $\sin(d\,z)\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^\beta$

01.07.21.2416.01

$$\int \sin(d\,z)\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^\beta\,dz = -\frac{1}{d^2-4\,e^2\,\beta^2}\Bigg(2^{-2\beta-1}\,e^{-i\,d\,z}\left(\frac{e^{2\,i\,e\,z}\,(c-b)}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}+1\right)^{-\beta}\left(\frac{e^{2\,i\,e\,z}\,(c-b)}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}}+1\right)^{-\beta} \left(e^{-2\,i\,e\,z}\left(-b\left(-1+e^{2\,i\,e\,z}\right)^2+4\,a\,e^{2\,i\,e\,z}+c\left(1+e^{2\,i\,e\,z}\right)^2\right)\right)^\beta\Bigg((d-2\,e\,\beta) F_1\left(-\frac{d+2\,e\,\beta}{2\,e};-\beta,-\beta;-\frac{d}{2\,e}-\beta+1;\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}},\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\right)+e^{2\,i\,d\,z} (d+2\,e\,\beta)\,F_1\left(\frac{d}{2\,e}-\beta;-\beta,-\beta;\frac{d}{2\,e}-\beta+1;\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c+2\sqrt{(a+b)\,(a+c)}},\frac{(b-c)\,e^{2\,i\,e\,z}}{2\,a+b+c-2\sqrt{(a+b)\,(a+c)}}\right)\Bigg)\Bigg)$$

Involving $\cos(d\,z)\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^\beta$

01.07.21.2417.01

$$\int \cos(d\,z)\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^\beta\,dz = -\frac{1}{d^2-4e^2\beta^2}\left(i\,2^{-2\beta-1}\,e^{-i\,d\,z}\left(\frac{e^{2iez}(c-b)}{2a+b+c-2\sqrt{(a+b)(a+c)}}+1\right)^{-\beta}\left(\frac{e^{2iez}(c-b)}{2a+b+c+2\sqrt{(a+b)(a+c)}}+1\right)^{-\beta}\right.$$
$$\left(e^{-2iez}\left(-b\left(-1+e^{2iez}\right)^2+4a\,e^{2iez}+c\left(1+e^{2iez}\right)^2\right)\right)^\beta\left(e^{2idz}(d+2e\beta)\right.$$
$$F_1\left(\frac{d}{2e}-\beta;-\beta,-\beta;\frac{d}{2e}-\beta+1;\frac{(b-c)e^{2iez}}{2a+b+c+2\sqrt{(a+b)(a+c)}},\frac{(b-c)e^{2iez}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)-(d-2e\beta)$$
$$\left.\left.F_1\left(-\frac{d+2e\beta}{2e};-\beta,-\beta;-\frac{d}{2e}-\beta+1;\frac{(b-c)e^{2iez}}{2a+b+c+2\sqrt{(a+b)(a+c)}},\frac{(b-c)e^{2iez}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)\right)$$

Involving $\left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^\beta$

01.07.21.2418.01

$$\int \left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^\beta\,dz = \frac{1}{e\,\beta}\left(i\,2^{-2\beta-1}\left(\frac{e^{2iez}(-a-2\,i\,b+c)}{a+c-2\sqrt{a\,c-b^2}}+1\right)^{-\beta}\right.$$
$$\left(\frac{e^{2iez}(-a-2\,i\,b+c)}{a+c+2\sqrt{a\,c-b^2}}+1\right)^{-\beta}\left(e^{-2iez}\left(\left(1+e^{2iez}\right)\left(c\left(1+e^{2iez}\right)-2\,i\,b\left(-1+e^{2iez}\right)\right)-a\left(-1+e^{2iez}\right)^2\right)\right)^\beta$$
$$\left.F_1\left(-\beta;-\beta,-\beta;1-\beta;\frac{(a-c+2\,i\,b)\,e^{2iez}}{a+c+2\sqrt{a\,c-b^2}},-\frac{(-a-2\,i\,b+c)\,e^{2iez}}{a+c-2\sqrt{a\,c-b^2}}\right)\right)$$

Involving $\sin(d\,z)\left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^\beta$

01.07.21.2419.01

$$\int \sin(d\,z)\left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^\beta\,dz = -\frac{1}{d^2-4e^2\beta^2}\left(2^{-2\beta-1}\,e^{-i\,d\,z}\left(\frac{e^{2iez}(-a-2\,i\,b+c)}{a+c-2\sqrt{a\,c-b^2}}+1\right)^{-\beta}\left(\frac{e^{2iez}(-a-2\,i\,b+c)}{a+c+2\sqrt{a\,c-b^2}}+1\right)^{-\beta}\right.$$
$$\left(e^{-2iez}\left(\left(1+e^{2iez}\right)\left(c\left(1+e^{2iez}\right)-2\,i\,b\left(-1+e^{2iez}\right)\right)-a\left(-1+e^{2iez}\right)^2\right)\right)^\beta$$
$$\left((d-2e\beta)F_1\left(-\frac{d+2e\beta}{2e};-\beta,-\beta;-\frac{d}{2e}-\beta+1;\frac{(a-c+2\,i\,b)\,e^{2iez}}{a+c+2\sqrt{a\,c-b^2}},-\frac{(-a-2\,i\,b+c)\,e^{2iez}}{a+c-2\sqrt{a\,c-b^2}}\right)+\right.$$
$$\left.\left.e^{2idz}(d+2e\beta)F_1\left(\frac{d}{2e}-\beta;-\beta,-\beta;\frac{d}{2e}-\beta+1;\frac{(a-c+2\,i\,b)\,e^{2iez}}{a+c+2\sqrt{a\,c-b^2}},-\frac{(-a-2\,i\,b+c)\,e^{2iez}}{a+c-2\sqrt{a\,c-b^2}}\right)\right)\right)$$

Involving $\cos(d\,z)\left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^\beta$

01.07.21.2420.01

$$\int \cos(d\,z)\left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^\beta\,dz = -\frac{1}{d^2-4\,e^2\,\beta^2}\left(i\,2^{-2\beta-1}\,e^{-i\,d\,z}\left(\frac{e^{2\,i\,e\,z}(-a-2\,i\,b+c)}{a+c-2\sqrt{a\,c-b^2}}+1\right)^{-\beta}\left(\frac{e^{2\,i\,e\,z}(-a-2\,i\,b+c)}{a+c+2\sqrt{a\,c-b^2}}+1\right)^{-\beta}\right.$$
$$\left(e^{-2\,i\,e\,z}\left(\left(1+e^{2\,i\,e\,z}\right)\left(c\left(1+e^{2\,i\,e\,z}\right)-2\,i\,b\left(-1+e^{2\,i\,e\,z}\right)\right)-a\left(-1+e^{2\,i\,e\,z}\right)^2\right)\right)^\beta$$
$$\left(e^{2\,i\,d\,z}(d+2\,e\,\beta)\,F_1\left(\frac{d}{2\,e}-\beta;-\beta,-\beta;\frac{d}{2\,e}-\beta+1;\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\sqrt{a\,c-b^2}},-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)-\right.$$
$$\left.\left.(d-2\,e\,\beta)\,F_1\left(-\frac{d+2\,e\,\beta}{2\,e};-\beta,-\beta;-\frac{d}{2\,e}-\beta+1;\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\sqrt{a\,c-b^2}},-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)\right)\right)$$

Involving functions of the direct function, trigonometric and a power functions

Involving powers of the direct function, trigonometric and a power functions

Involving sin and power

Involving $z^{\alpha-1}\sin(c\,z)\cos^\nu(a\,z)$

01.07.21.2421.01

$$\int z^{\alpha-1}\sin(c\,z)\cos^\nu(a\,z)\,dz = -i\,2^{-\nu-1}\,z^\alpha\left(-\binom{\nu}{\frac{\nu}{2}}\left((-i\,c\,z)^{-\alpha}\,\Gamma(\alpha,-i\,c\,z)-(i\,c\,z)^{-\alpha}\,\Gamma(\alpha,i\,c\,z)\right)(1-\nu\bmod 2)-\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left((c+2\,a\,s-a\,\nu)^2\,z^2\right)^{-\alpha}\right.$$
$$\left((c-2\,a\,s+a\,\nu)^2\,z^2\right)^{-\alpha}\binom{\nu}{s}\left((i\,(c+2\,a\,s-a\,\nu)\,z)^\alpha\,\Gamma(\alpha,-i\,(c+2\,a\,s-a\,\nu)\,z)\left((c-2\,a\,s+a\,\nu)^2\,z^2\right)^\alpha-\right.$$
$$(-i\,(c+2\,a\,s-a\,\nu)\,z)^\alpha\,\Gamma(\alpha,i\,(c+2\,a\,s-a\,\nu)\,z)\left((c-2\,a\,s+a\,\nu)^2\,z^2\right)^\alpha+\left((c+2\,a\,s-a\,\nu)^2\,z^2\right)^\alpha$$
$$\left.\left.\left((i\,(c-2\,a\,s+a\,\nu)\,z)^\alpha\,\Gamma(\alpha,-i\,(c-2\,a\,s+a\,\nu)\,z)-(-i\,(c-2\,a\,s+a\,\nu)\,z)^\alpha\,\Gamma(\alpha,i\,(c-2\,a\,s+a\,\nu)\,z)\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2422.01

$$\int z^n \sin(c\,z)\cos^\nu(a\,z)\,dz = \frac{i\,n!}{2}\cos^\nu(a\,z)\left(1+e^{2\,i\,a\,z}\right)^{-\nu} \left(-e^{i\,c\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}}{(n-p)!\,(i\,c-i\,a\,\nu)^{p+1}}\,{}_{p+2}F_{p+1}\left(\frac{c-a\,\nu}{2\,a},\ldots,\frac{c-a\,\nu}{2\,a},-\nu;1+\frac{c-a\,\nu}{2\,a},\ldots,1+\frac{c-a\,\nu}{2\,a};-e^{2\,i\,a\,z}\right)+e^{-i\,c\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}}{(n-p)!\,(-i\,c-i\,a\,\nu)^{p+1}}\,{}_{p+2}F_{p+1}\left(-\frac{c+a\,\nu}{2\,a},\ldots,-\frac{c+a\,\nu}{2\,a},-\nu;1-\frac{c+a\,\nu}{2\,a},\ldots,1-\frac{c+a\,\nu}{2\,a};-e^{2\,i\,a\,z}\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sin(c\,z+d)\cos^\nu(a\,z)$

01.07.21.2423.01

$$\int z^{\alpha-1}\sin(c\,z+d)\cos^\nu(a\,z)\,dz = -i\,2^{-\nu-1}e^{-i\,d}z^\alpha\left(-\binom{\nu}{\frac{\nu}{2}}\left(e^{2\,i\,d}(i\,c\,z)^\alpha\,\Gamma(\alpha,-i\,c\,z)-(-i\,c\,z)^\alpha\,\Gamma(\alpha,i\,c\,z)\right)(1-\nu \bmod 2)\left(c^2 z^2\right)^{-\alpha}-\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left((c+2\,a\,s-a\,\nu)^2 z^2\right)^{-\alpha}\left((c-2\,a\,s+a\,\nu)^2 z^2\right)^{-\alpha}\binom{\nu}{s}\left(e^{2\,i\,d}(i\,(c+2\,a\,s-a\,\nu)\,z)^\alpha\,\Gamma(\alpha,-i\,(c+2\,a\,s-a\,\nu)\,z)\left((c-2\,a\,s+a\,\nu)^2 z^2\right)^\alpha-(-i\,(c+2\,a\,s-a\,\nu)\,z)^\alpha\,\Gamma(\alpha,i\,(c+2\,a\,s-a\,\nu)\,z)\left((c-2\,a\,s+a\,\nu)^2 z^2\right)^\alpha+\left((c+2\,a\,s-a\,\nu)^2 z^2\right)^\alpha\left(e^{2\,i\,d}(i\,(c-2\,a\,s+a\,\nu)\,z)^\alpha\,\Gamma(\alpha,-i\,(c-2\,a\,s+a\,\nu)\,z)-(-i\,(c-2\,a\,s+a\,\nu)\,z)^\alpha\,\Gamma(\alpha,i\,(c-2\,a\,s+a\,\nu)\,z)\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.07.21.2424.01

$$\int z^n \sin(d+c\,z)\cos^\nu(a\,z)\,dz = \frac{1}{2}\,i\left(1+e^{2\,i\,a\,z}\right)^{-\nu}\cos^\nu(a\,z)\,n!\left(e^{-i\,(d+c\,z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-i\,c-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c+a\,\nu}{2\,a},\ldots,-\frac{c+a\,\nu}{2\,a},-\nu;1-\frac{c+a\,\nu}{2\,a},\ldots,1-\frac{c+a\,\nu}{2\,a};-e^{2\,i\,a\,z}\right)-e^{i\,(d+c\,z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(i\,c-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{a\,\nu-c}{2\,a},\ldots,-\frac{a\,\nu-c}{2\,a},-\nu;1-\frac{a\,\nu-c}{2\,a},\ldots,1-\frac{a\,\nu-c}{2\,a};-e^{2\,i\,a\,z}\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sin(c\,z)\cos^\nu(a\,z+b)$

01.07.21.2425.01

$$\int z^{\alpha-1}\sin(c\,z)\cos^{\nu}(b+a\,z)\,dz = i\,2^{-\nu-1}\,z^{\alpha}\left(\binom{\nu}{\frac{\nu}{2}}\left((i\,c\,z)^{\alpha}\,\Gamma(\alpha,-i\,c\,z)-(-i\,c\,z)^{\alpha}\,\Gamma(\alpha,i\,c\,z)\right)(1-\nu\bmod 2)\left(c^2\,z^2\right)^{-\alpha}+\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i(2\,b\,s+b\,\nu)}\left((c+2\,a\,s-a\,\nu)^2\,z^2\right)^{-\alpha}\left((c-2\,a\,s+a\,\nu)^2\,z^2\right)^{-\alpha}\binom{\nu}{s}\left(e^{4\,i\,b\,s}\,(i\,(c+2\,a\,s-a\,\nu)\,z)^{\alpha}\,\Gamma(\alpha,-i\,(c+2\,a\,s-a\,\nu)\,z)\left((c-2\,a\,s+a\,\nu)^2\,z^2\right)^{\alpha}-e^{2\,i\,b\,\nu}\,(-i\,(c+2\,a\,s-a\,\nu)\,z)^{\alpha}\,\Gamma(\alpha,i\,(c+2\,a\,s-a\,\nu)\,z)\left((c-2\,a\,s+a\,\nu)^2\,z^2\right)^{\alpha}+\left((c+2\,a\,s-a\,\nu)^2\,z^2\right)^{\alpha}\left(e^{2\,i\,b\,\nu}\,(i\,(c-2\,a\,s+a\,\nu)\,z)^{\alpha}\,\Gamma(\alpha,-i\,(c-2\,a\,s+a\,\nu)\,z)-e^{4\,i\,b\,s}\,(-i\,(c-2\,a\,s+a\,\nu)\,z)^{\alpha}\,\Gamma(\alpha,i\,(c-2\,a\,s+a\,\nu)\,z)\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.07.21.2426.01

$$\int z^{n}\sin(c\,z)\cos^{\nu}(b+a\,z)\,dz = \frac{1}{2}\,i\left(1+e^{2\,i\,(b+a\,z)}\right)^{-\nu}\cos^{\nu}(b+a\,z)\,n!\left(e^{-i\,c\,z}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(-i\,c-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c+a\,\nu}{2\,a},\ldots,-\frac{c+a\,\nu}{2\,a},-\nu;1-\frac{c+a\,\nu}{2\,a},\ldots,1-\frac{c+a\,\nu}{2\,a};-e^{2\,i\,(b+a\,z)}\right)-e^{i\,c\,z}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(i\,c-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{a\,\nu-c}{2\,a},\ldots,-\frac{a\,\nu-c}{2\,a},-\nu;1-\frac{a\,\nu-c}{2\,a},\ldots,1-\frac{a\,\nu-c}{2\,a};-e^{2\,i\,(b+a\,z)}\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sin(c\,z+d)\cos^{\nu}(a\,z+b)$

01.07.21.2427.01

$$\int z^{\alpha-1}\sin(c\,z+d)\cos^{\nu}(a\,z+b)\,dz = -i\,2^{-\nu-1}\,e^{-i\,d}\,z^{\alpha}\left(-\binom{\nu}{\frac{\nu}{2}}\left(e^{2\,i\,d}\,(i\,c\,z)^{\alpha}\,\Gamma(\alpha,-i\,c\,z)-(-i\,c\,z)^{\alpha}\,\Gamma(\alpha,i\,c\,z)\right)(1-\nu\bmod 2)\left(c^2\,z^2\right)^{-\alpha}-\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i(2\,b\,s+b\,\nu)}\left((c+2\,a\,s-a\,\nu)^2\,z^2\right)^{-\alpha}\left((c-2\,a\,s+a\,\nu)^2\,z^2\right)^{-\alpha}\binom{\nu}{s}\left(e^{2\,i\,(d+2\,b\,s)}\,(i\,(c+2\,a\,s-a\,\nu)\,z)^{\alpha}\,\Gamma(\alpha,-i\,(c+2\,a\,s-a\,\nu)\,z)\left((c-2\,a\,s+a\,\nu)^2\,z^2\right)^{\alpha}-e^{2\,i\,b\,\nu}\,(-i\,(c+2\,a\,s-a\,\nu)\,z)^{\alpha}\,\Gamma(\alpha,i\,(c+2\,a\,s-a\,\nu)\,z)\left((c-2\,a\,s+a\,\nu)^2\,z^2\right)^{\alpha}+\left((c+2\,a\,s-a\,\nu)^2\,z^2\right)^{\alpha}\left(e^{2\,i\,(d+b\,\nu)}\,(i\,(c-2\,a\,s+a\,\nu)\,z)^{\alpha}\,\Gamma(\alpha,-i\,(c-2\,a\,s+a\,\nu)\,z)-e^{4\,i\,b\,s}\,(-i\,(c-2\,a\,s+a\,\nu)\,z)^{\alpha}\,\Gamma(\alpha,i\,(c-2\,a\,s+a\,\nu)\,z)\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.07.21.2428.01

$$\int z^n \sin(d+c\,z)\cos^\nu(b+a\,z)\,dz = \frac{1}{2}\,i\left(1+e^{2\,i\,(b+a\,z)}\right)^{-\nu}\cos^\nu(b+a\,z)\,n!\left(e^{-i\,(d+c\,z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-i\,c-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c+a\,\nu}{2\,a},\ldots,-\frac{c+a\,\nu}{2\,a},-\nu;1-\frac{c+a\,\nu}{2\,a},\ldots,1-\frac{c+a\,\nu}{2\,a};-e^{2\,i\,(b+a\,z)}\right)-e^{i\,(d+c\,z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(i\,c-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{a\,\nu-c}{2\,a},\ldots,-\frac{a\,\nu-c}{2\,a},-\nu;1-\frac{a\,\nu-c}{2\,a},\ldots,1-\frac{a\,\nu-c}{2\,a};-e^{2\,i\,(b+a\,z)}\right)\right)/;\,n\in\mathbb{N}$$

Involving $z^n \sin(b\,z^r)\cos^\nu(c\,z)$

01.07.21.2429.01

$$\int z^n \sin(b\,z^2)\cos^\nu(c\,z)\,dz = i\,2^{-\nu-2}\left(z^{n+1}\binom{\nu}{\frac{\nu}{2}}\left(\left(-i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},-i\,b\,z^2\right)-\left(i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},i\,b\,z^2\right)\right)(1-\nu\bmod 2)-\frac{i}{b}\left((i\,b)^{-n}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-\frac{i\,c^2(\nu-2\,s)^2}{4\,b}}\binom{\nu}{s}\left((-1)^n e^{\frac{i\,c^2(\nu-2\,s)^2}{2\,b}}\sum_{q=0}^{n} i\,2^{q-n}(i\,c\,(\nu-2\,s))^{n-q}(2\,c\,s-c\,\nu-2\,b\,z)(-i\,(-2\,c\,s+c\,\nu+2\,b\,z))^q\left(\frac{i\,(-2\,c\,s+c\,\nu+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(-2\,c\,s+c\,\nu+2\,b\,z)^2}{4\,b}\right)+(-1)^n e^{\frac{i\,c^2(\nu-2\,s)^2}{2\,b}}\sum_{q=0}^{n}\left(i\,c\left(s-\frac{\nu}{2}\right)\right)^{n-q}(i\,(-2\,c\,s+c\,\nu-2\,b\,z))^{q+1}\left(\frac{i\,(2\,c\,s-c\,\nu+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(2\,c\,s-c\,\nu+2\,b\,z)^2}{4\,b}\right)+\sum_{q=0}^{n}2^{q-n}(i\,c\,(\nu-2\,s))^{n-q}(i\,(2\,c\,s-c\,\nu+2\,b\,z))^{q+1}\left(-\frac{i\,(2\,c\,s-c\,\nu+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(2\,c\,s-c\,\nu+2\,b\,z)^2}{4\,b}\right)+\mathrm{Sum}\left(\left(i\,c\left(s-\frac{\nu}{2}\right)\right)^{n-q}(i\,(-2\,c\,s+c\,\nu+2\,b\,z))^{q+1}\left(-\frac{i\,(-2\,c\,s+c\,\nu+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(-2\,c\,s+c\,\nu+2\,b\,z)^2}{4\,b}\right),\{q,0,n\}\right)\right)\right)\right)/;\,n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.07.21.2430.01

$$\int z^n \sin\left(b\sqrt{z}\right)\cos^\nu(c\,z)\,dz = -i\,2^{-2n-\nu-2}\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{\frac{i b^2}{8cs-4c\nu}}\left(c^2(\nu-2s)^2\right)^{-2n-1}\binom{\nu}{s}\right.$$

$$\left(-\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i\,b)^{-h-k+2n}\left(\frac{i\left(b+2c(2s-\nu)\sqrt{z}\right)^2}{c(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)}\left(-i\left(b-2c(\nu-2s)\sqrt{z}\right)\right)^{h+k}\binom{k}{h}\right.$$

$$\binom{n}{k}\left(b\left(b+2c(2s-\nu)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+2c(2s-\nu)\sqrt{z}\right)^2}{c(8s-4\nu)}\right)+2c\,i(2s-\nu)\right.$$

$$\left.\left.\sqrt{\frac{i\left(b+2c(2s-\nu)\sqrt{z}\right)^2}{c(2s-\nu)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(b+2c(2s-\nu)\sqrt{z}\right)^2}{c(8s-4\nu)}\right)\right)\right)(i\,c(2s-\nu))^{2n}+$$

$$\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i\,b)^{-h-k+2n}\left(i\left(b+2c(\nu-2s)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2c(\nu-2s)\sqrt{z}\right)^2}{c(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(b\left(b+2c(\nu-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+2c(\nu-2s)\sqrt{z}\right)^2}{c(8s-4\nu)}\right)+2c\,i(2s-\nu)\right.$$

$$\left.\left.\left.\sqrt{\frac{i\left(b+2c(\nu-2s)\sqrt{z}\right)^2}{c(2s-\nu)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(b+2c(\nu-2s)\sqrt{z}\right)^2}{c(8s-4\nu)}\right)\right)\right)\right)(i\,c(2s-\nu))^{2n}+$$

$$e^{\frac{i b^2}{2c\nu-4cs}}(i\,c(\nu-2s))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i\,b)^{-h-k+2n}\left(i\left(b+2c(2s-\nu)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+2c(2s-\nu)\sqrt{z}\right)^2}{c(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2c(2s-\nu)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+2c(2s-\nu)\sqrt{z}\right)^2}{c(8s-4\nu)}\right)+2c\,i\sqrt{-\frac{i\left(b+2c(2s-\nu)\sqrt{z}\right)^2}{c(2s-\nu)}}$$

$$(v-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\Bigg)-e^{\frac{i\,b^2}{2\,c\,v-4\,c\,s}}\,(i\,c\,(v-2\,s))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)-2\,i\,c$$

$$(2\,s-v)\,\sqrt{-\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\Bigg)\Bigg)-$$

$$4^{n+1}\,b^{-4\,n-2}\binom{v}{\frac{v}{2}}\left((i\,b)^{2\,n}\,\Gamma\left(2\,(n+1),\,-i\,b\,\sqrt{z}\right)-(-i\,b)^{2\,n}\,\Gamma\left(2\,(n+1),\,i\,b\,\sqrt{z}\right)\right)$$

$$(v \bmod 2-1)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\sin\left(b\,z^r+e\right)\cos^v(c\,z)$

01.07.21.2431.01

$$\int z^n \sin\left(b z^2 + e\right) \cos^\nu(c z)\, dz ==$$

$$2^{-\nu-2} \left(e^{-i e}\, i\, z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(e^{2 i e} \left(i b z^2\right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) - \left(-i b z^2\right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2) \left(b^2 z^4\right)^{\frac{1}{2}(-n-1)} + \right.$$

$$e^{i e}\, i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{i\left(\frac{c^2 (\nu-2 s)^2}{4 b} - 2 e + \pi\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i (2 c s - c \nu))^{n-q} (i (2 c s - c \nu - 2 b z))^{q+1} \right.\right.$$

$$\left.\left(\frac{i (c (\nu - 2 s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c (\nu - 2 s) + 2 b z)^2}{4 b}\right)\right) (-i b)^{-n-1} +$$

$$e^{i\left(\frac{(c \nu - 2 c s)^2}{4 b} - 2 e + \pi\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i (c \nu - 2 c s))^{n-q} (i (c (\nu - 2 s) - 2 b z))^{q+1} \left(\frac{i (c (\nu - 2 s) - 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \right.$$

$$\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c (\nu - 2 s) - 2 b z)^2}{4 b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{-\frac{i c^2 (\nu-2 s)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (i (2 c s - c \nu))^{n-q}$$

$$(-i (2 c s - c \nu - 2 b z))^{q+1} \left(-\frac{i (c (\nu - 2 s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c (\nu - 2 s) + 2 b z)^2}{4 b}\right) +$$

$$(i b)^{-n-1} e^{-\frac{i (c \nu - 2 c s)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (i (c \nu - 2 c s))^{n-q} (-i (c (\nu - 2 s) - 2 b z))^{q+1} \left(-\frac{i (c (\nu - 2 s) - 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c (\nu - 2 s) - 2 b z)^2}{4 b}\right)\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2432.01

$$\int z^n \sin\left(\sqrt{z}\, b + e\right) \cos^\nu(c z)\, dz ==$$

$$2^{-\nu-2} \left(4 (-1)^{n-1} e^{-i e}\, i \binom{\nu}{\frac{\nu}{2}} \left(e^{2 i e} \Gamma\left(2 (n+1), -i b \sqrt{z}\right) - \Gamma\left(2 (n+1), i b \sqrt{z}\right)\right) (1 - \nu \bmod 2)\, b^{-2 (n+1)} + \right.$$

$$4^{-n} e^{-i e}\, i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{i b^2}{4 c (\nu - 2 s)}} \left(c^2 (\nu - 2 s)^2\right)^{-2 n - 1} \left(e^{2 i e} (-i c (\nu - 2 s))^{2 n} \right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\left(i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)\right)^{h+k}\left(-\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(2\,i\,c\,(v-2\,s)\sqrt{-\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)-\right.$$

$$\left.b\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)\right)-$$

$$e^{\frac{i\,b^2}{2\,c\,(v-2\,s)}}\,(i\,c\,(v-2\,s))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)-\right.$$

$$\left.\left.2\,i\,c\,(v-2\,s)\sqrt{\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)-$$

$$\frac{1}{(2\,c\,s-c\,v)^2}\left(e^{\frac{i\,b^2}{8\,c\,s-4\,c\,v}}\,(-i\,(2\,c\,s-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\right.$$

$$\left(-i\left(b+2\,(2\,c\,s-c\,v)\,\sqrt{z}\,\right)\right)^{h+k}\left(\frac{i\left(b+2\,(2\,c\,s-c\,v)\,\sqrt{z}\,\right)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\left(b+2\,(2\,c\,s-c\,v)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,(2\,c\,s-c\,v)\,\sqrt{z}\,\right)^2}{8\,c\,s-4\,c\,v}\right)-\right.$$

$$2\,i\,(2\,c\,s-c\,v)\sqrt{\frac{i\left(b+2\,(2\,c\,s-c\,v)\sqrt{z}\right)^2}{2\,c\,s-c\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+2\,(2\,c\,s-c\,v)\sqrt{z}\right)^2}{8\,c\,s-4\,c\,v}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{(2\,c\,s-c\,v)^2}\left(e^{i\left(2\,e-\frac{b^2}{8\,c\,s-4\,c\,v}\right)}\,(i\,(2\,c\,s-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\right.$$

$$\left(i\left(b+2\,(2\,c\,s-c\,v)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2\,(2\,c\,s-c\,v)\sqrt{z}\right)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,(2\,c\,s-c\,v)\sqrt{-\frac{i\left(b+2\,(2\,c\,s-c\,v)\sqrt{z}\right)^2}{2\,c\,s-c\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,(2\,c\,s-c\,v)\sqrt{z}\right)^2}{8\,c\,s-4\,c\,v}\right)-\right.$$

$$\left.\left.b\left(b+2\,(2\,c\,s-c\,v)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,(2\,c\,s-c\,v)\sqrt{z}\right)^2}{8\,c\,s-4\,c\,v}\right)\right)\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\sin\left(b\,z^r+d\,z\right)\cos^v(c\,z)$

01.07.21.2433.01

$$\int z^n \sin\left(b z^2 + d z\right) \cos^\nu(c z)\, dz = 2^{-\nu-2} \Bigg(b^{-2n-1} e^{\frac{i d^2}{4 b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1)$$

$$\Bigg((i b)^n\, i \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^q (d + 2 b z) \left(\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4 b}\right) +$$

$$\frac{1}{d + 2 b z} \Bigg(e^{-\frac{i d^2}{2 b}} (b (-i b)^n) \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 b z))^q \left(-\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1-q}{2}} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4 b}\right)\Bigg)\Bigg) -$$

$$i\, b^{-2n-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{\frac{i \left(-d^2 - c^2 (\nu - 2 s)^2 - b \pi\right)}{2 b}} \binom{\nu}{s} \Bigg(-e^{\frac{i (-d - 2 c s + c \nu)^2}{4 b}} \Bigg(\sum_{q=0}^{n} 2^{q-n} (i (-d + 2 c s - c \nu))^{n-q} (i (d + c (\nu - 2 s) + 2 b z))^{q+1}$$

$$\left(-\frac{i (d + c (\nu - 2 s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + c (\nu - 2 s) + 2 b z)^2}{4 b}\right)\Bigg) (-i b)^n +$$

$$(i b)^n e^{-\frac{i \left(-3 d^2 + 2 c (2 s - \nu) d - 3 c^2 (\nu - 2 s)^2 - 4 b \pi\right)}{4 b}} \sum_{q=0}^{n} 2^{q-n} (-i (-d + 2 c s - c \nu))^{n-q} (i (-d + 2 c s - c \nu - 2 b z))^{q+1}$$

$$\left(\frac{i (d + c (\nu - 2 s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + c (\nu - 2 s) + 2 b z)^2}{4 b}\right) +$$

$$(i b)^n e^{-\frac{i \left(-3 d^2 - 2 c (2 s - \nu) d - 3 c^2 (\nu - 2 s)^2 - 4 b \pi\right)}{4 b}} \sum_{q=0}^{n} 2^{q-n} (i (d + 2 c s - c \nu))^{n-q} (i (-d - 2 c s + c \nu - 2 b z))^{q+1}$$

$$\left(\frac{i (-d - 2 c s + c \nu - 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (-d - 2 c s + c \nu - 2 b z)^2}{4 b}\right) -$$

$$(-i b)^n e^{\frac{i (d + c (\nu - 2 s))^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (i (-d - 2 c s + c \nu))^{n-q} (-i (-d - 2 c s + c \nu - 2 b z))^{q+1}$$

$$\left(-\frac{i (-d - 2 c s + c \nu - 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-d - 2 c s + c \nu - 2 b z)^2}{4 b}\right)\Bigg)\Bigg) /;\, n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.2434.01

$$\int z^n \sin\left(\sqrt{z}\; b + d z\right) \cos^\nu(c z)\, dz =$$

$$2^{-\nu-2} \Bigg(i\, 4^{-n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \Bigg(\left((d - 2 c s + c \nu)^2\right)^{-2n-1} \Bigg(e^{-\frac{i b^2}{4 (d - 2 c s + c \nu)}} (-i (d - 2 c s + c \nu))^{2n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2n}$$

$$\left(i\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{d-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d-2\,c\,s+c\,v)\sqrt{-\frac{i\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{d-2\,c\,s+c\,v}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{4\,(d-2\,c\,s+c\,v)}\right)-$$

$$\left.\left.b\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{4\,(d-2\,c\,s+c\,v)}\right)\right)\right)-$$

$$e^{\frac{i\,b^2}{4\,(d-2\,c\,s+c\,v)}}\,(i\,(d-2\,c\,s+c\,v))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{d-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-b\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{4\,(d-2\,c\,s+c\,v)}\right)-2\,i\,(d-2\,c\,s+c\,v)$$

$$\left.\left.\sqrt{\frac{i\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{d-2\,c\,s+c\,v}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+2\,(d-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{4\,(d-2\,c\,s+c\,v)}\right)\right)\right)+$$

$$\frac{1}{(d+2\,c\,s-c\,v)^2}\left(e^{-\frac{i\,b^2}{4\,(d+2\,c\,s-c\,v)}}\,(i\,(d+2\,c\,s-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\right.$$

$$\left(i\left(b+2\,(d+2\,c\,s-c\,v)\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{d+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+2\,c\,s-c\,v)\sqrt{-\frac{i\left(b+2\,(d+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{d+2\,c\,s-c\,v}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+2(d+2cs-cv)\sqrt{z}\right)^2}{4d+8cs-4cv}\right) - b\left(b+2(d+2cs-cv)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+2(d+2cs-cv)\sqrt{z}\right)^2}{4d+8cs-4cv}\right)\Bigg)\Bigg) - \frac{1}{(d+2cs-cv)^2}$$

$$\Bigg(e^{\frac{ib^2}{4d+8cs-4cv}} (-i(d+2cs-cv))^{-2n} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2n} \left(-i\left(b+2(d+2cs-cv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2(d+2cs-cv)\sqrt{z}\right)^2}{d+2cs-cv}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \Bigg(-b\left(b+2(d+2cs-cv)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+2(d+2cs-cv)\sqrt{z}\right)^2}{4d+8cs-4cv}\right) - 2i(d+2cs-cv)$$

$$\sqrt{\frac{i\left(b+2(d+2cs-cv)\sqrt{z}\right)^2}{d+2cs-cv}}\ \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+2(d+2cs-cv)\sqrt{z}\right)^2}{4d+8cs-4cv}\right)\Bigg)\Bigg)\Bigg) -$$

$$i(-1)^{n-1} 4^{-n} d^{-2(n+1)} e^{-\frac{ib^2}{4d}} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2n} \left(i\left(b+2d\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \Bigg(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right) -$$

$$2id\sqrt{-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg) -$$

$$e^{\frac{i b^2}{2 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2n} \left(-i \left(b + 2 d \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k} \left(b \left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b + 2 d \sqrt{z}\right)^2}{4 d}\right) + \right.$$

$$\left. 2 \sqrt{\frac{i \left(b + 2 d \sqrt{z}\right)^2}{d}} \, d \, i \, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b + 2 d \sqrt{z}\right)^2}{4 d}\right)\right)\Bigg)\Bigg) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n \sin\left(b z^r + d z + e\right) \cos^v(c z)$

01.07.21.2435.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \cos^\nu(c z)\, dz = \frac{1}{b} \Bigg(2^{-\nu-2} (i b)^{-n} e^{-\frac{i\left(d^2+4 b e\right)}{4 b}}$$

$$\Bigg(-(-1)^n e^{\frac{i d^2}{2 b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^{q+1} \left(\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4 b}\right) -$$

$$e^{2 i e} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 b z))^{q+1} \left(-\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4 b}\right) +$$

$$e^{\frac{i\left(d^2+4 b e\right)}{4 b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-\frac{i\left(d^2+2 c (2 s+\nu) d+c^2 (\nu-2 s)^2+4 b e\right)}{4 b}} \binom{\nu}{s}$$

$$\Bigg((-1)^n e^{\frac{i\left(d^2+2 c \nu d+c^2 (\nu-2 s)^2\right)}{2 b}} \sum_{q=0}^{n} 2^{q-n} (i (d - 2 c s + c \nu))^{n-q} (-i (d - 2 c s + c \nu + 2 b z))^{q+1}$$

$$\left(\frac{i (d - 2 c s + c \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d - 2 c s + c \nu + 2 b z)^2}{4 b}\right) +$$

$$(-1)^n e^{\frac{i\left(d^2+4 c s d+c^2 (\nu-2 s)^2\right)}{2 b}} \sum_{q=0}^{n} 2^{q-n} (i (d + 2 c s - c \nu))^{n-q} (-i (d + 2 c s - c \nu + 2 b z))^{q+1}$$

$$\left(\frac{i (d + 2 c s - c \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 c s - c \nu + 2 b z)^2}{4 b}\right) +$$

$$e^{\frac{2 i (b e+c d s)}{b}} \sum_{q=0}^{n} 2^{q-n} (-i (d - 2 c s + c \nu))^{n-q} (i (d - 2 c s + c \nu + 2 b z))^{q+1}$$

$$\left(-\frac{i (d - 2 c s + c \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d - 2 c s + c \nu + 2 b z)^2}{4 b}\right) +$$

$$e^{i\left(2 e+\frac{c d \nu}{b}\right)} \sum_{q=0}^{n} 2^{q-n} (-i (d + 2 c s - c \nu))^{n-q} (i (d + 2 c s - c \nu + 2 b z))^{q+1}$$

$$\left(-\frac{i (d + 2 c s - c \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 c s - c \nu + 2 b z)^2}{4 b}\right)\Bigg)\Bigg)\Bigg) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2436.01

$$\int z^n \sin\left(\sqrt{z}\, b + d\, z + e\right) \cos^{\nu}(c\, z)\, dz = i\, (-1)^{n-1}\, 2^{-2n-\nu-2}\, d^{-2(n+1)}\, e^{-\frac{i\left(b^2+4 d e\right)}{4 d}}$$
$$\left(e^{\frac{i b^2}{4 d}} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(-e^{\frac{i b^2}{4 d+8 c s-4 c \nu}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, b)^{-h-k+2n} \left(-i \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right)\right)^{h+k} \right.\right.\right.\right.$$
$$\left(\frac{i \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right)^2}{d + 2\, c\, s - c\, \nu} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right) \right.$$
$$\Gamma\left(\frac{1}{2}(h + k + 1),\, \frac{i \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right)^2}{4\,(d + 2\, c\, s - c\, \nu)}\right) + 2\, i \sqrt{\frac{i \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right)^2}{d + 2\, c\, s - c\, \nu}}$$
$$\left.\left.\left.(d + 2\, c\, s - c\, \nu)\, \Gamma\left(\frac{1}{2}(h + k + 2),\, \frac{i \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right)^2}{4\,(d + 2\, c\, s - c\, \nu)}\right)\right)\right) (d + 2\, c\, s - c\, \nu)^{-2n-2} -$$
$$e^{i\left(\frac{b^2}{-4 d-8 c s+4 c \nu}+2 e\right)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right)\right)^{h+k} \right.$$
$$\left(-\frac{i \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right)^2}{d + 2\, c\, s - c\, \nu} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2\, i\, (d + 2\, c\, s - c\, \nu) \right.$$
$$\sqrt{-\frac{i \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right)^2}{d + 2\, c\, s - c\, \nu}}\; \Gamma\left(\frac{1}{2}(h + k + 2),\, -\frac{i \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right)^2}{4\,(d + 2\, c\, s - c\, \nu)}\right) -$$
$$\left.\left.\left. b \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1),\, -\frac{i \left(b + 2\,(d + 2\, c\, s - c\, \nu) \sqrt{z}\right)^2}{4\,(d + 2\, c\, s - c\, \nu)}\right)\right)\right)\right)$$
$$(d + 2\, c\, s - c\, \nu)^{-2n-2} + e^{-\frac{i b^2}{4(d-2 c s+c \nu)}}\, (d - 2\, c\, s + c\, \nu)^{-2n-2} \left(e^{\frac{i b^2}{2(d-2 c s+c \nu)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k \right.$$

$$(-i\, b)^{-h-k+2n} \left(-i \left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)\right)^{h+k} \left(\frac{i \left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)^2}{d - 2\,c\,s + c\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-b\left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\ \frac{i \left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)^2}{4\,(d - 2\,c\,s + c\,v)}\right) - \right.$$

$$2\,i\,(d - 2\,c\,s + c\,v)\sqrt{\frac{i \left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)^2}{d - 2\,c\,s + c\,v}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\ \frac{i \left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)^2}{4\,(d - 2\,c\,s + c\,v)}\right)\right)\right) -$$

$$e^{2\,i\,e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i \left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(-\frac{i \left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)^2}{d - 2\,c\,s + c\,v}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(2\,i\,(d - 2\,c\,s + c\,v)\right.$$

$$\sqrt{-\frac{i \left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)^2}{d - 2\,c\,s + c\,v}}\ \Gamma\left(\frac{1}{2}\,(h+k+2),\ -\frac{i \left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)^2}{4\,(d - 2\,c\,s + c\,v)}\right) -$$

$$\left.\left.\left.\left.\left. b\left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\ -\frac{i \left(b + 2\,(d - 2\,c\,s + c\,v)\,\sqrt{z}\,\right)^2}{4\,(d - 2\,c\,s + c\,v)}\right)\right)\right)\right)\right)\right)$$

$$d^{2n+2} - e^{\frac{i\,b^2}{2\,d}} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, b)^{-h-k+2n} \left(-i \left(b + 2\,d\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(\frac{i \left(b + 2\,d\,\sqrt{z}\,\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(b\left(b + 2\,d\,\sqrt{z}\,\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\ \frac{i \left(b + 2\,d\,\sqrt{z}\,\right)^2}{4\,d}\right) + \right.$$

$$2\sqrt{\frac{i\left(b+2d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)+$$

$$e^{2ie}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2n}\left(i\left(b+2d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(b\left(b+2d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin\left(b\,z^r\right)\cos^v(f\,z+g)$

01.07.21.2437.01

$$\int z^n \sin\left(b\,z^2\right)\cos^\nu(f\,z+g)\,dz ==$$

$$2^{-\nu-2}\left(i\,z^{n+1}\binom{\nu}{\frac{\nu}{2}}\left(\left(i\,b\,z^2\right)^{\frac{n+1}{2}}\Gamma\left(\frac{n+1}{2},-i\,b\,z^2\right)-\left(-i\,b\,z^2\right)^{\frac{n+1}{2}}\Gamma\left(\frac{n+1}{2},i\,b\,z^2\right)\right)(1-\nu\bmod 2)\left(b^2\,z^4\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$i\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i(2\,g\,s-g\,\nu)}\binom{\nu}{s}\left(e^{i\left(\frac{f^2(\nu-2\,s)^2}{4\,b}-2\,g(\nu-2\,s)+\pi\right)}\left(\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,f\,s-f\,\nu))^{n-q}\,(i\,(2\,f\,s-f\,\nu-2\,b\,z))^{q+1}\right.\right.$$

$$\left.\left(\frac{i\,(f\,(\nu-2\,s)+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(f\,(\nu-2\,s)+2\,b\,z)^2}{4\,b}\right)\right)(-i\,b)^{-n-1}+$$

$$e^{i\left(\frac{(f\,\nu-2\,f\,s)^2}{4\,b}+\pi\right)}\left(\sum_{q=0}^{n}2^{q-n}\,(-i\,(f\,\nu-2\,f\,s))^{n-q}\,(i\,(f\,(\nu-2\,s)-2\,b\,z))^{q+1}\left(\frac{i\,(f\,(\nu-2\,s)-2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\right.$$

$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(f\,(\nu-2\,s)-2\,b\,z)^2}{4\,b}\right)\right)(-i\,b)^{-n-1}+(i\,b)^{-n-1}\,e^{-\frac{i\,f^2(\nu-2\,s)^2}{4\,b}}\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,f\,s-f\,\nu))^{n-q}$$

$$(-i\,(2\,f\,s-f\,\nu-2\,b\,z))^{q+1}\left(-\frac{i\,(f\,(\nu-2\,s)+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(f\,(\nu-2\,s)+2\,b\,z)^2}{4\,b}\right)+$$

$$(i\,b)^{-n-1}\,e^{-\frac{i\,(f\,\nu-2\,f\,s)^2}{4\,b}-2\,g\,i\,(\nu-2\,s)}\sum_{q=0}^{n}2^{q-n}\,(i\,(f\,\nu-2\,f\,s))^{n-q}\,(-i\,(f\,(\nu-2\,s)-2\,b\,z))^{q+1}$$

$$\left.\left.\left(-\frac{i\,(f\,(\nu-2\,s)-2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(f\,(\nu-2\,s)-2\,b\,z)^2}{4\,b}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge\nu\in\mathbb{N}^+$$

01.07.21.2438.01

$$\int z^n \sin\left(b\sqrt{z}\right)\cos^\nu(f\,z+g)\,dz ==$$

$$2^{-\nu-2}\left(i\,4^{-n}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i(2\,g\,s-g\,\nu)}\binom{\nu}{s}\left(e^{-\frac{i\,b^2}{4\,f(\nu-2\,s)}}\left(f^2\,(\nu-2\,s)^2\right)^{-2\,n-1}\left((-i\,f\,(\nu-2\,s))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\right.\right.\right.$$

$$\left(i\left(b+2\,f\,(\nu-2\,s)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2\,f\,(\nu-2\,s)\sqrt{z}\right)^2}{f\,(\nu-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,f\,(v-2\,s)\,\sqrt{-\frac{i\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-\right.$$

$$\left.\left. b\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)-$$

$$e^{\frac{1}{2}\,i\left(\frac{b^2}{f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}\,(i\,f\,(v-2\,s))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-\right.$$

$$\left.\left. 2\,i\,f\,(v-2\,s)\,\sqrt{\frac{i\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)-$$

$$\frac{1}{(2\,f\,s-f\,v)^2}\left(e^{\frac{i\,b^2}{8\,f\,s-4\,f\,v}}\,(-i\,(2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\right.$$

$$\left(-i\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)-2\,i\,(2\,f\,s-f\,v)\right.$$

$$\left.\left.\sqrt{\frac{i\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)\right)\right)+$$

$$\frac{1}{(2\,f\,s-f\,v)^2}\left(e^{i\left(g\,(4\,s-2\,v)-\frac{b^2}{8\,f\,s-4\,f\,v}\right)}\,(i\,(2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\right.$$

$$\left(i\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,(2\,f\,s-f\,v)\sqrt{-\frac{i\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)-\right.$$

$$\left.\left.b\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)\right)\right)-$$

$$\left.4\,i\,(-1)^n\,b^{-2\,(n+1)}\binom{v}{\frac{v}{2}}\left(\Gamma\!\left(2\,(n+1),\,-i\,b\sqrt{z}\right)-\Gamma\!\left(2\,(n+1),\,i\,b\sqrt{z}\right)\right)(1-v \bmod 2)\right)\,/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin\left(b\,z^r+e\right)\cos^v(f\,z+g)$

01.07.21.2439.01

$$\int z^n \sin\left(b z^2+e\right) \cos^\nu(f z+g)\,dz = 2^{-\nu-2}\left(e^{-i e}\, i\, z^{n+1}\binom{\nu}{\frac{\nu}{2}}\left(e^{2 i e}\left(i b z^2\right)^{-\frac{n+1}{2}}\Gamma\left(\frac{n+1}{2}, -i b z^2\right)-\left(-i b z^2\right)^{-\frac{n+1}{2}}\Gamma\left(\frac{n+1}{2}, i b z^2\right)\right)(1-\nu \bmod 2)\left(b^2 z^4\right)^{\frac{1}{2}(-n-1)}+\right.$$
$$i\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i(-e+2 g s-g \nu)}\binom{\nu}{s}\left(e^{i\left(\frac{f^2(\nu-2 s)^2}{4 b}-2 g(\nu-2 s)-2 e+\pi\right)}\left(\sum_{q=0}^{n} 2^{q-n}(-i(2 f s-f \nu))^{n-q}(i(2 f s-f \nu-2 b z))^{q+1}\right.\right.$$
$$\left.\left(\frac{i(f(\nu-2 s)+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(f(\nu-2 s)+2 b z)^2}{4 b}\right)\right)(-i b)^{-n-1}+$$
$$e^{i\left(\frac{(f \nu-2 f s)^2}{4 b}-2 e+\pi\right)}\left(\sum_{q=0}^{n} 2^{q-n}(-i(f \nu-2 f s))^{n-q}(i(f(\nu-2 s)-2 b z))^{q+1}\left(\frac{i(f(\nu-2 s)-2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\right.$$
$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(f(\nu-2 s)-2 b z)^2}{4 b}\right)\right)(-i b)^{-n-1}+(i b)^{-n-1} e^{-\frac{i f^2(\nu-2 s)^2}{4 b}}\sum_{q=0}^{n} 2^{q-n}(i(2 f s-f \nu))^{n-q}$$
$$(-i(2 f s-f \nu-2 b z))^{q+1}\left(-\frac{i(f(\nu-2 s)+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(f(\nu-2 s)+2 b z)^2}{4 b}\right)+$$
$$(i b)^{-n-1} e^{-\frac{i(f \nu-2 f s)^2}{4 b}-2 g i(\nu-2 s)}\sum_{q=0}^{n} 2^{q-n}(i(f \nu-2 f s))^{n-q}(-i(f(\nu-2 s)-2 b z))^{q+1}$$
$$\left.\left.\left.\left(-\frac{i(f(\nu-2 s)-2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(f(\nu-2 s)-2 b z)^2}{4 b}\right)\right)\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2440.01

$$\int z^n \sin\left(\sqrt{z}\, b+e\right) \cos^\nu(f z+g)\,dz = 2^{-\nu-2}\left(i\, 4^{-n}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i(e+2 g s-g \nu)}\binom{\nu}{s}\left(e^{-\frac{i b^2}{4 f(\nu-2 s)}}\left(f^2(\nu-2 s)^2\right)^{-2 n-1}\left(e^{2 i e}(-i f(\nu-2 s))^{2 n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (i b)^{-h-k+2 n}\right.\right.\right.$$
$$\left(i\left(b+2 f(\nu-2 s)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2 f(\nu-2 s)\sqrt{z}\right)^2}{f(\nu-2 s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,f\,(v-2\,s)\sqrt{-\frac{i\left(b+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-\right.$$

$$\left.\left.b\left(b+2\,f\,(v-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)-$$

$$e^{\frac{1}{2}\,i\left(\frac{b^2}{f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}\,(i\,f\,(v-2\,s))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,f\,(v-2\,s)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\left(b+2\,f\,(v-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-\right.$$

$$\left.\left.2\,i\,f\,(v-2\,s)\sqrt{\frac{i\left(b+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)-$$

$$\frac{1}{(2\,f\,s-f\,v)^2}\left(e^{\frac{i\,b^2}{8\,f\,s-4\,f\,v}}\,(-i\,(2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\right.$$

$$\left(-i\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)-2\,i\,(2\,f\,s-f\,v)\right.$$

$$\left.\left.\sqrt{\frac{i\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)\right)\right)+$$

$$\frac{1}{(2\,f\,s-f\,v)^2}\left(e^{i\left(-\frac{b^2}{8\,f\,s-4\,f\,v}+2\,e+g\,(4\,s-2\,v)\right)}\,(i\,(2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\right.$$

$$\left(i\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,(2\,f\,s-f\,v)\sqrt{-\frac{i\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)-\right.$$

$$\left.\left.b\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)\right)\right)-$$

$$i\,4\,(-1)^n\,b^{-2\,(n+1)}\,e^{-i\,e}\binom{v}{\frac{v}{2}}\left(e^{2\,i\,e}\,\Gamma\!\left(2\,(n+1),\,-i\,b\,\sqrt{z}\right)-\Gamma\!\left(2\,(n+1),\,i\,b\,\sqrt{z}\right)\right)$$

$$\left.(1-v\bmod 2)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\,\sin\!\left(b\,z^r+d\,z\right)\cos^v(f\,z+g)$

01.07.21.2441.01

$$\int z^n \sin\left(b z^2 + d z\right) \cos^\nu(f z + g) \, dz = 2^{-\nu-2} \left(i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i(2 g s - g \nu)} \binom{\nu}{s} \left(e^{i\left(\frac{(d+f(\nu-2s))^2}{4b} - 2g(\nu-2s)+\pi\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i(-d+2fs-f\nu))^{n-q} (i(-d+2fs-f\nu-2bz))^{q+1} \left(\frac{i(d+f(\nu-2s)+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+f(\nu-2s)+2bz)^2}{4b}\right) \right) (-i b)^{-n-1} + e^{i\left(\frac{(-d-2fs+f\nu)^2}{4b}+\pi\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i(-d-2fs+f\nu))^{n-q} (i(-d+f(\nu-2s)-2bz))^{q+1} \left(\frac{i(-d+f(\nu-2s)-2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-d+f(\nu-2s)-2bz)^2}{4b}\right) \right) (-i b)^{-n-1} + (i b)^{-n-1} e^{-\frac{i(d+f(\nu-2s))^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (i(-d+2fs-f\nu))^{n-q} (-i(-d+2fs-f\nu-2bz))^{q+1} \left(-\frac{i(d+f(\nu-2s)+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+f(\nu-2s)+2bz)^2}{4b}\right) + (i b)^{-n-1} e^{-\frac{i(-d-2fs+f\nu)^2}{4b} - 2 g i(\nu-2s)} \sum_{q=0}^{n} 2^{q-n} (i(-d-2fs+f\nu))^{n-q} (-i(-d+f(\nu-2s)-2bz))^{q+1} \left(-\frac{i(-d+f(\nu-2s)-2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-d+f(\nu-2s)-2bz)^2}{4b}\right) \right) - i(-i b)^{-n-1} e^{-\frac{i d^2}{4b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i(d+2bz))^{q+1} \left(-\frac{i(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+2bz)^2}{4b}\right) - e^{\frac{i d^2}{2b}} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i(d+2bz))^{q+1} \left(\frac{i(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+2bz)^2}{4b}\right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2442.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \cos^\nu(f z + g) \, dz = 2^{-\nu-2} \left(i\, 4^{-n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i(2 g s - g \nu)} \binom{\nu}{s} \left(\frac{1}{(d+2fs-f\nu)^2} \left(e^{i\left(g(4s-2\nu) - \frac{b^2}{4d+8fs-4f\nu}\right)} (i(d+2fs-f\nu))^{-2n} \right.\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\left(i\left(b+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)^2}{d+2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+2\,f\,s-f\,v)\right.$$

$$\sqrt{-\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)^2}{d+2\,f\,s-f\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)-$$

$$\left.\left.b\left(b+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)\right)\right)+$$

$$e^{-\frac{i\,b^2}{4\,(d+f\,(v-2\,s))}}\left((d+f\,(v-2\,s))^2\right)^{-2\,n-1}\left((-i\,(d+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\right.$$

$$\left(i\left(b+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)\right)^{h+k}\left(-\frac{i\left(b+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+f\,(v-2\,s))\,\sqrt{-\frac{i\left(b+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d+f\,(v-2\,s)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,s))}\right)-b\left(b+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)$$

$$\left.\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,s))}\right)\right)-e^{\frac{1}{2}\,i\left(\frac{b^2}{d+f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}$$

$$(i\,(d+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-b\left(b+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)-2\,i\,(d+f(v-2s))$$

$$\sqrt{\frac{i\left(b+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)\Bigg)\Bigg)\Bigg)-$$

$$\frac{1}{(d+2fs-fv)^2}\Bigg(e^{\frac{i\,b^2}{4d+8fs-4fv}}\,(-i\,(d+2fs-fv))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2n}$$

$$\left(-i\left(b+2(d+2fs-fv)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(-b\left(b+2(d+2fs-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)-$$

$$2\,i\,(d+2fs-fv)\sqrt{\frac{i\left(b+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)\Bigg)\Bigg)\Bigg)\Bigg)-$$

$$i\left(-\frac{1}{4}\right)^n d^{-2(n+1)}\,e^{-\frac{i\,b^2}{4d}}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2n}\left(i\left(b+2d\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)-$$

$$e^{\frac{i b^2}{2 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2n} \left(-i \left(b + 2 d \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b + 2 d \sqrt{z}\right)^2}{4 d}\right) + 2 \sqrt{\frac{i \left(b + 2 d \sqrt{z}\right)^2}{d}} \, d \, i \, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b + 2 d \sqrt{z}\right)^2}{4 d}\right)\right) /; n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving $z^n \sin\left(b z^r + d z + e\right) \cos^v(f z + g)$

01.07.21.2443.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \cos^{\nu}(f z + g)\, dz = 2^{-\nu-2} \left(i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i(-e+2 g s - g \nu)} \binom{\nu}{s} \left(e^{i\left(\frac{(d+f(\nu-2s))^2}{4b} - 2e - 2g(\nu-2s) + \pi\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i(-d+2fs-f\nu))^{n-q} (i(-d+2fs-f\nu-2bz))^{q+1} \left(\frac{i(d+f(\nu-2s)+2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+f(\nu-2s)+2bz)^2}{4b} \right) \right) (-i b)^{-n-1} + e^{i\left(\frac{(-d-2fs+f\nu)^2}{4b} - 2e + \pi\right)} \left(\sum_{q=0}^{n} 2^{q-n} (-i(-d-2fs+f\nu))^{n-q} (i(-d+f(\nu-2s)-2bz))^{q+1} \left(\frac{i(-d+f(\nu-2s)-2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-d+f(\nu-2s)-2bz)^2}{4b} \right) \right) (-i b)^{-n-1} + (i b)^{-n-1} e^{-\frac{i(d+f(\nu-2s))^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (i(-d+2fs-f\nu))^{n-q} (-i(-d+2fs-f\nu-2bz))^{q+1} \left(-\frac{i(d+f(\nu-2s)+2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+f(\nu-2s)+2bz)^2}{4b} \right) + (i b)^{-n-1} e^{-\frac{i(-d-2fs+f\nu)^2}{4b} - 2 g i (\nu-2s)} \sum_{q=0}^{n} 2^{q-n} (i(-d-2fs+f\nu))^{n-q} (-i(-d+f(\nu-2s)-2bz))^{q+1} \left(-\frac{i(-d+f(\nu-2s)-2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-d+f(\nu-2s)-2bz)^2}{4b} \right) \right) - i(-i b)^{-n-1} e^{-\frac{1}{4} i \left(\frac{d^2}{b} + 4e\right)} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(e^{2ie} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i(d+2bz))^{q+1} \left(-\frac{i(d+2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+2bz)^2}{4b} \right) - e^{\frac{i d^2}{2b}} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i(d+2bz))^{q+1} \left(\frac{i(d+2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+2bz)^2}{4b} \right) \right) \right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2444.01

$$\int z^n \sin\left(\sqrt{z}\, b + d\,z + e\right) \cos^{\nu}(f\,z + g)\, dz = 2^{-\nu-2} \left(i\, 4^{-n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i\,(e+2\,g\,s-g\,\nu)} \binom{\nu}{s} \left(\frac{1}{(d+2\,f\,s-f\,\nu)^2} \left(e^{i\left(-\frac{b^2}{4\,d+8\,f\,s-4\,f\,\nu}+2\,e+g\,(4\,s-2\,\nu)\right)} (i\,(d+2\,f\,s-f\,\nu))^{-2\,n} \right.\right.\right.$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,b)^{-h-k+2\,n} \left(i \left(b + 2\,(d+2\,f\,s-f\,\nu) \sqrt{z} \right) \right)^{h+k}$$

$$\left(-\frac{i \left(b + 2\,(d+2\,f\,s-f\,\nu) \sqrt{z} \right)^2}{d+2\,f\,s-f\,\nu} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2\,i\,(d+2\,f\,s-f\,\nu) \right.$$

$$\sqrt{-\frac{i \left(b + 2\,(d+2\,f\,s-f\,\nu) \sqrt{z} \right)^2}{d+2\,f\,s-f\,\nu}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b + 2\,(d+2\,f\,s-f\,\nu) \sqrt{z} \right)^2}{4\,d+8\,f\,s-4\,f\,\nu} \right) -$$

$$\left.\left. b \left(b + 2\,(d+2\,f\,s-f\,\nu) \sqrt{z} \right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b + 2\,(d+2\,f\,s-f\,\nu) \sqrt{z} \right)^2}{4\,d+8\,f\,s-4\,f\,\nu} \right) \right) \right) +$$

$$e^{-\frac{i\,b^2}{4\,(d+f\,(\nu-2\,s))}} \left((d+f\,(\nu-2\,s))^2 \right)^{-2\,n-1} \left(e^{2\,i\,e} \left(-i\,(d+f\,(\nu-2\,s)) \right)^{2\,n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,b)^{-h-k+2\,n} \right.$$

$$\left(i \left(b + 2\,(d+f\,(\nu-2\,s)) \sqrt{z} \right) \right)^{h+k} \left(-\frac{i \left(b + 2\,(d+f\,(\nu-2\,s)) \sqrt{z} \right)^2}{d+f\,(\nu-2\,s)} \right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(2\,i\,(d+f\,(\nu-2\,s)) \sqrt{-\frac{i \left(b + 2\,(d+f\,(\nu-2\,s)) \sqrt{z} \right)^2}{d+f\,(\nu-2\,s)}} \right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i \left(b + 2\,(d+f\,(\nu-2\,s)) \sqrt{z} \right)^2}{4\,(d+f\,(\nu-2\,s))} \right) - b \left(b + 2\,(d+f\,(\nu-2\,s)) \sqrt{z} \right)$$

$$\left. \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i \left(b + 2\,(d+f\,(\nu-2\,s)) \sqrt{z} \right)^2}{4\,(d+f\,(\nu-2\,s))} \right) \right) - e^{\frac{1}{2}\,i\left(\frac{b^2}{d+f\,(\nu-2\,s)} + 8\,g\,s - 4\,g\,\nu \right)}$$

$$(i (d + f (v - 2 s)))^{2 n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2 n} \left(-i \left(b + 2 (d + f (v - 2 s)) \sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i \left(b + 2 (d + f (v - 2 s)) \sqrt{z}\right)^2}{d + f (v - 2 s)}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \left(-b \left(b + 2 (d + f (v - 2 s)) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2} (h + k + 1), \frac{i \left(b + 2 (d + f (v - 2 s)) \sqrt{z}\right)^2}{4 (d + f (v - 2 s))}\right) - 2 i (d + f (v - 2 s))$$

$$\left.\left.\left.\sqrt{\frac{i \left(b + 2 (d + f (v - 2 s)) \sqrt{z}\right)^2}{d + f (v - 2 s)}} \; \Gamma\left(\frac{1}{2} (h + k + 2), \frac{i \left(b + 2 (d + f (v - 2 s)) \sqrt{z}\right)^2}{4 (d + f (v - 2 s))}\right)\right)\right)\right) -$$

$$\frac{1}{(d + 2 f s - f v)^2} \left(e^{\frac{i b^2}{4 d + 8 f s - 4 f v}} (-i (d + 2 f s - f v))^{-2 n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2 n}\right.$$

$$\left(-i \left(b + 2 (d + 2 f s - f v) \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b + 2 (d + 2 f s - f v) \sqrt{z}\right)^2}{d + 2 f s - f v}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left(-b \left(b + 2 (d + 2 f s - f v) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h + k + 1), \frac{i \left(b + 2 (d + 2 f s - f v) \sqrt{z}\right)^2}{4 d + 8 f s - 4 f v}\right) -\right.$$

$$2 i (d + 2 f s - f v) \sqrt{\frac{i \left(b + 2 (d + 2 f s - f v) \sqrt{z}\right)^2}{d + 2 f s - f v}}$$

$$\left.\left.\left.\left.\Gamma\left(\frac{1}{2} (h + k + 2), \frac{i \left(b + 2 (d + 2 f s - f v) \sqrt{z}\right)^2}{4 d + 8 f s - 4 f v}\right)\right)\right)\right)\right) -$$

$$i \left(-\frac{1}{4}\right)^n d^{-2 (n+1)} e^{-\frac{i \left(b^2 + 4 d e\right)}{4 d}} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(e^{2 i e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2 n} \left(i \left(b + 2 d \sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)-$$

$$e^{\frac{i b^2}{2d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2n}\left(-i\left(b+2d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.\left.\left.2\sqrt{\frac{i\left(b+2d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(b\,z)\cos^v\left(c\,z^r\right)$

01.07.21.2445.01

$$\int z^n \sin(b\,z)\cos^\nu(c\,z^2)\,dz = i\,2^{-\nu-2}\left(2\,(i\,b)^{-n-1}\binom{\nu}{\frac{\nu}{2}}\left((-1)^n\,\Gamma(n+1,-i\,b\,z)+\Gamma(n+1,i\,b\,z)\right)(\nu \bmod 2-1)+i\,c^{-1-2n}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}-e^{\frac{i\,b^2}{4\,c\,\nu-8\,c\,s}}\,(2\,s-\nu)^{-2n-1}\binom{\nu}{s}\left(-e^{\frac{i\,b^2}{4\,c\,s-2\,c\,\nu}}\left(\sum_{q=0}^{n}2^{q-n}\,(-i\,b)^{n-q}\,(i\,(b+2\,c\,(\nu-2\,s)\,z))^{q+1}\left(\frac{i\,(b+2\,c\,(\nu-2\,s)\,z)^2}{c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\frac{i\,(b-4\,c\,s\,z+2\,c\,\nu\,z)^2}{8\,c\,s-4\,c\,\nu}\right)\right)(i\,c\,(2\,s-\nu))^n+e^{\frac{i\,b^2}{4\,c\,s-2\,c\,\nu}}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,b)^{n-q}\,(-i\,(b+4\,c\,s\,z-2\,c\,\nu\,z))^{q+1}\left(\frac{i\,(b+4\,c\,s\,z-2\,c\,\nu\,z)^2}{c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\frac{i\,(b+4\,c\,s\,z-2\,c\,\nu\,z)^2}{8\,c\,s-4\,c\,\nu}\right)\right)(i\,c\,(2\,s-\nu))^n+(i\,c\,(\nu-2\,s))^n\sum_{q=0}^{n}2^{q-n}\,(-i\,b)^{n-q}\,(i\,(b+4\,c\,s\,z-2\,c\,\nu\,z))^{q+1}\left(-\frac{i\,(b+4\,c\,s\,z-2\,c\,\nu\,z)^2}{c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},-\frac{i\,(b+4\,c\,s\,z-2\,c\,\nu\,z)^2}{c\,(8\,s-4\,\nu)}\right)-(i\,c\,(\nu-2\,s))^n\sum_{q=0}^{n}2^{q-n}\,(i\,b)^{n-q}\,(-i\,(b+2\,c\,(\nu-2\,s)\,z))^{q+1}\left(-\frac{i\,(b+2\,c\,(\nu-2\,s)\,z)^2}{c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\frac{(b-4\,c\,s\,z+2\,c\,\nu\,z)^2}{8\,i\,c\,s-4\,i\,c\,\nu}\right)\right)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.07.21.2446.01

$$\int z^n \sin(b\,z)\cos^\nu\!\left(c\,\sqrt{z}\right)dz = 2^{-2n-\nu-2}\,b^{-2n-2}\left(i\,(-1)^n\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-\frac{i\,c^2\,(\nu-2\,s)^2}{4\,b}}\binom{\nu}{s}\left(e^{\frac{i\,c^2\,(\nu-2\,s)^2}{2\,b}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(2\,s-\nu))^{-h-k+2n}\left(i\left(-2\sqrt{z}\,b+2\,c\,s-c\,\nu\right)\right)^{h+k}\left(\frac{i\left(2\sqrt{z}\,b-2\,c\,s+c\,\nu\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\,(2\,s-\nu)\left(-2\sqrt{z}\,b+2\,c\,s-c\,\nu\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\frac{i\left(2\sqrt{z}\,b-2\,c\,s+c\,\nu\right)^2}{4\,b}\right)+2\sqrt{\frac{i\left(2\sqrt{z}\,b-2\,c\,s+c\,\nu\right)^2}{b}}\,b\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\frac{i\left(2\sqrt{z}\,b-2\,c\,s+c\,\nu\right)^2}{4\,b}\right)\right)+e^{\frac{i\,c^2\,(\nu-2\,s)^2}{2\,b}}\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\left(-2\sqrt{z}\,b-2\,c\,s+c\,v\right)\right)^{h+k}\left(\frac{i\left(2\sqrt{z}\,b+2\,c\,s-c\,v\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(c\,(2\,s-v)\left(2\sqrt{z}\,b+2\,c\,s-c\,v\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\sqrt{z}\,b+2\,c\,s-c\,v\right)^2}{4\,b}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(2\sqrt{z}\,b+2\,c\,s-c\,v\right)^2}{b}}\;b\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\sqrt{z}\,b+2\,c\,s-c\,v\right)^2}{4\,b}\right)\right)-$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\left(-2\sqrt{z}\,b+2\,c\,s-c\,v\right)\right)^{h+k}\left(-\frac{i\left(2\sqrt{z}\,b-2\,c\,s+c\,v\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(c\,(2\,s-v)\left(-2\sqrt{z}\,b+2\,c\,s-c\,v\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\sqrt{z}\,b-2\,c\,s+c\,v\right)^2}{4\,b}\right)-2\right.$$

$$\left.i\,b\sqrt{-\frac{i\left(2\sqrt{z}\,b-2\,c\,s+c\,v\right)^2}{b}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\sqrt{z}\,b-2\,c\,s+c\,v\right)^2}{4\,b}\right)\right)-$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(2\,s-v))^{-h-k+2\,n}\left(i\left(2\sqrt{z}\,b+2\,c\,s-c\,v\right)\right)^{h+k}\left(-\frac{i\left(2\sqrt{z}\,b+2\,c\,s-c\,v\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(c\,(2\,s-v)\left(2\sqrt{z}\,b+2\,c\,s-c\,v\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\sqrt{z}\,b+2\,c\,s-c\,v\right)^2}{4\,b}\right)-2\right.$$

$$\left.\left.i\,b\sqrt{-\frac{i\left(2\sqrt{z}\,b+2\,c\,s-c\,v\right)^2}{b}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\sqrt{z}\,b+2\,c\,s-c\,v\right)^2}{4\,b}\right)\right)\right)-$$

$$\left.2^{2\,n+1}\,b^{n+1}\binom{v}{\frac{v}{2}}\left(\Gamma(n+1,\,i\,b\,z)\,(-i)^n+i^n\,\Gamma(n+1,\,-i\,b\,z)\right)(1-v\bmod 2)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(d\, z + e) \cos^\nu(c\, z^r)$

01.07.21.2447.01

$$\int z^n \sin(e + d\, z) \cos^\nu(c\, z^2)\, dz = 2^{-\nu-2} \Bigg(2\, d^{-2n-1}\, e^{-i e} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(n+1,\, i\, d\, z)\, (-i\, d)^n + (i\, d)^n\, e^{2 i e}\, \Gamma(n+1,\, -i\, d\, z)\right) (\nu \bmod 2 - 1) - \frac{1}{c} \Bigg((-1)^n\, (i\, c)^{-2n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i\left(\frac{d^2}{8 c s - 4 c \nu} + e\right)} (2 s - \nu)^{-2n-1} \binom{\nu}{s} \Bigg(e^{2 i \left(\frac{d^2}{8 c s - 4 c \nu} + e\right)} \Bigg(\sum_{q=0}^{n} 2^{q-n} (-i\, d)^{n-q} (i\, (d + 2\, c\, (\nu - 2 s)\, z))^{q+1} \left(\frac{i\, (d + 2\, c\, (\nu - 2 s)\, z)^2}{c\, (2 s - \nu)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2},\, \frac{i\, (d - 4\, c\, s\, z + 2\, c\, \nu\, z)^2}{8\, c\, s - 4\, c\, \nu} \right) \Bigg) (i\, c\, (2 s - \nu))^n - e^{\frac{i d^2}{4 c s - 2 c \nu}} \Bigg(\sum_{q=0}^{n} 2^{q-n} (i\, d)^{n-q} (-i\, (d + 4\, c\, s\, z - 2\, c\, \nu\, z))^{q+1} \left(\frac{i\, (d + 4\, c\, s\, z - 2\, c\, \nu\, z)^2}{c\, (2 s - \nu)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2},\, \frac{i\, (d + 4\, c\, s\, z - 2\, c\, \nu\, z)^2}{8\, c\, s - 4\, c\, \nu} \right) \Bigg) (i\, c\, (2 s - \nu))^n - e^{2 i e}\, (i\, c\, (\nu - 2 s))^n \sum_{q=0}^{n} 2^{q-n} (-i\, d)^{n-q} (i\, (d + 4\, c\, s\, z - 2\, c\, \nu\, z))^{q+1} \left(- \frac{i\, (d + 4\, c\, s\, z - 2\, c\, \nu\, z)^2}{c\, (2 s - \nu)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2},\, - \frac{i\, (d + 4\, c\, s\, z - 2\, c\, \nu\, z)^2}{c\, (8 s - 4 \nu)} \right) + (i\, c\, (\nu - 2 s))^n \sum_{q=0}^{n} 2^{q-n} (i\, d)^{n-q} (-i\, (d + 2\, c\, (\nu - 2 s)\, z))^{q+1} \left(- \frac{i\, (d + 2\, c\, (\nu - 2 s)\, z)^2}{c\, (2 s - \nu)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2},\, \frac{(d - 4\, c\, s\, z + 2\, c\, \nu\, z)^2}{8\, i\, c\, s - 4\, i\, c\, \nu} \right) \Bigg) \Bigg) \Bigg) \;/;\; n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.2448.01

$$\int z^n \sin(d\, z + e) \cos^\nu\!\left(c \sqrt{z}\right) dz = 2^{-2n-\nu-2}\, d^{-2n-2}\, e^{-i e} \Bigg(i\, (-1)^n\, e^{i e} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-\frac{1}{4} i \left(\frac{c^2 (\nu - 2 s)^2}{d} + 4 e \right)} \binom{\nu}{s} \Bigg(e^{\frac{i c^2 (\nu - 2 s)^2}{2 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, c\, (2 s - \nu))^{-h-k+2n} \left(i \left(-2 \sqrt{z}\, d + 2\, c\, s - c\, \nu \right) \right)^{h+k} \left(\frac{i \left(2 \sqrt{z}\, d - 2\, c\, s + c\, \nu \right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \Bigg(c\, (2 s - \nu) \left(-2 \sqrt{z}\, d + 2\, c\, s - c\, \nu \right) \Gamma\!\left(\frac{1}{2} (h + k + 1),\, \frac{i \left(2 \sqrt{z}\, d - 2\, c\, s + c\, \nu \right)^2}{4\, d} \right) +$$

$$2\sqrt{\frac{i\left(2\sqrt{z}\ d-2\,c\,s+c\,v\right)^2}{d}}\ d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(2\sqrt{z}\ d-2\,c\,s+c\,v\right)^2}{4\,d}\right)\Bigg)+e^{\frac{i\,c^2\,(v-2\,s)^2}{2\,d}}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\left(-2\sqrt{z}\ d-2\,c\,s+c\,v\right)\right)^{h+k}\left(\frac{i\left(2\sqrt{z}\ d+2\,c\,s-c\,v\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(c\,(2\,s-v)\left(2\sqrt{z}\ d+2\,c\,s-c\,v\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(2\sqrt{z}\ d+2\,c\,s-c\,v\right)^2}{4\,d}\right)+$$

$$2\sqrt{\frac{i\left(2\sqrt{z}\ d+2\,c\,s-c\,v\right)^2}{d}}\ d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(2\sqrt{z}\ d+2\,c\,s-c\,v\right)^2}{4\,d}\right)\Bigg)-e^{2\,i\,e}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\left(-2\sqrt{z}\ d+2\,c\,s-c\,v\right)\right)^{h+k}\left(-\frac{i\left(2\sqrt{z}\ d-2\,c\,s+c\,v\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(c\,(2\,s-v)\left(-2\sqrt{z}\ d+2\,c\,s-c\,v\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(2\sqrt{z}\ d-2\,c\,s+c\,v\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(2\sqrt{z}\ d-2\,c\,s+c\,v\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(2\sqrt{z}\ d-2\,c\,s+c\,v\right)^2}{4\,d}\right)\Bigg)-$$

$$e^{2\,i\,e}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(2\,s-v))^{-h-k+2\,n}\left(i\left(2\sqrt{z}\ d+2\,c\,s-c\,v\right)\right)^{h+k}\left(-\frac{i\left(2\sqrt{z}\ d+2\,c\,s-c\,v\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(c\,(2\,s-v)\left(2\sqrt{z}\ d+2\,c\,s-c\,v\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(2\sqrt{z}\ d+2\,c\,s-c\,v\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(2\sqrt{z}\ d+2\,c\,s-c\,v\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(2\sqrt{z}\ d+2\,c\,s-c\,v\right)^2}{4\,d}\right)\Bigg)\Bigg)-$$

$$\Big)$$

Involving $z^{\alpha-1}\sin(b\,z^r)\cos^\nu(c\,z^r)$

01.07.21.2449.01

$$\int z^{\alpha-1}\sin(b\,z^r)\cos^\nu(c\,z^r)\,dz = \frac{i\,2^{-\nu-1}\,z^\alpha}{r}\left(\binom{\nu}{\frac{\nu}{2}}\left((-i\,b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,-i\,b\,z^r\right)-(i\,b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,i\,b\,z^r\right)\right)(1-\nu \bmod 2)+\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\Gamma\left(\frac{\alpha}{r},\,-i\,(b-2\,c\,s+c\,\nu)\,z^r\right)(-i\,(b-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}}-(i\,(b-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,i\,(b-2\,c\,s+c\,\nu)\,z^r\right)+(-i\,(b+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,-i\,(b+2\,c\,s-c\,\nu)\,z^r\right)-(i\,(b+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,i\,(b+2\,c\,s-c\,\nu)\,z^r\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin(b\,z^r+e)\cos^\nu(c\,z^r)$

01.07.21.2450.01

$$\int z^{\alpha-1}\sin(b\,z^r+e)\cos^\nu(c\,z^r)\,dz = \frac{i\,2^{-\nu-1}\,z^\alpha}{r}\left(\binom{\nu}{\frac{\nu}{2}}\left(e^{i\,e}\,(-i\,b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,-i\,b\,z^r\right)-e^{-i\,e}\,(i\,b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,i\,b\,z^r\right)\right)(1-\nu \bmod 2)+\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i\,e}\binom{\nu}{s}\left(e^{2\,i\,e}\,\Gamma\left(\frac{\alpha}{r},\,-i\,(b-2\,c\,s+c\,\nu)\,z^r\right)(-i\,(b-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}}-(i\,(b-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,i\,(b-2\,c\,s+c\,\nu)\,z^r\right)+e^{2\,i\,e}\,(-i\,(b+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,-i\,(b+2\,c\,s-c\,\nu)\,z^r\right)-(i\,(b+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,i\,(b+2\,c\,s-c\,\nu)\,z^r\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $z^n\sin(b\,z^r+d\,z)\cos^\nu(c\,z^r)$

01.07.21.2451.01

$$\int z^n \sin\left(b z^2 + d z\right) \cos^\nu\left(c z^2\right) dz = \frac{2^{-\nu-2} (-i b)^{-n}}{b} e^{-\frac{i d^2}{4 b}} \left(b e^{\frac{i d^2}{4 b}} i \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(-e^{\frac{i d^2}{4 (b-2 c s+c \nu)}} \left(\sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 (b - 2 c s + c \nu) z))^{q+1} \left(\frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{b - 2 c s + c \nu}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{4 (b - 2 c s + c \nu)}\right)\right) (-i (b - 2 c s + c \nu))^{-n-1} + e^{-\frac{i d^2}{4 (b-2 c s+c \nu)}} (i (b - 2 c s + c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 (b - 2 c s + c \nu) z))^{q+1} \left(-\frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{b - 2 c s + c \nu}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{4 (b - 2 c s + c \nu)}\right) - e^{\frac{i d^2}{4 b+8 c s-4 c \nu}} (-i (b + 2 c s - c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 (b + 2 c s - c \nu) z))^{q+1} \left(\frac{i (d + 2 (b + 2 c s - c \nu) z)^2}{b + 2 c s - c \nu}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 (b + 2 c s - c \nu) z)^2}{4 (b + 2 c s - c \nu)}\right) + e^{\frac{i d^2}{-4 b-8 c s+4 c \nu}} (i (b + 2 c s - c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d + 2 (b + 2 c s - c \nu) z))^{q+1} \left(-\frac{i (d + 2 (b + 2 c s - c \nu) z)^2}{b + 2 c s - c \nu}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 (b + 2 c s - c \nu) z)^2}{4 (b + 2 c s - c \nu)}\right)\right)\right) (-i b)^n - e^{\frac{i d^2}{2 b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^{q+1} \left(\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4 b}\right) + \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^{q+1} \left(-\frac{i (d + 2 b z)^2}{b}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4 b}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2452.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \cos^\nu\left(c \sqrt{z}\right) dz = -i\, 2^{-2 n-\nu-2} \left(d^2\right)^{-2 n-1} e^{-\frac{i b^2}{4 d}} \left(\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h} 4^k (i b)^{-h-k+2 n} \left(i \left(b + 2 d \sqrt{z}\right)\right)^{h+k}\right.\right.$$

$$\left(-\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.\left.2\,i\,d\sqrt{-\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)(-i\,d)^{2\,n}-$$

$$(i\,d)^{2\,n}\,e^{\frac{i\,b^2}{2\,d}}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}-(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,d\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.\left.2\sqrt{\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$\left(d^2\right)^{2\,n+1}\,e^{\frac{i\,b^2}{4\,d}}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(d^2\right)^{-2\,n-1}\,e^{-\frac{i\left(3\,b^2+c\,(4\,s-2\,v)\,b+3\,c^2\,(v-2\,s)^2\right)}{4\,d}}\binom{v}{s}\left(-e^{\frac{i\,(b+2\,c\,s-c\,v)^2}{2\,d}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-2\,c\,s+c\,v))^{-h-k+2\,n}\right.\right.$$

$$\left(i\left(b-2\,c\,s+c\,v+2\,d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b-2\,c\,s+c\,v+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,d\sqrt{-\frac{i\left(b-2\,c\,s+c\,v+2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b-2\,c\,s+c\,v+2\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.\left.(b-2\,c\,s+c\,v)\left(b-2\,c\,s+c\,v+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b-2\,c\,s+c\,v+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)$$

$$(-i\,d)^{2\,n}+(i\,d)^{2\,n}\,e^{\frac{i\left(b^2+c^2\,(v-2\,s)^2\right)}{d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b-2\,c\,s+c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(b-2cs+cv+2d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b-2cs+cv+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-(b-2cs+cv)\left(b-2cs+cv+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b-2cs+cv+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{\frac{i\left(b-2cs+cv+2d\sqrt{z}\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b-2cs+cv+2d\sqrt{z}\right)^2}{4d}\right)\right)+$$

$$(i\,d)^{2n}\,e^{\frac{i\left(b^2+c(2s-v)b+c^2(v-2s)^2\right)}{d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+2cs-cv))^{-h-k+2n}$$

$$\left(-i\left(b+2cs-cv+2d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-(b+2cs-cv)\left(b+2cs-cv+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{4d}\right)\right)\Bigg)-$$

$$(-i\,d)^{2n}\,e^{\frac{i\left(b^2+c^2(v-2s)^2\right)}{2d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+2cs-cv))^{-h-k+2n}\left(i\left(b+2cs-cv+2d\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2\,i\,d\sqrt{-\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{d}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{4d}\right)-(b+2cs-cv)\left(b+2cs-cv+2d\sqrt{z}\right)$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{4d}\right)\right)\Bigg)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sin(b z^r + d z + e) \cos^v(c z^r)$

01.07.21.2453.01

$$\int z^n \sin(b z^2 + d z + e) \cos^v(c z^2)\, dz = \frac{2^{-v-2} (-i b)^{-n}}{b} e^{-\frac{i(d^2+4 b e)}{4 b}} \Bigg(b\, e^{\frac{i(d^2+8 b e)}{4 b}} i \Bigg(\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \Bigg(-e^{\frac{i d^2}{4(b-2 c s+c v)}-2 i e} \Bigg(\sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d+2 (b-2 c s+c v) z))^{q+1} \left(\frac{i (d+2 (b-2 c s+c v) z)^2}{b-2 c s+c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d+2 (b-2 c s+c v) z)^2}{4 (b-2 c s+c v)}\right)\Bigg) (-i (b-2 c s+c v))^{-n-1} + e^{-\frac{i d^2}{4(b-2 c s+c v)}} (i (b-2 c s+c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d+2 (b-2 c s+c v) z))^{q+1} \left(-\frac{i (d+2 (b-2 c s+c v) z)^2}{b-2 c s+c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d+2 (b-2 c s+c v) z)^2}{4 (b-2 c s+c v)}\right) - e^{-i\left(\frac{d^2}{-4 b-8 c s+4 c v}+2 e\right)} (-i (b+2 c s-c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d+2 (b+2 c s-c v) z))^{q+1} \left(\frac{i (d+2 (b+2 c s-c v) z)^2}{b+2 c s-c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d+2 (b+2 c s-c v) z)^2}{4 (b+2 c s-c v)}\right) + e^{\frac{i d^2}{-4 b-8 c s+4 c v}} (i (b+2 c s-c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (i (d+2 (b+2 c s-c v) z))^{q+1} \left(-\frac{i (d+2 (b+2 c s-c v) z)^2}{b+2 c s-c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d+2 (b+2 c s-c v) z)^2}{4 (b+2 c s-c v)}\right)\Bigg)\Bigg) (-i b)^n - e^{\frac{i d^2}{2 b}} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d+2 b z))^{q+1} \left(\frac{i (d+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d+2 b z)^2}{4 b}\right) + e^{2 i e} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d+2 b z))^{q+1} \left(-\frac{i (d+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d+2 b z)^2}{4 b}\right)\Bigg) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.07.21.2454.01

$$\int z^n \sin\left(\sqrt{z}\, b + d\, z + e\right) \cos^\nu\left(c\, \sqrt{z}\right) dz =$$

$$i\, 2^{-2n-\nu-2} (i\, d)^{-2(n+1)} e^{-\frac{i\left(b^2+4 d e\right)}{4 d}} \left(-e^{\frac{i b^2}{2 d}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h}\, 4^k\, (-i\, b)^{-h-k+2n} \left(-i\left(b + 2 d \sqrt{z}\right)\right)^{h+k} \right.$$

$$\left(\frac{i\left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b + 2 d \sqrt{z}\right)^2}{4 d}\right) + \right.$$

$$\left.\left. 2 \sqrt{\frac{i\left(b + 2 d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b + 2 d \sqrt{z}\right)^2}{4 d}\right)\right) + e^{2 i e} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1)\right.$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h}\, 4^k\, (i\, b)^{-h-k+2n} \left(i\left(b + 2 d \sqrt{z}\right)\right)^{h+k} \left(-\frac{i\left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b + 2 d \sqrt{z}\right)\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b + 2 d \sqrt{z}\right)^2}{4 d}\right) - 2\, i\, d \sqrt{-\frac{i\left(b + 2 d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b + 2 d \sqrt{z}\right)^2}{4 d}\right)\right) -$$

$$e^{\frac{i\left(b^2+4 d e\right)}{4 d}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-\frac{i\left(b^2+2 c (2 s+\nu) b+c^2 (\nu-2 s)^2+4 d e\right)}{4 d}} \binom{\nu}{s} \left(-e^{\frac{i\left(b^2+2 c \nu b+c^2 (\nu-2 s)^2\right)}{2 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, (b - 2 c s + c \nu))^{-h-k+2n}\right.$$

$$\left(-i\left(b - 2 c s + c \nu + 2 d \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b - 2 c s + c \nu + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left(-(b - 2 c s + c \nu)\left(b - 2 c s + c \nu + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b - 2 c s + c \nu + 2 d \sqrt{z}\right)^2}{4 d}\right) - \right.$$

$$\left. 2\, i\, d \sqrt{\frac{i\left(b - 2 c s + c \nu + 2 d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b - 2 c s + c \nu + 2 d \sqrt{z}\right)^2}{4 d}\right)\right) -$$

$$e^{\frac{i\left(b^2+4csb+c^2(v-2s)^2\right)}{2d}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+2cs-cv))^{-h-k+2n}\left(-i\left(b+2cs-cv+2d\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-(b+2cs-cv)\left(b+2cs-cv+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{4d}\right)\right)+$$

$$e^{\frac{2i(de+bcs)}{d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-2cs+cv))^{-h-k+2n}\left(i\left(b-2cs+cv+2d\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b-2cs+cv+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,d\sqrt{-\frac{i\left(b-2cs+cv+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b-2cs+cv+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.(b-2cs+cv)\left(b-2cs+cv+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b-2cs+cv+2d\sqrt{z}\right)^2}{4d}\right)\right)+$$

$$e^{i\left(2e+\frac{bcv}{d}\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+2cs-cv))^{-h-k+2n}\left(i\left(b+2cs-cv+2d\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2\,i\,d\sqrt{-\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{d}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{4d}\right)-(b+2cs-cv)\left(b+2cs-cv+2d\sqrt{z}\right)$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+2cs-cv+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)\right)\right)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sin(d\, z) \cos^v(c\, z^r + g)$

01.07.21.2455.01

$$\int z^n \sin(d\, z) \cos^v(c\, z^2 + g)\, dz = 2^{-v-2}$$

$$\left(i \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i(2 g s - g v)} \binom{v}{s} \left(e^{\frac{i d^2}{4 c v - 8 c s} - 2 i g (v - 2 s)} \left(\sum_{q=0}^{n} 2^{q-n} (-i\, d)^{n-q} (-i(2(c v - 2 c s) z - d))^{q+1} \left(\frac{i(2(c v - 2 c s) z - d)^2}{c v - 2 c s} \right)^{\frac{1}{2}(-q-1)} \right.\right.\right.$$

$$\left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(2(c v - 2 c s) z - d)^2}{4 c v - 8 c s} \right) \right) (-i(c v - 2 c s))^{-n-1} -$$

$$e^{-\frac{i d^2}{4 c v - 8 c s}} (i(c v - 2 c s))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i\, d)^{n-q} (i(2(c v - 2 c s) z - d))^{q+1} \left(-\frac{i(2(c v - 2 c s) z - d)^2}{c v - 2 c s} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(2(c v - 2 c s) z - d)^2}{4 c v - 8 c s} \right) + e^{\frac{i d^2}{8 c s - 4 c v}} (-i(2 c s - c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i\, d)^{n-q}$$

$$(-i(-d + 4 c s z - 2 c v z))^{q+1} \left(\frac{i(d + 2(c v - 2 c s) z)^2}{2 c s - c v} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d + 2(c v - 2 c s) z)^2}{8 c s - 4 c v} \right) -$$

$$e^{-i\left(\frac{d^2}{8 c s - 4 c v} + 2 g (v - 2 s) \right)} (i(2 c s - c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i\, d)^{n-q} (i(-d + 4 c s z - 2 c v z))^{q+1}$$

$$\left. \left(-\frac{i(d + 2(c v - 2 c s) z)^2}{2 c s - c v} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d + 2(c v - 2 c s) z)^2}{8 c s - 4 c v} \right) \right) -$$

$$\left. 2\, d^{-n-1} \binom{v}{\frac{v}{2}} (\Gamma(n+1, i\, d\, z)(-i)^n + i^n\, \Gamma(n+1, -i\, d\, z))(1 - v \bmod 2) \right) /;\, n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.07.21.2456.01

$$\int z^n \sin(d\, z) \cos^v\left(\sqrt{z}\, c + g\right) dz =$$

$$2^{-v-2} \left(i\, 4^{-n} (-1)^n d^{-2n-2} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i(2 g s - g v)} \binom{v}{s} \left(-e^{\frac{i(2 c s - c v)^2}{4 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k (-i(2 c s - c v))^{-h-k+2n} \right.\right.$$

$$\left(-i\left(2\sqrt{z}\, d + c(2 s - v) \right) \right)^{h+k} \left(\frac{i\left(2\sqrt{z}\, d + c(2 s - v) \right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((c\,v-2\,c\,s)\left(2\,\sqrt{z}\,d+c\,(2\,s-v)\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\,\sqrt{z}\,d+c\,(2\,s-v)\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\,\sqrt{\frac{i\left(2\,\sqrt{z}\,d+c\,(2\,s-v)\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\,\sqrt{z}\,d+c\,(2\,s-v)\right)^2}{4\,d}\right)\right)\right)+e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}}$$

$$\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)\right)^{h+k}\left(-\frac{i\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,d\,\sqrt{-\frac{i\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.c\,(v-2\,s)\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{4\,d}\right)\right)\right)-$$

$$e^{\frac{1}{2}\,i\left(\frac{c^2\,(v-2\,s)^2}{d}+8\,g\,s-4\,g\,v\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)\right)^{h+k}$$

$$\left(\frac{i\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-c\,(v-2\,s)\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\,\sqrt{\frac{i\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{4\,d}\right)\right)\right)+$$

$$e^{i\left(g\,(4\,s-2\,v)-\frac{(2\,c\,s-c\,v)^2}{4\,d}\right)}\,\mathrm{Sum}\Bigg(\mathrm{Sum}\Bigg((-1)^{k-h}\,4^k\,(i\,(2\,c\,s-c\,v))^{-h-k+2\,n}\left(i\left(2\,\sqrt{z}\,d+c\,(2\,s-v)\right)\right)^{h+k}$$

$$\left(-\frac{i\left(2\sqrt{z}\ d+c\,(2\,s-v)\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg((c\,v-2\,c\,s)\left(2\sqrt{z}\ d+c\,(2\,s-v)\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(2\sqrt{z}\ d+c\,(2\,s-v)\right)^2}{4\,d}\right)+2\sqrt{-\frac{i\left(2\sqrt{z}\ d+c\,(2\,s-v)\right)^2}{d}}$$

$$d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(2\sqrt{z}\ d+c\,(2\,s-v)\right)^2}{4\,d}\right)\Bigg),\,\{h,0,k\}\Bigg),\,\{k,0,n\}\Bigg)\Bigg)-$$

$$2\,d^{-n-1}\binom{v}{\frac{v}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i)^n+i^n\,\Gamma(n+1,\,-i\,d\,z)\right)(1-v\bmod 2)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(d\,z+e)\cos^v\left(c\,z^r+g\right)$

01.07.21.2457.01

$$\int z^n \sin(d z+e)\cos^\nu\left(c z^2+g\right) dz = 2^{-\nu-2}\left(i\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i(-e+2 g s-g\nu)}\binom{\nu}{s}\left(e^{\frac{i d^2}{4 c\nu-8 c s}-2 i g(\nu-2 s)}\left(\sum_{q=0}^{n} 2^{q-n}(-i d)^{n-q}(-i(2(c\nu-2 c s) z-d))^{q+1}\right.\right.\right.$$

$$\left(\frac{i(2(c\nu-2 c s) z-d)^2}{c\nu-2 c s}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(2(c\nu-2 c s) z-d)^2}{4 c\nu-8 c s}\right)\Bigg)(-i(c\nu-2 c s))^{-n-1}-$$

$$e^{-i\left(\frac{d^2}{4 c\nu-8 c s}+2 e\right)}(i(c\nu-2 c s))^{-n-1}\sum_{q=0}^{n} 2^{q-n}(i d)^{n-q}(i(2(c\nu-2 c s) z-d))^{q+1}\left(-\frac{i(2(c\nu-2 c s) z-d)^2}{c\nu-2 c s}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(2(c\nu-2 c s) z-d)^2}{4 c\nu-8 c s}\right)+e^{\frac{i d^2}{8 c s-4 c\nu}}(-i(2 c s-c\nu))^{-n-1}\sum_{q=0}^{n} 2^{q-n}(-i d)^{n-q}$$

$$(-i(-d+4 c s z-2 c\nu z))^{q+1}\left(\frac{i(d+2(c\nu-2 c s) z)^2}{2 c s-c\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(d+2(c\nu-2 c s) z)^2}{8 c s-4 c\nu}\right)-$$

$$e^{-i\left(\frac{d^2}{8 c s-4 c\nu}+2 e+2 g(\nu-2 s)\right)}(i(2 c s-c\nu))^{-n-1}\sum_{q=0}^{n} 2^{q-n}(i d)^{n-q}(i(-d+4 c s z-2 c\nu z))^{q+1}$$

$$\left.\left.\left(-\frac{i(d+2(c\nu-2 c s) z)^2}{2 c s-c\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(d+2(c\nu-2 c s) z)^2}{8 c s-4 c\nu}\right)\right)\right)-$$

$$\left.2 d^{-2 n-1} e^{-i e}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma(n+1, i d z)(-i d)^n+(i d)^n e^{2 i e}\,\Gamma(n+1, -i d z)\right)(1-\nu \bmod 2)\right) /;\, n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.07.21.2458.01

$$\int z^n \sin(d z+e)\cos^\nu\left(\sqrt{z}\, c+g\right) dz = 2^{-\nu-2}\left(i\, 4^{-n}(-1)^n d^{-2 n-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i(e+2 g s-g\nu)}\binom{\nu}{s}\left(-e^{\frac{i(2 c s-c\nu)^2}{4 d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k(-i(2 c s-c\nu))^{-h-k+2 n}\right.\right.$$

$$\left(-i\left(2\sqrt{z}\, d+c(2 s-\nu)\right)\right)^{h+k}\left(\frac{i\left(2\sqrt{z}\, d+c(2 s-\nu)\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((c\nu-2 c s)\left(2\sqrt{z}\, d+c(2 s-\nu)\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(2\sqrt{z}\, d+c(2 s-\nu)\right)^2}{4 d}\right)-\right.$$

$$2\,i\,d\sqrt{\frac{i\left(2\sqrt{z}\;d+c\,(2\,s-v)\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\sqrt{z}\;d+c\,(2\,s-v)\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}}\Bigg(e^{2\,i\,e}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)\right)^{h+k}$$

$$\left(-\frac{i\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,d\sqrt{-\frac{i\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)^2}{d}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)^2}{4\,d}\right)-c\,(v-2\,s)\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)^2}{4\,d}\right)\Bigg)-e^{\frac{1}{2}\,i\left(\frac{c^2\,(v-2\,s)^2}{d}+8\,g\,s-4\,g\,v\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(-i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)\right)^{h+k}\left(\frac{i\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(-c\,(v-2\,s)\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{\frac{i\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\sqrt{z}\;d+c\,(v-2\,s)\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{i\left(-\frac{(2\,c\,s-c\,v)^2}{4\,d}+2\,e+g\,(4\,s-2\,v)\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(2\,c\,s-c\,v))^{-h-k+2\,n}\left(i\left(2\sqrt{z}\;d+c\,(2\,s-v)\right)\right)^{h+k}$$

$$\left(-\frac{i\left(2\sqrt{z}\;d+c\,(2\,s-v)\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((c\,v-2\,c\,s)\left(2\sqrt{z}\;d+c\,(2\,s-v)\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\sqrt{z}\;d+c\,(2\,s-v)\right)^{2}}{4\,d}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(2\sqrt{z}\;d+c\,(2\,s-v)\right)^{2}}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\sqrt{z}\;d+c\,(2\,s-v)\right)^{2}}{4\,d}\right)\right)\right)-$$

$$\left.2\,d^{-n-1}\,e^{-i\,e}\binom{v}{\frac{v}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i)^{n}+e^{2\,i\,e}\,i^{n}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-v\bmod 2)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^{+}$$

Involving $z^{\alpha-1}\sin(b\,z^{r})\cos^{v}(c\,z^{r}+g)$

01.07.21.2459.01

$$\int z^{\alpha-1}\sin(b\,z^{r})\cos^{v}(c\,z^{r}+g)\,dz=$$

$$\frac{i\,2^{-v-1}\,(1-v\bmod 2)}{r}\,z^{\alpha}\binom{v}{\frac{v}{2}}\left((-i\,b\,z^{r})^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,-i\,b\,z^{r}\right)-(i\,b\,z^{r})^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,b\,z^{r}\right)\right)-\frac{1}{r}\,i\,2^{-v-1}\,z^{\alpha}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(-e^{-i\,g\,(v-2\,s)}\,\Gamma\!\left(\frac{\alpha}{r},\,(-i\,b+i\,c\,(v-2\,s))\,z^{r}\right)((-i\,b+i\,c\,(v-2\,s))\,z^{r})^{-\frac{\alpha}{r}}+e^{-i\,g\,(v-2\,s)}\,((i\,b+i\,c\,(v-2\,s))\,z^{r})^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\right.\right.$$

$$\left.(i\,b+i\,c\,(v-2\,s))\,z^{r}\right)-e^{i\,g\,(v-2\,s)}\,((-i\,b-i\,c\,(v-2\,s))\,z^{r})^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(-i\,b-i\,c\,(v-2\,s))\,z^{r}\right)+$$

$$\left.e^{i\,g\,(v-2\,s)}\,((i\,b-i\,c\,(v-2\,s))\,z^{r})^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,b-i\,c\,(v-2\,s))\,z^{r}\right)\right)\;/;\;v\in\mathbb{N}^{+}$$

01.07.21.2460.01

$$\int z^{n}\sin\!\left(b\,z^{2}\right)\cos^{v}\!\left(c\,z^{2}+g\right)dz=$$

$$-2^{-v-2}\,i\binom{v}{\frac{v}{2}}\left(\left(i\,b\,z^{2}\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,i\,b\,z^{2}\right)-\left(-i\,b\,z^{2}\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,-i\,b\,z^{2}\right)\right)(1-v\bmod 2)\,z^{n+1}-$$

$$2^{-v-2}\,i\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(-e^{-i\,g\,(v-2\,s)}\,\Gamma\!\left(\frac{n+1}{2},\,(-i\,b+i\,c\,(v-2\,s))\,z^{2}\right)\left((-i\,b+i\,c\,(v-2\,s))\,z^{2}\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$e^{-i\,g\,(v-2\,s)}\left((i\,b+i\,c\,(v-2\,s))\,z^{2}\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(i\,b+i\,c\,(v-2\,s))\,z^{2}\right)-$$

$$e^{i\,g\,(v-2\,s)}\left((-i\,b-i\,c\,(v-2\,s))\,z^{2}\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(-i\,b-i\,c\,(v-2\,s))\,z^{2}\right)+$$

$$\left.e^{i\,g\,(v-2\,s)}\left((i\,b-i\,c\,(v-2\,s))\,z^{2}\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(i\,b-i\,c\,(v-2\,s))\,z^{2}\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^{+}$$

01.07.21.2461.01

$$\int z^n \sin\left(\sqrt{z}\, b\right) \cos^\nu\left(\sqrt{z}\, c + g\right) dz = (-1)^n\, i\, 2^{-\nu}\, b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1),\, i\, b\sqrt{z}\right) - \Gamma\left(2(n+1),\, -i\, b\sqrt{z}\right)\right)(1 - \nu \bmod 2) - 2^{-\nu}\, i\, z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(-e^{-i g(\nu-2s)}\, \Gamma\left(2(n+1),\, (-i\, b + i\, c(\nu - 2s))\sqrt{z}\right) \left((-i\, b + i\, c(\nu-2s))\sqrt{z}\right)^{-2(n+1)} + e^{-i g(\nu-2s)} \left((i\, b + i\, c(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1),\, (i\, b + i\, c(\nu-2s))\sqrt{z}\right) - e^{i g(\nu-2s)} \left((-i\, b - i\, c(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1),\, (-i\, b - i\, c(\nu-2s))\sqrt{z}\right) + e^{i g(\nu-2s)} \left((i\, b - i\, c(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1),\, (i\, b - i\, c(\nu-2s))\sqrt{z}\right)\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \sin(b z^r + e) \cos^\nu(c z^r + g)$

01.07.21.2462.01

$$\int z^{\alpha-1} \sin(b z^r + e) \cos^\nu(c z^r + g)\, dz = -\frac{i}{r}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(e^{-i e} (i\, b z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r},\, i\, b z^r\right) - e^{i e} (-i\, b z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r},\, -i\, b z^r\right)\right)(1 - \nu \bmod 2)\, z^\alpha - \frac{1}{r}\, i\, 2^{-\nu-1} z^\alpha \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(-e^{i e - i g(\nu-2s)}\, \Gamma\left(\frac{\alpha}{r},\, (-i\, b + i\, c(\nu-2s)) z^r\right) ((-i\, b + i\, c(\nu-2s)) z^r)^{-\frac{\alpha}{r}} + e^{-i e - i g(\nu-2s)} ((i\, b + i\, c(\nu-2s)) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r},\, (i\, b + i\, c(\nu-2s)) z^r\right) - e^{i e + i g(\nu-2s)} ((-i\, b - i\, c(\nu-2s)) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r},\, (-i\, b - i\, c(\nu-2s)) z^r\right) + e^{-i e + i g(\nu-2s)} ((i\, b - i\, c(\nu-2s)) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r},\, (i\, b - i\, c(\nu-2s)) z^r\right)\right) /;\, \nu \in \mathbb{N}^+$$

01.07.21.2463.01

$$\int z^n \sin\left(b z^2 + e\right) \cos^\nu\left(c z^2 + g\right) dz = -2^{-\nu-2}\, i \binom{\nu}{\frac{\nu}{2}} \left(e^{-i e} \left(i\, b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2},\, i\, b z^2\right) - e^{i e} \left(-i\, b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2},\, -i\, b z^2\right)\right)(1 - \nu \bmod 2)\, z^{n+1} - 2^{-\nu-2}\, i\, z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(-e^{i e - i g(\nu-2s)}\, \Gamma\left(\frac{n+1}{2},\, (-i\, b + i\, c(\nu-2s)) z^2\right) \left((-i\, b + i\, c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e - i g(\nu-2s)} \left((i\, b + i\, c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2},\, (i\, b + i\, c(\nu-2s)) z^2\right) - e^{i e + i g(\nu-2s)} \left((-i\, b - i\, c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2},\, (-i\, b - i\, c(\nu-2s)) z^2\right) + e^{-i e + i g(\nu-2s)} \left((i\, b - i\, c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2},\, (i\, b - i\, c(\nu-2s)) z^2\right)\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2464.01

$$\int z^n \sin\left(\sqrt{z}\, b + e\right) \cos^v\left(\sqrt{z}\, c + g\right) dz = 2^{-v} (-1)^n i\, b^{-2(n+1)} \binom{v}{\frac{v}{2}} \left(e^{-i e}\, \Gamma\left(2(n+1), i\, b \sqrt{z}\right) - e^{i e}\, \Gamma\left(2(n+1), -i\, b \sqrt{z}\right)\right) (1 - v \bmod 2) - 2^{-v} i\, z^{n+1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(-e^{i e - i g (v - 2 s)}\, \Gamma\left(2(n+1), (-i\, b + i\, c\, (v - 2 s)) \sqrt{z}\right) \left((-i\, b + i\, c\, (v - 2 s)) \sqrt{z}\right)^{-2(n+1)} + e^{-i e - i g (v - 2 s)} \left((i\, b + i\, c\, (v - 2 s)) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i\, b + i\, c\, (v - 2 s)) \sqrt{z}\right) - e^{i e + i g (v - 2 s)} \left((-i\, b - i\, c\, (v - 2 s)) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-i\, b - i\, c\, (v - 2 s)) \sqrt{z}\right) + e^{-i e + i g (v - 2 s)} \left((i\, b - i\, c\, (v - 2 s)) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i\, b - i\, c\, (v - 2 s)) \sqrt{z}\right)\right) /;\, n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n \sin\left(b\, z^r + d\, z\right) \cos^v\left(c\, z^r + g\right)$

01.07.21.2465.01

$$\int z^n \sin\left(b z^2 + d z\right) \cos^\nu\left(c z^2 + g\right) dz = 2^{-\nu-2} \left(i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i (2 g s - g \nu)} \binom{\nu}{s} \left(e^{\frac{i d^2}{-4 b - 8 c s + 4 c \nu} - 2 i g (\nu - 2 s)} \left(\sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i (2 (-b - 2 c s + c \nu) z - d))^{q+1} \left(\frac{i (2 (-b - 2 c s + c \nu) z - d)^2}{-b - 2 c s + c \nu} \right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2 (-b - 2 c s + c \nu) z - d)^2}{-4 b - 8 c s + 4 c \nu} \right) \right) (-i (-b - 2 c s + c \nu))^{-n-1} + e^{i \left(\pi - \frac{d^2}{-4 b - 8 c s + 4 c \nu}\right)} (i (-b - 2 c s + c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i (2 (-b - 2 c s + c \nu) z - d))^{q+1} \left(-\frac{i (2 (-b - 2 c s + c \nu) z - d)^2}{-b - 2 c s + c \nu} \right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2 (-b - 2 c s + c \nu) z - d)^2}{-4 b - 8 c s + 4 c \nu} \right) + e^{\frac{i d^2}{-4 b + 8 c s - 4 c \nu}} (-i (-b + 2 c s - c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i (-d - 2 b z + 4 c s z - 2 c \nu z))^{q+1} \left(\frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{-b + 2 c s - c \nu} \right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{-4 b + 8 c s - 4 c \nu} \right) + e^{i \left(-\frac{d^2}{-4 b + 8 c s - 4 c \nu} - 2 g (\nu - 2 s) + \pi\right)} (i (-b + 2 c s - c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i (-d - 2 b z + 4 c s z - 2 c \nu z))^{q+1} \left(-\frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{-b + 2 c s - c \nu} \right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 (b - 2 c s + c \nu) z)^2}{-4 b + 8 c s - 4 c \nu} \right) \right) - i (-i b)^{-n-1} e^{-\frac{i d^2}{4 b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^{q+1} \left(-\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + 2 b z)^2}{4 b} \right) - e^{\frac{i d^2}{2 b}} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i (d + 2 b z))^{q+1} \left(\frac{i (d + 2 b z)^2}{b} \right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + 2 b z)^2}{4 b} \right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2466.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \cos^\nu\left(\sqrt{z}\, c + g\right) dz = i (-1)^n 2^{-2 n - \nu - 2} d^{-2 n - 2} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i (2 g s - g \nu)} \binom{\nu}{s} \left(-e^{\frac{i (b + 2 c s - c \nu)^2}{4 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b + 2 c s - c \nu))^{-h-k+2 n} \right.\right.$$

$$\left(-i\left(b+c(2s-v)+2d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+c(2s-v)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b-2cs+cv)\left(b+c(2s-v)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+c(2s-v)+2d\sqrt{z}\right)^2}{4d}\right)-2\right.$$

$$\left.i\,d\sqrt{\frac{i\left(b+c(2s-v)+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(b+c(2s-v)+2d\sqrt{z}\right)^2}{4d}\right)\right)+$$

$$e^{-\frac{i(b+c(v-2s))^2}{4d}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i(b+c(v-2s)))^{-h-k+2n}\left(i\left(b+c(v-2s)+2d\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+c(v-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b-c(v-2s))\left(b+c(v-2s)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+c(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{i\left(b+c(v-2s)+2d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+c(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)-$$

$$e^{\frac{1}{2}i\left(\frac{(b+c(v-2s))^2}{d}+8gs-4gv\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i(b+c(v-2s)))^{-h-k+2n}$$

$$\left(-i\left(b+c(v-2s)+2d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+c(v-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b-c(v-2s))\left(b+c(v-2s)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+c(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$2\,i\,d\sqrt{\frac{i\left(b+c\,(v-2\,s)+2\,d\,\sqrt{z}\,\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+c\,(v-2\,s)+2\,d\,\sqrt{z}\,\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{i\left(g\,(4\,s-2\,v)-\frac{(b+2\,c\,s-c\,v)^2}{4\,d}\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+2\,c\,s-c\,v))^{-h-k+2\,n}\left(i\left(b+c\,(2\,s-v)+2\,d\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c\,(2\,s-v)+2\,d\,\sqrt{z}\,\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b-2\,c\,s+c\,v)\left(b+c\,(2\,s-v)+2\,d\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+c\,(2\,s-v)+2\,d\,\sqrt{z}\,\right)^2}{4\,d}\right)+2$$

$$\sqrt{-\frac{i\left(b+c\,(2\,s-v)+2\,d\,\sqrt{z}\,\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+c\,(2\,s-v)+2\,d\,\sqrt{z}\,\right)^2}{4\,d}\right)\Bigg)\Bigg)-$$

$$e^{-\frac{i\,b^2}{4\,d}}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\left(i\left(b+2\,d\,\sqrt{z}\,\right)\right)^{h+k}\left(-\frac{i\left(b+2\,d\,\sqrt{z}\,\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2\,d\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+2\,d\,\sqrt{z}\,\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(b+2\,d\,\sqrt{z}\,\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+2\,d\,\sqrt{z}\,\right)^2}{4\,d}\right)\Bigg)-$$

$$e^{\frac{i\,b^2}{2\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,d\,\sqrt{z}\,\right)\right)^{h+k}\left(\frac{i\left(b+2\,d\,\sqrt{z}\,\right)^2}{d}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(b\left(b+2\,d\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+2\,d\,\sqrt{z}\,\right)^2}{4\,d}\right)+$$

$$2\sqrt{\frac{i\left(b+2\,d\,\sqrt{z}\,\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+2\,d\,\sqrt{z}\,\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sin(b z^r + d z + e) \cos^v(c z^r + g)$

01.07.21.2467.01

$$\int z^n \sin(b z^2 + d z + e) \cos^v(c z^2 + g) \, dz =$$

$$2^{-v-2} \Bigg(i \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i(-e+2gs-gv)} \binom{v}{s} \Bigg(e^{\frac{i d^2}{-4b-8cs+4cv} - 2ig(v-2s)} \Bigg(\sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i(2(-b-2cs+cv)z-d))^{q+1}$$

$$\left(\frac{i(2(-b-2cs+cv)z-d)^2}{-b-2cs+cv} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(2(-b-2cs+cv)z-d)^2}{-4b-8cs+4cv} \right) \Bigg)$$

$$(-i(-b-2cs+cv))^{-n-1} - e^{-i\left(\frac{d^2}{-4b-8cs+4cv}+2e\right)} (i(-b-2cs+cv))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i(2(-b-2cs+cv)z-d))^{q+1} \left(-\frac{i(2(-b-2cs+cv)z-d)^2}{-b-2cs+cv} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(2(-b-2cs+cv)z-d)^2}{-4b-8cs+4cv} \right) + e^{\frac{i d^2}{-4b+8cs-4cv}} (-i(-b+2cs-cv))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n} (-i d)^{n-q} (-i(-d-2bz+4csz-2cvz))^{q+1} \left(\frac{i(d+2(b-2cs+cv)z)^2}{-b+2cs-cv} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+2(b-2cs+cv)z)^2}{-4b+8cs-4cv} \right) - e^{-i\left(\frac{d^2}{-4b+8cs-4cv}+2e+2g(v-2s)\right)} (i(-b+2cs-cv))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (i(-d-2bz+4csz-2cvz))^{q+1} \left(-\frac{i(d+2(b-2cs+cv)z)^2}{-b+2cs-cv} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+2(b-2cs+cv)z)^2}{-4b+8cs-4cv} \right) \Bigg) - i(-i b)^{-n-1} e^{-\frac{1}{4} i \left(\frac{d^2}{b}+4e\right)} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1)$$

$$\Bigg(e^{2ie} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i(d+2bz))^{q+1} \left(-\frac{i(d+2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+2bz)^2}{4b} \right) -$$

$$e^{\frac{i d^2}{2b}} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (-i(d+2bz))^{q+1} \left(\frac{i(d+2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+2bz)^2}{4b} \right) \Bigg) \Bigg) \; /; \; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.07.21.2468.01

$$\int z^n \sin\left(\sqrt{z}\, b + d\, z + e\right) \cos^\nu\left(\sqrt{z}\, c + g\right) dz ==$$

$$2^{-2n-\nu-2}\, i\, (-1)^n\, d^{-2n-2} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i(e+2gs-g\nu)} \binom{\nu}{s} \left(-e^{\frac{i(b+2cs-c\nu)^2}{4d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,(b+2cs-c\nu))^{-h-k+2n} \right.\right.$$

$$\left(-i\left(b+c\,(2s-\nu)+2d\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b+c\,(2s-\nu)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((-b-2cs+c\nu)\left(b+c\,(2s-\nu)+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),\, \frac{i\left(b+c\,(2s-\nu)+2d\sqrt{z}\right)^2}{4d}\right) - 2 \right.$$

$$\left.\left. i\, d\, \sqrt{\frac{i\left(b+c\,(2s-\nu)+2d\sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+k+2),\, \frac{i\left(b+c\,(2s-\nu)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) +$$

$$e^{-\frac{i(b+c(\nu-2s))^2}{4d}} \left(e^{2ie} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,(b+c\,(\nu-2s)))^{-h-k+2n} \left(i\left(b+c\,(\nu-2s)+2d\sqrt{z}\right)\right)^{h+k} \right.$$

$$\left(-\frac{i\left(b+c\,(\nu-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((-b-c\,(\nu-2s))\left(b+c\,(\nu-2s)+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{i\left(b+c\,(\nu-2s)+2d\sqrt{z}\right)^2}{4d}\right) + \right.$$

$$\left. 2\sqrt{-\frac{i\left(b+c\,(\nu-2s)+2d\sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{i\left(b+c\,(\nu-2s)+2d\sqrt{z}\right)^2}{4d}\right)\right) -$$

$$e^{\frac{1}{2} i\left(\frac{(b+c(\nu-2s))^2}{d}+8gs-4g\nu\right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,(b+c\,(\nu-2s)))^{-h-k+2n} \left(-i\left(b+c\,(\nu-2s)+2d\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c\,(\nu-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((-b-c(v-2s))\left(b+c(v-2s)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+c(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{\frac{i\left(b+c(v-2s)+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+c(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)+$$

$$e^{i\left(-\frac{(b+2cs-cv)^2}{4d}+2e+g(4s-2v)\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i(b+2cs-cv))^{-h-k+2n}\left(i\left(b+c(2s-v)+2d\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c(2s-v)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b-2cs+cv)\left(b+c(2s-v)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+c(2s-v)+2d\sqrt{z}\right)^2}{4d}\right)+2\right.$$

$$\left.\left.\sqrt{-\frac{i\left(b+c(2s-v)+2d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+c(2s-v)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)-$$

$$e^{-\frac{i\left(b^2+4de\right)}{4d}}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(e^{2ie}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2n}\left(i\left(b+2d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)-$$

$$e^{\frac{i b^2}{2 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i b)^{-h-k+2n} \left(-i \left(b + 2 d \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k} \left(b \left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(b + 2 d \sqrt{z}\right)^2}{4 d}\right) + \right.$$

$$\left. \left. 2 \sqrt{\frac{i \left(b + 2 d \sqrt{z}\right)^2}{d}} \, d \, i \, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(b + 2 d \sqrt{z}\right)^2}{4 d}\right)\right)\right) /; n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving $z^n \sin(d z) \cos^v\left(c z^r + f z\right)$

01.07.21.2469.01

$$\int z^n \sin(d\,z)\cos^\nu\left(c\,z^2+f\,z\right)dz = 2^{-\nu-2}\left(i\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{i(-d-2fs+f\nu)^2}{4c\nu-8cs}}\left(\sum_{q=0}^{n}2^{q-n}\,(i(-d-2fs+f\nu))^{n-q}\,(-i(-d+f(\nu-2s)+2(c\nu-2cs)z))^{q+1}\left(\frac{i(-d+f(\nu-2s)+2(c\nu-2cs)z)^2}{c\nu-2cs}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(-d+f(\nu-2s)+2(c\nu-2cs)z)^2}{4c\nu-8cs}\right)\right)\right.\right.$$
$$(-i(c\nu-2cs))^{-n-1}-e^{-\frac{i(-d-2fs+f\nu)^2}{4c\nu-8cs}}\,(i(c\nu-2cs))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i(-d-2fs+f\nu))^{n-q}$$
$$(i(-d+f(\nu-2s)+2(c\nu-2cs)z))^{q+1}\left(-\frac{i(-d+f(\nu-2s)+2(c\nu-2cs)z)^2}{c\nu-2cs}\right)^{\frac{1}{2}(-q-1)}$$
$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(-d+f(\nu-2s)+2(c\nu-2cs)z)^2}{4c\nu-8cs}\right)+$$
$$e^{\frac{i(d+f(\nu-2s))^2}{8cs-4c\nu}}\,(-i(2cs-c\nu))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i(-d+2fs-f\nu))^{n-q}\,(-i(-d+2fs-f\nu+4csz-2c\nu z))^{q+1}$$
$$\left(\frac{i(d+f(\nu-2s)+2(c\nu-2cs)z)^2}{2cs-c\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(d+f(\nu-2s)+2(c\nu-2cs)z)^2}{8cs-4c\nu}\right)-$$
$$e^{-\frac{i(d+f(\nu-2s))^2}{8cs-4c\nu}}\,(i(2cs-c\nu))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i(-d+2fs-f\nu))^{n-q}\,(i(-d+2fs-f\nu+4csz-2c\nu z))^{q+1}$$
$$\left.\left(-\frac{i(d+f(\nu-2s)+2(c\nu-2cs)z)^2}{2cs-c\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d+f(\nu-2s)+2(c\nu-2cs)z)^2}{8cs-4c\nu}\right)\right)-$$
$$\left.2\,d^{-2n-1}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma(n+1,i\,d\,z)\,(-i\,d)^n+(i\,d)^n\,\Gamma(n+1,-i\,d\,z)\right)(1-\nu\bmod 2)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.07.21.2470.01

$$\int z^n \sin(d\,z)\cos^\nu\left(\sqrt{z}\,c+f\,z\right)dz = 2^{-\nu-2}\left(i\,4^{-n}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(d+2fs-f\nu)^2}\left(e^{-\frac{i(2cs-c\nu)^2}{4d+8fs-4f\nu}}\,(i(d+2fs-f\nu))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i(2cs-c\nu))^{-h-k+2n}\right.\right.\right.$$
$$\left(i\left(c(2s-\nu)+2(d+2fs-f\nu)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c(2s-\nu)+2(d+2fs-f\nu)\sqrt{z}\right)^2}{d+2fs-f\nu}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c\,v-2\,c\,s)\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)+$$

$$2\,i\,\sqrt{-\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}}\;(d+2\,f\,s-f\,v)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,(d+f\,(v-2\,s))}}\left((d+f\,(v-2\,s))^2\right)^{-2\,n-1}\Bigg((-i\,(d+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}$$

$$\left(i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,(d+f\,(v-2\,s))\,\sqrt{-\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)-c\,(v-2\,s)\left(c\,(v-2\,s)+\right.$$

$$\left.2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)\Bigg)-$$

$$e^{\frac{i\,c^2\,(v-2\,s)^2}{2\,(d+f\,(v-2\,s))}}\,(i\,(d+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(v-2\,s))^{-h-k+2\,n}$$

$$\left(-i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(-c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)-$$

$$2\,i\,(d+f\,(v-2\,s))\sqrt{\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{d+f\,(v-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)\Bigg)\Bigg)\Bigg)-$$

$$\frac{1}{(d+2\,f\,s-f\,v)^2}\Bigg(e^{\frac{i\,(2\,c\,s-c\,v)^2}{4\,d+8\,f\,s-4\,f\,v}}\,(-i\,(d+2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(2\,c\,s-c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c\,v-2\,c\,s)\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)-$$

$$2\,i\,(d+2\,f\,s-f\,v)\sqrt{\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)\Bigg)\Bigg)\Bigg)\Bigg)-$$

$$2\,d^{-2\,n-1}\binom{v}{\frac{v}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^n+(i\,d)^n\,\Gamma(n+1,\,-i\,d\,z)\right)(1-v\bmod 2)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(d\,z+e)\cos^\nu(c\,z^r+f\,z)$

01.07.21.2471.01

$$\int z^n \sin(d\,z+e)\cos^\nu\left(c\,z^2+f\,z\right)dz = 2^{-\nu-2}\left(i\,e^{i\,e}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{i\,(-d-2\,f\,s+f\,\nu)^2}{4\,c\,\nu-8\,c\,s}}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(-d-2\,f\,s+f\,\nu))^{n-q}\,(-i\,(-d+f\,(\nu-2\,s)+2\,(c\,\nu-2\,c\,s)\,z))^{q+1}\left(\frac{i\,(-d+f\,(\nu-2\,s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{c\,\nu-2\,c\,s}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(-d+f\,(\nu-2\,s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{4\,c\,\nu-8\,c\,s}\right)\right)(-i\,(c\,\nu-2\,c\,s))^{-n-1}+e^{i\left(-\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,c\,\nu-8\,c\,s}-2\,e+\pi\right)}(i\,(c\,\nu-2\,c\,s))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(-d-2\,f\,s+f\,\nu))^{n-q}\,(i\,(-d+f\,(\nu-2\,s)+2\,(c\,\nu-2\,c\,s)\,z))^{q+1}\left(-\frac{i\,(-d+f\,(\nu-2\,s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{c\,\nu-2\,c\,s}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(-d+f\,(\nu-2\,s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{4\,c\,\nu-8\,c\,s}\right)+e^{\frac{i\,(d+f\,(\nu-2\,s))^2}{8\,c\,s-4\,c\,\nu}}(-i\,(2\,c\,s-c\,\nu))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i\,(-d+2\,f\,s-f\,\nu))^{n-q}\,(-i\,(-d+2\,f\,s-f\,\nu+4\,c\,s\,z-2\,c\,\nu\,z))^{q+1}\left(\frac{i\,(d+f\,(\nu-2\,s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{2\,c\,s-c\,\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(d+f\,(\nu-2\,s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{8\,c\,s-4\,c\,\nu}\right)+e^{i\left(-\frac{(d+f\,(\nu-2\,s))^2}{8\,c\,s-4\,c\,\nu}-2\,e+\pi\right)}(i\,(2\,c\,s-c\,\nu))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(-d+2\,f\,s-f\,\nu))^{n-q}\,(i\,(-d+2\,f\,s-f\,\nu+4\,c\,s\,z-2\,c\,\nu\,z))^{q+1}\left(-\frac{i\,(d+f\,(\nu-2\,s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{2\,c\,s-c\,\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(d+f\,(\nu-2\,s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{8\,c\,s-4\,c\,\nu}\right)\right)-2\,d^{-2\,n-1}\,e^{-i\,e}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^n+(i\,d)^n\,e^{2\,i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu\bmod 2)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.07.21.2472.01

$$\int z^n \sin(d\,z+e)\cos^\nu\left(\sqrt{z}\,c+f\,z\right)dz = 2^{-\nu-2}\left(i\,4^{-n}\,e^{-i\,e}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{(d+2\,f\,s-f\,\nu)^2}\left(e^{i\left(2\,e-\frac{(2\,c\,s-c\,\nu)^2}{4\,d+8\,f\,s-4\,f\,\nu}\right)}\,(i\,(d+2\,f\,s-f\,\nu))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(2\,c\,s-c\,\nu))^{-h-k+2\,n}\right.\right.\right.$$

$$\left(i\left(c\,(2\,s-\nu)+2\,(d+2\,f\,s-f\,\nu)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c\,(2\,s-\nu)+2\,(d+2\,f\,s-f\,\nu)\sqrt{z}\right)^2}{d+2\,f\,s-f\,\nu}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c\,\nu-2\,c\,s)\left(c\,(2\,s-\nu)+2\,(d+2\,f\,s-f\,\nu)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(c\,(2\,s-\nu)+2\,(d+2\,f\,s-f\,\nu)\sqrt{z}\right)^2}{4\,d+8\,f\,s-4\,f\,\nu}\right)+$$

$$2\,i\sqrt{-\frac{i\left(c\,(2\,s-\nu)+2\,(d+2\,f\,s-f\,\nu)\sqrt{z}\right)^2}{d+2\,f\,s-f\,\nu}}\;(d+2\,f\,s-f\,\nu)$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c\,(2\,s-\nu)+2\,(d+2\,f\,s-f\,\nu)\sqrt{z}\right)^2}{4\,d+8\,f\,s-4\,f\,\nu}\right)\right)\right)+$$

$$e^{-\frac{i\,c^2\,(\nu-2\,s)^2}{4\,(d+f\,(\nu-2\,s))}}\left((d+f\,(\nu-2\,s))^2\right)^{-2\,n-1}\left(e^{2\,i\,e}\,(-i\,(d+f\,(\nu-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(\nu-2\,s))^{-h-k+2\,n}\right.$$

$$\left(i\left(c\,(\nu-2\,s)+2\,(d+f\,(\nu-2\,s))\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c\,(\nu-2\,s)+2\,(d+f\,(\nu-2\,s))\sqrt{z}\right)^2}{d+f\,(\nu-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d+f\,(\nu-2\,s))\sqrt{-\frac{i\left(c\,(\nu-2\,s)+2\,(d+f\,(\nu-2\,s))\sqrt{z}\right)^2}{d+f\,(\nu-2\,s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c\,(\nu-2\,s)+2\,(d+f\,(\nu-2\,s))\sqrt{z}\right)^2}{4\,(d+f\,(\nu-2\,s))}\right)-c\,(\nu-2\,s)\left(c\,(\nu-2\,s)+\right.$$

$$2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,s))}\right)\Bigg)-$$

$$e^{\frac{i\,c^2\,(v-2\,s)^2}{2\,(d+f\,(v-2\,s))}}\,(i\,(d+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(v-2\,s))^{-h-k+2\,n}$$

$$\left(-i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)\right)^{h+k}\left(\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(-c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,s))}\right)-$$

$$2\,i\,(d+f\,(v-2\,s))\,\sqrt{\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d+f\,(v-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,s))}\right)\Bigg)\Bigg)-$$

$$\frac{1}{(d+2\,f\,s-f\,v)^2}\Bigg(e^{\frac{i\,(2\,c\,s-c\,v)^2}{4\,d+8\,f\,s-4\,f\,v}}\,(-i\,(d+2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(2\,c\,s-c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)\right)^{h+k}\left(\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)^2}{d+2\,f\,s-f\,v}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c\,v-2\,c\,s)\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)-$$

$$2\,i\,(d+2\,f\,s-f\,v)\sqrt{\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}}$$

$$\left.\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)\right)\right)\right)\right)-$$

$$2\,d^{-2\,n-1}\,e^{-i\,e}\binom{v}{\frac{v}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^n+(i\,d)^n\,e^{2\,i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)$$

$$(1-$$

$$\left.v \bmod 2)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(b\,z^r) \cos^v(c\,z^r+f\,z)$

01.07.21.2473.01

$$\int z^n \sin(b z^2) \cos^\nu(c z^2 + f z) \, dz = 2^{-\nu-2} \left(i z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left((i b z^2)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) - (-i b z^2)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, i b z^2\right) \right) (1 - \nu \bmod 2) \left(b^2 z^4\right)^{\frac{1}{2}(-n-1)} + i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{i (f \nu - 2 f s)^2}{-4 b - 8 c s + 4 c \nu}} \left(\sum_{q=0}^{n} 2^{q-n} (i (f \nu - 2 f s))^{n-q} (-i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z))^{q+1} \left(\frac{i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-b - 2 c s + c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-4 b - 8 c s + 4 c \nu} \right) \right) (-i (-b - 2 c s + c \nu))^{-n-1} + e^{i \left(\pi - \frac{(f \nu - 2 f s)^2}{-4 b - 8 c s + 4 c \nu} \right)} (i (-b - 2 c s + c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (f \nu - 2 f s))^{n-q} (i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z))^{q+1} \left(-\frac{i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-b - 2 c s + c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-4 b - 8 c s + 4 c \nu} \right) + e^{\frac{i f^2 (\nu - 2 s)^2}{-4 b + 8 c s - 4 c \nu}} (-i (-b + 2 c s - c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i (2 f s - f \nu))^{n-q} (-i (2 f s + 4 c z s - f \nu - 2 b z - 2 c \nu z))^{q+1} \left(\frac{i (f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{-b + 2 c s - c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{-4 b + 8 c s - 4 c \nu} \right) + e^{i \left(\pi - \frac{f^2 (\nu - 2 s)^2}{-4 b + 8 c s - 4 c \nu} \right)} (i (-b + 2 c s - c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (2 f s - f \nu))^{n-q} (i (2 f s + 4 c z s - f \nu - 2 b z - 2 c \nu z))^{q+1} \left(-\frac{i (f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{-b + 2 c s - c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{-4 b + 8 c s - 4 c \nu} \right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2474.01

$$\int z^n \sin(\sqrt{z}\, b) \cos^\nu(\sqrt{z}\, c + f z) \, dz = 2^{-\nu-2} \left(i \left(-\frac{1}{4}\right)^n f^{-2(n+1)} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (\nu - 2 s)^{-2(n+1)} \binom{\nu}{s} \left(e^{-\frac{i (b + c (\nu - 2 s))^2}{4 f (\nu - 2 s)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b + c (\nu - 2 s)))^{-h-k+2n} \right. \right. \right.$$

$$\left(i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)\right)^{h+k}\left(-\frac{i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((-b-c\,(v-2\,s))\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,i\,(v-2\,s)\sqrt{-\frac{i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg)\Bigg)-$$

$$e^{\frac{i\,(b+c\,(v-2\,s))^2}{2\,f\,(v-2\,s)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+c\,(v-2\,s)))^{-h-k+2\,n}\left(-i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((-b-c\,(v-2\,s))\Big(b+c\,(v-2\,s)+$$

$$2\,f\,(v-2\,s)\,\sqrt{z}\,\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)-$$

$$2\,i\,f\,(v-2\,s)\sqrt{\frac{i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}}\;\Gamma\Bigg(\frac{1}{2}\,(h+k+2),$$

$$\frac{i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)\Bigg)-$$

$$e^{\frac{i\,(b+2\,c\,s-c\,v)^2}{8\,f\,s-4\,f\,v}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+2\,c\,s-c\,v))^{-h-k+2\,n}\left(-i\left(b+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg((-b-2cs+cv)$$

$$\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)-$$

$$2i(2fs-fv)\sqrt{\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)\Bigg)+$$

$$e^{-\frac{i(b+2cs-cv)^2}{8fs-4fv}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i(b+2cs-cv))^{-h-k+2n}\left(i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b-2cs+cv)\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),$$

$$-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\Bigg)+2i\sqrt{-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}}$$

$$(2fs-fv)\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)\Bigg)\Bigg)-$$

$$4i(-1)^n b^{-2(n+1)}\binom{v}{\frac{v}{2}}\left(\Gamma\left(2(n+1),\ -ib\sqrt{z}\right)-\Gamma\left(2(n+1),\ ib\sqrt{z}\right)\right)$$

$$(1-$$

$$v \bmod 2)\Bigg)\ /;\ n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(b z^r + e) \cos^v(c z^r + f z)$

01.07.21.2475.01

$$\int z^n \sin(b z^2 + e) \cos^v(c z^2 + f z)\, dz = 2^{-v-2} \Bigg(e^{-i e}\, i\, z^{n+1} \binom{v}{\frac{v}{2}} \left(e^{2 i e} \left(i b z^2\right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) - \left(-i b z^2\right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - v \bmod 2) \left(b^2 z^4\right)^{\frac{1}{2}(-n-1)} +$$

$$e^{i e}\, i \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \Bigg(e^{\frac{i (f v - 2 f s)^2}{-4 b - 8 c s + 4 c v}} \Bigg(\sum_{q=0}^{n} 2^{q-n} (i (f v - 2 f s))^{n-q} (-i (f (v - 2 s) + 2 (-b - 2 c s + c v) z))^{q+1}$$

$$\left(\frac{i (f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-b - 2 c s + c v} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-4 b - 8 c s + 4 c v} \right) \Bigg)$$

$$(-i (-b - 2 c s + c v))^{-n-1} + e^{i \left(-\frac{(f v - 2 f s)^2}{-4 b - 8 c s + 4 c v} - 2 e + \pi \right)} (i (-b - 2 c s + c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (f v - 2 f s))^{n-q}$$

$$(i (f (v - 2 s) + 2 (-b - 2 c s + c v) z))^{q+1} \left(-\frac{i (f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-b - 2 c s + c v} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-4 b - 8 c s + 4 c v} \right) +$$

$$e^{\frac{i f^2 (v - 2 s)^2}{-4 b + 8 c s - 4 c v}} (-i (-b + 2 c s - c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i (2 f s - f v))^{n-q} (-i (2 f s + 4 c z s - f v - 2 b z - 2 c v z))^{q+1}$$

$$\left(\frac{i (f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-b + 2 c s - c v} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-4 b + 8 c s - 4 c v} \right) +$$

$$e^{i \left(-\frac{f^2 (v - 2 s)^2}{-4 b + 8 c s - 4 c v} - 2 e + \pi \right)} (i (-b + 2 c s - c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (2 f s - f v))^{n-q}$$

$$(i (2 f s + 4 c z s - f v - 2 b z - 2 c v z))^{q+1} \left(-\frac{i (f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-b + 2 c s - c v} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-4 b + 8 c s - 4 c v} \right) \Bigg) \Bigg) \Bigg) \;/;\; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.07.21.2476.01

$$\int z^n \sin\left(\sqrt{z}\, b + e\right) \cos^{\nu}\left(\sqrt{z}\, c + f z\right) dz =$$

$$2^{-\nu-2} \Bigg(-i\, f^{-2(n+1)}\, e^{-i e} \Bigg(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (\nu - 2s)^{-2(n+1)} \binom{\nu}{s} \Bigg(e^{-\frac{i (b+c(\nu-2s))^2}{4 f (\nu-2s)}} \Bigg(e^{\frac{i (b+c(\nu-2s))^2}{2 f (\nu-2s)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,(b + c\,(\nu - 2s)))^{-h-k+2n}$$

$$\left(-i\left(b + c\,(\nu - 2s) + 2 f\,(\nu - 2s) \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b + c\,(\nu - 2s) + 2 f\,(\nu - 2s) \sqrt{z}\right)^2}{f\,(\nu - 2s)} \right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \Bigg((-b - c\,(\nu - 2s)) \left(b + c\,(\nu - 2s) + 2 f\,(\nu - 2s) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h + k + 1),\ \frac{i \left(b + c\,(\nu - 2s) + 2 f\,(\nu - 2s) \sqrt{z}\right)^2}{4 f\,(\nu - 2s)} \right) -$$

$$2\, i\, f\,(\nu - 2s) \sqrt{\frac{i \left(b + c\,(\nu - 2s) + 2 f\,(\nu - 2s) \sqrt{z}\right)^2}{f\,(\nu - 2s)}}$$

$$\Gamma\left(\frac{1}{2}(h + k + 2),\ \frac{i \left(b + c\,(\nu - 2s) + 2 f\,(\nu - 2s) \sqrt{z}\right)^2}{4 f\,(\nu - 2s)} \right) \Bigg) -$$

$$e^{2 i e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\,(b + c\,(\nu - 2s)))^{-h-k+2n} \left(i\left(b + c\,(\nu - 2s) + 2 f\,(\nu - 2s) \sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i \left(b + c\,(\nu - 2s) + 2 f\,(\nu - 2s) \sqrt{z}\right)^2}{f\,(\nu - 2s)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \Bigg((-b - c\,(\nu - 2s)) \Big(b + c\,(\nu - 2s) +$$

$$2 f\,(\nu - 2s) \sqrt{z}\Big) \Gamma\left(\frac{1}{2}(h + k + 1),\ -\frac{i \left(b + c\,(\nu - 2s) + 2 f\,(\nu - 2s) \sqrt{z}\right)^2}{4 f\,(\nu - 2s)} \right) +$$

$$2\, f\, i\,(\nu - 2s) \sqrt{-\frac{i \left(b + c\,(\nu - 2s) + 2 f\,(\nu - 2s) \sqrt{z}\right)^2}{f\,(\nu - 2s)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\Bigg)\Bigg)\Bigg) +$$

$$e^{\frac{i(b+2cs-cv)^2}{8fs-4fv}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (-i(b+2cs-cv))^{-h-k+2n} \left(-i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg((-b-2cs+cv)\left(b+c(2s-v)+\right.$$

$$\left.2(2fs-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right) -$$

$$2i(2fs-fv)\sqrt{\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}}\ \Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)\Bigg) - e^{i\left(2e-\frac{(b+2cs-cv)^2}{8fs-4fv}\right)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (i(b+2cs-cv))^{-h-k+2n} \left(i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b-2cs+cv)\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.$$

$$\left.-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right) + 2i\sqrt{-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}}$$

$$(2fs-fv)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$\left(-\frac{1}{4}\right)^n - 4\,(-1)^n\, b^{-2\,(n+1)}\, e^{-i\,e}\, i \binom{v}{\frac{v}{2}} \left(e^{2\,i\,e}\,\Gamma\!\left(2\,(n+1),\, -i\,b\,\sqrt{z}\right) - \Gamma\!\left(2\,(n+1),\, i\,b\,\sqrt{z}\right)\right)$$

$$\left.(1 - v \bmod 2)\right) /;\, n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving $z^n \sin\left(b\, z^r + d\, z\right) \cos^v\left(c\, z^r + f\, z\right)$

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$$\int z^n \sin\left(b\, z^2 + d\, z\right) \cos^v\left(c\, z^2 + f\, z\right) dz =$$

$$2^{-v-2} \left(i \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{\frac{i\,(-d-2\,f\,s+f\,v)^2}{-4\,b-8\,c\,s+4\,c\,v}} \left(\sum_{q=0}^{n} 2^{q-n}\, (i\,(-d-2\,f\,s+f\,v))^{n-q}\, (-i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z))^{q+1} \right.\right.\right.$$

$$\left(\frac{i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z)^2}{-b-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$

$$\left.\Gamma\!\left(\frac{q+1}{2},\, \frac{i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z)^2}{-4\,b-8\,c\,s+4\,c\,v}\right)\right) (-i\,(-b-2\,c\,s+c\,v))^{-n-1} +$$

$$e^{i\left(\pi - \frac{(-d-2\,f\,s+f\,v)^2}{-4\,b-8\,c\,s+4\,c\,v}\right)}\, (i\,(-b-2\,c\,s+c\,v))^{-n-1} \sum_{q=0}^{n} 2^{q-n}\, (-i\,(-d-2\,f\,s+f\,v))^{n-q}$$

$$(i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z))^{q+1} \left(-\frac{i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z)^2}{-b-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\!\left(\frac{q+1}{2},\, -\frac{i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z)^2}{-4\,b-8\,c\,s+4\,c\,v}\right) +$$

$$e^{\frac{i\,(d+f\,(v-2\,s))^2}{-4\,b+8\,c\,s-4\,c\,v}}\, (-i\,(-b+2\,c\,s-c\,v))^{-n-1} \sum_{q=0}^{n} 2^{q-n}\, (i\,(-d+2\,f\,s-f\,v))^{n-q}$$

$$(-i\,(-d+2\,f\,s-f\,v-2\,b\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1} \left(\frac{i\,(d+f\,(v-2\,s)+2\,(b-2\,c\,s+c\,v)\,z)^2}{-b+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\!\left(\frac{q+1}{2},\, \frac{i\,(d+f\,(v-2\,s)+2\,(b-2\,c\,s+c\,v)\,z)^2}{-4\,b+8\,c\,s-4\,c\,v}\right) +$$

$$e^{i\left(\pi - \frac{(d+f\,(v-2\,s))^2}{-4\,b+8\,c\,s-4\,c\,v}\right)}\, (i\,(-b+2\,c\,s-c\,v))^{-n-1} \sum_{q=0}^{n} 2^{q-n}\, (-i\,(-d+2\,f\,s-f\,v))^{n-q}$$

$$(i(-d+2fs-fv-2bz+4csz-2cvz))^{q+1}\left(-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right)\Bigg)-i(-ib)^{-n-1}e^{-\frac{id^2}{4b}}\binom{v}{\frac{v}{2}}$$

$$(v\bmod 2-1)\left(\sum_{q=0}^{n}2^{q-n}(id)^{n-q}(-i(d+2bz))^{q+1}\left(-\frac{i(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d+2bz)^2}{4b}\right)-\right.$$

$$\left.\left.e^{\frac{id^2}{2b}}\sum_{q=0}^{n}2^{q-n}(id)^{n-q}(-i(d+2bz))^{q+1}\left(\frac{i(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(d+2bz)^2}{4b}\right)\right)\right)/;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

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$$\int z^n\sin\left(\sqrt{z}\,b+dz\right)\cos^v\left(\sqrt{z}\,c+fz\right)dz=$$

$$2^{-v-2}\left(-i\,d^{-2(n+1)}e^{-\frac{ib^2}{4d}}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(ib)^{-h-k+2n}\left(i\left(b+2d\sqrt{z}\right)\right)^{h+k}\right.\right.$$

$$\left(-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.2id\sqrt{-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}}\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)-$$

$$e^{\frac{ib^2}{2d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-ib)^{-h-k+2n}\left(-i\left(b+2d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.\left.\left.2\sqrt{\frac{i\left(b+2d\sqrt{z}\right)^2}{d}}\,d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)\left(-\frac{1}{4}\right)^n-\right.$$

$$i\,4^{-n}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left((-1)^n e^{-\frac{i(b+2cs-cv)^2}{4(d+2fs-fv)}}\left(e^{\frac{2i(b+2cs-cv)^2}{4d+8fs-4fv}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(b+2cs-cv))^{-h-k+2n}\left(-i\left(b+c(2s-v)+\right.\right.\right.\right.$$

$$\left.\left.2(d+2fs-fv)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-2cs+cv)\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)-$$

$$2i(d+2fs-fv)\sqrt{\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)\right)\right)-$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i(b+2cs-cv))^{-h-k+2n}\left(i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left((-b-2cs+cv)\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)+$$

$$2i\sqrt{-\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}}\,(d+2fs-fv)$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)\Bigg)\Bigg)$$

$$(d+2\,f\,s-f\,v)^{-2\,(n+1)}+(-1)^n\, e^{-\frac{i\,(b+c\,(v-2\,s))^2}{4\,(d+f\,(v-2\,s))}}\,(d+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\Bigg(e^{\frac{i\,(b+c\,(v-2\,s))^2}{2\,(d+f\,(v-2\,s))}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+c\,(v-2\,s)))^{-h-k+2\,n}\left(-i\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((-b-c\,(v-2\,s))\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)-$$

$$2\,i\,(d+f\,(v-2\,s))\sqrt{\frac{i\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{d+f\,(v-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)\Bigg)-$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+c\,(v-2\,s)))^{-h-k+2\,n}\left(i\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((-b-c\,(v-2\,s))\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)+$$

$$2\,i\,(d+f(v-2s))\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)$$

$$\sqrt{-\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}}\Bigg)\Bigg)\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(b z^r + d z + e) \cos^v(c z^r + f z)$

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$$\int z^n \sin(b z^2 + d z + e) \cos^v(c z^2 + f z)\, dz =$$

$$2^{-v-2}\left(i\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{i e}\binom{v}{s}\left(e^{\frac{i(-d-2fs+fv)^2}{-4b-8cs+4cv}}\left(\sum_{q=0}^{n} 2^{q-n}\,(i(-d-2fs+fv))^{n-q}\,(-i(-d+f(v-2s)+2(-b-2cs+cv)z))^{q+1}\right.\right.\right.$$

$$\left(\frac{i(-d+f(v-2s)+2(-b-2cs+cv)z)^2}{-b-2cs+cv}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\left.\Gamma\left(\frac{q+1}{2}, \frac{i(-d+f(v-2s)+2(-b-2cs+cv)z)^2}{-4b-8cs+4cv}\right)\right)(-i(-b-2cs+cv))^{-n-1}+$$

$$e^{i\left(-\frac{(-d-2fs+fv)^2}{-4b-8cs+4cv}-2e+\pi\right)}(i(-b-2cs+cv))^{-n-1}\sum_{q=0}^{n} 2^{q-n}\,(-i(-d-2fs+fv))^{n-q}$$

$$(i(-d+f(v-2s)+2(-b-2cs+cv)z))^{q+1}\left(-\frac{i(-d+f(v-2s)+2(-b-2cs+cv)z)^2}{-b-2cs+cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(-d+f(v-2s)+2(-b-2cs+cv)z)^2}{-4b-8cs+4cv}\right)+$$

$$e^{\frac{i(d+f(v-2s))^2}{-4b+8cs-4cv}}(-i(-b+2cs-cv))^{-n-1}\sum_{q=0}^{n} 2^{q-n}\,(i(-d+2fs-fv))^{n-q}$$

$$(-i(-d+2fs-fv-2bz+4csz-2cvz))^{q+1}\left(\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right)+$$

$$e^{i\left(-\frac{(d+f(v-2s))^2}{-4b+8cs-4cv}-2e+\pi\right)}(i(-b+2cs-cv))^{-n-1}\sum_{q=0}^{n}2^{q-n}(-i(-d+2fs-fv))^{n-q}$$

$$(i(-d+2fs-fv-2bz+4csz-2cvz))^{q+1}\left(-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2},-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right)\Bigg)-i(-ib)^{-n-1}e^{-\frac{1}{4}i\left(\frac{d^2}{b}+4e\right)}\binom{v}{\frac{v}{2}}(v\bmod 2-1)$$

$$\Bigg(e^{\frac{1}{2}i\left(\frac{d^2}{b}+2\pi\right)}\sum_{q=0}^{n}2^{q-n}(id)^{n-q}(-i(d+2bz))^{q+1}\left(\frac{i(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(d+2bz)^2}{4b}\right)+$$

$$e^{2ie}\sum_{q=0}^{n}2^{q-n}(id)^{n-q}(-i(d+2bz))^{q+1}\left(-\frac{i(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d+2bz)^2}{4b}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin\left(\sqrt{z}\,b+dz+e\right)\cos^v\left(\sqrt{z}\,c+fz\right)dz=$$

$$2^{-v-2}\Bigg(i\,4^{-n}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-ie}\binom{v}{s}\Bigg(\frac{1}{(d+2fs-fv)^2}\Bigg(e^{i\left(2e-\frac{(b+2cs-cv)^2}{4d+8fs-4fv}\right)}(i(d+2fs-fv))^{-2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i(b+2cs-cv))^{-h-k+2n}\left(i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((-b-2cs+cv)\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)+$$

$$2i\sqrt{-\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}}\,(d+2fs-fv)$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)\Bigg)\Bigg)\Bigg) +$$

$$e^{-\frac{i(b+c(v-2s))^2}{4(d+f(v-2s))}}\left((d+f(v-2s))^2\right)^{-2n-1}\Bigg(e^{2ie}(-i(d+f(v-2s)))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k$$

$$(i(b+c(v-2s)))^{-h-k+2n}\left(i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((-b-c(v-2s))\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)+$$

$$2i(d+f(v-2s))\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)$$

$$\sqrt{-\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}}\Bigg) - e^{\frac{i(b+c(v-2s))^2}{2(d+f(v-2s))}}(i(d+f(v-2s)))^{2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(b+c(v-2s)))^{-h-k+2n}\left(-i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((-b-c(v-2s))\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)-$$

$$2\,i\,(d+f(v-2s))\sqrt{\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)\Bigg)\Bigg)\Bigg)-$$

$$\frac{1}{(d+2fs-fv)^2}\left(e^{\frac{i(b+2cs-cv)^2}{4d+8fs-4fv}}(-i(d+2fs-fv))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i(b+2cs-cv))^{-h-k+2n}\right.$$

$$\left(-i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((-b-2cs+cv)\Big(b+c(2s-v)+$$

$$2(d+2fs-fv)\sqrt{z}\Big)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)-$$

$$2\,i\,(d+2fs-fv)\sqrt{\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)\Bigg)\Bigg)\Bigg)\Bigg)-$$

$$i\left(-\frac{1}{4}\right)^n d^{-2(n+1)}\,e^{-\frac{i\left(b^2+4de\right)}{4d}}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(e^{2ie}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2n}\left(i\left(b+2d\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$2\,i\,d\sqrt{-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)-$$

$$e^{\frac{i\,b^2}{2\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,d\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(b\left(b+2\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(d\,z)\cos^v\left(c\,z^r+f\,z+g\right)$

01.07.21.2481.01

$$\int z^n \sin(d\,z)\cos^\nu\!\left(c\,z^2+f\,z+g\right)dz = 2^{-\nu-2}\left(i\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{i(\nu-2s)g}\binom{\nu}{s}\left(e^{\frac{i(-d-2fs+f\nu)^2}{4c\nu-8cs}-2ig(\nu-2s)}\left(\sum_{q=0}^{n}2^{q-n}\,(i(-d-2fs+f\nu))^{n-q}\,(-i(-d+f(\nu-2s)+2(c\nu-2cs)z))^{q+1}\right.\right.\right.$$
$$\left.\left(\frac{i(-d+f(\nu-2s)+2(c\nu-2cs)z)^2}{c\nu-2cs}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\frac{i(-d+f(\nu-2s)+2(c\nu-2cs)z)^2}{4c\nu-8cs}\right)\right)$$
$$(-i(c\nu-2cs))^{-n-1}-e^{-\frac{i(-d-2fs+f\nu)^2}{4c\nu-8cs}}\,(i(c\nu-2cs))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i(-d-2fs+f\nu))^{n-q}$$
$$(i(-d+f(\nu-2s)+2(c\nu-2cs)z))^{q+1}\left(-\frac{i(-d+f(\nu-2s)+2(c\nu-2cs)z)^2}{c\nu-2cs}\right)^{\frac{1}{2}(-q-1)}$$
$$\left.\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},-\frac{i(-d+f(\nu-2s)+2(c\nu-2cs)z)^2}{4c\nu-8cs}\right)\right)+$$
$$e^{\frac{i(d+f(\nu-2s))^2}{8cs-4c\nu}}\,(-i(2cs-c\nu))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i(-d+2fs-f\nu))^{n-q}\,(-i(-d+2fs-f\nu+4csz-2c\nu z))^{q+1}$$
$$\left(\frac{i(d+f(\nu-2s)+2(c\nu-2cs)z)^2}{2cs-c\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\frac{i(d+f(\nu-2s)+2(c\nu-2cs)z)^2}{8cs-4c\nu}\right)-$$
$$e^{i\left(-\frac{(d+f(\nu-2s))^2}{8cs-4c\nu}-2g(\nu-2s)\right)}\,(i(2cs-c\nu))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i(-d+2fs-f\nu))^{n-q}$$
$$(i(-d+2fs-f\nu+4csz-2c\nu z))^{q+1}\left(-\frac{i(d+f(\nu-2s)+2(c\nu-2cs)z)^2}{2cs-c\nu}\right)^{\frac{1}{2}(-q-1)}$$
$$\left.\left.\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},-\frac{i(d+f(\nu-2s)+2(c\nu-2cs)z)^2}{8cs-4c\nu}\right)\right)\right)-$$
$$\left.2\,d^{-2n-1}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma(n+1,i\,d\,z)\,(-i\,d)^n+(i\,d)^n\,\Gamma(n+1,-i\,d\,z)\right)(1-\nu \bmod 2)\right)/;\ n\in\mathbb{N}\bigwedge \nu\in\mathbb{N}^+$$

01.07.21.2482.01

$$\int z^n \sin(d\,z)\cos^\nu\!\left(\sqrt{z}\,c+f\,z+g\right)dz =$$
$$2^{-\nu-2}\left(i\,4^{-n}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i(2gs-g\nu)}\binom{\nu}{s}\left(\frac{1}{(d+2fs-f\nu)^2}\left(e^{i\left(g(4s-2\nu)-\frac{(2cs-c\nu)^2}{4d+8fs-4f\nu}\right)}\,(i(d+2fs-f\nu))^{-2n}\right.\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(2\,c\,s-c\,v))^{-h-k+2\,n}\left(i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((c\,v-2\,c\,s)\left(c\,(2\,s-v)+\right.$$

$$\left.2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)+$$

$$2\,i\sqrt{-\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}}\;(d+2\,f\,s-f\,v)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,(d+f\,(v-2\,s))}}\left((d+f\,(v-2\,s))^2\right)^{-2\,n-1}\Bigg((-i\,(d+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}$$

$$\left(i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,(d+f\,(v-2\,s))\sqrt{-\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{d+f\,(v-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)-c\,(v-2\,s)\left(c\,(v-2\,s)+\right.$$

$$\left.2\,(d+f\,(v-2\,s))\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)\Bigg)-$$

$$e^{\frac{1}{2}\,i\left(\frac{c^2\,(v-2\,s)^2}{d+f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}\,(i\,(d+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(v-2\,s))^{-h-k+2\,n}$$

$$\left(-i\left(c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(-c(v-2s)\left(c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)-$$

$$2i(d+f(v-2s))\sqrt{\frac{i\left(c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)\right)\right)\right)-$$

$$\frac{1}{(d+2fs-fv)^2}\left(e^{\frac{i(2cs-cv)^2}{4d+8fs-4fv}}(-i(d+2fs-fv))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(2cs-cv))^{-h-k+2n}\right.$$

$$\left(-i\left(c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((cv-2cs)\left(c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)-$$

$$2i(d+2fs-fv)\sqrt{\frac{i\left(c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}}$$

$$\left.\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)\right)\right)\right)\right)-$$

Involving $z^n \sin(d z + e) \cos^\nu(c z^r + f z + g)$

01.07.21.2483.01

$$\int z^n \sin(d z + e) \cos^\nu(c z^2 + f z + g)\, dz = 2^{-\nu-2} \Bigg(i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i(-e+2 g s - g \nu)} \binom{\nu}{s} \Bigg(e^{\frac{i(-d-2 f s + f \nu)^2}{4 c \nu - 8 c s} - 2 i g (\nu - 2 s)} \Bigg(\sum_{q=0}^{n} 2^{q-n} (i(-d - 2 f s + f \nu))^{n-q} (-i(-d + f(\nu - 2 s) + 2(c \nu - 2 c s) z))^{q+1}$$

$$\left(\frac{i(-d + f(\nu - 2 s) + 2(c \nu - 2 c s) z)^2}{c \nu - 2 c s} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-d + f(\nu - 2 s) + 2(c \nu - 2 c s) z)^2}{4 c \nu - 8 c s} \right) \Bigg)$$

$$(-i(c \nu - 2 c s))^{-n-1} + e^{i\left(-\frac{(-d-2 f s + f \nu)^2}{4 c \nu - 8 c s} - 2 e + \pi\right)} (i(c \nu - 2 c s))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i(-d - 2 f s + f \nu))^{n-q}$$

$$(i(-d + f(\nu - 2 s) + 2(c \nu - 2 c s) z))^{q+1} \left(-\frac{i(-d + f(\nu - 2 s) + 2(c \nu - 2 c s) z)^2}{c \nu - 2 c s} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-d + f(\nu - 2 s) + 2(c \nu - 2 c s) z)^2}{4 c \nu - 8 c s} \right) \Bigg) +$$

$$e^{\frac{i(d + f(\nu - 2 s))^2}{8 c s - 4 c \nu}} (-i(2 c s - c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i(-d + 2 f s - f \nu))^{n-q} (-i(-d + 2 f s - f \nu + 4 c s z - 2 c \nu z))^{q+1}$$

$$\left(\frac{i(d + f(\nu - 2 s) + 2(c \nu - 2 c s) z)^2}{2 c s - c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d + f(\nu - 2 s) + 2(c \nu - 2 c s) z)^2}{8 c s - 4 c \nu} \right) +$$

$$e^{i\left(-\frac{(d + f(\nu - 2 s))^2}{8 c s - 4 c \nu} - 2 e - 2 g(\nu - 2 s) + \pi\right)} (i(2 c s - c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i(-d + 2 f s - f \nu))^{n-q}$$

$$(i(-d + 2 f s - f \nu + 4 c s z - 2 c \nu z))^{q+1} \left(-\frac{i(d + f(\nu - 2 s) + 2(c \nu - 2 c s) z)^2}{2 c s - c \nu} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d + f(\nu - 2 s) + 2(c \nu - 2 c s) z)^2}{8 c s - 4 c \nu} \right) \Bigg) \Bigg) -$$

$$2 d^{-2 n - 1} e^{-i e} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(n+1, i d z) (-i d)^n + (i d)^n e^{2 i e} \Gamma(n+1, -i d z) \right) (1 - \nu \bmod 2) \Bigg) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2484.01

$$\int z^n \sin(d z + e) \cos^\nu\left(\sqrt{z}\ c + f z + g\right) dz = 2^{-\nu-2} \left(i\, 4^{-n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i(e+2 g s - g \nu)} \binom{\nu}{s} \left(\frac{1}{(d + 2 f s - f \nu)^2} \left(e^{i\left(-\frac{(2 c s - c \nu)^2}{4 d + 8 f s - 4 f \nu} + 2 e + g (4 s - 2 \nu)\right)} (i (d + 2 f s - f \nu))^{-2n} \right.\right.\right.$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i (2 c s - c \nu))^{-h-k+2n} \left(i \left(c (2 s - \nu) + 2 (d + 2 f s - f \nu) \sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i \left(c (2 s - \nu) + 2 (d + 2 f s - f \nu) \sqrt{z}\right)^2}{d + 2 f s - f \nu}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((c \nu - 2 c s) \left(c (2 s - \nu) + \right.\right.$$

$$\left. 2 (d + 2 f s - f \nu) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1), -\frac{i \left(c (2 s - \nu) + 2 (d + 2 f s - f \nu) \sqrt{z}\right)^2}{4 d + 8 f s - 4 f \nu}\right) +$$

$$2 i \sqrt{-\frac{i \left(c (2 s - \nu) + 2 (d + 2 f s - f \nu) \sqrt{z}\right)^2}{d + 2 f s - f \nu}}\ (d + 2 f s - f \nu)$$

$$\left.\left.\left. \Gamma\left(\frac{1}{2}(h + k + 2), -\frac{i \left(c (2 s - \nu) + 2 (d + 2 f s - f \nu) \sqrt{z}\right)^2}{4 d + 8 f s - 4 f \nu}\right)\right)\right) +$$

$$e^{-\frac{i c^2 (\nu - 2 s)^2}{4 (d + f (\nu - 2 s))}} \left((d + f (\nu - 2 s))^2\right)^{-2n-1} \left(e^{2 i e} (-i (d + f (\nu - 2 s)))^{2n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i c (\nu - 2 s))^{-h-k+2n} \right.$$

$$\left(i \left(c (\nu - 2 s) + 2 (d + f (\nu - 2 s)) \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(c (\nu - 2 s) + 2 (d + f (\nu - 2 s)) \sqrt{z}\right)^2}{d + f (\nu - 2 s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(2 i (d + f (\nu - 2 s)) \sqrt{-\frac{i \left(c (\nu - 2 s) + 2 (d + f (\nu - 2 s)) \sqrt{z}\right)^2}{d + f (\nu - 2 s)}} \right.$$

$$\Gamma\left(\frac{1}{2}(h + k + 2), -\frac{i \left(c (\nu - 2 s) + 2 (d + f (\nu - 2 s)) \sqrt{z}\right)^2}{4 (d + f (\nu - 2 s))}\right) - c (\nu - 2 s) \left(c (\nu - 2 s) + \right.$$

$$2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,s))}\right)\Bigg)-$$

$$e^{\frac{1}{2}\,i\left(\frac{c^2\,(v-2\,s)^2}{d+f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}\,(i\,(d+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(v-2\,s))^{-h-k+2\,n}$$

$$\left(-i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)\right)^{h+k}\left(\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(-c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,s))}\right)-$$

$$2\,i\,(d+f\,(v-2\,s))\sqrt{\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d+f\,(v-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,s))}\right)\Bigg)\Bigg)-$$

$$\frac{1}{(d+2\,f\,s-f\,v)^2}\Bigg(e^{\frac{i\,(2\,c\,s-c\,v)^2}{4\,d+8\,f\,s-4\,f\,v}}\,(-i\,(d+2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(2\,c\,s-c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)\right)^{h+k}\left(\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)^2}{d+2\,f\,s-f\,v}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c\,v-2\,c\,s)\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\,\sqrt{z}\,\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)-$$

$$2\,i\,(d+2\,f\,s-f\,v)\sqrt{\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}}$$

$$\left.\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,d+8\,f\,s-4\,f\,v}\right)\right)\right)\right)\right)-$$

$$2\,d^{-2\,n-1}\,e^{-i\,e}\binom{v}{\frac{v}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^n+(i\,d)^n\,e^{2\,i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)$$

$$\left.(1-v \bmod 2)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin\left(b\,z^r\right)\cos^v\left(c\,z^r+f\,z+g\right)$

01.07.21.2485.01

$$\int z^n \sin(b z^2) \cos^\nu(c z^2 + f z + g)\, dz = 2^{-\nu-2} \left(i z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left((i b z^2)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) - (-i b z^2)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2) \left(b^2 z^4\right)^{\frac{1}{2}(-n-1)} + i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i(2 g s - g \nu)} \binom{\nu}{s} \left(e^{\frac{i (f \nu - 2 f s)^2}{-4 b - 8 c s + 4 c \nu} - 2 i g (\nu - 2 s)} \left(\sum_{q=0}^{n} 2^{q-n} (i (f \nu - 2 f s))^{n-q} (-i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z))^{q+1} \left(\frac{i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-b - 2 c s + c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-4 b - 8 c s + 4 c \nu} \right) \right) (-i (-b - 2 c s + c \nu))^{-n-1} + e^{i\left(\pi - \frac{(f \nu - 2 f s)^2}{-4 b - 8 c s + 4 c \nu}\right)} (i (-b - 2 c s + c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (f \nu - 2 f s))^{n-q} (i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z))^{q+1} \left(-\frac{i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-b - 2 c s + c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f (\nu - 2 s) + 2 (-b - 2 c s + c \nu) z)^2}{-4 b - 8 c s + 4 c \nu} \right) + e^{\frac{i f^2 (\nu - 2 s)^2}{-4 b + 8 c s - 4 c \nu}} (-i (-b + 2 c s - c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i (2 f s - f \nu))^{n-q} (-i (2 f s + 4 c z s - f \nu - 2 b z - 2 c \nu z))^{q+1} \left(\frac{i (f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{-b + 2 c s - c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{-4 b + 8 c s - 4 c \nu} \right) + e^{i\left(-\frac{f^2 (\nu - 2 s)^2}{-4 b + 8 c s - 4 c \nu} - 2 g (\nu - 2 s) + \pi\right)} (i (-b + 2 c s - c \nu))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (2 f s - f \nu))^{n-q} (i (2 f s + 4 c z s - f \nu - 2 b z - 2 c \nu z))^{q+1} \left(-\frac{i (f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{-b + 2 c s - c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{-4 b + 8 c s - 4 c \nu} \right) \right) \right) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2486.01

$$\int z^n \sin(b \sqrt{z}) \cos^\nu(\sqrt{z}\, c + f z + g)\, dz = 2^{-\nu-2} \left(i \left(-\frac{1}{4}\right)^n f^{-2(n+1)} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i(2 g s - g \nu)} (\nu - 2 s)^{-2(n+1)} \binom{\nu}{s} \left(e^{-\frac{i (b + c (\nu - 2 s))^2}{4 f (\nu - 2 s)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b + c (\nu - 2 s)))^{-h-k+2n} \right.\right.\right.$$

$$\left(i\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c(v-2s))\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)+$$

$$2fi(v-2s)\sqrt{-\frac{i\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.-\frac{i\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\right)-e^{\frac{1}{2}i\left(\frac{(b+c(v-2s))^2}{f(v-2s)}+8gs-4gv\right)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(b+c(v-2s)))^{-h-k+2n}\left(-i\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((-b-c(v-2s))\left(b+c(v-2s)+\right.\right.$$

$$\left.2f(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)-$$

$$2if(v-2s)\sqrt{\frac{i\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.\left.\frac{i\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\right)\right)-$$

$$e^{\frac{i(b+2cs-cv)^2}{8fs-4fv}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(b+2cs-cv))^{-h-k+2n}\left(-i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg((-b-2cs+cv)$$

$$\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)-$$

$$2i(2fs-fv)\sqrt{\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)\Bigg)\Bigg)+e^{i\left(g(4s-2v)-\frac{(b+2cs-cv)^2}{8fs-4fv}\right)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i(b+2cs-cv))^{-h-k+2n}\left(i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b-2cs+cv)\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),$$

$$-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\Bigg)+2i\sqrt{-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}}$$

$$(2fs-fv)\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)\Bigg)\Bigg)\Bigg)-$$

$$4i(-1)^n b^{-2(n+1)}\binom{v}{\frac{v}{2}}\left(\Gamma\left(2(n+1),\ -i\,b\sqrt{z}\right)-\Gamma\left(2(n+1),\ i\,b\sqrt{z}\right)\right)$$

$$(1-$$

$$v \bmod 2)\Bigg)\ /;\ n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(b z^r + e) \cos^v(c z^r + f z + g)$

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$$\int z^n \sin(b z^2 + e) \cos^v(c z^2 + f z + g) \, dz = 2^{-v-2} \left(i \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i(-e+2 g s - g v)} \binom{v}{s} \left(e^{\frac{i (f v - 2 f s)^2}{-4 b - 8 c s + 4 c v} - 2 i g (v - 2 s)} \left(\sum_{q=0}^{n} 2^{q-n} (i (f v - 2 f s))^{n-q} (-i (f (v - 2 s) + 2 (-b - 2 c s + c v) z))^{q+1} \left(\frac{i (f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-b - 2 c s + c v} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-4 b - 8 c s + 4 c v} \right) \right) (-i (-b - 2 c s + c v))^{-n-1} + e^{i \left(-\frac{(f v - 2 f s)^2}{-4 b - 8 c s + 4 c v} - 2 e + \pi \right)} (i (-b - 2 c s + c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (f v - 2 f s))^{n-q} (i (f (v - 2 s) + 2 (-b - 2 c s + c v) z))^{q+1} \left(-\frac{i (f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-b - 2 c s + c v} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f (v - 2 s) + 2 (-b - 2 c s + c v) z)^2}{-4 b - 8 c s + 4 c v} \right) + e^{\frac{i f^2 (v - 2 s)^2}{-4 b + 8 c s - 4 c v}} (-i (-b + 2 c s - c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i (2 f s - f v))^{n-q} (-i (2 f s + 4 c z s - f v - 2 b z - 2 c v z))^{q+1} \left(\frac{i (f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-b + 2 c s - c v} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-4 b + 8 c s - 4 c v} \right) + e^{i \left(-\frac{f^2 (v - 2 s)^2}{-4 b + 8 c s - 4 c v} - 2 g (v - 2 s) - 2 e + \pi \right)} (i (-b + 2 c s - c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (2 f s - f v))^{n-q} (i (2 f s + 4 c z s - f v - 2 b z - 2 c v z))^{q+1} \left(-\frac{i (f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-b + 2 c s - c v} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{-4 b + 8 c s - 4 c v} \right) \right) - e^{-\frac{1}{2} i (2 e + \pi)} z^{n+1} \left(b^2 z^4 \right)^{\frac{1}{2}(-n-1)} \binom{v}{\frac{v}{2}} \left(e^{2 i e} \left(i b z^2 \right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i b z^2 \right) - \left(-i b z^2 \right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, i b z^2 \right) \right) (1 - v \bmod 2) \right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

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$$\int z^n \sin\left(\sqrt{z}\; b+e\right)\cos^{\nu}\left(\sqrt{z}\; c+f\,z+g\right) dz = 2^{-\nu-2}\left(4\,(-1)^n\, b^{-2(n+1)}\, e^{-\frac{1}{2}i(2e+\pi)}\binom{\nu}{\frac{\nu}{2}}\left(e^{2ie}\,\Gamma\left(2(n+1),\,-i\,b\sqrt{z}\right)-\Gamma\left(2(n+1),\,i\,b\sqrt{z}\right)\right)(1-\nu \bmod 2)-\right.$$

$$i\left(-\frac{1}{4}\right)^n f^{-2(n+1)}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-i(e+2gs-g\nu)}\,(\nu-2s)^{-2(n+1)}\binom{\nu}{s}$$

$$\left(e^{-\frac{i(b+c(\nu-2s))^2}{4f(\nu-2s)}}\left(e^{\frac{1}{2}i\left(\frac{(b+c(\nu-2s))^2}{f(\nu-2s)}+8gs-4g\nu\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+c(\nu-2s)))^{-h-k+2n}\right.\right.$$

$$\left(-i\left(b+c(\nu-2s)+2f(\nu-2s)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+c(\nu-2s)+2f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b-c(\nu-2s))\left(b+c(\nu-2s)+2f(\nu-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+c(\nu-2s)+2f(\nu-2s)\sqrt{z}\right)^2}{4f(\nu-2s)}\right)-2\,i\,f(\nu-2s)$$

$$\sqrt{\frac{i\left(b+c(\nu-2s)+2f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+c(\nu-2s)+2f(\nu-2s)\sqrt{z}\right)^2}{4f(\nu-2s)}\right)\right)\right)-$$

$$e^{2ie}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+c(\nu-2s)))^{-h-k+2n}\left(i\left(b+c(\nu-2s)+2f(\nu-2s)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c(\nu-2s)+2f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((-b-c(\nu-2s))\left(b+c(\nu-2s)+\right.\right.$$

$$2\,f\,(v-2\,s)\,\sqrt{z}\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,i\,(v-2\,s)\,\sqrt{-\frac{i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.\left.-\frac{i\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)+$$

$$e^{\frac{i\,(b+2\,c\,s-c\,v)^2}{8\,f\,s-4\,f\,v}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+2\,c\,s-c\,v))^{-h-k+2\,n}\left(-i\left(b+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Big((-b-2\,c\,s+c\,v)$$

$$\left(b+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)-$$

$$2\,i\,(2\,f\,s-f\,v)\,\sqrt{\frac{i\left(b+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.\frac{i\left(b+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)\right)-e^{i\left(-\frac{(b+2\,c\,s-c\,v)^2}{8\,f\,s-4\,f\,v}+2\,e+g\,(4\,s-2\,v)\right)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b+2\,c\,s-c\,v))^{-h-k+2\,n}\left(i\left(b+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b-2cs+cv)\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)+2i\sqrt{-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}}$$

$$\left.\left.\left.\left.(2fs-fv)\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)\right)\right)\right)\right) /; n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(b z^r + d z) \cos^v(c z^r + f z + g)$

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$$\int z^n \sin\left(b z^2+d z\right)\cos^v\left(c z^2+f z+g\right)dz ==$$

$$2^{-v-2}\left(i\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-i(2gs-gv)}\binom{v}{s}\left(e^{\frac{i(-d-2fs+fv)^2}{-4b-8cs+4cv}-2ig(v-2s)}\left(\sum_{q=0}^{n}2^{q-n}(i(-d-2fs+fv))^{n-q}(-i(-d+f(v-2s)+\right.\right.\right.$$

$$2(-b-2cs+cv)z))^{q+1}\left(\frac{i(-d+f(v-2s)+2(-b-2cs+cv)z)^2}{-b-2cs+cv}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\left.\left.\Gamma\left(\frac{q+1}{2},\frac{i(-d+f(v-2s)+2(-b-2cs+cv)z)^2}{-4b-8cs+4cv}\right)\right)(-i(-b-2cs+cv))^{-n-1}+$$

$$e^{i\left(\pi-\frac{(-d-2fs+fv)^2}{-4b-8cs+4cv}\right)}(i(-b-2cs+cv))^{-n-1}\sum_{q=0}^{n}2^{q-n}(-i(-d-2fs+fv))^{n-q}$$

$$(i(-d+f(v-2s)+2(-b-2cs+cv)z))^{q+1}\left(-\frac{i(-d+f(v-2s)+2(-b-2cs+cv)z)^2}{-b-2cs+cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(-d+f(v-2s)+2(-b-2cs+cv)z)^2}{-4b-8cs+4cv}\right)+$$

$$e^{\frac{i(d+f(v-2s))^2}{-4b+8cs-4cv}}(-i(-b+2cs-cv))^{-n-1}\sum_{q=0}^{n}2^{q-n}(i(-d+2fs-fv))^{n-q}$$

$$(-i(-d+2fs-fv-2bz+4csz-2cvz))^{q+1}\left(\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right)+$$

$$e^{i\left(-\frac{(d+f(v-2s))^2}{-4b+8cs-4cv}-2g(v-2s)+\pi\right)}(i(-b+2cs-cv))^{-n-1}\sum_{q=0}^{n}2^{q-n}(-i(-d+2fs-fv))^{n-q}$$

$$(i(-d+2fs-fv-2bz+4csz-2cvz))^{q+1}\left(-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right)\Bigg)-i(-ib)^{-n-1}e^{-\frac{id^2}{4b}}\binom{v}{\frac{v}{2}}$$

$$(v \bmod 2-1)\left(\sum_{q=0}^{n}2^{q-n}(id)^{n-q}(-i(d+2bz))^{q+1}\left(-\frac{i(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d+2bz)^2}{4b}\right)-\right.$$

$$\left.e^{\frac{id^2}{2b}}\sum_{q=0}^{n}2^{q-n}(id)^{n-q}(-i(d+2bz))^{q+1}\left(\frac{i(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(d+2bz)^2}{4b}\right)\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin\left(\sqrt{z}\,b+dz\right)\cos^v\left(\sqrt{z}\,c+fz+g\right)dz=$$

$$2^{-v-2}\left(i\,4^{-n}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i(2gs-gv)}\binom{v}{s}\left(\frac{1}{(d+2fs-fv)^2}\left(e^{i\left(g(4s-2v)-\frac{(b+2cs-cv)^2}{4d+8fs-4fv}\right)}(i(d+2fs-fv))^{-2n}\right.\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i(b+2cs-cv))^{-h-k+2n}\left(i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left((-b-2cs+cv)\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)+$$

$$2i\sqrt{-\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}}\,(d+2fs-fv)$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)\Bigg)\Bigg)\Bigg)+$$

$$e^{-\frac{i(b+c(v-2s))^2}{4(d+f(v-2s))}}\left((d+f(v-2s))^2\right)^{-2n-1}\Bigg((-i(d+f(v-2s)))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k$$

$$(i(b+c(v-2s)))^{-h-k+2n}\left(i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((-b-c(v-2s))\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)+$$

$$2i(d+f(v-2s))\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)$$

$$\sqrt{-\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}}\Bigg)-$$

$$e^{\frac{1}{2}i\left(\frac{(b+c(v-2s))^2}{d+f(v-2s)}+8gs-4gv\right)}(i(d+f(v-2s)))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(b+c(v-2s)))^{-h-k+2n}$$

$$\left(-i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((-b-c(v-2s))\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)-$$

$$2\,i(d+f(v-2s))\sqrt{\frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)\right)\right)\right)-$$

$$\frac{1}{(d+2fs-fv)^2}\left(e^{\frac{i(b+2cs-cv)^2}{4d+8fs-4fv}}(-i(d+2fs-fv))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i(b+2cs-cv))^{-h-k+2n}\right.$$

$$\left(-i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((-b-2cs+cv)\left(b+c(2s-v)+\right.\right.$$

$$\left.2(d+2fs-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)-$$

$$2\,i(d+2fs-fv)\sqrt{\frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{d+2fs-fv}}$$

$$\left.\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+c(2s-v)+2(d+2fs-fv)\sqrt{z}\right)^2}{4d+8fs-4fv}\right)\right)\right)\right)\right)-$$

$$i\left(-\frac{1}{4}\right)^n d^{-2(n+1)}\,e^{-\frac{i b^2}{4d}}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2n}\left(i\left(b+2d\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(b+2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$2\,i\,d\sqrt{-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)-$$

$$e^{\frac{i\,b^2}{2\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,d\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(b\left(b+2\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin\left(b\,z^r+d\,z+e\right)\cos^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n\sin\left(b\,z^2+d\,z+e\right)\cos^v\left(c\,z^2+f\,z+g\right)dz==$$

$$2^{-v-2}\left(i\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i(-e+2\,g\,s-g\,v)}\binom{v}{s}\left(e^{\frac{i(-d-2\,f\,s+f\,v)^2}{-4\,b-8\,c\,s+4\,c\,v}-2\,i\,g\,(v-2\,s)}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(-d-2\,f\,s+f\,v))^{n-q}\right.\right.\right.$$

$$(-i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z))^{q+1}\left(\frac{i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z)^2}{-b-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z)^2}{-4\,b-8\,c\,s+4\,c\,v}\right)\right)(-i\,(-b-2\,c\,s+c\,v))^{-n-1}+$$

$$e^{i\left(-\frac{(-d-2\,f\,s+f\,v)^2}{-4\,b-8\,c\,s+4\,c\,v}-2\,e+\pi\right)}(i\,(-b-2\,c\,s+c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(-d-2\,f\,s+f\,v))^{n-q}$$

$$(i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z))^{q+1}\left(-\frac{i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z)^2}{-b-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(-d+f\,(v-2\,s)+2\,(-b-2\,c\,s+c\,v)\,z)^2}{-4\,b-8\,c\,s+4\,c\,v}\right)+$$

$$e^{\frac{i\,(d+f\,(v-2\,s))^2}{-4\,b+8\,c\,s-4\,c\,v}}(-i\,(-b+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i\,(-d+2\,f\,s-f\,v))^{n-q}$$

$$(-i(-d+2fs-fv-2bz+4csz-2cvz))^{q+1}\left(\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right)+$$

$$e^{i\left(-\frac{(d+f(v-2s))^2}{-4b+8cs-4cv}-2e-2g(v-2s)+\pi\right)}(i(-b+2cs-cv))^{-n-1}\sum_{q=0}^{n}2^{q-n}(-i(-d+2fs-fv))^{n-q}$$

$$(i(-d+2fs-fv-2bz+4csz-2cvz))^{q+1}\left(-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2},-\frac{i(d+f(v-2s)+2(b-2cs+cv)z)^2}{-4b+8cs-4cv}\right)\Bigg)\Bigg)-i(-ib)^{-n-1}e^{-\frac{1}{4}i\left(\frac{d^2}{b}+4e\right)}\binom{v}{\frac{v}{2}}(v\bmod 2-1)$$

$$\Bigg(e^{\frac{1}{2}i\left(\frac{d^2}{b}+2\pi\right)}\sum_{q=0}^{n}2^{q-n}(id)^{n-q}(-i(d+2bz))^{q+1}\left(\frac{i(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(d+2bz)^2}{4b}\right)+$$

$$e^{2ie}\sum_{q=0}^{n}2^{q-n}(id)^{n-q}(-i(d+2bz))^{q+1}\left(-\frac{i(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d+2bz)^2}{4b}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

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$$\int z^n\sin\left(\sqrt{z}\,b+dz+e\right)\cos^v\left(\sqrt{z}\,c+fz+g\right)dz = -i(-1)^n\,2^{-2n-v-2}\,d^{-2(n+1)}\,e^{-\frac{i\left(b^2+4de\right)}{4d}}$$

$$\Bigg(d^2\,e^{\frac{i\left(b^2+4de\right)}{4d}}\Bigg(\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i(e+2gs-gv)}\binom{v}{s}\Bigg(e^{-\frac{i(b-2cs+cv)^2}{4(d-2fs+fv)}}\left((d-2fs+fv)^2\right)^{-2n-1}\Bigg(e^{\frac{1}{2}i\left(\frac{(b-2cs+cv)^2}{d-2fs+fv}+8gs-4gv\right)}(i(d-2fs+fv))^{2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i(b-2cs+cv))^{-h-k+2n}\left(-i\left(b+c(v-2s)+2(d-2fs+fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c(v-2s)+2(d-2fs+fv)\sqrt{z}\right)^2}{d-2fs+fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(-(b-2cs+cv)\left(b+c(v-2s)+2(d-2fs+fv)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(b+c(v-2s)+2(d-2fs+fv)\sqrt{z}\right)^2}{4(d-2fs+fv)}\right)-$$

$$2\,i\,(d-2\,f\,s+f\,v)\sqrt{\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\sqrt{z}\right)^2}{d-2\,f\,s+f\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\sqrt{z}\right)^2}{4\,(d-2\,f\,s+f\,v)}\right)\right)-e^{2\,i\,e}\,(-i\,(d-2\,f\,s+f\,v))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b-2\,c\,s+c\,v))^{-h-k+2\,n}\left(i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\sqrt{z}\right)^2}{d-2\,f\,s+f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,(d-2\,f\,s+f\,v)\sqrt{-\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\sqrt{z}\right)^2}{d-2\,f\,s+f\,v}}\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\sqrt{z}\right)^2}{4\,(d-2\,f\,s+f\,v)}\right)-$$

$$(b-2\,c\,s+c\,v)\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\sqrt{z}\right)$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+c\,(v-2\,s)+2\,(d-2\,f\,s+f\,v)\sqrt{z}\right)^2}{4\,(d-2\,f\,s+f\,v)}\right)\right)\right)+$$

$$\frac{1}{(d+2\,f\,s-f\,v)^2}\left(e^{\frac{i\,(b+2\,c\,s-c\,v)^2}{4\,(d+2\,f\,s-f\,v)}}\,(-i\,(d+2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b+2\,c\,s-c\,v))^{-h-k+2\,n}\right.$$

$$\left(-i\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(-(b+2\,c\,s-c\,v)\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,(d+2\,f\,s-f\,v)}\right)-$$

$$2\,i\,(d+2\,f\,s-f\,v)\sqrt{\frac{i\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,(d+2\,f\,s-f\,v)}\right)\Bigg)\Bigg)\Bigg)-$$

$$\frac{1}{(d+2\,f\,s-f\,v)^2}\left(e^{\frac{1}{4}i\left(-\frac{(b+2\,c\,s-c\,v)^2}{d+2\,f\,s-f\,v}+8\,e+8\,g\,(2\,s-v)\right)}\,(i\,(d+2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(i\,(b+2\,c\,s-c\,v))^{-h-k+2\,n}\left(i\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,(d+2\,f\,s-f\,v)\sqrt{-\frac{i\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{d+2\,f\,s-f\,v}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,(d+2\,f\,s-f\,v)}\right)-$$

$$(b+2\,c\,s-c\,v)\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(b+c\,(2\,s-v)+2\,(d+2\,f\,s-f\,v)\sqrt{z}\right)^2}{4\,(d+2\,f\,s-f\,v)}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$(i\,d)^{2\,n}-e^{\frac{i\,b^2}{2\,d}}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}-(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\left(b+2\,d\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}$$

$$\binom{n}{k}$$

$$\left(b\left(b+2\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\,\sqrt{\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$e^{2\,i\,e}\binom{\nu}{\frac{\nu}{2}}(\nu\bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}-(-1)^{k-h}\,4^k\,(i\,b)^{-h-k+2\,n}\left(i\left(b+2\,d\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(b\left(b+2\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\,\sqrt{-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge\nu\in\mathbb{N}^+$$

Involving powers of sin and power

Involving $z^{\alpha-1}\sin^{\mu}(c\,z)\cos^{\nu}(a\,z)$

01.07.21.2493.01

$$\int z^{\alpha-1}\sin^m(c\,z)\cos^\nu(a\,z)\,dz = 2^{-m-\nu}z^\alpha\left(\frac{(m \bmod 2-1)(\nu \bmod 2-1)}{\alpha}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}} + i^{-m}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\left(c^2(m-2k)^2z^2\right)^{-\alpha}\binom{m}{k}\right.$$
$$\left((-1)^m\,\Gamma(\alpha, i\,c\,(m-2k)\,z)\,(i\,c\,(2k-m)\,z)^\alpha + (i\,c\,(m-2k)\,z)^\alpha\,\Gamma(\alpha, i\,c\,(2k-m)\,z)\right) + \binom{m}{\frac{m}{2}}(m \bmod 2-1)$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(a^2(\nu-2s)^2z^2\right)^{-\alpha}\binom{\nu}{s}\left(\Gamma(\alpha, i\,a\,(\nu-2s)\,z)\,(i\,a\,(2s-\nu)\,z)^\alpha + (i\,a\,(\nu-2s)\,z)^\alpha\,\Gamma(\alpha, i\,a\,(2s-\nu)\,z)\right) -$$
$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left((2ck-cm-2as+a\nu)^2z^2\right)^{-\alpha}\left((c(m-2k)+a(\nu-2s))^2z^2\right)^{-\alpha}\binom{\nu}{s}$$
$$\Big(\big(\Gamma(\alpha, i\,(2ck-cm-2as+a\nu)\,z)\,(-i\,(2ck-cm-2as+a\nu)\,z)^\alpha + (-1)^m\,(i\,(2ck-cm-2as+a\nu)\,z)^\alpha$$
$$\Gamma(\alpha, -i\,(2ck-cm-2as+a\nu)\,z)\big)\left((-2ck+cm-2as+a\nu)^2z^2\right)^\alpha +$$
$$(-1)^m\,(i\,(2ck-cm+2as-a\nu)\,z)^\alpha\left((2ck-cm-2as+a\nu)^2z^2\right)^\alpha\,\Gamma(\alpha, -i\,(2ck-cm+2as-a\nu)\,z) +$$
$$(-i\,(2ck-cm+2as-a\nu)\,z)^\alpha\left((2ck-cm-2as+a\nu)^2z^2\right)^\alpha$$
$$\left.\Gamma(\alpha, i\,(2ck-cm+2as-a\nu)\,z)\Big)\right)\ /;\ m\in\mathbb{N}^+\bigwedge \nu\in\mathbb{N}^+$$

01.07.21.2494.01

$$\int z^n\sin^\mu(c\,z)\cos^\nu(a\,z)\,dz = 2^{-\nu}\binom{\nu}{\frac{\nu}{2}}n!\,(1-\nu \bmod 2)\sin^\mu(c\,z)$$
$$\left(1-e^{2icz}\right)^{-\mu}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-i\,c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{\mu}{2},\ldots,-\frac{\mu}{2},-\mu;1-\frac{\mu}{2},\ldots,1-\frac{\mu}{2};e^{2icz}\right)+$$
$$2^{-\nu}n!\sin^\mu(c\,z)\left(1-e^{2icz}\right)^{-\mu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{i\,a\,(\nu-2s)\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(i\,a\,(\nu-2s)-i\,c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\right.$$
$$\left(-\frac{c\,\mu-a(\nu-2s)}{2c},\ldots,-\frac{c\,\mu-a(\nu-2s)}{2c},-\mu;1-\frac{c\,\mu-a(\nu-2s)}{2c},\ldots,1-\frac{c\,\mu-a(\nu-2s)}{2c};e^{2icz}\right)+$$
$$e^{-i\,a\,(\nu-2s)\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-i\,a\,(\nu-2s)-i\,c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{a(\nu-2s)+c\,\mu}{2c},\ldots,-\frac{a(\nu-2s)+c\,\mu}{2c},\right.$$
$$\left.\left.-\mu;1-\frac{a(\nu-2s)+c\,\mu}{2c},\ldots,1-\frac{a(\nu-2s)+c\,\mu}{2c};e^{2icz}\right)\right)\ /;\ \nu\in\mathbb{N}\land n\in\mathbb{N}$$

01.07.21.2495.01

$$\int z^n \sin^m(c\,z)\cos^\nu(a\,z)\,dz = 2^{-m}\,n!\binom{m}{\frac{m}{2}}(1-m \bmod 2)\cos^\nu(a\,z)\left(1+e^{2\,i\,a\,z}\right)^{-\nu}\sum_{p=0}^{n}\frac{(-1)^p\,z^{n-p}}{(n-p)!\,(-i\,a\,\nu)^{p+1}}\,{}_{p+2}F_{p+1}\left(-\frac{\nu}{2},\,\ldots,\,-\frac{\nu}{2},\,-\nu;\,1-\frac{\nu}{2},\,\ldots,\,1-\frac{\nu}{2};\,-e^{2\,i\,a\,z}\right)+$$
$$2^{-m}\,n!\cos^\nu(a\,z)\left(1+e^{2\,i\,a\,z}\right)^{-\nu}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{m+s}\binom{m}{s}\left(e^{i\frac{m\pi}{2}+i\,c\,(m-2\,s)\,z}\sum_{p=0}^{n}\frac{(-1)^p\,z^{n-p}}{(n-p)!\,(i\,c\,(m-2\,s)-i\,a\,\nu)^{p+1}}\,{}_{p+2}F_{p+1}\right.$$
$$\left(\frac{c\,(m-2\,s)-a\,\nu}{2\,a},\,\ldots,\,\frac{c\,(m-2\,s)-a\,\nu}{2\,a},\,-\nu;\,1+\frac{c\,(m-2\,s)-a\,\nu}{2\,a},\,\ldots,\,1+\frac{c\,(m-2\,s)-a\,\nu}{2\,a};\,-e^{2\,i\,a\,z}\right)+$$
$$e^{-i\frac{m\pi}{2}-i\,c\,(m-2\,s)\,z}\sum_{p=0}^{n}\frac{(-1)^p\,z^{n-p}}{(n-p)!\,(-i\,c\,(m-2\,s)-i\,a\,\nu)^{p+1}}\,{}_{p+2}F_{p+1}\left(\frac{-c\,(m-2\,s)-a\,\nu}{2\,a},\,\ldots,\right.$$
$$\left.\left.\frac{-c\,(m-2\,s)-a\,\nu}{2\,a},\,-\nu;\,1+\frac{-c\,(m-2\,s)-a\,\nu}{2\,a},\,\ldots,\,1+\frac{-c\,(m-2\,s)-a\,\nu}{2\,a};\,-e^{2\,i\,a\,z}\right)\right)\,/;\,m\in\mathbb{N}\land n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sin^\mu(c\,z+d)\cos^\nu(a\,z)$

01.07.21.2496.01

$$\int z^{\alpha-1}\sin^m(c\,z+d)\cos^\nu(a\,z)\,dz = 2^{-m-\nu} z^\alpha \Bigg(\binom{\nu}{\frac{\nu}{2}}\Bigg(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-\frac{1}{2}i(-4dk+2dm+m\pi)}\left(c^2(m-2k)^2 z^2\right)^{-\alpha}\binom{m}{k}$$

$$\left(e^{i m\pi}\Gamma(\alpha, i\,c(m-2k)z)(i\,c(2k-m)z)^\alpha + e^{2 i d(m-2k)}(i\,c(m-2k)z)^\alpha\Gamma(\alpha, i\,c(2k-m)z)\right)\Bigg)$$

$$(\nu \bmod 2-1) + \frac{\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2-1)(\nu \bmod 2-1)}{\alpha} + \binom{m}{\frac{m}{2}}(m \bmod 2-1)$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(a^2(\nu-2s)^2 z^2\right)^{-\alpha}\binom{\nu}{s}\left(\Gamma(\alpha, i\,a(\nu-2s)z)(i\,a(2s-\nu)z)^\alpha + (i\,a(\nu-2s)z)^\alpha\Gamma(\alpha, i\,a(2s-\nu)z)\right) -$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{-\frac{1}{2}i(\pi m+2d(4k+m))}\left((2ck-cm-2as+a\nu)^2 z^2\right)^{-\alpha}\left((c(m-2k)+a(\nu-2s))^2 z^2\right)^{-\alpha}\binom{\nu}{s}$$

$$\Big(e^{i(6dk+m\pi)}(i(2ck-cm+2as-a\nu)z)^\alpha\,\Gamma(\alpha, -i(2ck-cm+2as-a\nu)z)\left((2ck-cm-2as+a\nu)^2 z^2\right)^\alpha +$$

$$e^{2id(k+m)}(-i(2ck-cm+2as-a\nu)z)^\alpha\,\Gamma(\alpha, i(2ck-cm+2as-a\nu)z)$$

$$\left((2ck-cm-2as+a\nu)^2 z^2\right)^\alpha + \left((c(m-2k)+a(\nu-2s))^2 z^2\right)^\alpha$$

$$\Big(e^{2id(k+m)}\Gamma(\alpha, i(2ck-cm-2as+a\nu)z)(-i(2ck-cm-2as+a\nu)z)^\alpha +$$

$$e^{i(6dk+m\pi)}(i(2ck-cm-2as+a\nu)z)^\alpha\,\Gamma(\alpha, -i(2ck-cm-2as+a\nu)z)\Big)\Big)\Bigg) /; m\in\mathbb{N}^+ \land \nu\in\mathbb{N}^+$$

01.07.21.2497.01

$$\int z^n \sin^\mu(c\,z+d)\cos^\nu(a\,z)\,dz = 2^{-\nu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\sin^\mu(d+c\,z)\left(1-e^{2i(d+cz)}\right)^{-\mu}$$

$$\sum_{j=0}^{n}\frac{\left((-1)^j z^{n-j}\right)}{(n-j)!\,(-i\,c\,\mu)^{j+1}}\;{}_{j+2}F_{j+1}\!\left(-\frac{\mu}{2},\ldots,-\frac{\mu}{2},-\mu;1-\frac{\mu}{2},\ldots,1-\frac{\mu}{2};e^{2i(d+cz)}\right) + 2^{-\nu}\left(1-e^{2i(d+cz)}\right)^{-\mu} n!$$

$$\sin^\mu(d+c\,z)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\Bigg(e^{-\frac{1}{2}i(4azk-2a\nu z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(i\,a(\nu-2k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\Bigg(-\frac{c\,\mu-a(\nu-2k)}{2c},$$

$$\ldots,-\frac{c\,\mu-a(\nu-2k)}{2c},-\mu;1-\frac{c\,\mu-a(\nu-2k)}{2c},\ldots,1-\frac{c\,\mu-a(\nu-2k)}{2c};e^{2i(d+cz)}\Bigg) +$$

$$e^{\frac{1}{2}i(4azk-2a\nu z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-i\,a(\nu-2k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\Bigg(-\frac{a(\nu-2k)+c\,\mu}{2c},\ldots,$$

$$-\frac{a(\nu-2k)+c\,\mu}{2c},-\mu;1-\frac{a(\nu-2k)+c\,\mu}{2c},\ldots,1-\frac{a(\nu-2k)+c\,\mu}{2c};e^{2i(d+cz)}\Bigg)\Bigg) /; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.07.21.2498.01

$$\int z^n \sin^m(d+c\,z)\cos^\nu(a\,z)\,dz = 2^{-m}\binom{m}{\frac{m}{2}}\cos^\nu(a\,z)\,n!\,(1-m \bmod 2)\left(1+e^{2\,i\,a\,z}\right)^{-\nu} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{\nu}{2},\ldots,-\frac{\nu}{2},-\nu;1-\frac{\nu}{2},\ldots,1-\frac{\nu}{2};-e^{2\,i\,a\,z}\right)+2^{-m}\,n!\cos^\nu(a\,z)\left(1+e^{2\,i\,a\,z}\right)^{-\nu} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{1}{2}i(4\,d\,k+4\,c\,z\,k-2\,d\,m-2\,c\,m\,z+m\,\pi)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(i\,c\,(m-2\,k)-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{a\,\nu-c\,(m-2\,k)}{2\,a},\ldots,-\frac{a\,\nu-c\,(m-2\,k)}{2\,a},-\nu;1-\frac{a\,\nu-c\,(m-2\,k)}{2\,a},\ldots,1-\frac{a\,\nu-c\,(m-2\,k)}{2\,a};-e^{2\,i\,a\,z}\right)+ e^{\frac{1}{2}i(4\,d\,k+4\,c\,z\,k-2\,d\,m-2\,c\,m\,z+m\,\pi)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-i\,c\,(m-2\,k)-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{c\,(m-2\,k)+a\,\nu}{2\,a},\ldots,-\frac{c\,(m-2\,k)+a\,\nu}{2\,a},-\nu;1-\frac{c\,(m-2\,k)+a\,\nu}{2\,a},\ldots,1-\frac{c\,(m-2\,k)+a\,\nu}{2\,a};-e^{2\,i\,a\,z}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^\mu(c\,z)\cos^\nu(a\,z+b)$

01.07.21.2499.01

$$\int z^{\alpha-1}\sin^m(c\,z)\cos^\nu(b+a\,z)\,dz = 2^{-m-\nu}z^\alpha\left(e^{-\frac{1}{2}i\,m\,\pi}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\left(c^2(m-2\,k)^2z^2\right)^{-\alpha}\binom{m}{k} \left((-1)^m\,\Gamma(\alpha,i\,c\,(m-2\,k)\,z)\,(i\,c\,(2\,k-m)\,z)^\alpha+(i\,c\,(m-2\,k)\,z)^\alpha\,\Gamma(\alpha,i\,c\,(2\,k-m)\,z)\right)\right)(\nu \bmod 2-1)+ \frac{\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2-1)(\nu \bmod 2-1)}{\alpha}+\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i\,b\,(2\,s-\nu)}\left(a^2(\nu-2\,s)^2z^2\right)^{-\alpha}\binom{\nu}{s} \left(e^{2\,i\,b\,(2\,s-\nu)}\,\Gamma(\alpha,i\,a\,(\nu-2\,s)\,z)\,(i\,a\,(2\,s-\nu)\,z)^\alpha+(i\,a\,(\nu-2\,s)\,z)^\alpha\,\Gamma(\alpha,i\,a\,(2\,s-\nu)\,z)\right)- \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-\frac{1}{2}i(\pi\,m+2\,b\,(2\,s+\nu))}\left((2\,c\,k-c\,m-2\,a\,s+a\,\nu)^2z^2\right)^{-\alpha}\left((c\,(m-2\,k)+a\,(\nu-2\,s))^2z^2\right)^{-\alpha}\binom{\nu}{s} \left(e^{i(\pi\,m+4\,b\,s)}(i\,(2\,c\,k-c\,m+2\,a\,s-a\,\nu)\,z)^\alpha\,\Gamma(\alpha,-i\,(2\,c\,k-c\,m+2\,a\,s-a\,\nu)\,z)\left((2\,c\,k-c\,m-2\,a\,s+a\,\nu)^2z^2\right)^\alpha+ e^{2\,i\,b\,\nu}(-i\,(2\,c\,k-c\,m+2\,a\,s-a\,\nu)\,z)^\alpha\,\Gamma(\alpha,i\,(2\,c\,k-c\,m+2\,a\,s-a\,\nu)\,z)\left((2\,c\,k-c\,m-2\,a\,s+a\,\nu)^2z^2\right)^\alpha+ \left((c\,(m-2\,k)+a\,(\nu-2\,s))^2z^2\right)^\alpha\left(e^{4\,i\,b\,s}\,\Gamma(\alpha,i\,(2\,c\,k-c\,m-2\,a\,s+a\,\nu)\,z)\,(-i\,(2\,c\,k-c\,m-2\,a\,s+a\,\nu)\,z)^\alpha+ e^{i(\pi\,m+2\,b\,\nu)}(i\,(2\,c\,k-c\,m-2\,a\,s+a\,\nu)\,z)^\alpha\,\Gamma(\alpha,-i\,(2\,c\,k-c\,m-2\,a\,s+a\,\nu)\,z)\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.07.21.2500.01

$$\int z^n \sin^\mu(c\,z)\cos^\nu(a\,z+b)\,dz = 2^{-\nu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\sin^\mu(c\,z)\left(1-e^{2 i c z}\right)^{-\mu}\sum_{j=0}^{n}\frac{\left((-1)^j z^{n-j}\right)}{(n-j)!\,(-i\,c\,\mu)^{j+1}}\,{}_{j+2}F_{j+1}\left(-\frac{\mu}{2},\ldots,-\frac{\mu}{2},-\mu;1-\frac{\mu}{2},\ldots,1-\frac{\mu}{2};e^{2 i c z}\right)+2^{-\nu}\left(1-e^{2 i c z}\right)^{-\mu} n!\sin^\mu(c\,z)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{-\frac{1}{2} i (4 b k+4 a z k-2 b \nu-2 a \nu z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(i\,a(\nu-2k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c\,\mu-a(\nu-2k)}{2c},\ldots,-\frac{c\,\mu-a(\nu-2k)}{2c},-\mu;1-\frac{c\,\mu-a(\nu-2k)}{2c},\ldots,1-\frac{c\,\mu-a(\nu-2k)}{2c};e^{2 i c z}\right)+e^{\frac{1}{2} i (4 b k+4 a z k-2 b \nu-2 a \nu z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(-i\,a(\nu-2k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{a(\nu-2k)+c\,\mu}{2c},\ldots,-\frac{a(\nu-2k)+c\,\mu}{2c},-\mu;1-\frac{a(\nu-2k)+c\,\mu}{2c},\ldots,1-\frac{a(\nu-2k)+c\,\mu}{2c};e^{2 i c z}\right)\right)\,/;\,n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.07.21.2501.01

$$\int z^n \sin^m(c\,z)\cos^\nu(b+a\,z)\,dz = 2^{-m}\binom{m}{\frac{m}{2}}\cos^\nu(b+a\,z)\,n!\,(1-m \bmod 2)\left(1+e^{2 i (b+a z)}\right)^{-\nu}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{\nu}{2},\ldots,-\frac{\nu}{2},-\nu;1-\frac{\nu}{2},\ldots,1-\frac{\nu}{2};-e^{2 i (b+a z)}\right)+2^{-m} n!\cos^\nu(b+a\,z)\left(1+e^{2 i (b+a z)}\right)^{-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{1}{2} i (4 c z k-2 c m z+m\pi)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(i\,c(m-2k)-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{a\,\nu-c(m-2k)}{2a},\ldots,-\frac{a\,\nu-c(m-2k)}{2a},-\nu;1-\frac{a\,\nu-c(m-2k)}{2a},\ldots,1-\frac{a\,\nu-c(m-2k)}{2a};-e^{2 i (b+a z)}\right)+e^{\frac{1}{2} i (4 c z k-2 c m z+m\pi)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(-i\,c(m-2k)-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c(m-2k)+a\,\nu}{2a},\ldots,-\frac{c(m-2k)+a\,\nu}{2a},-\nu;1-\frac{c(m-2k)+a\,\nu}{2a},\ldots,1-\frac{c(m-2k)+a\,\nu}{2a};-e^{2 i (b+a z)}\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^\mu(c\,z+d)\cos^\nu(a\,z+b)$

01.07.21.2502.01

$$\int z^{\alpha-1}\sin^m(c\,z+d)\cos^\nu(a\,z+b)\,dz = 2^{-m-\nu}z^\alpha\left(\left(\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-\frac{1}{2}i(-4dk+2dm+m\pi)}\left(c^2(m-2k)^2z^2\right)^{-\alpha}\binom{m}{k}\left(e^{i m\pi}\Gamma(\alpha,\,i\,c\,(m-2k)\,z)\,(i\,c\,(2k-m)\,z)^\alpha+e^{2id(m-2k)}(i\,c\,(m-2k)\,z)^\alpha\,\Gamma(\alpha,\,i\,c\,(2k-m)\,z)\right)\right)(\nu \bmod 2-1)+\frac{(m \bmod 2-1)(\nu \bmod 2-1)}{\alpha}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}+\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-ib(2s-\nu)}\left(a^2(\nu-2s)^2z^2\right)^{-\alpha}\binom{\nu}{s}\left(e^{2ib(2s-\nu)}\Gamma(\alpha,\,i\,a\,(\nu-2s)\,z)\,(i\,a\,(2s-\nu)\,z)^\alpha+(i\,a\,(\nu-2s)\,z)^\alpha\,\Gamma(\alpha,\,i\,a\,(2s-\nu)\,z)\right)-\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-\frac{1}{2}i(\pi m+2d(4k+m)+2b(2s+\nu))}\left((2ck-cm-2as+a\nu)^2z^2\right)^{-\alpha}\left((c(m-2k)+a(\nu-2s))^2z^2\right)^{-\alpha}\binom{\nu}{s}\left(e^{i(6dk+4bs+m\pi)}(i\,(2ck-cm+2as-a\nu)\,z)^\alpha\,\Gamma(\alpha,\,-i\,(2ck-cm+2as-a\nu)\,z)\left((2ck-cm-2as+a\nu)^2z^2\right)^\alpha+e^{2i(d(k+m)+b\nu)}(-i\,(2ck-cm+2as-a\nu)\,z)^\alpha\,\Gamma(\alpha,\,i\,(2ck-cm+2as-a\nu)\,z)\left((2ck-cm-2as+a\nu)^2z^2\right)^\alpha+\left((c(m-2k)+a(\nu-2s))^2z^2\right)^\alpha\left(e^{2i(d(k+m)+2bs)}\Gamma(\alpha,\,i\,(2ck-cm-2as+a\nu)\,z)\,(-i\,(2ck-cm-2as+a\nu)\,z)^\alpha+e^{i(6dk+2b\nu+m\pi)}(i\,(2ck-cm-2as+a\nu)\,z)^\alpha\,\Gamma(\alpha,\,-i\,(2ck-cm-2as+a\nu)\,z)\right)\right)\right)\right)\,/;\,m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.07.21.2503.01

$$\int z^n\sin^\mu(c\,z+d)\cos^\nu(a\,z+b)\,dz = 2^{-\nu}\binom{\nu}{\frac{\nu}{2}}n!\,(1-\nu \bmod 2)\sin^\mu(d+c\,z)\left(1-e^{2i(d+cz)}\right)^{-\mu}\sum_{j=0}^{n}\frac{\left((-1)^j z^{n-j}\right)}{(n-j)!\,(-i\,c\,\mu)^{j+1}}\,{}_{j+2}F_{j+1}\left(-\frac{\mu}{2},\,\ldots,\,-\frac{\mu}{2},\,-\mu;\,1-\frac{\mu}{2},\,\ldots,\,1-\frac{\mu}{2};\,e^{2i(d+cz)}\right)+2^{-\nu}\left(1-e^{2i(d+cz)}\right)^{-\mu}n!\,\sin^\mu(d+c\,z)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\left(e^{-\frac{1}{2}i(4bk+4azk-2b\nu-2a\nu z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(i\,a\,(\nu-2k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c\,\mu-a\,(\nu-2k)}{2c},\,\ldots,\,-\frac{c\,\mu-a\,(\nu-2k)}{2c},\,-\mu;\,1-\frac{c\,\mu-a\,(\nu-2k)}{2c},\,\ldots,\,1-\frac{c\,\mu-a\,(\nu-2k)}{2c};\,e^{2i(d+cz)}\right)+e^{\frac{1}{2}i(4bk+4azk-2b\nu-2a\nu z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(-i\,a\,(\nu-2k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{a\,(\nu-2k)+c\,\mu}{2c},\,\ldots,\,-\frac{a\,(\nu-2k)+c\,\mu}{2c},\,-\mu;\,1-\frac{a\,(\nu-2k)+c\,\mu}{2c},\,\ldots,\,1-\frac{a\,(\nu-2k)+c\,\mu}{2c};\,e^{2i(d+cz)}\right)\right)\,/;\,n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.07.21.2504.01

$$\int z^n \sin^m(d+c\,z)\cos^\nu(b+a\,z)\,dz = 2^{-m}\binom{m}{\frac{m}{2}}\cos^\nu(b+a\,z)\,n!\,(1-m \bmod 2)\left(1+e^{2\,i\,(b+a\,z)}\right)^{-\nu} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{\nu}{2},\,\ldots,\,-\frac{\nu}{2},\,-\nu;\,1-\frac{\nu}{2},\,\ldots,\,1-\frac{\nu}{2};\,-e^{2\,i\,(b+a\,z)}\right)+2^{-m}\,n!\cos^\nu(b+a\,z)\left(1+e^{2\,i\,(b+a\,z)}\right)^{-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{1}{2}\,i\,(4\,d\,k+4\,c\,z\,k-2\,d\,m-2\,c\,m\,z+m\,\pi)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(i\,c\,(m-2\,k)-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{a\,\nu-c\,(m-2\,k)}{2\,a},\,\ldots,\,-\frac{a\,\nu-c\,(m-2\,k)}{2\,a},\,-\nu;\,1-\frac{a\,\nu-c\,(m-2\,k)}{2\,a},\,\ldots,\,1-\frac{a\,\nu-c\,(m-2\,k)}{2\,a};\,-e^{2\,i\,(b+a\,z)}\right)+e^{\frac{1}{2}\,i\,(4\,d\,k+4\,c\,z\,k-2\,d\,m-2\,c\,m\,z+m\,\pi)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(-i\,c\,(m-2\,k)-i\,a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{c\,(m-2\,k)+a\,\nu}{2\,a},\,\ldots,\,-\frac{c\,(m-2\,k)+a\,\nu}{2\,a},\,-\nu;\,1-\frac{c\,(m-2\,k)+a\,\nu}{2\,a},\,\ldots,\,1-\frac{c\,(m-2\,k)+a\,\nu}{2\,a};\,-e^{2\,i\,(b+a\,z)}\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r\right)\cos^\nu(c\,z)$

01.07.21.2505.01

$$\int z^n \sin^m\left(b z^2\right) \cos^\nu(c z)\, dz = 2^{-m-\nu-1} \Bigg(\frac{2 z^{n+1}\ (m \bmod 2 - 1)(\nu \bmod 2 - 1)}{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + i^{-m} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{n+1}{2}, -i b (2k-m) z^2\right) \left(-i b (2k-m) z^2\right)^{\frac{1}{2}(-n-1)} + \left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -i b (m-2k) z^2\right)\right) + 2 \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma(n+1, -i c (\nu-2s) z)\, (-i c (\nu - 2s))^{-n-1} + (i c (\nu-2s))^{-n-1} \Gamma(n+1, i c (\nu-2s) z)\right) - \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} i b\, e^{-\frac{1}{4} i \left(\frac{c^2 (\nu-2s)^2}{b(2k-m)} + 2 m \pi\right)} (m-2k) \left(b^2 (m-2k)^2\right)^{-n-1} \binom{\nu}{s} \Bigg(-e^{\frac{i c^2 (\nu-2s)^2}{4bk - 2bm}} \Bigg(\sum_{q=0}^{n} 2^{q-n} (-i c (\nu-2s))^{n-q} (i (c(\nu-2s) + 2b(m-2k) z))^{q+1} \left(\frac{i (c(\nu-2s) + 2b(m-2k)z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-2cs + c\nu - 4bkz + 2bmz)^2}{8bk - 4bm}\right)\Bigg) (i b (2k-m))^n - e^{\frac{i c^2 (\nu-2s)^2}{4bk-2bm}} \Bigg(\sum_{q=0}^{n} 2^{q-n} (i c (\nu - 2s))^{n-q} (-i(-2cs + c\nu + 4bkz - 2bmz))^{q+1} \left(\frac{i(-2cs + c\nu + 4bkz - 2bmz)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(-2cs + c\nu + 4bkz - 2bmz)^2}{8bk - 4bm}\right)\Bigg) (i b (2k-m))^n + e^{i m \pi} (i b (m-2k))^n \sum_{q=0}^{n} 2^{q-n} (-i c (\nu-2s))^{n-q} (i(-2cs + c\nu + 4bkz - 2bmz))^{q+1} \left(-\frac{i(-2cs + c\nu + 4bkz - 2bmz)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-2cs + c\nu + 4bkz - 2bmz)^2}{b(8k-4m)}\right) + e^{i m \pi} (i b (m-2k))^n \sum_{q=0}^{n} 2^{q-n} (i c (\nu - 2s))^{n-q} (i(2cs - c\nu + 4bkz - 2bmz))^{q+1} \left(-\frac{i(c(\nu-2s) + 2b(m-2k)z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(-2cs + c\nu - 4bkz + 2bmz)^2}{8bk-4bm}\right)\Bigg)\Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2506.01

$$\int z^n \sin^m\left(b\sqrt{z}\right)\cos^\nu(c\,z)\,dz = 2^{-m-\nu-1}\left(\frac{2\,z^{n+1}\,(m \bmod 2-1)\,(\nu \bmod 2-1)}{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}+\right.$$

$$2\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\Gamma(n+1,\,-i\,c\,(2\,s-\nu)\,z)\,(-i\,c\,(2\,s-\nu))^{-n-1}+(i\,c\,(2\,s-\nu))^{-n-1}\,\Gamma(n+1,\,i\,c\,(2\,s-\nu)\,z)\right)+$$

$$4\,i^{-m}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\left(\Gamma\left(2\,(n+1),\,-i\,b\,(m-2\,u)\sqrt{z}\right)(-i\,b\,(m-2\,u))^{-2\,(n+1)}+\right.$$

$$\left.(-1)^m\,(i\,b\,(m-2\,u))^{-2\,(n+1)}\,\Gamma\left(2\,(n+1),\,i\,b\,(m-2\,u)\sqrt{z}\right)\right)+i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}-e^{-\frac{i\,b^2\,(m-2\,u)^2}{c\,(8\,s-4\,\nu)}}\left(c^2\,(\nu-2\,s)^2\right)^{-2\,n-1}\binom{\nu}{s}\left((-1)^m\,e^{\frac{i\,b^2\,(m-2\,u)^2}{4\,c\,s-2\,c\,\nu}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}i\,(-1)^{k-h}\,4^k\,(-i\,b\,(m-2\,u))^{-h-k+2\,n}\right.\right.$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,c\,(2\,s-\nu)\sqrt{z}\right)^2}{c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-h-k-1)}\left(i\left(2\,c\,(\nu-2\,s)\sqrt{z}-b\,(m-2\,u)\right)\right)^{h+k}$$

$$\binom{k}{h}\binom{n}{k}\left(b\,i\,(m-2\,u)\left(b\,(m-2\,u)+2\,c\,(2\,s-\nu)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.\frac{i\left(b\,(m-2\,u)+2\,c\,(2\,s-\nu)\sqrt{z}\right)^2}{c\,(8\,s-4\,\nu)}\right)+2\,c\sqrt{\frac{i\left(b\,(m-2\,u)+2\,c\,(2\,s-\nu)\sqrt{z}\right)^2}{c\,(2\,s-\nu)}}$$

$$\left.\left.\left.(\nu-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)+2\,c\,(2\,s-\nu)\sqrt{z}\right)^2}{c\,(8\,s-4\,\nu)}\right)\right)\right)(i\,c\,(2\,s-\nu))^{2\,n}+$$

$$e^{\frac{i\,b^2\,(m-2\,u)^2}{4\,c\,s-2\,c\,\nu}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}i\,(-1)^{k-h}\,4^k\,(i\,b\,(m-2\,u))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+2\,c\,(\nu-2\,s)\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,c\,(\nu-2\,s)\sqrt{z}\right)^2}{c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(b\,i\,(m-2u)\left(b\,(m-2u)+2c\,(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$\left.\frac{i\left(b\,(m-2u)+2c\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)+2c\sqrt{\frac{i\left(b\,(m-2u)+2c\,(v-2s)\sqrt{z}\right)^2}{c\,(2s-v)}}$$

$$\left.\left.(v-2s)\,\Gamma\left(\frac{1}{2}(h+k+2),\;\frac{i\left(b\,(m-2u)+2c\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)\right)\right)(i\,c\,(2s-v))^{2n}+$$

$$(i\,c\,(v-2s))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k} i\,(-1)^{k-h}\,4^k\,(i\,b\,(m-2u))^{-h-k+2n}\left(i\left(b\,(m-2u)+2c\,(2s-v)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2u)+2c\,(2s-v)\sqrt{z}\right)^2}{c\,(2s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\,i\,(m-2u)\right.$$

$$\left(b\,(m-2u)+2c\,(2s-v)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b\,(m-2u)+2c\,(2s-v)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)+$$

$$2c\,(2s-v)\sqrt{-\frac{i\left(b\,(m-2u)+2c\,(2s-v)\sqrt{z}\right)^2}{c\,(2s-v)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.-\frac{i\left(b\,(m-2u)+2c\,(2s-v)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)\right)+(-1)^m\,(i\,c\,(v-2s))^{2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k} i\,(-1)^{k-h}\,4^k\,(-i\,b\,(m-2u))^{-h-k+2n}\left(i\left(2c\,(2s-v)\sqrt{z}-b\,(m-2u)\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2u)+2c\,(v-2s)\sqrt{z}\right)^2}{c\,(2s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\,i\,(m-2u)\right.$$

$$\left(b\,(m-2\,u)+2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+$$

$$2\,c\,(2\,s-v)\,\sqrt{-\frac{i\left(b\,(m-2\,u)+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.\left.\left.-\frac{i\left(b\,(m-2\,u)+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\right)\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r+e\right)\cos^v(c\,z)$

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$$\int z^n \sin^m\left(b z^2 + e\right) \cos^\nu(c z)\, dz = 2^{-m-\nu-1} \left(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (m \bmod 2 - 1)(\nu \bmod 2 - 1)}{n+1} - \right.$$

$$z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{1}{2} i (\pi m + 2 e (2k+m))} \left(b^2 (m-2k)^2 z^4\right)^{\frac{1}{2}(-n-1)} \binom{m}{k} \left(e^{2 i e m}\, \Gamma\left(\frac{n+1}{2}, i b (2k-m) z^2\right) \right.$$

$$\left. \left(-i b (2k-m) z^2\right)^{\frac{n+1}{2}} + e^{i (4 e k + m \pi)} \left(i b (2k-m) z^2\right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i b (2k-m) z^2\right) \right) -$$

$$2 \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma(n+1, -i c (2s-\nu) z) (-i c (2s-\nu))^{-n-1} + (i c (2s-\nu))^{-n-1} \Gamma(n+1, i c (2s-\nu) z) \right) -$$

$$i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i (2 e k - e m)} \binom{\nu}{s} \left(e^{\frac{i c^2 (\nu-2s)^2}{8bk-4bm}} \left(\sum_{q=0}^{n} 2^{q-n} (i (2cs - c\nu))^{n-q} (-i (2cs - c\nu + 4bkz - 2bmz))^{q+1} \right. \right.$$

$$\left. \left(\frac{i (c(\nu-2s) + 2(bm-2bk)z)^2}{2bk-bm} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c(\nu-2s) + 2(bm-2bk)z)^2}{8bk-4bm}\right) \right)$$

$$(-i (2bk - bm))^{-n-1} + e^{\frac{i (c\nu - 2cs)^2}{8bk-4bm}} \left(\sum_{q=0}^{n} 2^{q-n} (i (c\nu - 2cs))^{n-q} (-i (c(\nu-2s) + 2(2bk-bm) z))^{q+1} \right.$$

$$\left. \left(\frac{i (c(\nu-2s) + 2(2bk-bm)z)^2}{2bk-bm} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c(\nu-2s) + 2(2bk-bm)z)^2}{8bk-4bm}\right) \right)$$

$$(-i (2bk - bm))^{-n-1} + e^{i \left(-\frac{c^2 (\nu-2s)^2}{8bk-4bm} + e(4k-2m) + m\pi\right)} (i (2bk-bm))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (2cs - c\nu))^{n-q}$$

$$(i (2cs - c\nu + 4bkz - 2bmz))^{q+1} \left(-\frac{i (c(\nu-2s) + 2(bm-2bk)z)^2}{2bk-bm} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \right.$$

$$\left. -\frac{i (c(\nu-2s) + 2(bm-2bk)z)^2}{8bk-4bm} \right) + e^{i \left(-\frac{(c\nu-2cs)^2}{8bk-4bm} + e(4k-2m) + m\pi\right)} (i (2bk-bm))^{-n-1} \sum_{q=0}^{n} 2^{q-n}$$

$$(-i (c\nu - 2cs))^{n-q} (i (c(\nu-2s) + 2(2bk-bm)z))^{q+1} \left(-\frac{i (c(\nu-2s) + 2(2bk-bm)z)^2}{2bk-bm} \right)^{\frac{1}{2}(-q-1)}$$

$$\left. \left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c(\nu-2s) + 2(2bk-bm)z)^2}{8bk-4bm}\right) \right) \right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b+e\right) \cos^\nu(c\, z)\, dz = 2^{-m-\nu-1} \left(\frac{2\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)\, (1-\nu \bmod 2)}{n+1} - \right.$$

$$2 \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma(n+1,\, -i\, c\, (2\, s-\nu)\, z)\, (-i\, c\, (2\, s-\nu))^{-n-1} + (i\, c\, (2\, s-\nu))^{-n-1}\, \Gamma(n+1,\, i\, c\, (2\, s-\nu)\, z)\right) +$$

$$4\, b^{-2\,(n+1)} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+n}\, e^{-\frac{1}{2}\, i\, (\pi\, m+2\, e\, (2\, k+m))}\, (m-2\, k)^{-2\, n-2} \binom{m}{k}$$

$$\left(e^{i\,(4\, e\, k+m\, \pi)}\, \Gamma\left(2\,(n+1),\, -i\, b\, (2\, k-m) \sqrt{z}\right) + e^{2\, i\, e\, m}\, \Gamma\left(2\,(n+1),\, i\, b\, (2\, k-m) \sqrt{z}\right)\right) - i^{-m}\, 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u}$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i\,(e\, m-2\, e\, u)} \binom{\nu}{s} \left(e^{-\frac{i\, b^2\, (m-2\, u)^2}{4\, c\, (\nu-2\, s)}} \left(c^2\, (\nu-2\, s)^2\right)^{-2\, n-1} \left(e^{2\, i\, e\, (m-2\, u)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, b\, (m-2\, u))^{-h-k+2\, n} \right.\right.\right.$$

$$\left(i \left(b\, (m-2\, u)+2\, c\, (\nu-2\, s) \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b\, (m-2\, u)+2\, c\, (\nu-2\, s) \sqrt{z}\right)^2}{c\, (\nu-2\, s)} \right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(2\, i\, c\, (\nu-2\, s) \sqrt{-\frac{i \left(b\, (m-2\, u)+2\, c\, (\nu-2\, s) \sqrt{z}\right)^2}{c\, (\nu-2\, s)}}\; \Gamma\left(\frac{1}{2}\, (h+k+2), \right.\right.$$

$$\left. -\frac{i \left(b\, (m-2\, u)+2\, c\, (\nu-2\, s) \sqrt{z}\right)^2}{4\, c\, (\nu-2\, s)} \right) - b\, (m-2\, u) \left(b\, (m-2\, u)+2\, c\, (\nu-2\, s) \sqrt{z}\right)$$

$$\left.\left.\left. \Gamma\left(\frac{1}{2}\, (h+k+1),\, -\frac{i \left(b\, (m-2\, u)+2\, c\, (\nu-2\, s) \sqrt{z}\right)^2}{4\, c\, (\nu-2\, s)} \right) \right)\right) (-i\, c\, (\nu-2\, s))^{2\, n} +$$

$$(-1)^m\, e^{\frac{i\, b^2\, (m-2\, u)^2}{2\, c\, (\nu-2\, s)}}\, (i\, c\, (\nu-2\, s))^{2\, n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, b\, (m-2\, u))^{-h-k+2\, n}$$

$$\left(-i \left(b\, (m-2\, u)+2\, c\, (\nu-2\, s) \sqrt{z}\right)\right)^{h+k} \left(\frac{i \left(b\, (m-2\, u)+2\, c\, (\nu-2\, s) \sqrt{z}\right)^2}{c\, (\nu-2\, s)} \right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(-b\,(m-2\,u)\left(b\,(m-2\,u)+2\,c\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(b\,(m-2\,u)+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)-2$$

$$i\,c\,(v-2\,s)\sqrt{\frac{i\left(b\,(m-2\,u)+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(b\,(m-2\,u)+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(2\,c\,s-c\,v)^2}\Bigg((-1)^m\,e^{\frac{i\,(b\,m-2\,b\,u)^2}{8\,c\,s-4\,c\,v}}\,(-i\,(2\,c\,s-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m-2\,b\,u))^{-h-k+2\,n}$$

$$\left(-i\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((2\,b\,u-b\,m)\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{8\,c\,s-4\,c\,v}\right)-$$

$$2\,i\,(2\,c\,s-c\,v)\sqrt{\frac{i\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{2\,c\,s-c\,v}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{8\,c\,s-4\,c\,v}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(2\,c\,s-c\,v)^2}\Bigg(e^{i\left(2\,e\,(m-2\,u)-\frac{(b\,m-2\,b\,u)^2}{8\,c\,s-4\,c\,v}\right)}\,(i\,(2\,c\,s-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,m-2\,b\,u))^{-h-k+2\,n}$$

$$\left(i\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\,\right)\right)^{h+k}\left(-\frac{i\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\,\right)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((2\,b\,u-b\,m)\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\,\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\,\right)^2}{8\,c\,s-4\,c\,v}\right)+$$

$$2\,i\,\sqrt{-\frac{i\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\,\right)^2}{2\,c\,s-c\,v}}\;(2\,c\,s-c\,v)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.-\frac{i\left(b\,(m-2\,u)+2\,(2\,c\,s-c\,v)\,\sqrt{z}\,\right)^2}{8\,c\,s-4\,c\,v}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r+d\,z\right)\cos^v(c\,z)$

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$$\int z^n \sin^m\left(b\,z^2+d\,z\right)\cos^v(c\,z)\,dz = 2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m \bmod 2-1)\,(v \bmod 2-1)}{n+1}+\right.$$

$$2\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma(n+1,\,-i\,c\,(v-2\,s)\,z)\,(-i\,c\,(v-2\,s))^{-n-1}+(i\,c\,(v-2\,s))^{-n-1}\,\Gamma(n+1,\,i\,c\,(v-2\,s)\,z)\right)-$$

$$\frac{1}{b^{2\,n+1}}\left(i\binom{v}{\frac{v}{2}}(v \bmod 2-1)\right.$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(2\,k-m)^{2\,n+1}}\left((-1)^k\,e^{-\frac{i\left((2\,k-m)\,d^2+2\,b\,m\,\pi\right)}{4\,b}}\binom{m}{k}\left(e^{\frac{i\,d^2\,(2\,k-m)}{2\,b}}\,(i\,b\,(2\,k-m))^n\sum_{q=0}^{n}\frac{1}{d+2\,b\,z}\left(2^{q-n}\,b\,(-i\,d\,(m-2\,k))^{n-q}\right.\right.\right.$$

$$\left.(i\,(m-2\,k)\,(d+2\,b\,z))^q\left(\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1-q}{2}}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)\right)-$$

$$e^{i m \pi} (i b (m-2k))^n \sum_{q=0}^{n} \frac{1}{d} \Bigg(2^{q-n} (-i d (2k-m))^{n-q+1} (d+2bz) (i (2k-m)(d+2bz))^q$$

$$\left(-\frac{i (2k-m)(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2k-m)(d+2bz)^2}{4b}\right)\Bigg)\Bigg)\Bigg)\Bigg) +$$

$$\frac{1}{b^{2n+1}} \Bigg(i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{(2k-m)^{2n+1}} \Bigg(e^{-\frac{i\left(-d^2 (m-2k)^2 - c^2 (v-2s)^2 + b (2k-m) m \pi\right)}{b(4k-2m)}} \binom{v}{s} \Bigg(-e^{-\frac{i (2dk - dm - 2cs + cv)^2}{b(8k-4m)}}$$

$$\Bigg(\sum_{q=0}^{n} 2^{q-n} (i (2dk - dm + 2cs - cv))^{n-q} (i (d (m-2k) + 2bz (m-2k) + c (v-2s)))^{q+1}$$

$$\left(\frac{i (d (m-2k) + 2bz (m-2k) + c (v-2s))^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2}, \frac{i (d (m-2k) + 2bz (m-2k) + c (v-2s))^2}{b(8k-4m)}\right)\Bigg) (i b (2k-m))^n - e^{-\frac{i (d (m-2k) + c (v-2s))^2}{b(8k-4m)}}$$

$$\Bigg(\sum_{q=0}^{n} 2^{q-n} (i (2dk - dm - 2cs + cv))^{n-q} (-i (2dk + 4bzk - dm - 2cs + cv - 2bmz))^{q+1}$$

$$\left(\frac{i (2dk + 4bzk - dm - 2cs + cv - 2bmz)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2}, \frac{i (2dk + 4bzk - dm - 2cs + cv - 2bmz)^2}{b(8k-4m)}\right)\Bigg)$$

$$(i b (2k-m))^n + e^{\frac{i\left(-3d^2 (m-2k)^2 - 3c^2 (v-2s)^2 - 2cd (2k-m)(2s-v) + 4b (2k-m) m \pi\right)}{b(8k-4m)}} (i b (m-2k))^n$$

$$\sum_{q=0}^{n} 2^{q-n} (-i (2dk - dm + 2cs - cv))^{n-q} (i (2dk + 4bzk - dm + 2cs - cv - 2bmz))^{q+1}$$

$$\left(-\frac{i (d (m-2k) + 2bz (m-2k) + c (v-2s))^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2}, -\frac{i (d (m-2k) + 2bz (m-2k) + c (v-2s))^2}{b(8k-4m)}\right) +$$

$$e^{\frac{i\left(-3d^2 (m-2k)^2 - 3c^2 (v-2s)^2 + 2cd (2k-m)(2s-v) + 4b (2k-m) m \pi\right)}{b(8k-4m)}} (i b (m-2k))^n$$

$$\sum_{q=0}^{n} 2^{q-n} (i(-2dk+dm+2cs-cv))^{n-q} (i(2dk+4bzk-dm-2cs+cv-2bmz))^{q+1}$$

$$\left(-\frac{i(2dk+4bzk-dm-2cs+cv-2bmz)^2}{b(2k-m)}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$

$$\left.\left.\left.\left.\Gamma\left(\frac{q+1}{2}, -\frac{i(2dk+4bzk-dm-2cs+cv-2bmz)^2}{b(8k-4m)}\right)\right)\right)\right)\right) /; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + dz\right) \cos^v(cz)\, dz = 2^{-m-v-1} \left(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (m \bmod 2 - 1)(v \bmod 2 - 1)}{n+1} + \right.$$

$$2 \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\Gamma(n+1, -i c(2s-v) z)(-i c(2s-v))^{-n-1} + (i c(2s-v))^{-n-1} \Gamma(n+1, i c(2s-v) z)\right) +$$

$$i^{-m} 4^{-n} d^{-2(n+1)} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1)$$

$$\sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{n+u-1} e^{-\frac{i b^2 (m-2u)}{4d}} (m-2u)^{-2(n+1)} \binom{m}{u} \left((-1)^m e^{\frac{i b^2 (m-2u)}{2d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (m-2u)(-i b(m-2u))^{-h-k+2n} \right.$$

$$\left(-i(m-2u)\left(b+2d\sqrt{z}\right)\right)^{h+k} \left(\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k} \left(b(m-2u)\left(b+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{4d}\right) + \right.$$

$$\left.\left. 2\sqrt{\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) + \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}$$

$$4^k (m-2u)(i b(m-2u))^{-h-k+2n} \left(i(m-2u)\left(b+2d\sqrt{z}\right)\right)^{h+k} \left(-\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(b\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\right.$$

$$\left.\left.\sqrt{-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)-$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left((d\,m-2\,c\,s-2\,d\,u+c\,v)^2\right)^{-2\,n-1}\left(e^{-\frac{i\,b^2\,(m-2\,u)^2}{4\,(d\,m-2\,c\,s-2\,d\,u+c\,v)}}\right.\right.$$

$$\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b\,(m-2\,u))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\left(i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2\right)\Big/(d\,m-2\,c\,s-2\,d\,u+c\,v)\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\right.$$

$$\sqrt{\left(-\left(i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2\right)\Big/(d\,m-2\,c\,s-2\,d\,u+c\,v)\right)}$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\left(i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2\right)\Big/\right.$$

$$\left.(4\,(d\,m-2\,c\,s-2\,d\,u+c\,v))\right)-b\,(m-2\,u)\left(b\,(m-2\,u)+\right.$$

$$\left.2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\left(i\left(b\,(m-2\,u)+2\,(d\,m-\right.\right.\right.$$

$$\left.\left.\left.\left.\left.2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2\right)\Big/(4\,(d\,m-2\,c\,s-2\,d\,u+c\,v))\right)\right)\right)$$

$$(-i\,(d\,m-2\,c\,s-2\,d\,u+c\,v))^{2\,n}+(-1)^m\,e^{\frac{i\,b^2\,(m-2\,u)^2}{4\,(d\,m-2\,c\,s-2\,d\,u+c\,v)}}\,(i\,(d\,m-2\,c\,s-2\,d\,u+c\,v))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2}{d\,m-2\,c\,s-2\,d\,u+c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\,(m-2\,u)\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.\frac{i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2}{4\,(d\,m-2\,c\,s-2\,d\,u+c\,v)}\right)-2\,i\,(d\,m-2\,c\,s-2\,d\,u+c\,v)$$

$$\sqrt{\left(\left(i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2\right)\Big/(d\,m-2\,c\,s-2\,d\,u+c\,v)\right)}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2}{4\,(d\,m-2\,c\,s-2\,d\,u+c\,v)}\right)\right)\right)\right)+$$

$$\left((-1)^m\,e^{\frac{i\,b^2\,(m-2\,u)^2}{4\,d\,m+8\,c\,s-8\,d\,u-4\,c\,v}}\,(-i\,(d\,m+2\,c\,s-2\,d\,u-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b\,(m-2\,u))^{-h-k+2\,n}\right.$$

$$\left(-i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\right)^2}{d\,m+2\,c\,s-2\,d\,u-c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(-b\,(m-2\,u)\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\right)^2}{4\,d\,m+8\,c\,s-8\,d\,u-4\,c\,v}\right)-$$

$$2\,i\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\sqrt{\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\right)^2}{d\,m+2\,c\,s-2\,d\,u-c\,v}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\right)^2}{4\,d\,m+8\,c\,s-8\,d\,u-4\,c\,v}\right)\right)\right)\right)\Big/$$

$$(d\,m+2\,c\,s-2\,d\,u-c\,v)^2+\left(e^{-\frac{i\,b^2\,(m-2\,u)^2}{4\,(d\,m+2\,c\,s-2\,d\,u-c\,v)}}\,(i\,(d\,m+2\,c\,s-2\,d\,u-c\,v))^{-2\,n}\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b\,(m-2\,u))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\sqrt{z}\right)^2}{d\,m+2\,c\,s-2\,d\,u-c\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,(d\,m+2\,c\,s-2\,d\,u-c\,v)$$

$$\sqrt{\left(-\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\sqrt{z}\right)^2\right)\Big/(d\,m+2\,c\,s-2\,d\,u-c\,v)\right)}$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\sqrt{z}\right)^2}{8\,c\,s+4\,d\,(m-2\,u)-4\,c\,v}\right)-$$

$$b\,(m-2\,u)\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\sqrt{z}\right)^2}{8\,c\,s+4\,d\,(m-2\,u)-4\,c\,v}\right)\Bigg)\Bigg)\Bigg/(d$$

$$m+2\,c\,s-2\,d\,u-c\,v)^2\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\sin^m\left(b\,z^r+d\,z+e\right)\cos^v(c\,z)$

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$$\int z^n\sin^m\left(b\,z^2+d\,z+e\right)\cos^v(c\,z)\,dz = 2^{-m-v-1}\left(\frac{2\,z^{n+1}\;(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}+\right.$$

$$2\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma(n+1,\,-i\,c\,(v-2\,s)\,z)\,(-i\,c\,(v-2\,s))^{-n-1}+(i\,c\,(v-2\,s))^{-n-1}\,\Gamma(n+1,\,i\,c\,(v-2\,s)\,z)\right)+$$

$$\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{b\,(2\,k-m)}\Bigg(i\,(-1)^k\,e^{-\frac{i\left((2\,k-m)\,d^2+2\,b\,(\pi\,m+2\,e\,(2\,k+m))\right)}{4\,b}}\left(b^2\,(m-2\,k)^2\right)^{-n}\binom{m}{k}$$

$$\Bigg(e^{\frac{1}{2}\,i\left(\frac{(2\,k-m)\,d^2}{b}+4\,e\,m\right)}\,(i\,b\,(2\,k-m))^n\sum_{q=0}^{n}-\frac{1}{d+2\,b\,z}\Bigg(2^{q-n}\,b\,(-i\,d\,(m-2\,k))^{n-q}\,(i\,(m-2\,k)\,(d+2\,b\,z))^q$$

$$\left(\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1-q}{2}}\binom{n}{q}\,\Gamma\left(\frac{q+1}{2},\,\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)\Bigg)-$$

$$e^{i(4ek+m\pi)}(i\,b\,(m-2k))^n\sum_{q=0}^{n}-\frac{1}{d}\left(2^{q-n}(-i\,d\,(2k-m))^{n-q+1}(d+2bz)(i\,(2k-m)(d+2bz))^q\right.$$

$$\left.\left(-\frac{i\,(2k-m)(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(2k-m)(d+2bz)^2}{4b}\right)\right)\Bigg)\Bigg)-$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}-\frac{1}{b\,(2k-m)}\left(i\,e^{-\frac{i\left(-d^2(m-2k)^2-c^2(v-2s)^2+b(2k-m)(4ek-2em+m\pi)\right)}{b(4k-2m)}}\left(b^2(m-2k)^2\right)^{-n}\binom{v}{s}\right.$$

$$\left(-e^{-\frac{i(2dk-dm-2cs+cv)^2}{b(8k-4m)}}\left(\sum_{q=0}^{n}2^{q-n}(i\,(2dk-dm+2cs-cv))^{n-q}(i\,(d\,(m-2k)+2bz\,(m-2k)+\right.\right.$$

$$c\,(v-2s)))^{q+1}\left(\frac{i\,(d\,(m-2k)+2bz\,(m-2k)+c\,(v-2s))^2}{b\,(2k-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\right.$$

$$\left.\left.\frac{i\,(d\,(m-2k)+2bz\,(m-2k)+c\,(v-2s))^2}{b\,(8k-4m)}\right)\right)(i\,b\,(2k-m))^n-e^{-\frac{i(d(m-2k)+c(v-2s))^2}{b(8k-4m)}}$$

$$\left(\sum_{q=0}^{n}2^{q-n}(i\,(2dk-dm-2cs+cv))^{n-q}(-i\,(2dk+4bzk-dm-2cs+cv-2bmz))^{q+1}\right.$$

$$\left(\frac{i\,(2dk+4bzk-dm-2cs+cv-2bmz)^2}{b\,(2k-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\left.\Gamma\left(\frac{q+1}{2},\frac{i\,(2dk+4bzk-dm-2cs+cv-2bmz)^2}{b\,(8k-4m)}\right)\right)(i\,b\,(2k-m))^n+$$

$$e^{\frac{i\left(-3d^2(m-2k)^2-3c^2(v-2s)^2+4b(2k-m)(4ek-2em+m\pi)-2cd(2k-m)(2s-v)\right)}{b(8k-4m)}}(i\,b\,(m-2k))^n\sum_{q=0}^{n}2^{q-n}$$

$$(-i\,(2dk-dm+2cs-cv))^{n-q}(i\,(2dk+4bzk-dm+2cs-cv-2bmz))^{q+1}$$

$$\left(-\frac{i\,(d\,(m-2k)+2bz\,(m-2k)+c\,(v-2s))^2}{b\,(2k-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2},-\frac{i\,(d\,(m-2k)+2bz\,(m-2k)+c\,(v-2s))^2}{b\,(8k-4m)}\right)+$$

$$e^{\frac{i\left(-3d^2(m-2k)^2-3c^2(v-2s)^2+4b(2k-m)(4ek-2em+m\pi)+2cd(2k-m)(2s-v)\right)}{b(8k-4m)}}(i\,b\,(m-2k))^n\sum_{q=0}^{n}2^{q-n}$$

$$(i\,(-2\,d\,k+d\,m+2\,c\,s-c\,v))^{n-q}\,(i\,(2\,d\,k+4\,b\,z\,k-d\,m-2\,c\,s+c\,v-2\,b\,m\,z))^{q+1}$$

$$\left(-\frac{i\,(2\,d\,k+4\,b\,z\,k-d\,m-2\,c\,s+c\,v-2\,b\,m\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(2\,d\,k+4\,b\,z\,k-d\,m-2\,c\,s+c\,v-2\,b\,m\,z)^2}{b\,(8\,k-4\,m)}\right)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\sin^m\!\left(\sqrt{z}\;b+d\,z+e\right)\cos^v(c\,z)\,dz = 2^{-m-v-1}\Bigg(\frac{2\,z^{n+1}\,(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}+$$

$$2\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma(n+1,\,-i\,c\,(2\,s-v)\,z)\,(-i\,c\,(2\,s-v))^{-n-1}+(i\,c\,(2\,s-v))^{-n-1}\,\Gamma(n+1,\,i\,c\,(2\,s-v)\,z)\right)-$$

$$i^{-m}\,4^{-n}\binom{v}{\frac{v}{2}}(v\bmod 2-1)$$

$$\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{u-1}\,e^{-\frac{i\left(b^2+4\,d\,e\right)(m-2\,u)}{4\,d}}\left(d^2\,(m-2\,u)^2\right)^{-2\,n-1}\binom{m}{u}\Bigg(e^{2\,i\,e\,(m-2\,u)}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}-(-1)^{k-h}\,4^k\,(m-2\,u)\,(i\,b\,(m-2\,u))^{-h-k+2\,n}$$

$$\left(i\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(b\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)$$

$$(-i\,d\,(m-2\,u))^{2\,n}+(-1)^m\,e^{\frac{i\,b^2\,(m-2\,u)}{2\,d}}\,(i\,d\,(m-2\,u))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}-(-1)^{k-h}\,4^k\,(m-2\,u)$$

$$(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(-i\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)\right)^{h+k}\left(\frac{i\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(b\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.\left.2\sqrt{\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,e\,(m-2\,u)}\binom{v}{s}\left(\left((d\,m-2\,c\,s-2\,d\,u+c\,v)^2\right)^{-2\,n-1}\left(-e^{\frac{1}{4}\,i\,(m-2\,u)\left(8\,e-\frac{b^2\,(m-2\,u)}{d\,m-2\,c\,s-2\,d\,u+c\,v}\right)}\right.\right.$$

$$\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b\,(m-2\,u))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\left(i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2\right)\Big/(d\,m-2\,c\,s-2\,d\,u+c\,v)\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\right.$$

$$\sqrt{\left(-\left(i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2\right)\Big/(d\,m-2\,c\,s-2\,d\,u+c\,v)\right)}$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\left(i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2\right)\Big/\right.$$

$$\left.(4\,(d\,m-2\,c\,s-2\,d\,u+c\,v))\right)-b\,(m-2\,u)\left(b\,(m-2\,u)+\right.$$

$$\left.2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\left(i\left(b\,(m-2\,u)+2\,(d\,m-\right.\right.\right.$$

$$\left.\left.\left.\left.\left.2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2\right)\Big/(4\,(d\,m-2\,c\,s-2\,d\,u+c\,v))\right)\right)\right)$$

$$(-i\,(d\,m-2\,c\,s-2\,d\,u+c\,v))^{2\,n}-(-1)^m\,e^{\frac{i\,b^2\,(m-2\,u)^2}{4\,(d\,m-2\,c\,s-2\,d\,u+c\,v)}}\,(i\,(d\,m-2\,c\,s-2\,d\,u+c\,v))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)^2}{d\,m-2\,c\,s-2\,d\,u+c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-b\,(m-2\,u)\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.\frac{i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\,\right)^2}{4\,(d\,m-2\,c\,s-2\,d\,u+c\,v)}\right)-2\,i\,(d\,m-2\,c\,s-2\,d\,u+c\,v)$$

$$\sqrt{\left(\left(i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\,\right)^2\right)\Big/(d\,m-2\,c\,s-2\,d\,u+c\,v)\right)}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)+2\,(d\,m-2\,c\,s-2\,d\,u+c\,v)\,\sqrt{z}\,\right)^2}{4\,(d\,m-2\,c\,s-2\,d\,u+c\,v)}\right)\right)\right)\right)-$$

$$\left(e^{\frac{1}{4}\,(m-2\,u)\left(8\,i\,e-\frac{i\,b^2\,(m-2\,u)}{d\,m+2\,c\,s-2\,d\,u-c\,v}\right)}\,(i\,(d\,m+2\,c\,s-2\,d\,u-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(i\,b\,(m-2\,u))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\,\right)^2}{d\,m+2\,c\,s-2\,d\,u-c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{\left(-\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\,\right)^2\right)\Big/\right.}\right.$$

$$\left.(d\,m+2\,c\,s-2\,d\,u-c\,v)\right)\Gamma\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.-\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\,\right)^2\right)\Big/(8\,c\,s+4\,d\,(m-2\,u)-4\,c\,v)\right)-$$

$$b\,(m-2\,u)\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\,\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\,\right)^2\right)\Big/\right.$$

$$\left.\left.\left.(8\,c\,s+4\,d\,(m-2\,u)-4\,c\,v)\right)\right)\right)\Big/$$

$$(d\,m+2\,c\,s-2\,d\,u-c\,v)^2-\left((-1)^m\,e^{\frac{i\,b^2\,(m-2\,u)^2}{4\,d\,m+8\,c\,s-8\,d\,u-4\,c\,v}}\,(-i\,(d\,m+2\,c\,s-2\,d\,u-c\,v))^{-2\,n}\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\,\sqrt{z}\,\right)^2}{d\,m+2\,c\,s-2\,d\,u-c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(-b\,(m-2u)\left(b\,(m-2u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b\,(m-2u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\sqrt{z}\right)^2}{4\,d\,m+8\,c\,s-8\,d\,u-4\,c\,v}\right)-$$

$$2\,i\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\sqrt{\frac{i\left(b\,(m-2u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\sqrt{z}\right)^2}{d\,m+2\,c\,s-2\,d\,u-c\,v}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b\,(m-2u)+2\,(d\,m+2\,c\,s-2\,d\,u-c\,v)\sqrt{z}\right)^2}{4\,d\,m+8\,c\,s-8\,d\,u-4\,c\,v}\right)\right)\right)\Big/(d$$

$$\left.\left.m+2\,c\,s-2\,d\,u-c\,v)^2\right)\right)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r\right)\cos^v(f\,z+g)$

01.07.21.2513.01

$$\int z^n \sin^m\left(b\,z^2\right)\cos^v(f\,z+g)\,dz ==$$

$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m \bmod 2-1)\,(v \bmod 2-1)}{n+1}-z^{n+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{1}{2}i\,m\,\pi}\left(b^2\,(m-2k)^2\,z^4\right)^{\frac{1}{2}(-n-1)}\right.$$

$$\binom{m}{k}\left(\Gamma\left(\frac{n+1}{2},\ i\,b\,(2k-m)\,z^2\right)\left(-i\,b\,(2k-m)\,z^2\right)^{\frac{n+1}{2}}+e^{i\,m\,\pi}\left(i\,b\,(2k-m)\,z^2\right)^{\frac{n+1}{2}}\Gamma\left(\frac{n+1}{2},\ -i\,b\,(2k-m)\,z^2\right)\right)-$$

$$2\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{i\,g\,(2s-v)}\,\Gamma(n+1,\ -i\,f\,(2s-v)\,z)\,(-i\,f\,(2s-v))^{-n-1}+\right.$$

$$\left.e^{-i\,g\,(2s-v)}\,(i\,f\,(2s-v))^{-n-1}\,\Gamma(n+1,\ i\,f\,(2s-v)\,z)\right)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(2\,g\,s-g\,v)}\binom{v}{s}\left(e^{\frac{i\,f^2\,(v-2s)^2}{8\,b\,k-4\,b\,m}}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,f\,s-f\,v))^{n-q}\,(-i\,(2\,f\,s-f\,v+4\,b\,k\,z-2\,b\,m\,z))^{q+1}\right.\right.$$

$$\left.\left.\left.\left(\frac{i\,(f\,(v-2s)+2\,(b\,m-2\,b\,k)\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\left(\frac{q+1}{2},\ \frac{i\,(f\,(v-2s)+2\,(b\,m-2\,b\,k)\,z)^2}{8\,b\,k-4\,b\,m}\right)\right)\right)\right.$$

$$(-i\,(2\,b\,k-b\,m))^{-n-1}+e^{\frac{i\,(f\,v-2\,f\,s)^2}{8\,b\,k-4\,b\,m}-2\,i\,g\,(v-2\,s)}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(f\,v-2\,f\,s))^{n-q}\right.$$

$$(-i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m)\,z))^{q+1}\left(\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m)\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\left.\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m)\,z)^2}{8\,b\,k-4\,b\,m}\right)\right)(-i\,(2\,b\,k-b\,m))^{-n-1}+e^{i\left(-\frac{f^2\,(v-2\,s)^2}{8\,b\,k-4\,b\,m}-2\,g\,(v-2\,s)+m\,\pi\right)}$$

$$(i\,(2\,b\,k-b\,m))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,f\,s-f\,v))^{n-q}\,(i\,(2\,f\,s-f\,v+4\,b\,k\,z-2\,b\,m\,z))^{q+1}$$

$$\left(-\frac{i\,(f\,(v-2\,s)+2\,(b\,m-2\,b\,k)\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(f\,(v-2\,s)+2\,(b\,m-2\,b\,k)\,z)^2}{8\,b\,k-4\,b\,m}\right)+$$

$$e^{i\left(m\,\pi-\frac{(f\,v-2\,f\,s)^2}{8\,b\,k-4\,b\,m}\right)}(i\,(2\,b\,k-b\,m))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(f\,v-2\,f\,s))^{n-q}\,(i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m)\,z))^{q+1}$$

$$\left(-\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m)\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\right.$$

$$\left.\left.\left.-\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m)\,z)^2}{8\,b\,k-4\,b\,m}\right)\right)\right)\,/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.07.21.2514.01

$$\int z^n\sin^m\!\left(b\sqrt{z}\right)\cos^v(f\,z+g)\,dz=2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}-2\binom{m}{\frac{m}{2}}(1-m\bmod 2)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{i\,g\,(2\,s-v)}\,\Gamma(n+1,\,-i\,f\,(2\,s-v)\,z)\,(-i\,f\,(2\,s-v))^{-n-1}+e^{-i\,g\,(2\,s-v)}\,(i\,f\,(2\,s-v))^{-n-1}\,\Gamma(n+1,\,i\,f\,(2\,s-v)\,z)\right)+$$

$$4\,b^{-2\,(n+1)}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+n}\,e^{-\frac{1}{2}\,i\,m\,\pi}\,(m-2\,k)^{-2\,n-2}\binom{m}{k}$$

$$\left(e^{i\,m\,\pi}\,\Gamma\!\left(2\,(n+1),\,-i\,b\,(2\,k-m)\sqrt{z}\right)+\Gamma\!\left(2\,(n+1),\,i\,b\,(2\,k-m)\sqrt{z}\right)\right)-$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(2\,g\,s-g\,v)}\binom{v}{s}\left(e^{-\frac{i\,b^2\,(m-2\,u)^2}{4\,f\,(v-2\,s)}}\left(f^2\,(v-2\,s)^2\right)^{-2\,n-1}\left(\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b\,(m-2\,u))^{-h-k+2\,n}\right.\right.\right.$$

$$\left(i\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,f\,(v-2\,s)\sqrt{-\frac{i\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\right.\right.$$

$$\left.-\frac{i\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-b\,(m-2\,u)\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)$$

$$(-i\,f\,(v-2\,s))^{2\,n}+(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{b^2\,(m-2\,u)^2}{f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}\,(i\,f\,(v-2\,s))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(-b\,(m-2\,u)\right.$$

$$\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-$$

$$2\,i\,f\,(v-2\,s)\sqrt{\frac{i\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)+$$

$$\frac{1}{(2\,f\,s-f\,v)^2}\left((-1)^m\,e^{\frac{i\,(b\,m-2\,b\,u)^2}{8\,f\,s-4\,f\,v}}\,(-i\,(2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m-2\,b\,u))^{-h-k+2\,n}\right.$$

$$\left(-i\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((2\,b\,u-b\,m)\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)-$$

$$2\,i\,(2\,f\,s-f\,v)\sqrt{\frac{i\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}}$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(2\,f\,s-f\,v)^2}\Bigg(e^{i\left(g\,(4\,s-2\,v)-\frac{(b\,m-2\,b\,u)^2}{8\,f\,s-4\,f\,v}\right)}\,(i\,(2\,f\,s-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,m-2\,b\,u))^{-h-k+2\,n}$$

$$\left(i\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((2\,b\,u-b\,m)\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\ -\frac{i\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)+$$

$$2\,i\sqrt{-\frac{i\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}}\ (2\,f\,s-f\,v)\,\Gamma\Bigg(\frac{1}{2}\,(h+k+2),$$

$$-\frac{i\left(b\,(m-2\,u)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r + e\right) \cos^v(f z + g)$

01.07.21.2515.01

$$\int z^n \sin^m\left(b z^2 + e\right) \cos^v(f z + g)\, dz = 2^{-m-v-1} \Bigg(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (m \bmod 2 - 1)(v \bmod 2 - 1)}{n+1} - 2 \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{i g (2 s - v)}\, \Gamma(n+1, -i f (2 s - v) z) (-i f (2 s - v))^{-n-1} + e^{-i g (2 s - v)} (i f (2 s - v))^{-n-1}\, \Gamma(n+1, i f (2 s - v) z) \right) -$$

$$\binom{v}{\frac{v}{2}} (1 - v \bmod 2) z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} e^{-\frac{1}{2} i (\pi m + 2 e (2 k + m))} \left(b^2 (m - 2 k)^2 z^4\right)^{\frac{1}{2}(-n-1)} \bigg(e^{2 i e m}\, \Gamma\!\left(\frac{n+1}{2}, i b (2 k - m) z^2\right)$$

$$\left(-i b (2 k - m) z^2\right)^{\frac{n+1}{2}} + e^{i (4 e k + m \pi)} \left(i b (2 k - m) z^2\right)^{\frac{n+1}{2}}\, \Gamma\!\left(\frac{n+1}{2}, -i b (2 k - m) z^2\right) \bigg) -$$

$$i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i (2 e k - e m + 2 g s - g v)} \binom{v}{s} \Bigg(e^{\frac{i f^2 (v - 2 s)^2}{8 b k - 4 b m}} \Bigg(\sum_{q=0}^{n} 2^{q-n} (i (2 f s - f v))^{n-q}$$

$$(-i (2 f s - f v + 4 b k z - 2 b m z))^{q+1} \left(\frac{i (f (v - 2 s) + 2 (b m - 2 b k) z)^2}{2 b k - b m} \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i (f (v - 2 s) + 2 (b m - 2 b k) z)^2}{8 b k - 4 b m} \right) \Bigg) (-i (2 b k - b m))^{-n-1} +$$

$$e^{\frac{i (f v - 2 f s)^2}{8 b k - 4 b m} - 2 i g (v - 2 s)} \Bigg(\sum_{q=0}^{n} 2^{q-n} (i (f v - 2 f s))^{n-q} (-i (f (v - 2 s) + 2 (2 b k - b m) z))^{q+1}$$

$$\left(\frac{i (f (v - 2 s) + 2 (2 b k - b m) z)^2}{2 b k - b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i (f (v - 2 s) + 2 (2 b k - b m) z)^2}{8 b k - 4 b m} \right) \Bigg)$$

$$(-i (2 b k - b m))^{-n-1} + e^{i \left(-\frac{f^2 (v - 2 s)^2}{8 b k - 4 b m} - 2 g (v - 2 s) + e (4 k - 2 m) + m \pi \right)} (i (2 b k - b m))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n} (-i (2 f s - f v))^{n-q} (i (2 f s - f v + 4 b k z - 2 b m z))^{q+1}$$

$$\left(-\frac{i (f (v - 2 s) + 2 (b m - 2 b k) z)^2}{2 b k - b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{i (f (v - 2 s) + 2 (b m - 2 b k) z)^2}{8 b k - 4 b m} \right) +$$

$$e^{i\left(-\frac{(f v-2 f s)^2}{8 b k-4 b m}+e (4 k-2 m)+m \pi\right)} (i (2 b k-b m))^{-n-1} \sum_{q=0}^n 2^{q-n} (-i (f v-2 f s))^{n-q}$$

$$(i (f (v-2 s)+2 (2 b k-b m) z))^{q+1} \left(-\frac{i (f (v-2 s)+2 (2 b k-b m) z)^2}{2 b k-b m}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\right.$$

$$\left.\left.\left.\frac{q+1}{2}, -\frac{i (f (v-2 s)+2 (2 b k-b m) z)^2}{8 b k-4 b m}\right)\right)\right) /; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.07.21.2516.01

$$\int z^n \sin^m\left(\sqrt{z}\, b+e\right) \cos^v(f z+g)\, dz ==$$

$$2^{-m-v-1} \left(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2) (1-v \bmod 2)}{n+1} + 4 \binom{v}{\frac{v}{2}} (1-v \bmod 2)\, b^{-2 (n+1)} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+n} \binom{m}{k} e^{-\frac{1}{2} i (\pi m+2 e (2 k+m))}\right.$$

$$(m-2 k)^{-2 n-2} \left(e^{i (4 e k+m \pi)} \Gamma\left(2 (n+1), -i b (2 k-m) \sqrt{z}\right) + e^{2 i e m} \Gamma\left(2 (n+1), i b (2 k-m) \sqrt{z}\right)\right) -$$

$$2 \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{i g (2 s-v)} \Gamma(n+1, -i f (2 s-v) z) (-i f (2 s-v))^{-n-1} +\right.$$

$$\left. e^{-i g (2 s-v)} (i f (2 s-v))^{-n-1} \Gamma(n+1, i f (2 s-v) z)\right) - i^{-m} 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u}$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i (e m+2 g s-2 e u-g v)} \binom{v}{s} \left(e^{-\frac{i b^2 (m-2 u)^2}{4 f (v-2 s)}} \left(f^2 (v-2 s)^2\right)^{-2 n-1} \left(e^{2 i e (m-2 u)} \left(\sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (i b (m-2 u))^{-h-k+2 n}\right.\right.\right.$$

$$\left(i \left(b (m-2 u)+2 f (v-2 s) \sqrt{z}\right)\right)^{h+k} \left(-\frac{i \left(b (m-2 u)+2 f (v-2 s) \sqrt{z}\right)^2}{f (v-2 s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(2 i f (v-2 s) \sqrt{-\frac{i \left(b (m-2 u)+2 f (v-2 s) \sqrt{z}\right)^2}{f (v-2 s)}}\, \Gamma\left(\frac{1}{2} (h+k+2),\right.\right.$$

$$\left.-\frac{i \left(b (m-2 u)+2 f (v-2 s) \sqrt{z}\right)^2}{4 f (v-2 s)}\right) - b (m-2 u) \left(b (m-2 u)+2 f (v-2 s) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b(m-2u)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\Bigg)\Bigg)$$

$$(-i f(v-2s))^{2n}+(-1)^m e^{\frac{1}{2}i\left(\frac{b^2(m-2u)^2}{f(v-2s)}+8gs-4gv\right)}(i f(v-2s))^{2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i b(m-2u))^{-h-k+2n}\left(-i\left(b(m-2u)+2f(v-2s)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b(m-2u)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(-b(m-2u)$$

$$\left(b(m-2u)+2f(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b(m-2u)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)-$$

$$2i f(v-2s)\sqrt{\frac{i\left(b(m-2u)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b(m-2u)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(2fs-fv)^2}\Bigg((-1)^m e^{\frac{i(bm-2bu)^2}{8fs-4fv}}(-i(2fs-fv))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(bm-2bu))^{-h-k+2n}$$

$$\left(-i\left(b(m-2u)+2(2fs-fv)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b(m-2u)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((2bu-bm)\left(b(m-2u)+2(2fs-fv)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b(m-2u)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)-$$

$$2i(2fs-fv)\sqrt{\frac{i\left(b(m-2u)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b(m-2u)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(2fs-fv)^2}\Bigg(e^{i\left(-\frac{(bm-2bu)^2}{8fs-4fv}+2e(m-2u)+g(4s-2v)\right)}(i(2fs-fv))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k$$

$$(i(bm-2bu))^{-h-k+2n}\left(i\left(b(m-2u)+2(2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b(m-2u)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((2bu-bm)\Big(b(m-2u)+$$

$$2(2fs-fv)\sqrt{z}\Big)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b(m-2u)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)+$$

$$2i\sqrt{-\frac{i\left(b(m-2u)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}}(2fs-fv)\Gamma\Bigg(\frac{1}{2}(h+k+2),$$

$$-\frac{i\left(b(m-2u)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg) /; n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r + d z\right) \cos^v(f z + g)$

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$$\int z^n \sin^m\left(b z^2+d z\right)\cos^v(fz+g)\,dz = 2^{-m-v-1}\Bigg(\frac{2z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m \bmod 2-1)(v \bmod 2-1)}{n+1} - 2\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{ig(2s-v)}\Gamma(n+1,-if(2s-v)z)(-if(2s-v))^{-n-1}+e^{-ig(2s-v)}(if(2s-v))^{-n-1}\Gamma(n+1,if(2s-v)z)\right)+$$

$$i^{-m}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-\frac{i d^2(m-2k)}{4b}}(ib(2k-m))^{-n-1}\binom{m}{k}$$

$$\left(\sum_{q=0}^{n} 2^{q-n} (i\, d)^{n-q} (m-2k)^{n+1} (-i\,(d+2\,b\,z))^{q+1} \left(\frac{i\,(2k-m)(d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\right.$$

$$\Gamma\left(\frac{q+1}{2}, \frac{i\,(2k-m)(d+2\,b\,z)^2}{4\,b}\right) + e^{\frac{1}{2} i \left(\frac{(m-2k)\,d^2}{b}+2\,m\,\pi\right)} \sum_{q=0}^{n} 2^{q-n}(i\,d)^{n-q}(m-2k)^{n+1}$$

$$\left.(-i\,(d+2\,b\,z))^{q+1}\left(-\frac{i\,(2k-m)(d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i\,(2k-m)(d+2\,b\,z)^2}{4\,b}\right)\right) -$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-i\,(2\,g\,s-g\,v)}\binom{v}{s}\left(e^{\frac{i\,(d\,(m-2k)+f\,(v-2s))^2}{8\,b\,k-4\,b\,m}}\left(\sum_{q=0}^n 2^{q-n}(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}(-i\,(2\,d\,k+4\,b\,z\,k-\right.\right.$$

$$d\,m+2\,f\,s-f\,v-2\,b\,m\,z))^{q+1}\left(\frac{i\,(d\,(m-2k)+f\,(v-2s)+2\,(b\,m-2\,b\,k)\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i\,(d\,(m-2k)+f\,(v-2s)+2\,(b\,m-2\,b\,k)\,z)^2}{8\,b\,k-4\,b\,m}\right)\right)(-i\,(2\,b\,k-b\,m))^{-n-1}+$$

$$e^{\frac{i\,(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m}-2\,i\,g\,(v-2s)}\left(\sum_{q=0}^n 2^{q-n}(i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}(-i\,(d\,(2k-m)+f\,(v-2s)+\right.$$

$$2\,(2\,b\,k-b\,m)\,z))^{q+1}\left(\frac{i\,(d\,(2k-m)+f\,(v-2s)+2\,(2\,b\,k-b\,m)\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(d\,(2k-m)+f\,(v-2s)+2\,(2\,b\,k-b\,m)\,z)^2}{8\,b\,k-4\,b\,m}\right)\right)$$

$$(-i\,(2\,b\,k-b\,m))^{-n-1}+e^{i\left(-\frac{(d\,(m-2k)+f\,(v-2s))^2}{8\,b\,k-4\,b\,m}-2\,g\,(v-2s)+m\,\pi\right)}(i\,(2\,b\,k-b\,m))^{-n-1}$$

$$\sum_{q=0}^n 2^{q-n}(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}(i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(m-2k)+f\,(v-2s)+2\,(b\,m-2\,b\,k)\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\right.$$

$$\left.-\frac{i\,(d\,(m-2k)+f\,(v-2s)+2\,(b\,m-2\,b\,k)\,z)^2}{8\,b\,k-4\,b\,m}\right)+e^{i\left(m\,\pi-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m}\right)}(i\,(2\,b\,k-b\,m))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n} (-i(2dk-dm-2fs+fv))^{n-q} (i(d(2k-m)+f(v-2s)+2(2bk-bm)z))^{q+1}$$

$$\left(-\frac{i(d(2k-m)+f(v-2s)+2(2bk-bm)z)^2}{2bk-bm}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2},\right.$$

$$\left.\left.\left.-\frac{i(d(2k-m)+f(v-2s)+2(2bk-bm)z)^2}{8bk-4bm}\right)\right)\right) /; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b+d z\right) \cos^v(f z+g)\, dz = 2^{-m-v-1} \left(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2)}{n+1} - 2 \binom{m}{\frac{m}{2}} (1-m \bmod 2)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} \left(e^{i g(2s-v)} \Gamma(n+1, -i f(2s-v) z)(-i f(2s-v))^{-n-1} + e^{-i g(2s-v)} (i f(2s-v))^{-n-1} \Gamma(n+1, i f(2s-v) z)\right) +$$

$$i^{-m} 4^{-n} d^{-2(n+1)} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^{n+u} e^{-\frac{i b^2 (m-2u)}{4d}} (m-2u)^{-2(n+1)} \binom{m}{u}$$

$$\left((-1)^m e^{\frac{i b^2 (m-2u)}{2d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (m-2u)(-i b(m-2u))^{-h-k+2n} \left(-i(m-2u)\left(b+2d\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b(m-2u)\left(b+2d\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}}$$

$$\left.\left. d\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) + \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (m-2u)$$

$$(i b(m-2u))^{-h-k+2n} \left(i(m-2u)\left(b+2d\sqrt{z}\right)\right)^{h+k} \left(-\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(b\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\right.$$

$$\left.\left.\sqrt{-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)-$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(2\,g\,s-g\,v)}\binom{v}{s}\left(\left((-1)^m\,e^{\frac{i\,(b\,m-2\,b\,u)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}}\,(-i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2\,n}\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m-2\,b\,u))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2}{d\,m+2\,f\,s-2\,d\,u-f\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((2\,b\,u-b\,m)\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}\right)-2\,i\,(d\,m+2\,f\,s-2\,d\,u-f\,v)$$

$$\sqrt{\left(\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2\right)\Big/(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}\right)\right)\right)\Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+\left(e^{i\left(g\,(4\,s-2\,v)-\frac{(b\,m-2\,b\,u)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}\right)}\,(i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2\,n}\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,m-2\,b\,u))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2}{d\,m+2\,f\,s-2\,d\,u-f\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg((2\,b\,u-b\,m)\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)$$
$$\Gamma\Bigg(\frac{1}{2}(h+k+1),\,-\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)^2\right)\Big/$$
$$(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\Bigg)+2\,i\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\Gamma\Bigg(\frac{1}{2}(h+k+2),$$
$$-\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)^2\right)\Big/(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\Bigg)$$
$$\sqrt{\left(-\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)^2\right)\Big/\right.}$$
$$\left.(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)\Bigg)\Bigg/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+e^{-\frac{i\,b^2\,(m-2\,u)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}}\left((d\,(m-2\,u)+f\,(v-2\,s))^2\right)^{-2\,n-1}$$
$$\Bigg(\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b\,(m-2\,u))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)\right)^{h+k}$$
$$\Bigg(-\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2\right)\Big/$$
$$(d\,(m-2\,u)+f\,(v-2\,s))\Bigg)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))$$
$$\sqrt{\left(-\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)}$$
$$\Gamma\Bigg(\frac{1}{2}(h+k+2),\,-\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2\right)\Big/$$
$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Bigg)-b\,(m-2\,u)$$
$$\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),$$
$$-\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2\right)\Big/$$
$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Bigg)\Bigg)\Bigg)(-i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}+$$
$$(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{b^2\,(m-2\,u)^2}{d\,(m-2\,u)+f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}\,(i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$
$$(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)\right)^{h+k}$$
$$\left(\frac{i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2}{d\,(m-2\,u)+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(-b\,(m-2\,u)\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}\right)-$$

$$2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{\left(\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2\right)\Big/\right.}$$

$$\left.(d\,(m-2\,u)+f\,(v-2\,s))\right)\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.\left.\left.\frac{i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}\right)\right)\right)\right)\Bigg)\,/;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r+d\,z+e\right)\cos^v(f\,z+g)$

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$$\int z^n \sin^m\left(b\,z^2+d\,z+e\right)\cos^v(f\,z+g)\,dz = 2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m \bmod 2-1)\,(v \bmod 2-1)}{n+1}-2\binom{m}{\frac{m}{2}}(1-m \bmod 2)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{i\,g\,(2\,s-v)}\,\Gamma(n+1,\,-i\,f\,(2\,s-v)\,z)\,(-i\,f\,(2\,s-v))^{-n-1}+e^{-i\,g\,(2\,s-v)}\,(i\,f\,(2\,s-v))^{-n-1}\,\Gamma(n+1,\,i\,f\,(2\,s-v)\,z)\right)+$$

$$i^{-m}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{1}{4}\,i\left(\frac{(m-2\,k)\,d^2}{b}+4\,e\,(2\,k+m)\right)}\,(i\,b\,(2\,k-m))^{-n-1}\binom{m}{k}$$

$$\left(e^{2\,i\,e\,m}\sum_{q=0}^{n}2^{q-n}\,(i\,d)^{n-q}\,(m-2\,k)^{n+1}\,(-i\,(d+2\,b\,z))^{q+1}\left(\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\right.$$

$$\Gamma\!\left(\frac{q+1}{2},\ \frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)+e^{\frac{1}{2}\,i\left(\frac{(m-2\,k)\,d^2}{b}+8\,e\,k+2\,m\,\pi\right)}\sum_{q=0}^{n}2^{q-n}\,(i\,d)^{n-q}\,(m-2\,k)^{n+1}$$

$$\left.(-i\,(d+2\,b\,z))^{q+1}\left(-\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\ -\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)\right)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(2\,e\,k-e\,m+2\,g\,s-g\,v)}\binom{v}{s}\left(e^{\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m}}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}\right.\right.$$

$$(-i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z))^{q+1}\left(\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(b\,m-2\,b\,k)\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2},\,\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(b\,m-2\,b\,k)\,z)^2}{8\,b\,k-4\,b\,m}\right)\Bigg)(-i\,(2\,b\,k-b\,m))^{-n-1}+$$

$$e^{\frac{i\,(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m}-2\,i\,g\,(v-2\,s)}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\,(-i\,(d\,(2\,k-m)+f\,(v-2\,s)+\right.$$

$$2\,(2\,b\,k-b\,m)\,z))^{q+1}\left(\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m)\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m)\,z)^2}{8\,b\,k-4\,b\,m}\right)\right)$$

$$(-i\,(2\,b\,k-b\,m))^{-n-1}+e^{i\left(-\frac{(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m}+e\,(4\,k-2\,m)-2\,g\,(v-2\,s)+m\,\pi\right)}\,(i\,(2\,b\,k-b\,m))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}\,(i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(b\,m-2\,b\,k)\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\right.$$

$$\left.-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(b\,m-2\,b\,k)\,z)^2}{8\,b\,k-4\,b\,m}\right)+e^{i\left(-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m}+e\,(4\,k-2\,m)+m\,\pi\right)}$$

$$(i\,(2\,b\,k-b\,m))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\,(i\,(d\,(2\,k-m)+f\,(v-2\,s)+$$

$$2\,(2\,b\,k-b\,m)\,z))^{q+1}\left(-\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m)\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg($$

$$\left.\left.\frac{q+1}{2},\,-\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m)\,z)^2}{8\,b\,k-4\,b\,m}\right)\right)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \cos^\nu(f\, z + g)\, dz = 2^{-m-\nu-1} \left(\frac{2\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2)}{n+1} - 2 \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \right.$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{i\, g\, (2 s - \nu)}\, \Gamma(n+1, -i\, f\, (2 s - \nu)\, z)\, (-i\, f\, (2 s - \nu))^{-n-1} + e^{-i\, g\, (2 s - \nu)}\, (i\, f\, (2 s - \nu))^{-n-1}\, \Gamma(n+1, i\, f\, (2 s - \nu)\, z)\right) +$$

$$i^{-m}\, 4^{-n}\, d^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{n+u}\, e^{-\frac{i\left(b^2 + 4 d e\right)(m - 2 u)}{4 d}}\, (m - 2 u)^{-2(n+1)} \binom{m}{u}$$

$$\left((-1)^m\, e^{\frac{i\, b^2 (m - 2 u)}{2 d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (m - 2 u)\, (-i\, b\, (m - 2 u))^{-h-k+2 n} \left(-i\, (m - 2 u) \left(b + 2 d \sqrt{z}\right)\right)^{h+k} \right.$$

$$\left(\frac{i\, (m - 2 u) \left(b + 2 d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\, (m - 2 u) \left(b + 2 d \sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2}(h + k + 1), \frac{i\, (m - 2 u) \left(b + 2 d \sqrt{z}\right)^2}{4 d} \right) + 2 \sqrt{\frac{i\, (m - 2 u) \left(b + 2 d \sqrt{z}\right)^2}{d}}\; d\, i$$

$$\left.\left. \Gamma\left(\frac{1}{2}(h + k + 2), \frac{i\, (m - 2 u) \left(b + 2 d \sqrt{z}\right)^2}{4 d} \right) \right) \right) + e^{2 i e (m - 2 u)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (m - 2 u)$$

$$(i\, b\, (m - 2 u))^{-h-k+2 n} \left(i\, (m - 2 u) \left(b + 2 d \sqrt{z}\right)\right)^{h+k} \left(-\frac{i\, (m - 2 u) \left(b + 2 d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(b\, (m - 2 u) \left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1), -\frac{i\, (m - 2 u) \left(b + 2 d \sqrt{z}\right)^2}{4 d} \right) - \right.$$

$$\left.\left.\left. 2\, i\, d \sqrt{-\frac{i\, (m - 2 u) \left(b + 2 d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h + k + 2), -\frac{i\, (m - 2 u) \left(b + 2 d \sqrt{z}\right)^2}{4 d} \right) \right) \right) \right) -$$

$$i^{-m}\, 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i\,(e\,m+2\,g\,s-2\,e\,u-g\,v)} \binom{v}{s} \Bigg(\Bigg(\Bigg((-1)^m\, e^{\frac{i\,(b\,m-2\,b\,u)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}}\, (-i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (-i\,(b\,m-2\,b\,u))^{-h-k+2\,n} \left(-i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2}{d\,m+2\,f\,s-2\,d\,u-f\,v}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\Bigg((2\,b\,u-b\,m)\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+k+1),$$

$$\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}\Bigg)-2\,i\,(d\,m+2\,f\,s-2\,d\,u-f\,v)$$

$$\sqrt{\left(\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2\right)\Big/(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)}$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}\right)\Bigg)\Bigg)\Bigg/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+\Bigg(e^{i\left(-\frac{(b\,m-2\,b\,u)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}+2\,e\,(m-2\,u)+g\,(4\,s-2\,v)\right)}\,(i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k\, (i\,(b\,m-2\,b\,u))^{-h-k+2\,n} \left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2}{d\,m+2\,f\,s-2\,d\,u-f\,v}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k}\Bigg((2\,b\,u-b\,m)\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)$$

$$\Gamma\Bigg(\frac{1}{2}\,(h+k+1),\ -\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2\right)\Big/$$

$$(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\Bigg)+2\,i\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\Gamma\Bigg(\frac{1}{2}\,(h+k+2),$$

$$-\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2\right)\Big/(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\Bigg)$$

$$\sqrt{\Bigg(-\left(i\left(b\,(m-2\,u)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2\right)\Big/}$$

$$\left.\left.\left.(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)\right)\right)\Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+e^{-\frac{i\,b^2\,(m-2\,u)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}}\left((d\,(m-2\,u)+f\,(v-2\,s))^2\right)^{-2\,n-1}\Bigg(e^{2\,i\,e\,(m-2\,u)}$$

$$\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b\,(m-2\,u))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2\right)\Big/\right.$$

$$\left.(d\,(m-2\,u)+f\,(v-2\,s))\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\Big(2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))$$

$$\sqrt{\left(-\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)}$$

$$\Gamma\Bigg(\frac{1}{2}\,(h+k+2),\,-\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2\right)\Big/$$

$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Bigg)-b\,(m-2\,u)$$

$$\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+k+1),$$

$$-\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2\right)\Big/$$

$$\left.\left.(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Bigg)\Big)\Bigg)\right)(-i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}+$$

$$(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{b^2\,(m-2\,u)^2}{d\,(m-2\,u)+f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}\,(i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2}{d\,(m-2\,u)+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(-b\,(m-2\,u)\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}\right)-$$

$$2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{\left(\left(i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2\right)\Big/\right.}$$
$$\left.(d\,(m-2\,u)+f\,(v-2\,s))\right)\Gamma\left(\frac{1}{2}\,(h+k+2),\right.$$
$$\left.\left.\left.\left.\left.\frac{i\left(b\,(m-2\,u)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}\right)\right)\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z)\cos^v\left(c\,z^r\right)$

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$$\int z^n \sin^m(b\,z) \cos^\nu\!\left(c\,z^2\right) dz ==$$

$$2^{-m-\nu-1} \Bigg(\frac{2\, z^{n+1} (m \bmod 2 - 1)(\nu \bmod 2 - 1)}{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + z^{n+1} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \Bigg(\Gamma\!\left(\frac{n+1}{2}, -i\, c\,(2s-\nu)\, z^2\right)$$

$$\left(-i\, c\,(2s-\nu)\, z^2\right)^{\frac{1}{2}(-n-1)} + \left(i\, c\,(2s-\nu)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, i\, c\,(2s-\nu)\, z^2\right)\Bigg) + 2\, i^{-m} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\Gamma(n+1, i\, b\,(2k-m)\, z)\, (i\, b\,(2k-m))^{-n-1} + e^{i\, m\, \pi}\, (i\, b\,(m-2k))^{-n-1}\, \Gamma(n+1, i\, b\,(m-2k)\, z)\right) +$$

$$(-1)^n\, i^{-m}\, (i\, c)^{-2n-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-\frac{i\, b^2 (m-2k)^2}{c\,(8s-4\nu)}}\, (2s-\nu)^{-2n-1} \binom{\nu}{s}$$

$$\Bigg(e^{\frac{i\, b^2 (m-2k)^2}{4cs-2c\nu}} \Bigg(\sum_{q=0}^{n} \left(i\, b\left(k - \frac{m}{2}\right)\right)^{n-q} (i\,(b\,(m-2k) + 2\, c\,(\nu-2s)\, z))^{q+1} \left(\frac{i\,(b\,(m-2k) + 2\, c\,(\nu-2s)\, z)^2}{c\,(2s-\nu)}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i\,(-2\,b\,k + b\,m - 4\,c\,s\,z + 2\,c\,\nu\,z)^2}{8\,c\,s - 4\,c\,\nu}\right)\Bigg) (i\, c\,(2s-\nu))^n + e^{i\left(\frac{b^2 (m-2k)^2}{4cs-2c\nu} + m\pi\right)} \Bigg(\sum_{q=0}^{n} 2^{q-n}$$

$$(i\, b\,(m-2k))^{n-q} \left(\frac{i\,(-2\,b\,k + b\,m + 4\,c\,s\,z - 2\,c\,\nu\,z)^2}{c\,(2s-\nu)}\right)^{\frac{1}{2}(-q-1)} (i\,(2\,b\,k - b\,m - 4\,c\,s\,z + 2\,c\,\nu\,z))^{q+1}$$

$$\binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{i\,(-2\,b\,k + b\,m + 4\,c\,s\,z - 2\,c\,\nu\,z)^2}{8\,c\,s - 4\,c\,\nu}\right)\Bigg) (i\, c\,(2s-\nu))^n - (i\, c\,(\nu-2s))^n$$

$$\sum_{q=0}^{n} \left(i\, b\left(k - \frac{m}{2}\right)\right)^{n-q} \left(-\frac{i\,(-2\,b\,k + b\,m + 4\,c\,s\,z - 2\,c\,\nu\,z)^2}{c\,(2s-\nu)}\right)^{\frac{1}{2}(-q-1)} (-i\,(b\,(2k-m) + 2\,c\,(\nu-2s)\,z))^{q+1}$$

$$\binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{i\,(-2\,b\,k + b\,m + 4\,c\,s\,z - 2\,c\,\nu\,z)^2}{c\,(8s-4\nu)}\right) - e^{i\, m\, \pi}\, (i\, c\,(\nu-2s))^n$$

$$\sum_{q=0}^{n} 2^{q-n}\, (i\, b\,(m-2k))^{n-q}\, (i\,(2\,b\,k - b\,m + 4\,c\,s\,z - 2\,c\,\nu\,z))^{q+1} \left(-\frac{i\,(b\,(m-2k) + 2\,c\,(\nu-2s)\,z)^2}{c\,(2s-\nu)}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{i\,(-2\,b\,k + b\,m - 4\,c\,s\,z + 2\,c\,\nu\,z)^2}{8\,c\,s - 4\,c\,\nu}\right)\Bigg)\Bigg) \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

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$$\int z^n \sin^m(b\,z) \cos^\nu\left(c\,\sqrt{z}\right) dz = 2^{-m-\nu-1} \left(\frac{2\,z^{n+1}\,(m \bmod 2-1)\,(\nu \bmod 2-1)}{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + 2\,i^{-m} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2-1) \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \left(\Gamma(n+1,\,-i\,b\,(m-2\,u)\,z)\right.\right.$$

$$\left.(-i\,b\,(m-2\,u))^{-n-1} + (-1)^m\,(i\,b\,(m-2\,u))^{-n-1}\,\Gamma(n+1,\,i\,b\,(m-2\,u)\,z)\right) + 4 \binom{m}{\frac{m}{2}} (m \bmod 2-1)$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma\left(2\,(n+1),\,-i\,c\,(2\,s-\nu)\,\sqrt{z}\right)(-i\,c\,(2\,s-\nu))^{-2\,(n+1)} + (i\,c\,(2\,s-\nu))^{-2\,(n+1)}\,\Gamma\left(2\,(n+1),\,i\,c\,(2\,s-\nu)\,\sqrt{z}\right)\right) +$$

$$i^{-m}\,4^{-n}\,\mathrm{Sum}\left[(-1)^u \binom{m}{u} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} -e^{-\frac{i\,c^2\,(\nu-2\,s)^2}{4\,b\,(m-2\,u)}} \left(b^2\,(m-2\,u)^2\right)^{-2\,n-1} \binom{\nu}{s}\right.$$

$$\left(\left(\sum_{k=0}^{n} \sum_{h=0}^{k} i\,(-1)^{k-h}\,4^k\,(i\,c\,(2\,s-\nu))^{-h-k+2\,n} \left(i\left(2\,b\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-\nu)\right)\right)^{h+k}\right.\right.$$

$$\left(-\frac{i\left(2\,b\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-\nu)\right)^2}{b\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\,i\,(2\,s-\nu)\right.$$

$$\left(2\,b\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-\nu)\right) \Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\,b\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-\nu)\right)^2}{4\,b\,(m-2\,u)}\right) +$$

$$2\,b\,(m-2\,u)\,\sqrt{-\frac{i\left(2\,b\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-\nu)\right)^2}{b\,(m-2\,u)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.\left.-\frac{i\left(2\,b\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-\nu)\right)^2}{4\,b\,(m-2\,u)}\right)\right)\right)(-i\,b\,(m-2\,u))^{2\,n} +$$

$$\left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\,4^k\,(i\,c\,(\nu-2\,s))^{-h-k+2\,n} \left(i\left(2\,b\,\sqrt{z}\,(m-2\,u)+c\,(\nu-2\,s)\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\left(2\,b\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{b\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,b\,(m-2\,u)\sqrt{-\frac{i\left(2\,b\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{b\,(m-2\,u)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.\right.$$

$$\left.-\frac{i\left(2\,b\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,u)}\right)-c\,(v-2\,s)\left(2\,b\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\,b\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,u)}\right)\right)\right)(-i\,b\,(m-2\,u))^{2\,n}+$$

$$(-1)^m\,e^{\frac{i\,c^2\,(v-2\,s)^2}{2\,b\,(m-2\,u)}}\,(i\,b\,(m-2\,u))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k} i\,(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}$$

$$\left(i\left(c\,(v-2\,s)-2\,b\,(m-2\,u)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(2\,b\sqrt{z}\,(m-2\,u)+c\,(2\,s-v)\right)^2}{b\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(i\,c\,(v-2\,s)\left(c\,(v-2\,s)-2\,b\,(m-2\,u)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\,b\sqrt{z}\,(m-2\,u)+c\,(2\,s-v)\right)^2}{4\,b\,(m-2\,u)}\right)-\right.$$

$$2\,b\,(m-2\,u)\sqrt{\frac{i\left(2\,b\sqrt{z}\,(m-2\,u)+c\,(2\,s-v)\right)^2}{b\,(m-2\,u)}}$$

$$\left.\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\,b\sqrt{z}\,(m-2\,u)+c\,(2\,s-v)\right)^2}{4\,b\,(m-2\,u)}\right)\right)+$$

$$(-1)^m\,e^{\frac{i\,c^2\,(v-2\,s)^2}{2\,b\,(m-2\,u)}}\,(i\,b\,(m-2\,u))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k} i\,(-1)^{k-h}\,4^k\,(i\,c\,(2\,s-v))^{-h-k+2\,n}$$

$$\left(i\left(c\,(2\,s-v)-2\,b\,(m-2\,u)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(2\,b\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{b\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(i\, c\,(2\,s-v)\left(c\,(2\,s-v)-2\,b\,(m-2\,u)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(2\,b\,\sqrt{z}\ (m-2\,u)+c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,u)}\right)-\right.$$

$$2\,b\,(m-2\,u)\sqrt{\frac{i\left(2\,b\,\sqrt{z}\ (m-2\,u)+c\,(v-2\,s)\right)^2}{b\,(m-2\,u)}}\ \Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.\left.\left.\frac{i\left(2\,b\,\sqrt{z}\ (m-2\,u)+c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,u)}\right)\right)\right),\ \left\{u,\ 0,\ \left\lfloor\frac{m-1}{2}\right\rfloor\right\}\right)\right) /;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\cos^v\left(c\,z^r\right)$

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$$\int z^n \sin^m(d\,z+e)\cos^v\left(c\,z^2\right)dz = 2^{-m-v-1}\left(\frac{2\,z^{n+1}\,(m \bmod 2-1)\,(v \bmod 2-1)}{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} + z^{n+1}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma\left(\frac{n+1}{2},\,-i\,c\,(2\,s-v)\,z^2\right)\left(-i\,c\,(2\,s-v)\,z^2\right)^{\frac{1}{2}(-n-1)} + \left(i\,c\,(2\,s-v)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,i\,c\,(2\,s-v)\,z^2\right)\right) + 2$$

$$i^{-m}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\left(e^{i\,e\,(m-2\,k)}\,\Gamma(n+1,\,i\,d\,(2\,k-m)\,z)\,(i\,d\,(2\,k-m))^{-n-1} + e^{i\,(2\,e\,k-e\,m+m\,\pi)}\,(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,i\,d\,(m-2\,k)\,z)\right) +$$

$$(-1)^n\,i^{-m}\,(i\,c)^{-2\,n-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\left(\frac{d^2\,(m-2\,k)^2}{c\,(8\,s-4\,v)}+e\,(3\,m-2\,k)\right)}(2\,s-v)^{-2\,n-1}\binom{v}{s}$$

$$\left(e^{i\left(\frac{d^2\,(m-2\,k)^2}{4\,c\,s-2\,c\,v}+4\,e\,(m-k)\right)}\left(\sum_{q=0}^{n}\left(i\,d\left(k-\frac{m}{2}\right)\right)^{n-q}(i\,(d\,(m-2\,k)+2\,c\,(v-2\,s)\,z))^{q+1}\right.\right.$$

$$\left.\left(\frac{i\,(d\,(m-2\,k)+2\,c\,(v-2\,s)\,z)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(-2\,d\,k+d\,m-4\,c\,s\,z+2\,c\,v\,z)^2}{8\,c\,s-4\,c\,v}\right)\right)$$

$$(i\,c\,(2\,s-v))^n + e^{i\left(\frac{d^2\,(m-2\,k)^2}{4\,c\,s-2\,c\,v}+2\,e\,m+m\,\pi\right)}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,d\,(m-2\,k))^{n-q}\,(-i\,(-2\,d\,k+d\,m+4\,c\,s\,z-2\,c\,v\,z))^{q+1}\right.$$

$$\left.\left(\frac{i\,(-2\,d\,k+d\,m+4\,c\,s\,z-2\,c\,v\,z)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(-2\,d\,k+d\,m+4\,c\,s\,z-2\,c\,v\,z)^2}{8\,c\,s-4\,c\,v}\right)\right)$$

$$(i\,c\,(2\,s-v))^n - e^{4\,i\,e\,(m-k)}\,(i\,c\,(v-2\,s))^n\sum_{q=0}^{n}\left(i\,d\left(k-\frac{m}{2}\right)\right)^{n-q}(i\,(-2\,d\,k+d\,m+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(-\frac{i\,(-2\,d\,k+d\,m+4\,c\,s\,z-2\,c\,v\,z)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(-2\,d\,k+d\,m+4\,c\,s\,z-2\,c\,v\,z)^2}{c\,(8\,s-4\,v)}\right) -$$

$$e^{i\,m\,(2\,e+\pi)}\,(i\,c\,(v-2\,s))^n\sum_{q=0}^{n}2^{q-n}\,(i\,d\,(m-2\,k))^{n-q}\,(i\,(2\,d\,k-d\,m+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(m-2\,k)+2\,c\,(v-2\,s)\,z)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\right.$$

$$\left.\left.\left.-\frac{i\,(-2\,d\,k+d\,m-4\,c\,s\,z+2\,c\,v\,z)^2}{8\,c\,s-4\,c\,v}\right)\right)\right)\right) /;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$
\begin{aligned}
&\int z^n \sin^m(d\,z+e)\cos^\nu\!\left(c\sqrt{z}\right)dz = 2^{-m-\nu-1}\Bigg(\frac{2\,z^{n+1}\,(m \bmod 2-1)(\nu \bmod 2-1)}{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}+\\
&\quad 2\,i^{-m}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\Big(e^{i\,e\,(m-2u)}\,\Gamma(n+1,\,-i\,d\,(m-2u)\,z)\,(-i\,d\,(m-2u))^{-n-1}+\\
&\qquad (-1)^m\,e^{-i\,e\,(m-2u)}\,(i\,d\,(m-2u))^{-n-1}\,\Gamma(n+1,\,i\,d\,(m-2u)\,z)\Big)+4\binom{m}{\frac{m}{2}}(m \bmod 2-1)\\
&\quad \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Big(\Gamma\!\left(2\,(n+1),\,-i\,c\,(2s-\nu)\sqrt{z}\right)(-i\,c\,(2s-\nu))^{-2(n+1)}+(i\,c\,(2s-\nu))^{-2(n+1)}\,\Gamma\!\left(2\,(n+1),\,i\,c\,(2s-\nu)\sqrt{z}\right)\Big)+\\
&\quad i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}-e^{-\frac{i\,c^2\,(\nu-2s)^2}{4\,d\,(m-2u)}-i\,e\,(m-2u)}\left(d^2\,(m-2u)^2\right)^{-2n-1}\binom{\nu}{s}\\
&\qquad\Bigg(e^{2\,i\,e\,(m-2u)}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k} i\,(-1)^{k-h}\,4^k\,(i\,c\,(2s-\nu))^{-h-k+2n}\left(i\left(2\,d\sqrt{z}\,(m-2u)+c\,(2s-\nu)\right)\right)^{h+k}\\
&\qquad\quad \left(-\frac{i\left(2\,d\sqrt{z}\,(m-2u)+c\,(2s-\nu)\right)^2}{d\,(m-2u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(c\,i\,(2s-\nu)\\
&\qquad\qquad \left(2\,d\sqrt{z}\,(m-2u)+c\,(2s-\nu)\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\,d\sqrt{z}\,(m-2u)+c\,(2s-\nu)\right)^2}{4\,d\,(m-2u)}\right)+\\
&\qquad\qquad 2\,d\,(m-2u)\sqrt{-\frac{i\left(2\,d\sqrt{z}\,(m-2u)+c\,(2s-\nu)\right)^2}{d\,(m-2u)}}\;\Gamma\Bigg(\frac{1}{2}\,(h+k+2),\\
&\qquad\qquad -\frac{i\left(2\,d\sqrt{z}\,(m-2u)+c\,(2s-\nu)\right)^2}{4\,d\,(m-2u)}\Bigg)\Bigg)\Bigg)(-i\,d\,(m-2u))^{2n}+\\
&\qquad e^{2\,i\,e\,(m-2u)}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(\nu-2s))^{-h-k+2n}\left(i\left(2\,d\sqrt{z}\,(m-2u)+c\,(\nu-2s)\right)\right)^{h+k}
\end{aligned}
$$

$$\left(-\frac{i\left(2 d \sqrt{z}\,(m-2 u)+c (v-2 s)\right)^2}{d (m-2 u)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(2 i d (m-2 u) \sqrt{-\frac{i\left(2 d \sqrt{z}\,(m-2 u)+c (v-2 s)\right)^2}{d (m-2 u)}}\; \Gamma\left(\frac{1}{2}(h+k+2),\right.\right.$$

$$\left.-\frac{i\left(2 d \sqrt{z}\,(m-2 u)+c (v-2 s)\right)^2}{4 d (m-2 u)}\right)-c (v-2 s)\left(2 d \sqrt{z}\,(m-2 u)+c (v-2 s)\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i\left(2 d \sqrt{z}\,(m-2 u)+c (v-2 s)\right)^2}{4 d (m-2 u)}\right)\right)\right)(-i d (m-2 u))^{2 n}+$$

$$(-1)^m e^{\frac{i c^2 (v-2 s)^2}{2 d (m-2 u)}} (i d (m-2 u))^{2 n} \sum_{k=0}^n \sum_{h=0}^k i (-1)^{k-h} 4^k (i c (v-2 s))^{-h-k+2 n}$$

$$\left(i\left(c (v-2 s)-2 d (m-2 u) \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(2 d \sqrt{z}\,(m-2 u)+c (2 s-v)\right)^2}{d (m-2 u)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(i c (v-2 s)\left(c (v-2 s)-2 d (m-2 u) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(2 d \sqrt{z}\,(m-2 u)+c (2 s-v)\right)^2}{4 d (m-2 u)}\right)-\right.$$

$$2 d (m-2 u) \sqrt{\frac{i\left(2 d \sqrt{z}\,(m-2 u)+c (2 s-v)\right)^2}{d (m-2 u)}}$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(2 d \sqrt{z}\,(m-2 u)+c (2 s-v)\right)^2}{4 d (m-2 u)}\right)\right)+$$

$$(-1)^m e^{\frac{i c^2 (v-2 s)^2}{2 d (m-2 u)}} (i d (m-2 u))^{2 n} \sum_{k=0}^n \sum_{h=0}^k i (-1)^{k-h} 4^k (i c (2 s-v))^{-h-k+2 n}$$

$$\left(i\left(c (2 s-v)-2 d (m-2 u) \sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(2 d \sqrt{z}\,(m-2 u)+c (v-2 s)\right)^2}{d (m-2 u)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(i\, c\,(2s-v)\left(c\,(2s-v)-2\,d\,(m-2u)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\ \frac{i\left(2\,d\sqrt{z}\,(m-2u)+c\,(v-2s)\right)^2}{4\,d\,(m-2u)}\right)-\right.$$

$$2\,d\,(m-2u)\sqrt{\frac{i\left(2\,d\sqrt{z}\,(m-2u)+c\,(v-2s)\right)^2}{d\,(m-2u)}}$$

$$\left.\left.\left.\left.\Gamma\!\left(\frac{1}{2}(h+k+2),\ \frac{i\left(2\,d\sqrt{z}\,(m-2u)+c\,(v-2s)\right)^2}{4\,d\,(m-2u)}\right)\right)\right)\right)\right)\ /;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m(b\,z^r)\cos^v(c\,z^r)$

01.07.21.2525.01

$$\int z^{\alpha-1}\sin^m(b\,z^r)\cos^v(c\,z^r)\,dz =$$

$$2^{-m-v}\left(\frac{z^\alpha\,(m \bmod 2-1)\,(v \bmod 2-1)}{\alpha}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}+\frac{1}{r}\left(i^{-m}\,z^\alpha\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\right.\right.$$

$$\left.\left(\Gamma\!\left(\frac{\alpha}{r},\ i\,b\,(2k-m)\,z^r\right)(i\,b\,(2k-m)\,z^r)^{-\frac{\alpha}{r}}+(-1)^m\,(i\,b\,(m-2k)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\ i\,b\,(m-2k)\,z^r\right)\right)\right)+$$

$$\frac{1}{r}\left(\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}z^\alpha\left(c^2\,(v-2s)^2\,z^{2r}\right)^{-\frac{\alpha}{r}}\binom{v}{s}\left(\Gamma\!\left(\frac{\alpha}{r},\ i\,c\,(2s-v)\,z^r\right)(-i\,c\,(2s-v)\,z^r)^{\alpha/r}+\right.\right.$$

$$\left.\left.(i\,c\,(2s-v)\,z^r)^{\alpha/r}\,\Gamma\!\left(\frac{\alpha}{r},\ i\,c\,(v-2s)\,z^r\right)\right)\right)-$$

$$\frac{i^{-m}}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}z^\alpha\binom{v}{s}\left((-1)^m\,\Gamma\!\left(\frac{\alpha}{r},\ -i\,(2bk-bm-2cs+cv)\,z^r\right)(-i\,(2bk-bm-2cs+cv)\,z^r)^{-\frac{\alpha}{r}}+\right.$$

$$(i\,(2bk-bm-2cs+cv)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\ i\,(2bk-bm-2cs+cv)\,z^r\right)+$$

$$(-1)^m\,(-i\,(2bk-bm+2cs-cv)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\ -i\,(2bk-bm+2cs-cv)\,z^r\right)+$$

$$\left.\left.(i\,(2bk-bm+2cs-cv)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\ i\,(2bk-bm+2cs-cv)\,z^r\right)\right)\right)\ /;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.07.21.2526.01

$$\int z^n \sin^m(b z^2) \cos^\nu(c z^2)\, dz = -2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{1}{2} i m \pi}\, \Gamma\left(\frac{n+1}{2}, -i\, b\, (m-2k)\, z^2\right) \left(-i\, b\, (m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{i m \pi}{2}} \left(i\, b\, (m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i\, b\, (m-2k)\, z^2\right) \right) \right) z^{n+1} - 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma\left(\frac{n+1}{2}, -i\, c\, (\nu-2s)\, z^2\right) \left(-i\, c\, (\nu-2s)\, z^2\right)^{\frac{1}{2}(-n-1)} + \left(i\, c\, (\nu-2s)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i\, c\, (\nu-2s)\, z^2\right) \right) \right) z^{n+1} - 2^{-m-\nu-1} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{-\frac{1}{2} i m \pi}\, \Gamma\left(\frac{n+1}{2}, (i\, c\, (\nu-2s) - i\, b\, (m-2k))\, z^2\right) \left((i\, c\, (\nu-2s) - i\, b\, (m-2k))\, z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{i m \pi}{2}} \left((b\, i\, (m-2k) + c\, i\, (\nu-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (b\, i\, (m-2k) + c\, i\, (\nu-2s))\, z^2\right) + e^{-\frac{1}{2} i m \pi} \left((-i\, b\, (m-2k) - i\, c\, (\nu-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i\, b\, (m-2k) - i\, c\, (\nu-2s))\, z^2\right) + e^{\frac{i m \pi}{2}} \left((i\, b\, (m-2k) - i\, c\, (\nu-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i\, b\, (m-2k) - i\, c\, (\nu-2s))\, z^2\right) \right) \right) z^{n+1} + \frac{2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2527.01

$$\int z^n \sin^m\left(\sqrt{z}\, b\right) \cos^v\left(\sqrt{z}\, c\right) dz =$$

$$-2^{-m-v+1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{1}{2} i m \pi} \Gamma\left(2(n+1), -i b (m-2k) \sqrt{z}\right) \left(-i b (m-2k) \sqrt{z}\right)^{-2(n+1)} + \right.\right.$$

$$\left.\left. e^{\frac{i m \pi}{2}} \left(i b (m-2k) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), i b (m-2k) \sqrt{z}\right)\right)\right) z^{n+1} -$$

$$2^{-m-v+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\Gamma\left(2(n+1), -i c (v-2s) \sqrt{z}\right) \left(-i c (v-2s) \sqrt{z}\right)^{-2(n+1)} + \right.\right.$$

$$\left.\left. \left(i c (v-2s) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), i c (v-2s) \sqrt{z}\right)\right)\right) z^{n+1} - 2^{-m-v+1} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \right.$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{1}{2} i m \pi} \Gamma\left(2(n+1), (i c (v-2s) - i b (m-2k)) \sqrt{z}\right) \left((i c (v-2s) - i b (m-2k)) \sqrt{z}\right)^{-2(n+1)} + \right.$$

$$e^{\frac{i m \pi}{2}} \left((b i (m-2k) + c i (v-2s)) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (b i (m-2k) + c i (v-2s)) \sqrt{z}\right) +$$

$$e^{-\frac{1}{2} i m \pi} \left((-i b (m-2k) - i c (v-2s)) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-i b (m-2k) - i c (v-2s)) \sqrt{z}\right) +$$

$$\left.\left. e^{\frac{i m \pi}{2}} \left((i b (m-2k) - i c (v-2s)) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i b (m-2k) - i c (v-2s)) \sqrt{z}\right)\right)\right) z^{n+1} +$$

$$\frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \sin^m\left(b z^r + e\right) \cos^v\left(c z^r\right)$

01.07.21.2528.01

$$\int z^{\alpha-1}\sin^m(b\,z^r+e)\cos^\nu(c\,z^r)\,dz = 2^{-m-\nu}\left(\frac{z^\alpha\,(m \bmod 2-1)(\nu \bmod 2-1)}{\alpha}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}+\frac{1}{r}\left(i^{-m}z^\alpha\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-i\,e\,(2k+m)}\binom{m}{k}\right.\right.$$
$$\left.\left(e^{2iem}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,b\,(2k-m)\,z^r\right)(i\,b\,(2k-m)\,z^r)^{-\frac{\alpha}{r}}+(-1)^m e^{4iek}\,(i\,b\,(m-2k)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,b\,(m-2k)\,z^r\right)\right)\right)+$$
$$\frac{1}{r}\left(z^\alpha\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(c^2\,(\nu-2s)^2\,z^{2r}\right)^{-\frac{\alpha}{r}}\binom{\nu}{s}\left(\Gamma\!\left(\frac{\alpha}{r},\,i\,c\,(2s-\nu)\,z^r\right)(-i\,c\,(2s-\nu)\,z^r)^{\alpha/r}+\right.\right.$$
$$\left.\left.(i\,c\,(2s-\nu)\,z^r)^{\alpha/r}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,c\,(\nu-2s)\,z^r\right)\right)\right)-\frac{1}{r}\left(i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\right.$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i\,e\,(2k+m)}\,z^\alpha\binom{\nu}{s}\left((-1)^m e^{4iek}\,\Gamma\!\left(\frac{\alpha}{r},\,-i\,(2bk-bm-2cs+c\nu)\,z^r\right)(-i\,(2bk-bm-2cs+c\nu)\,z^r)^{-\frac{\alpha}{r}}+\right.$$
$$e^{2iem}\,(i\,(2bk-bm-2cs+c\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,(2bk-bm-2cs+c\nu)\,z^r\right)+$$
$$(-1)^m e^{4iek}\,(-i\,(2bk-bm+2cs-c\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,-i\,(2bk-bm+2cs-c\nu)\,z^r\right)+$$
$$\left.\left.\left.e^{2iem}\,(i\,(2bk-bm+2cs-c\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,(2bk-bm+2cs-c\nu)\,z^r\right)\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.07.21.2529.01

$$\begin{aligned}
&\int z^n \sin^m\left(b z^2 + e\right)\cos^v\left(c z^2\right)\,dz == \\
&-2^{-m-v-1}\binom{v}{\frac{v}{2}}(1 - v \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{i e(m-2k)-\frac{i m\pi}{2}}\,\Gamma\left(\frac{n+1}{2}, -i b(m-2k) z^2\right)\left(-i b(m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + \right.\right.\\
&\qquad\left.\left. e^{\frac{i m\pi}{2}-i e(m-2k)}\left(i b(m-2k) z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, i b(m-2k) z^2\right)\right)\right) z^{n+1} - 2^{-m-v-1}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\\
&\left(\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma\left(\frac{n+1}{2}, -i c(v-2s) z^2\right)\left(-i c(v-2s) z^2\right)^{\frac{1}{2}(-n-1)} + \left(i c(v-2s) z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, i c(v-2s) z^2\right)\right)\right)\\
&z^{n+1} - 2^{-m-v-1}\\
&\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{i e(m-2k)-\frac{i m\pi}{2}}\,\Gamma\left(\frac{n+1}{2}, (i c(v-2s) - i b(m-2k)) z^2\right)\left((i c(v-2s) - i b(m-2k)) z^2\right)^{\frac{1}{2}(-n-1)} + \right.\right.\\
&\qquad e^{\frac{i m\pi}{2}-i e(m-2k)}\left((b i(m-2k) + c i(v-2s)) z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, (b i(m-2k) + c i(v-2s)) z^2\right) + \\
&\qquad e^{i e(m-2k)-\frac{i m\pi}{2}}\left((-i b(m-2k) - i c(v-2s)) z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, (-i b(m-2k) - i c(v-2s)) z^2\right) + \\
&\qquad\left.\left. e^{\frac{i m\pi}{2}-i e(m-2k)}\left((i b(m-2k) - i c(v-2s)) z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, (i b(m-2k) - i c(v-2s)) z^2\right)\right)\right) z^{n+1} + \\
&\frac{2^{-m-v} z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1 - m \bmod 2)(1 - v \bmod 2)}{n+1}\ /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+
\end{aligned}$$

01.07.21.2530.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + e\right) \cos^\nu\left(\sqrt{z}\, c\right) dz = -2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{i e (m-2k) - \frac{i m \pi}{2}} \Gamma\left(2(n+1), -i b (m-2k) \sqrt{z}\right) \left(-i b (m-2k) \sqrt{z}\right)^{-2(n+1)} + e^{\frac{i m \pi}{2} - i e (m-2k)} \left(i b (m-2k) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), i b (m-2k) \sqrt{z}\right)\right)\right) z^{n+1} - 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma\left(2(n+1), -i c (\nu - 2s) \sqrt{z}\right) \left(-i c (\nu - 2s) \sqrt{z}\right)^{-2(n+1)} + \left(i c (\nu - 2s) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), i c (\nu - 2s) \sqrt{z}\right)\right)\right) z^{n+1} - 2^{-m-\nu+1} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{i e (m-2k) - \frac{i m \pi}{2}} \Gamma\left(2(n+1), (i c (\nu - 2s) - i b (m-2k)) \sqrt{z}\right) \left((i c (\nu - 2s) - i b (m-2k)) \sqrt{z}\right)^{-2(n+1)} + e^{\frac{i m \pi}{2} - i e (m-2k)} \left((b i (m-2k) + c i (\nu - 2s)) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (b i (m-2k) + c i (\nu - 2s)) \sqrt{z}\right) + e^{i e (m-2k) - \frac{i m \pi}{2}} \left((-i b (m-2k) - i c (\nu - 2s)) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-i b (m-2k) - i c (\nu - 2s)) \sqrt{z}\right) + e^{\frac{i m \pi}{2} - i e (m-2k)} \left((i b (m-2k) - i c (\nu - 2s)) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i b (m-2k) - i c (\nu - 2s)) \sqrt{z}\right)\right)\right) z^{n+1} + \frac{2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} /;\, n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r + d z\right) \cos^\nu\left(c z^r\right)$

01.07.21.2531.01

$$\int z^n \sin^m\left(b z^2 + d z\right) \cos^\nu\left(c z^2\right) dz = 2^{-m-\nu-1} \left(\frac{2 z^{n+1} (m \bmod 2 - 1)(\nu \bmod 2 - 1)}{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + z^{n+1} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma\left(\frac{n+1}{2}, -i c (2s - \nu) z^2\right) \left(-i c (2s - \nu) z^2\right)^{\frac{1}{2}(-n-1)} + \left(i c (2s - \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i c (2s - \nu) z^2\right)\right) + i^{-m} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{i d^2 (m-2k)}{4b}} (i b (2k - m))^{-n-1} \binom{m}{k}\right.$$

$$\left(\sum_{q=0}^{n} 2^{q-n} (i\, d)^{n-q} (m-2k)^{n+1} (-i (d+2bz))^{q+1} \left(\frac{i (2k-m)(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\right.$$

$$\Gamma\left(\frac{q+1}{2}, \frac{i (2k-m)(d+2bz)^2}{4b}\right) + e^{\frac{1}{2} i \left(\frac{(m-2k) d^2}{b}+2 m \pi\right)} \sum_{q=0}^{n} 2^{q-n} (i\, d)^{n-q} (m-2k)^{n+1} (-i (d+2bz))^{q+1}$$

$$\left.\left(-\frac{i (2k-m)(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2k-m)(d+2bz)^2}{4b}\right)\right) - i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{\frac{i d^2 (m-2k)^2}{8bk-4bm-8cs+4cv}} \left(\sum_{q=0}^{n} 2^{q-n} (i\, d (2k-m))^{n-q} \left(\frac{i (d (m-2k)+2(-2bk+bm+2cs-cv) z)^2}{2bk-bm-2cs+cv}\right)^{\frac{1}{2}(-q-1)}\right.\right.$$

$$(-i (d (2k-m)+2(2bk-bm-2cs+cv) z))^{q+1} \binom{n}{q}$$

$$\left.\Gamma\left(\frac{q+1}{2}, \frac{i (d (m-2k)+2(-2bk+bm+2cs-cv) z)^2}{8bk-4bm-8cs+4cv}\right)\right) (-i (2bk-bm-2cs+cv))^{-n-1} +$$

$$\left(i\, e^{i \left(m \pi - \frac{d^2 (m-2k)^2}{8bk-4bm-8cs+4cv}\right)} (i (2bk-bm-2cs+cv))^{-n} \sum_{q=0}^{n} 2^{q-n} (-i\, d (2k-m))^{n-q}\right.$$

$$\left(-\frac{i (d (m-2k)+2(-2bk+bm+2cs-cv) z)^2}{2bk-bm-2cs+cv}\right)^{\frac{1}{2}(-q-1)}$$

$$(i (d (2k-m)+2(2bk-bm-2cs+cv) z))^{q+1} \binom{n}{q}$$

$$\left.\Gamma\left(\frac{q+1}{2}, -\frac{i (d (m-2k)+2(-2bk+bm+2cs-cv) z)^2}{8bk-4bm-8cs+4cv}\right)\right) \Big/ (-2bk+bm+2cs-cv) +$$

$$e^{\frac{i d^2 (m-2k)^2}{8bk-4bm+8cs-4cv}} (-i (2bk-bm+2cs-cv))^{-n-1} \sum_{q=0}^{n} \left(i\, d \left(k-\frac{m}{2}\right)\right)^{n-q} (-i (2dk+4bzk-dm-$$

$$2bmz+4csz-2cvz))^{q+1} \left(\frac{i (d (m-2k)+2(b (m-2k)+c (v-2s)) z)^2}{2bk-bm+2cs-cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2}, \frac{i (d (m-2k)+2(b (m-2k)+c (v-2s)) z)^2}{8bk-4bm+8cs-4cv}\right) + \left(i\, e^{i \left(m \pi - \frac{d^2 (m-2k)^2}{8bk-4bm+8cs-4cv}\right)}\right.$$

$$(i (2bk-bm+2cs-cv))^{-n} \sum_{q=0}^{n} 2^{q-n} (-i\, d (2k-m))^{n-q} (i (2dk+4bzk-dm-2bmz+$$

$$4\,c\,s\,z - 2\,c\,v\,z))^{q+1} \left(-\frac{i\,(d\,(m-2\,k) + 2\,(b\,(m-2\,k) + c\,(v-2\,s))\,z)^2}{2\,b\,k - b\,m + 2\,c\,s - c\,v}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\,(d\,(m-2\,k) + 2\,(b\,(m-2\,k) + c\,(v-2\,s))\,z)^2}{8\,b\,k - 4\,b\,m + 8\,c\,s - 4\,c\,v}\right)\Bigg) \Bigg/ (b$$

$$(m-2\,k) + c\,(v-2\,s))\Bigg)\Bigg) /;\, n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.07.21.2532.01

$$\int z^n \sin^m\left(\sqrt{z}\; b + d\,z\right) \cos^v\left(c\,\sqrt{z}\right) dz =$$

$$2^{-m-v-1} \Bigg(\frac{2\,z^{n+1}\;(m \bmod 2 - 1)\,(v \bmod 2 - 1)}{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} + 4\,z^{n+1} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \Big(\Gamma\left(2\,(n+1), -i\,c\,(2\,s-v)\,\sqrt{z}\right)$$

$$\left(-i\,c\,(2\,s-v)\,\sqrt{z}\right)^{-2\,(n+1)} + \left(i\,c\,(2\,s-v)\,\sqrt{z}\right)^{-2\,(n+1)} \Gamma\left(2\,(n+1), i\,c\,(2\,s-v)\,\sqrt{z}\right)\Big) -$$

$$i^{-m}\, 4^{-n} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{u-1}\, e^{-\frac{i\,b^2\,(m-2\,u)}{4\,d}} \left(d^2\,(m-2\,u)^2\right)^{-2\,n-1} \binom{m}{u} \Bigg(\Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h}\, 4^k\,(m-2\,u)$$

$$(i\,b\,(m-2\,u))^{-h-k+2\,n} \left(i\,(m-2\,u)\left(b + 2\,d\,\sqrt{z}\right)\right)^{h+k} \left(-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \Bigg(b\,(m-2\,u)\left(b + 2\,d\,\sqrt{z}\right) \Gamma\left(\frac{1}{2}\,(h+k+1), -\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right) -$$

$$2\,i\,d\,\sqrt{-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}\,(h+k+2), -\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)$$

$$(-i\,d\,(m-2\,u))^{2\,n} + (-1)^m\, e^{\frac{i\,b^2\,(m-2\,u)}{2\,d}}\,(i\,d\,(m-2\,u))^{2\,n} \sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h}\, 4^k\,(m-2\,u)$$

$$(-i\,b\,(m-2\,u))^{-h-k+2\,n} \left(-i\,(m-2\,u)\left(b + 2\,d\,\sqrt{z}\right)\right)^{h+k} \left(\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(b\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\,(m-2\,u)\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\Bigg)\Bigg)-$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i\left(3\,b^2\,(m-2\,u)^2+2\,b\,c\,(2\,s-v)\,(m-2\,u)+3\,c^2\,(v-2\,s)^2\right)}{4\,d\,(m-2\,u)}}\left(d^2\,(m-2\,u)^2\right)^{-2\,n-1}\binom{v}{s}$$

$$\left(e^{\frac{i\left(b^2\,(m-2\,u)^2+c^2\,(v-2\,s)^2\right)}{2\,d\,(m-2\,u)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+2\,d\sqrt{z}\;(m-2\,u)+\right.\right.\right.\right.$$

$$\left.\left.c\,(2\,s-v)\right)\right)^{h+k}\left(-\frac{i\left(b\,(m-2\,u)+2\,d\sqrt{z}\;(m-2\,u)+c\,(2\,s-v)\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,d\,(m-2\,u)\sqrt{-\frac{i\left(b\,(m-2\,u)+2\,d\sqrt{z}\;(m-2\,u)+c\,(2\,s-v)\right)^2}{d\,(m-2\,u)}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b\,(m-2\,u)+2\,d\sqrt{z}\;(m-2\,u)+c\,(2\,s-v)\right)^2}{4\,d\,(m-2\,u)}\right)-$$

$$(b\,m+2\,c\,s-2\,b\,u-c\,v)\left(b\,(m-2\,u)+2\,d\sqrt{z}\;(m-2\,u)+c\,(2\,s-v)\right)$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+2\,d\sqrt{z}\;(m-2\,u)+c\,(2\,s-v)\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)(-i\,d\,(m-2\,u))^{2\,n}+\right.$$

$$e^{\frac{i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{2\,d\,(m-2\,u)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,m-2\,c\,s-2\,b\,u+c\,v))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+2\,d\sqrt{z}\;(m-2\,u)+\right.\right.\right.$$

$$\left.\left.c\,(v-2\,s)\right)\right)^{h+k}\left(-\frac{i\left(b\,(m-2\,u)+2\,d\sqrt{z}\;(m-2\,u)+c\,(v-2\,s)\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,d\,(m-2\,u)\sqrt{-\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{d\,(m-2\,u)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,u)}\right)-$$

$$(b\,m-2\,c\,s-2\,b\,u+c\,v)\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)$$

$$(-i\,d\,(m-2\,u))^{2\,n}+(-1)^m\,e^{\frac{i\left((m-2\,u)\,b^2+c\,(2\,s-v)\,b+\frac{c^2\,(v-2\,s)^2}{m-2\,u}\right)}{d}}\,(i\,d\,(m-2\,u))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(-i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-v)\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-v)\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(-(b\,m+2\,c\,s-2\,b\,u-c\,v)\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-v)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-v)\right)^2}{4\,d\,(m-2\,u)}\right)-$$

$$2\,i\,d\,(m-2\,u)\sqrt{\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-v)\right)^2}{d\,(m-2\,u)}}$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,(m-2\,u)+c\,(2\,s-v)\right)^2}{4\,d\,(m-2\,u)}\right)\right)+$$

$$(-1)^m\,e^{\frac{i\left(b^2\,(m-2\,u)^2+c^2\,(v-2\,s)^2\right)}{d\,(m-2\,u)}}\,(i\,d\,(m-2\,u))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m-2\,c\,s-2\,b\,u+c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)\right)^{h+k}$$

$$\left(\frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(-(b\,m-2\,c\,s-2\,b\,u+c\,v)\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{4d(m-2u)}\right)-$$

$$2\,i\,d(m-2u)\sqrt{\frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{d(m-2u)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.\left.\left.\frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{4d(m-2u)}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin^m\left(b\,z^r+d\,z+e\right)\cos^v\left(c\,z^r\right)$

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$$\int z^n\sin^m\left(b\,z^2+d\,z+e\right)\cos^v\left(c\,z^2\right)dz = 2^{-m-v-1}\left(\frac{2\,z^{n+1}\,(m\bmod 2-1)(v\bmod 2-1)}{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}+z^{n+1}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma\left(\frac{n+1}{2},\,-i\,c(2s-v)z^2\right)\left(-i\,c(2s-v)z^2\right)^{\frac{1}{2}(-n-1)}+\left(i\,c(2s-v)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,i\,c(2s-v)z^2\right)\right)+$$

$$i^{-m}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{1}{4}i\left(\frac{(m-2k)d^2}{b}+4e(2k+m)\right)}(i\,b(2k-m))^{-n-1}\binom{m}{k}$$

$$\left(e^{2iem}\sum_{q=0}^{n}2^{q-n}(i\,d)^{n-q}(m-2k)^{n+1}(-i(d+2bz))^{q+1}\left(\frac{i(2k-m)(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\right.$$

$$\Gamma\left(\frac{q+1}{2},\,\frac{i(2k-m)(d+2bz)^2}{4b}\right)+e^{\frac{1}{2}i\left(\frac{(m-2k)d^2}{b}+8ek+2m\pi\right)}\sum_{q=0}^{n}2^{q-n}(i\,d)^{n-q}(m-2k)^{n+1}$$

$$\left.(-i(d+2bz))^{q+1}\left(-\frac{i(2k-m)(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i(2k-m)(d+2bz)^2}{4b}\right)\right)-$$

$$i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{i e m - 2 i e k} \binom{v}{s} \left(e^{\frac{i d^2 (m-2k)^2}{8bk-4bm-8cs+4cv}} \left(\sum_{q=0}^{n} 2^{q-n} (i d (2k-m))^{n-q} \left(\frac{i (d(m-2k) + 2(-2bk+bm+2cs-cv) z)^2}{2bk-bm-2cs+cv} \right)^{\frac{1}{2}(-q-1)} (-i (d(2k-m) + 2(2bk-bm-2cs+cv) z))^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d(m-2k) + 2(-2bk+bm+2cs-cv) z)^2}{8bk-4bm-8cs+4cv} \right) \right) (-i (2bk-bm-2cs+cv))^{-n-1} + e^{i \left(-\frac{d^2 (m-2k)^2}{8bk-4bm-8cs+4cv} + e(4k-2m) + m\pi \right)} (i (2bk-bm-2cs+cv))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i d (2k-m))^{n-q} \left(-\frac{i (d(m-2k) + 2(-2bk+bm+2cs-cv) z)^2}{2bk-bm-2cs+cv} \right)^{\frac{1}{2}(-q-1)} (i (d(2k-m) + 2(2bk-bm-2cs+cv) z))^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d(m-2k) + 2(-2bk+bm+2cs-cv) z)^2}{8bk-4bm-8cs+4cv} \right) + e^{\frac{i d^2 (m-2k)^2}{8bk-4bm+8cs-4cv}} (-i (2bk-bm+2cs-cv))^{-n-1} \sum_{q=0}^{n} \left(i d \left(k - \frac{m}{2} \right) \right)^{n-q} (-i (2dk + 4bzk - dm - 2bmz + 4csz - 2cvz))^{q+1} \left(\frac{i (d(m-2k) + 2(b(m-2k) + c(v-2s)) z)^2}{2bk-bm+2cs-cv} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d(m-2k) + 2(b(m-2k) + c(v-2s)) z)^2}{8bk-4bm+8cs-4cv} \right) + e^{i \left(-\frac{d^2 (m-2k)^2}{8bk-4bm+8cs-4cv} + e(4k-2m) + m\pi \right)} (i (2bk-bm+2cs-cv))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i d (2k-m))^{n-q} (i (2dk + 4bzk - dm - 2bmz + 4csz - 2cvz))^{q+1} \left(-\frac{i (d(m-2k) + 2(b(m-2k) + c(v-2s)) z)^2}{2bk-bm+2cs-cv} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d(m-2k) + 2(b(m-2k) + c(v-2s)) z)^2}{8bk-4bm+8cs-4cv} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d z + e\right) \cos^v\left(c \sqrt{z}\right) dz ==$$

$$2^{-m-v-1} \left(\frac{2 z^{n+1} (m \bmod 2 - 1)(v \bmod 2 - 1)}{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} + 4 z^{n+1} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\Gamma\left(2(n+1), -i c (2s-v) \sqrt{z}\right) \right.\right.$$

$$\left(-i\, c\, (2\, s - v)\, \sqrt{z}\right)^{-2\,(n+1)} + \left(i\, c\, (2\, s - v)\, \sqrt{z}\right)^{-2\,(n+1)}\, \Gamma\!\left(2\,(n+1),\, i\, c\, (2\, s - v)\, \sqrt{z}\right)\Big) -$$

$$i^{-m}\, 4^{-n} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{u-1}\, e^{-\frac{i\left(b^2 + 4\, d\, e\right)(m - 2\, u)}{4\, d}} \left(d^2\, (m - 2\, u)^2\right)^{-2\, n - 1} \binom{m}{u}$$

$$\Bigg(e^{2\, i\, e\,(m - 2\, u)} \Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h}\, 4^k\, (m - 2\, u)\, (i\, b\, (m - 2\, u))^{-h-k+2\, n} \left(i\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \Bigg(b\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h + k + 1),\, -\frac{i\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right)^2}{4\, d}\right) - 2\, i\, d\, \sqrt{-\frac{i\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right)^2}{d}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h + k + 2),\, -\frac{i\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right)^2}{4\, d}\right)\Bigg)\Bigg)(-i\, d\, (m - 2\, u))^{2\, n} +$$

$$(-1)^m\, e^{\frac{i\, b^2\,(m - 2\, u)}{2\, d}}\, (i\, d\, (m - 2\, u))^{2\, n} \sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h}\, 4^k\, (m - 2\, u)\, (-i\, b\, (m - 2\, u))^{-h-k+2\, n}$$

$$\left(-i\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right)\right)^{h+k} \left(\frac{i\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k} \Bigg(b\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}\,(h + k + 1),\, \frac{i\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right)^2}{4\, d}\right) +$$

$$2\, \sqrt{\frac{i\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right)^2}{d}}\;\, d\, i\, \Gamma\!\left(\frac{1}{2}\,(h + k + 2),\, \frac{i\, (m - 2\, u)\left(b + 2\, d\, \sqrt{z}\right)^2}{4\, d}\right)\Bigg)\Bigg) +$$

$$i^{-m}\, 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} -e^{-\frac{i\left(b^2\,(m - 2\, u)^2 + 4\, d\, e\,(m - 2\, u)^2 + 2\, b\, c\,(2\, s - v)\,(m - 2\, u) + c^2\,(v - 2\, s)^2\right)}{4\, d\,(m - 2\, u)}} \left(d^2\, (m - 2\, u)^2\right)^{-2\, n - 1} \binom{v}{s}$$

$$\Bigg(e^{2 i e (m-2 u)} \Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b m + 2 c s - 2 b u - c v))^{-h-k+2 n} \Big(i \Big(b (m - 2 u) + 2 d \sqrt{z} (m - 2 u) +$$

$$c (2 s - v)\Big)\Big)^{h+k} \left(-\frac{i \left(b (m - 2 u) + 2 d \sqrt{z} (m - 2 u) + c (2 s - v)\right)^2}{d (m - 2 u)}\right)^{\frac{1}{2} (-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \Bigg(2 i d (m - 2 u) \sqrt{-\frac{i \left(b (m - 2 u) + 2 d \sqrt{z} (m - 2 u) + c (2 s - v)\right)^2}{d (m - 2 u)}}$$

$$\Gamma\left(\frac{1}{2} (h + k + 2), -\frac{i \left(b (m - 2 u) + 2 d \sqrt{z} (m - 2 u) + c (2 s - v)\right)^2}{4 d (m - 2 u)}\right) -$$

$$(b m + 2 c s - 2 b u - c v) \left(b (m - 2 u) + 2 d \sqrt{z} (m - 2 u) + c (2 s - v)\right)$$

$$\Gamma\left(\frac{1}{2} (h + k + 1), -\frac{i \left(b (m - 2 u) + 2 d \sqrt{z} (m - 2 u) + c (2 s - v)\right)^2}{4 d (m - 2 u)}\right)\Bigg)\Bigg)\Bigg) (-i d (m - 2 u))^{2 n} +$$

$$e^{i \left(2 e (m-2 u) + \frac{b c (2 s - v)}{d}\right)} \Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b m - 2 c s - 2 b u + c v))^{-h-k+2 n}$$

$$\left(i \left(b (m - 2 u) + 2 d \sqrt{z} (m - 2 u) + c (v - 2 s)\right)\right)^{h+k}$$

$$\left(-\frac{i \left(b (m - 2 u) + 2 d \sqrt{z} (m - 2 u) + c (v - 2 s)\right)^2}{d (m - 2 u)}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\Bigg(2 i d (m - 2 u) \sqrt{-\frac{i \left(b (m - 2 u) + 2 d \sqrt{z} (m - 2 u) + c (v - 2 s)\right)^2}{d (m - 2 u)}}$$

$$\Gamma\left(\frac{1}{2} (h + k + 2), -\frac{i \left(b (m - 2 u) + 2 d \sqrt{z} (m - 2 u) + c (v - 2 s)\right)^2}{4 d (m - 2 u)}\right) -$$

$$(b m - 2 c s - 2 b u + c v) \left(b (m - 2 u) + 2 d \sqrt{z} (m - 2 u) + c (v - 2 s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b(m-2u)+2d\sqrt{z}(m-2u)+c(v-2s)\right)^2}{4d(m-2u)}\right)\Bigg)\Bigg)(-i\,d(m-2u))^{2n} +$$

$$(-1)^m e^{\frac{i(bm+2cs-2bu-cv)^2}{2d(m-2u)}}(i\,d(m-2u))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(bm+2cs-2bu-cv))^{-h-k+2n}$$

$$\left(-i\left(b(m-2u)+2d\sqrt{z}(m-2u)+c(2s-v)\right)\right)^{h+k}$$

$$\left(\frac{i\left(b(m-2u)+2d\sqrt{z}(m-2u)+c(2s-v)\right)^2}{d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(-(bm+2cs-2bu-cv)\left(b(m-2u)+2d\sqrt{z}(m-2u)+c(2s-v)\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b(m-2u)+2d\sqrt{z}(m-2u)+c(2s-v)\right)^2}{4d(m-2u)}\right)-$$

$$2\,i\,d(m-2u)\sqrt{\frac{i\left(b(m-2u)+2d\sqrt{z}(m-2u)+c(2s-v)\right)^2}{d(m-2u)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b(m-2u)+2d\sqrt{z}(m-2u)+c(2s-v)\right)^2}{4d(m-2u)}\right)\Bigg)+$$

$$(-1)^m e^{\frac{i\left(b^2(m-2u)^2+c^2(v-2s)^2\right)}{2d(m-2u)}}(i\,d(m-2u))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(bm-2cs-2bu+cv))^{-h-k+2n}$$

$$\left(-i\left(b(m-2u)+2d\sqrt{z}(m-2u)+c(v-2s)\right)\right)^{h+k}$$

$$\left(\frac{i\left(b(m-2u)+2d\sqrt{z}(m-2u)+c(v-2s)\right)^2}{d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(-(bm-2cs-2bu+cv)\left(b(m-2u)+2d\sqrt{z}(m-2u)+c(v-2s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{4d(m-2u)}\right)-$$

$$2\,i\,d(m-2u)\sqrt{\frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{d(m-2u)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.\left.\left.\frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{4d(m-2u)}\right)\right)\right)\right)\text{/; } n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z)\cos^v\left(c\,z^r+g\right)$

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$$\int z^n \sin^m(d\,z)\cos^v\left(c\,z^2+g\right)dz = $$

$$2^{-m-v-1}\left(\frac{2z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m \bmod 2-1)(v \bmod 2-1)}{n+1} - z^{n+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-i g(2s-v)}\left(c^2(v-2s)^2 z^4\right)^{\frac{1}{2}(-n-1)}\binom{v}{s}\right.$$

$$\left(\Gamma\left(\frac{n+1}{2}, i\,c(2s-v)z^2\right)\left(-i\,c(2s-v)z^2\right)^{\frac{n+1}{2}}+e^{2ig(2s-v)}\left(i\,c(2s-v)z^2\right)^{\frac{n+1}{2}}\Gamma\left(\frac{n+1}{2}, -i\,c(2s-v)z^2\right)\right)+$$

$$2\,i\,d^{-2n-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-\frac{1}{2}i m\pi}(2k-m)^{-2n-1}\binom{m}{k}$$

$$\left((-i\,d(2k-m))^n\,\Gamma(n+1, i\,d(2k-m)z)-e^{i m\pi}(i\,d(2k-m))^n\,\Gamma(n+1, -i\,d(2k-m)z)\right)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i(2gs-gv)}\binom{v}{s}\left(e^{\frac{i(2dk-dm)^2}{4cv-8cs}-2ig(v-2s)}\left(\sum_{q=0}^{n}2^{q-n}(i(2dk-dm))^{n-q}\right.\right.$$

$$(-i(d(2k-m)+2(cv-2cs)z))^{q+1}\left(\frac{i(d(2k-m)+2(cv-2cs)z)^2}{cv-2cs}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(d(2k-m)+2(cv-2cs)z)^2}{4cv-8cs}\right)\right)(-i(cv-2cs))^{-n-1}+$$

$$e^{i\left(m\pi-\frac{(2dk-dm)^2}{4cv-8cs}\right)}(i(cv-2cs))^{-n-1}\sum_{q=0}^{n}2^{q-n}(-i(2dk-dm))^{n-q}(i(d(2k-m)+2(cv-2cs)z))^{q+1}$$

$$\left(-\frac{i(d(2k-m)+2(cv-2cs)z)^2}{cv-2cs}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(d(2k-m)+2(cv-2cs)z)^2}{4cv-8cs}\right)+$$

$$e^{\frac{i d^2 (m-2k)^2}{8cs-4cv}} (-i(2cs-cv))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i(2dk-dm))^{n-q} (-i(2dk-dm+4csz-2cvz))^{q+1}$$

$$\left(\frac{i(d(m-2k)+2(cv-2cs)z)^2}{2cs-cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d(m-2k)+2(cv-2cs)z)^2}{8cs-4cv}\right) +$$

$$e^{i\left(-\frac{d^2(m-2k)^2}{8cs-4cv}-2g(v-2s)+m\pi\right)} (i(2cs-cv))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i(2dk-dm))^{n-q}$$

$$(i(2dk-dm+4csz-2cvz))^{q+1} \left(-\frac{i(d(m-2k)+2(cv-2cs)z)^2}{2cs-cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\Bigg($$

$$\left.\left.\frac{q+1}{2}, -\frac{i(d(m-2k)+2(cv-2cs)z)^2}{8cs-4cv}\right)\right)\Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n \sin^m(dz) \cos^v\left(\sqrt{z}\, c+g\right) dz ==$$

$$2^{-m-v-1} \Bigg(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (m \bmod 2-1)(v \bmod 2-1)}{n+1} + 2 i d^{-2n-1} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k e^{-\frac{1}{2} i m \pi} (2k-m)^{-2n-1}$$

$$\binom{m}{k} \left((-i d(2k-m))^n \Gamma(n+1, i d(2k-m) z) - e^{i m \pi} (i d(2k-m))^n \Gamma(n+1, -i d(2k-m) z)\right) +$$

$$4(-1)^n c^{-2(n+1)} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-i g(2s-v)} (v-2s)^{-2n-2} \binom{v}{s}$$

$$\left(e^{2 i g(2s-v)} \Gamma\left(2(n+1), -i c(2s-v)\sqrt{z}\right) + \Gamma\left(2(n+1), i c(2s-v)\sqrt{z}\right)\right) -$$

$$i^{-m} 4^{-n} \sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^u \binom{m}{u} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-i(2gs-gv)} \binom{v}{s} \Bigg(e^{-\frac{i c^2 (v-2s)^2}{4d(m-2u)}} \left(d^2(m-2u)^2\right)^{-2n-1} \Bigg(\Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c(v-2s))^{-h-k+2n}$$

$$\left(i\left(2d\sqrt{z}\,(m-2u)+c(v-2s)\right)\right)^{h+k} \left(-\frac{i\left(2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \Bigg(2 i d(m-2u) \sqrt{-\frac{i\left(2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{d(m-2u)}}\; \Gamma\Bigg(\frac{1}{2}(h+k+2),$$

$$-\frac{i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,u)}\Bigg)-c\,(v-2\,s)\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,u)}\right)\Bigg)\Bigg)\Bigg)$$

$$(-i\,d\,(m-2\,u))^{2\,n}+(-1)^m\,e^{\frac{1}{2}i\left(\frac{c^2\,(v-2\,s)^2}{d\,(m-2\,u)}+8\,g\,s-4\,g\,v\right)}\,(i\,d\,(m-2\,u))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)\right)^{h+k}$$

$$\left(\frac{i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(-c\,(v-2\,s)$$

$$\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,u)}\right)-$$

$$2\,i\,d\,(m-2\,u)\sqrt{\frac{i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{d\,(m-2\,u)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,u)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\Bigg((-1)^m\,e^{\frac{i\,(2\,c\,s-c\,v)^2}{4\,d\,m-8\,d\,u}}\,(-i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(2\,c\,s-c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)\right)^{h+k}\left(\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c\,v-2\,c\,s)\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{4\,d\,m-8\,d\,u}\right)-$$

$$2\,i\,(d\,m-2\,d\,u)\sqrt{\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{d\,m-2\,d\,u}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{4\,d\,m-8\,d\,u}\right)\right)\right)\right)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\left(e^{i\left(g\,(4\,s-2\,v)-\frac{(2\,c\,s-c\,v)^2}{4\,d\,m-8\,d\,u}\right)}\,(i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(2\,c\,s-c\,v))^{-h-k+2\,n}\right.$$

$$\left(i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)\right)^{h+k}\left(-\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c\,v-2\,c\,s)\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{4\,d\,m-8\,d\,u}\right)+$$

$$2\,i\sqrt{-\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{d\,m-2\,d\,u}}\,(d\,m-2\,d\,u)\,\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.\left.\left.\left.-\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{4\,d\,m-8\,d\,u}\right)\right)\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\sin^m(d\,z+e)\cos^v\left(c\,z^r+g\right)$

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$$\int z^n\sin^m(d\,z+e)\cos^v\left(c\,z^2+g\right)dz = 2^{-m-v-1}$$

$$\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}+2\,i\,d^{-2\,n-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{1}{2}i\,(\pi\,m+2\,e\,(2\,k+m))}\,(2\,k-m)^{-2\,n-1}\right.$$

$$\binom{m}{k}\left(e^{2 i e m}\,(-i\,d\,(2k-m))^n\,\Gamma(n+1,\,i\,d\,(2k-m)\,z)-e^{i\,(4 e k+m\pi)}\,(i\,d\,(2k-m))^n\,\Gamma(n+1,\,-i\,d\,(2k-m)\,z)\right)-$$

$$\binom{m}{\frac{m}{2}}(1-m \bmod 2)\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}e^{-i\,g\,(2s-v)}\left(c^2\,(v-2s)^2\,z^4\right)^{\frac{1}{2}(-n-1)}$$

$$\left(\Gamma\!\left(\frac{n+1}{2},\,i\,c\,(2s-v)\,z^2\right)\left(-i\,c\,(2s-v)\,z^2\right)^{\frac{n+1}{2}}+e^{2 i g\,(2s-v)}\left(i\,c\,(2s-v)\,z^2\right)^{\frac{n+1}{2}}\Gamma\!\left(\frac{n+1}{2},\,-i\,c\,(2s-v)\,z^2\right)\right)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(2 e k-e m+2 g s-g v)}\binom{v}{s}\left(e^{\frac{i\,(2 d k-d m)^2}{4 c v-8 c s}-2 i g\,(v-2s)}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(2 d k-d m))^{n-q}\right.\right.$$

$$(-i\,(d\,(2k-m)+2\,(c\,v-2\,c\,s)\,z))^{q+1}\left(\frac{i\,(d\,(2k-m)+2\,(c\,v-2\,c\,s)\,z)^2}{c\,v-2\,c\,s}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\left.\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(d\,(2k-m)+2\,(c\,v-2\,c\,s)\,z)^2}{4\,c\,v-8\,c\,s}\right)\right)(-i\,(c\,v-2\,c\,s))^{-n-1}+e^{i\left(-\frac{(2 d k-d m)^2}{4 c v-8 c s}+e\,(4k-2m)+m\pi\right)}$$

$$(i\,(c\,v-2\,c\,s))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m))^{n-q}\,(i\,(d\,(2k-m)+2\,(c\,v-2\,c\,s)\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(2k-m)+2\,(c\,v-2\,c\,s)\,z)^2}{c\,v-2\,c\,s}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(d\,(2k-m)+2\,(c\,v-2\,c\,s)\,z)^2}{4\,c\,v-8\,c\,s}\right)+$$

$$e^{\frac{i\,d^2\,(m-2k)^2}{8 c s-4 c v}}\,(-i\,(2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m))^{n-q}\,(-i\,(2\,d\,k-d\,m+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(\frac{i\,(d\,(m-2k)+2\,(c\,v-2\,c\,s)\,z)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(d\,(m-2k)+2\,(c\,v-2\,c\,s)\,z)^2}{8\,c\,s-4\,c\,v}\right)+$$

$$e^{i\left(-\frac{d^2\,(m-2k)^2}{8 c s-4 c v}+e\,(4k-2m)-2 g\,(v-2s)+m\pi\right)}\,(i\,(2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m))^{n-q}$$

$$(i\,(2\,d\,k-d\,m+4\,c\,s\,z-2\,c\,v\,z))^{q+1}\left(-\frac{i\,(d\,(m-2k)+2\,(c\,v-2\,c\,s)\,z)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg($$

$$\left.\left.\frac{q+1}{2},\,-\frac{i\,(d\,(m-2k)+2\,(c\,v-2\,c\,s)\,z)^2}{8\,c\,s-4\,c\,v}\Bigg)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n \sin^m(d\,z+e)\cos^\nu\left(\sqrt{z}\,c+g\right)dz = 2^{-m-\nu-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2-1)(\nu \bmod 2-1)}{n+1}+4\,(-1)^n\binom{m}{\frac{m}{2}}(1-m \bmod 2)\,c^{-2\,(n+1)}\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}e^{-i\,g\,(2\,s-\nu)}(\nu-2\,s)^{-2\,n-2}\left(e^{2\,i\,g\,(2\,s-\nu)}\,\Gamma\!\left(2\,(n+1),\,-i\,c\,(2\,s-\nu)\sqrt{z}\right)+\Gamma\!\left(2\,(n+1),\,i\,c\,(2\,s-\nu)\sqrt{z}\right)\right)+$$

$$2\,i\,d^{-2\,n-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{1}{2}\,i\,(\pi\,m+2\,e\,(2\,k+m))}\,(2\,k-m)^{-2\,n-1}\binom{m}{k}$$

$$\left(e^{2\,i\,e\,m}\,(-i\,d\,(2\,k-m))^n\,\Gamma(n+1,\,i\,d\,(2\,k-m)\,z)-e^{i\,(4\,e\,k+m\,\pi)}\,(i\,d\,(2\,k-m))^n\,\Gamma(n+1,\,-i\,d\,(2\,k-m)\,z)\right)-$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i\,(e\,m+2\,g\,s-2\,e\,u-g\,\nu)}\binom{\nu}{s}\left(e^{-\frac{i\,c^2\,(\nu-2\,s)^2}{4\,d\,(m-2\,u)}}\left(d^2\,(m-2\,u)^2\right)^{-2\,n-1}\right.$$

$$\left(e^{2\,i\,e\,(m-2\,u)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(\nu-2\,s))^{-h-k+2\,n}\left(i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(\nu-2\,s)\right)\right)^{h+k}\right.\right.$$

$$\left(-\frac{i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(\nu-2\,s)\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,d\,(m-2\,u)\sqrt{-\frac{i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(\nu-2\,s)\right)^2}{d\,(m-2\,u)}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),\right.\right.$$

$$\left.-\frac{i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(\nu-2\,s)\right)^2}{4\,d\,(m-2\,u)}\right)-c\,(\nu-2\,s)\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(\nu-2\,s)\right)$$

$$\left.\left.\left.\Gamma\!\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(\nu-2\,s)\right)^2}{4\,d\,(m-2\,u)}\right)\right)\right)\right)$$

$$(-i\,d\,(m-2\,u))^{2\,n}+(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{c^2\,(\nu-2\,s)^2}{d\,(m-2\,u)}+8\,g\,s-4\,g\,\nu\right)}\,(i\,d\,(m-2\,u))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(\nu-2\,s))^{-h-k+2\,n}\left(-i\left(2\,d\sqrt{z}\,(m-2\,u)+c\,(\nu-2\,s)\right)\right)^{h+k}$$

$$\left(\frac{i\left(2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(-c\,(v-2\,s)$$

$$\left(2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,u)}\right)-$$

$$2\,i\,d\,(m-2\,u)\sqrt{\frac{i\left(2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2}{d\,(m-2\,u)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,u)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\Bigg((-1)^m\,e^{\frac{i\,(2\,c\,s-c\,v)^2}{4\,d\,m-8\,d\,u}}\,(-i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(2\,c\,s-c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(2\,\sqrt{z}\,\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)\right)^{h+k}\left(\frac{i\left(2\,\sqrt{z}\,\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c\,v-2\,c\,s)\left(2\,\sqrt{z}\,\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\,\sqrt{z}\,\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{4\,d\,m-8\,d\,u}\right)-$$

$$2\,i\,(d\,m-2\,d\,u)\sqrt{\frac{i\left(2\,\sqrt{z}\,\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{d\,m-2\,d\,u}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\,\sqrt{z}\,\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{4\,d\,m-8\,d\,u}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\Bigg(e^{i\left(-\frac{(2\,c\,s-c\,v)^2}{4\,d\,m-8\,d\,u}+2\,e\,(m-2\,u)+g\,(4\,s-2\,v)\right)}\,(i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(i\,(2\,c\,s-c\,v))^{-h-k+2\,n}\left(i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)\right)^{h+k}$$

$$\left(-\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg((c\,v-2\,c\,s)\left(2\sqrt{z}\,(d\,m-2\,d\,u)+\right.$$

$$\left.c\,(2\,s-v)\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{4\,d\,m-8\,d\,u}\right)+$$

$$2\,i\,(d\,m-2\,d\,u)\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{4\,d\,m-8\,d\,u}\right)$$

$$\left.\left.\left.\left.\sqrt{-\frac{i\left(2\sqrt{z}\,(d\,m-2\,d\,u)+c\,(2\,s-v)\right)^2}{d\,m-2\,d\,u}}\right)\right)\right)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m(b\,z^r)\cos^v(c\,z^r+g)$

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$$\int z^{\alpha-1}\sin^m(b\,z^r)\cos^v(c\,z^r+g)\,dz = \frac{2^{-m-v}\,z^\alpha\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{\alpha}-\frac{2^{-m-v}\,z^\alpha}{r}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{1}{2}i\,m\,\pi}\,\Gamma\left(\frac{\alpha}{r},\,-i\,b\,(m-2\,k)\,z^r\right)(-i\,b\,(m-2\,k)\,z^r)^{-\frac{\alpha}{r}}+e^{\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2\,k)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,i\,b\,(m-2\,k)\,z^r\right)\right)-$$

$$\frac{2^{-m-v}\,z^\alpha}{r}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}$$

$$\left(e^{i\,g\,(v-2\,s)}\,\Gamma\left(\frac{\alpha}{r},\,-i\,c\,(v-2\,s)\,z^r\right)(-i\,c\,(v-2\,s)\,z^r)^{-\frac{\alpha}{r}}+e^{-i\,g\,(v-2\,s)}\,(i\,c\,(v-2\,s)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,i\,c\,(v-2\,s)\,z^r\right)\right)-\frac{2^{-m-v}\,z^\alpha}{r}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{-\frac{1}{2}i\,\pi\,m-i\,g\,(v-2\,s)}\,\Gamma\left(\frac{\alpha}{r},\,(i\,c\,(v-2\,s)-i\,b\,(m-2\,k))\,z^r\right)((i\,c\,(v-2\,s)-i\,b\,(m-2\,k))\,z^r)^{-\frac{\alpha}{r}}+\right.$$

$$e^{\frac{i\,m\,\pi}{2}-i\,g\,(v-2\,s)}\,((b\,i\,(m-2\,k)+c\,i\,(v-2\,s))\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))\,z^r\right)+$$

$$e^{i\,g\,(v-2\,s)-\frac{i\,m\,\pi}{2}}\,((-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\,z^r\right)+$$

$$\left.e^{\frac{i\,\pi\,m}{2}+g\,i\,(v-2\,s)}\,((i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(i\,b\,(m-2\,k)-i\,c\,(v-2\,s))\,z^r\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n \sin^m(b z^2) \cos^v(c z^2 + g)\, dz ==$$

$$-2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{1}{2} i m \pi}\, \Gamma\!\left(\frac{n+1}{2}, -i\, b\, (m-2k)\, z^2\right) \left(-i\, b\, (m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$

$$\left. e^{\frac{i m \pi}{2}} \left(i\, b\, (m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, i\, b\, (m-2k)\, z^2\right) \right) -$$

$$2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, z^{n+1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{i g (v-2s)}\, \Gamma\!\left(\frac{n+1}{2}, -i\, c\, (v-2s)\, z^2\right) \left(-i\, c\, (v-2s)\, z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$

$$\left. e^{-i g (v-2s)} \left(i\, c\, (v-2s)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, i\, c\, (v-2s)\, z^2\right) \right) - 2^{-m-v-1}\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{1}{2} i \pi m - i g (v-2s)}\, \Gamma\!\left(\frac{n+1}{2}, (i\, c\, (v-2s) - i\, b\, (m-2k))\, z^2\right) \left((i\, c\, (v-2s) - i\, b\, (m-2k))\, z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$

$$e^{\frac{i m \pi}{2} - i g (v-2s)} \left((b\, i\, (m-2k) + c\, i\, (v-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (b\, i\, (m-2k) + c\, i\, (v-2s))\, z^2\right) +$$

$$e^{i g (v-2s) - \frac{i m \pi}{2}} \left((-i\, b\, (m-2k) - i\, c\, (v-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (-i\, b\, (m-2k) - i\, c\, (v-2s))\, z^2\right) +$$

$$\left. e^{\frac{i \pi m}{2} + g\, i\, (v-2s)} \left((i\, b\, (m-2k) - i\, c\, (v-2s))\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (i\, b\, (m-2k) - i\, c\, (v-2s))\, z^2\right) \right) +$$

$$\frac{2^{-m-v}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2541.01

$$\int z^n \sin^m\left(\sqrt{z}\, b\right) \cos^v\left(\sqrt{z}\, c+g\right) dz = (-1)^n\, 2^{-m-v+1} \binom{v}{\frac{v}{2}} (1-v \bmod 2)\, b^{-2(n+1)}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} (m-2k)^{-2(n+1)} \left(e^{-\frac{1}{2} i m \pi}\, \Gamma\left(2(n+1), -i\, b\,(m-2k)\sqrt{z}\right) + e^{\frac{i m \pi}{2}}\, \Gamma\left(2(n+1), i\, b\,(m-2k)\sqrt{z}\right)\right) +$$
$$\frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2)}{n+1} + (-1)^n\, 2^{-m-v+1}\, c^{-2(n+1)} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$
$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} (v-2s)^{-2(n+1)} \left(e^{i g (v-2s)}\, \Gamma\left(2(n+1), -i\, c\,(v-2s)\sqrt{z}\right) + e^{-i g (v-2s)}\, \Gamma\left(2(n+1), i\, c\,(v-2s)\sqrt{z}\right)\right) -$$
$$2^{-m-v+1} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} \left(e^{-\frac{1}{2} i \pi m - i g (v-2s)}\, \Gamma\left(2(n+1), (i\, c\,(v-2s) - i\, b\,(m-2k))\sqrt{z}\right)\right.$$
$$\left((i\, c\,(v-2s) - i\, b\,(m-2k))\sqrt{z}\right)^{-2(n+1)} + e^{\frac{i m \pi}{2} - i g (v-2s)} \left((b\, i\,(m-2k) + c\, i\,(v-2s))\sqrt{z}\right)^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (b\, i\,(m-2k) + c\, i\,(v-2s))\sqrt{z}\right) + e^{i g (v-2s) - \frac{i m \pi}{2}} \left((-i\, b\,(m-2k) - i\, c\,(v-2s))\sqrt{z}\right)^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (-i\, b\,(m-2k) - i\, c\,(v-2s))\sqrt{z}\right) + e^{\frac{i \pi m}{2} + g\, i\,(v-2s)} \left((i\, b\,(m-2k) - i\, c\,(v-2s))\sqrt{z}\right)^{-2(n+1)}$$
$$\left.\Gamma\left(2(n+1), (i\, b\,(m-2k) - i\, c\,(v-2s))\sqrt{z}\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \sin^m\left(b\, z^r + e\right) \cos^v\left(c\, z^r + g\right)$

01.07.21.2542.01

$$\int z^{\alpha-1}\sin^m(b\,z^r+e)\cos^\nu(c\,z^r+g)\,dz = \frac{2^{-m-\nu}\,z^\alpha\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)}{\alpha} -$$

$$\frac{2^{-m-\nu}\,z^\alpha}{r}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Big(e^{i\,e\,(m-2k)-\frac{i\,m\,\pi}{2}}\,\Gamma\Big(\frac{\alpha}{r},-i\,b\,(m-2k)\,z^r\Big)(-i\,b\,(m-2k)\,z^r)^{-\frac{\alpha}{r}} +$$

$$e^{\frac{i\,m\,\pi}{2}-i\,e\,(m-2k)}\,(i\,b\,(m-2k)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\Big(\frac{\alpha}{r},\,i\,b\,(m-2k)\,z^r\Big)\Big) - \frac{2^{-m-\nu}\,z^\alpha}{r}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Big(e^{i\,g\,(\nu-2s)}\,\Gamma\Big(\frac{\alpha}{r},-i\,c\,(\nu-2s)\,z^r\Big)(-i\,c\,(\nu-2s)\,z^r)^{-\frac{\alpha}{r}} + e^{-i\,g\,(\nu-2s)}\,(i\,c\,(\nu-2s)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\Big(\frac{\alpha}{r},\,i\,c\,(\nu-2s)\,z^r\Big)\Big) -$$

$$\frac{2^{-m-\nu}\,z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Big(e^{-\frac{1}{2}i\,\pi\,m+e\,i\,(m-2k)-i\,g\,(\nu-2s)}\,\Gamma\Big(\frac{\alpha}{r},\,(i\,c\,(\nu-2s)-i\,b\,(m-2k))\,z^r\Big)$$

$$((i\,c\,(\nu-2s)-i\,b\,(m-2k))\,z^r)^{-\frac{\alpha}{r}} + e^{\frac{i\,\pi\,m}{2}-i\,e\,(m-2k)-i\,g\,(\nu-2s)}\,((b\,i\,(m-2k)+c\,i\,(\nu-2s))\,z^r)^{-\frac{\alpha}{r}}$$

$$\Gamma\Big(\frac{\alpha}{r},\,(b\,i\,(m-2k)+c\,i\,(\nu-2s))\,z^r\Big) + e^{-\frac{1}{2}i\,\pi\,m+e\,i\,(m-2k)+g\,i\,(\nu-2s)}$$

$$((-i\,b\,(m-2k)-i\,c\,(\nu-2s))\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\Big(\frac{\alpha}{r},\,(-i\,b\,(m-2k)-i\,c\,(\nu-2s))\,z^r\Big) + e^{\frac{i\,\pi\,m}{2}-i\,e\,(m-2k)+g\,i\,(\nu-2s)}$$

$$((i\,b\,(m-2k)-i\,c\,(\nu-2s))\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\Big(\frac{\alpha}{r},\,(i\,b\,(m-2k)-i\,c\,(\nu-2s))\,z^r\Big)\Big)\,/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.07.21.2543.01

$$\int z^n \sin^m\left(b z^2+e\right) \cos^v\left(c z^2+g\right) dz ==$$

$$-2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Big(e^{i e (m-2k) - \frac{i m \pi}{2}}\, \Gamma\Big(\frac{n+1}{2}, -i b (m-2k) z^2\Big) \left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} +$$

$$e^{\frac{i m \pi}{2} - i e (m-2k)} \left(i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, i b (m-2k) z^2\Big)\Big) -$$

$$2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, z^{n+1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \Big(e^{i g (v-2s)}\, \Gamma\Big(\frac{n+1}{2}, -i c (v-2s) z^2\Big) \left(-i c (v-2s) z^2\right)^{\frac{1}{2}(-n-1)} +$$

$$e^{-i g (v-2s)} \left(i c (v-2s) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, i c (v-2s) z^2\Big)\Big) - 2^{-m-v-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \Big(e^{-\frac{1}{2} i \pi m + e i (m-2k) - i g (v-2s)}\, \Gamma\Big(\frac{n+1}{2}, (i c (v-2s) - i b (m-2k)) z^2\Big) \left((i c (v-2s) - i b (m-2k)) z^2\right)^{\frac{1}{2}(-n-1)} +$$

$$e^{\frac{i \pi m}{2} - i e (m-2k) - i g (v-2s)} \left((b i (m-2k) + c i (v-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (b i (m-2k) + c i (v-2s)) z^2\Big) +$$

$$e^{-\frac{1}{2} i \pi m + e i (m-2k) + g i (v-2s)} \left((-i b (m-2k) - i c (v-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (-i b (m-2k) - i c (v-2s)) z^2\Big) +$$

$$e^{\frac{i \pi m}{2} - i e (m-2k) + g i (v-2s)} \left((i b (m-2k) - i c (v-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (i b (m-2k) - i c (v-2s)) z^2\Big)\Big) +$$

$$\frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2544.01

$$\int z^n \sin^m\left(\sqrt{z}\, b+e\right) \cos^v\left(\sqrt{z}\, c+g\right) dz = (-1)^n\, 2^{-m-v+1} \binom{v}{\frac{v}{2}} (1-v \bmod 2)\, b^{-2(n+1)} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} (m-2k)^{-2(n+1)}$$
$$\left(e^{i e (m-2k)-\frac{i m \pi}{2}}\, \Gamma\left(2(n+1), -i\, b\, (m-2k) \sqrt{z}\right) + e^{\frac{i m \pi}{2}-i e (m-2k)}\, \Gamma\left(2(n+1), i\, b\, (m-2k) \sqrt{z}\right)\right) +$$
$$\frac{2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2)}{n+1} + (-1)^n\, 2^{-m-v+1}\, c^{-2(n+1)} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$
$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} (v-2s)^{-2(n+1)} \left(e^{i g (v-2s)}\, \Gamma\left(2(n+1), -i\, c\, (v-2s) \sqrt{z}\right) + e^{-i g (v-2s)}\, \Gamma\left(2(n+1), i\, c\, (v-2s) \sqrt{z}\right)\right) -$$
$$2^{-m-v+1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s}$$
$$\left(e^{-\frac{1}{2} i \pi m + e i (m-2k) - i g (v-2s)}\, \Gamma\left(2(n+1), (i\, c\, (v-2s) - i\, b\, (m-2k)) \sqrt{z}\right) \left((i\, c\, (v-2s) - i\, b\, (m-2k)) \sqrt{z}\right)^{-2(n+1)} +\right.$$
$$e^{\frac{i \pi m}{2} - i e (m-2k) - i g (v-2s)} \left((b\, i\, (m-2k) + c\, i\, (v-2s)) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (b\, i\, (m-2k) + c\, i\, (v-2s)) \sqrt{z}\right) +$$
$$e^{-\frac{1}{2} i \pi m + e i (m-2k) + g i (v-2s)} \left((-i\, b\, (m-2k) - i\, c\, (v-2s)) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1),\right.$$
$$\left.(-i\, b\, (m-2k) - i\, c\, (v-2s)) \sqrt{z}\right) + e^{\frac{i \pi m}{2} - i e (m-2k) + g i (v-2s)} \left((i\, b\, (m-2k) - i\, c\, (v-2s)) \sqrt{z}\right)^{-2(n+1)}$$
$$\left.\Gamma\left(2(n+1), (i\, b\, (m-2k) - i\, c\, (v-2s)) \sqrt{z}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r + d z\right) \cos^v\left(c z^r + g\right)$

01.07.21.2545.01

$$\int z^n \sin^m\left(b z^2 + d z\right) \cos^v\left(c z^2 + g\right) dz =$$
$$2^{-m-v-1} \left(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (m \bmod 2 - 1)(v \bmod 2 - 1)}{n+1} - z^{n+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i g (2s-v)} \left(c^2 (v-2s)^2 z^4\right)^{\frac{1}{2}(-n-1)} \binom{v}{s}\right.$$
$$\left(\Gamma\left(\frac{n+1}{2}, i\, c\, (2s-v) z^2\right) \left(-i\, c\, (2s-v) z^2\right)^{\frac{n+1}{2}} + e^{2 i g (2s-v)} \left(i\, c\, (2s-v) z^2\right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i\, c\, (2s-v) z^2\right)\right) +$$
$$i^{-m} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{i d^2 (m-2k)}{4b}} (i\, b\, (2k-m))^{-n-1} \binom{m}{k}$$
$$\left(\sum_{q=0}^{n} 2^{q-n} (i\, d)^{n-q} (m-2k)^{n+1} (-i\, (d+2bz))^{q+1} \left(\frac{i\, (2k-m)(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\right.$$

$$\Gamma\left(\frac{q+1}{2}, \frac{i\,(2k-m)\,(d+2bz)^2}{4b}\right) + e^{\frac{1}{2}i\left(\frac{(m-2k)d^2}{b}+2m\pi\right)} \sum_{q=0}^{n} 2^{q-n}\,(i\,d)^{n-q}\,(m-2k)^{n+1}\,(-i\,(d+2bz))^{q+1}$$

$$\left(-\frac{i\,(2k-m)\,(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i\,(2k-m)\,(d+2bz)^2}{4b}\right)\Bigg) - i^{-m}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-i\,(2gs-gv)} \binom{v}{s} \Bigg(e^{\frac{i\,(2dk-dm)^2}{8bk-4bm-8cs+4cv}-2ig\,(v-2s)} \Bigg(\sum_{q=0}^{n} 2^{q-n}\,(i\,(2dk-dm))^{n-q}\,(-i\,(d\,(2k-m)+2\,(2bk-$$

$$bm-2cs+cv)\,z))^{q+1} \left(\frac{i\,(d\,(2k-m)+2\,(2bk-bm-2cs+cv)\,z)^2}{2bk-bm-2cs+cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\,(d\,(2k-m)+2\,(2bk-bm-2cs+cv)\,z)^2}{8bk-4bm-8cs+4cv}\right)\Bigg)$$

$$(-i\,(2bk-bm-2cs+cv))^{-n-1} + e^{i\left(m\pi-\frac{(2dk-dm)^2}{8bk-4bm-8cs+4cv}\right)}\,(i\,(2bk-bm-2cs+cv))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n}\,(-i\,(2dk-dm))^{n-q}\,(i\,(d\,(2k-m)+2\,(2bk-bm-2cs+cv)\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(2k-m)+2\,(2bk-bm-2cs+cv)\,z)^2}{2bk-bm-2cs+cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\Bigg($$

$$\frac{q+1}{2}, -\frac{i\,(d\,(2k-m)+2\,(2bk-bm-2cs+cv)\,z)^2}{8bk-4bm-8cs+4cv}\Bigg) +$$

$$e^{\frac{i\,d^2\,(m-2k)^2}{8bk-4bm+8cs-4cv}}\,(-i\,(2bk-bm+2cs-cv))^{-n-1} \sum_{q=0}^{n} 2^{q-n}\,(i\,(2dk-dm))^{n-q}\,(-i\,(2dk+4bzk-dm-$$

$$2bmz+4csz-2cvz))^{q+1} \left(\frac{i\,(d\,(m-2k)+2\,(-2bk+bm-2cs+cv)\,z)^2}{2bk-bm+2cs-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i\,(d\,(m-2k)+2\,(-2bk+bm-2cs+cv)\,z)^2}{8bk-4bm+8cs-4cv}\right) +$$

$$e^{i\left(-\frac{d^2\,(m-2k)^2}{8bk-4bm+8cs-4cv}-2g\,(v-2s)+m\pi\right)}\,(i\,(2bk-bm+2cs-cv))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n}\,(-i\,(2dk-dm))^{n-q}\,(i\,(2dk+4bzk-dm-2bmz+4csz-2cvz))^{q+1}$$

$$\left(-\frac{i\,(d\,(m-2k)+2\,(-2bk+bm-2cs+cv)\,z)^2}{2bk-bm+2cs-cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\Bigg(\frac{q+1}{2},$$

$$-\frac{i\,(d\,(m-2k)+2\,(-2bk+bm-2cs+cv)\,z)^2}{8bk-4bm+8cs-4cv}\Bigg)\Bigg)\Bigg) /;\ n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.07.21.2546.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z\right) \cos^v\left(\sqrt{z}\, c + g\right) dz = 2^{-m-v-1} \left(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (m \bmod 2 - 1)(v \bmod 2 - 1)}{n+1} + 4 (-1)^n c^{-2(n+1)} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \right.$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i g (2s-v)} (v - 2s)^{-2n-2} \binom{v}{s} \left(e^{2 i g (2s-v)} \Gamma\left(2(n+1), -i c (2s - v) \sqrt{z}\right) + \Gamma\left(2(n+1), i c (2s-v) \sqrt{z}\right)\right) +$$

$$i^{-m} 4^{-n} d^{-2(n+1)} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{n+u} e^{-\frac{i b^2 (m-2u)}{4d}} (m - 2u)^{-2(n+1)} \binom{m}{u} \left((-1)^m e^{\frac{i b^2 (m-2u)}{2d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k \right.$$

$$(m - 2u)(-i b (m - 2u))^{-h-k+2n} \left(-i (m - 2u)\left(b + 2 d \sqrt{z}\right)\right)^{h+k} \left(\frac{i (m-2u) \left(b + 2 d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(b (m - 2u) \left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h + k + 1), \frac{i (m-2u) \left(b + 2 d \sqrt{z}\right)^2}{4d} \right) + \right.$$

$$\left.\left. 2 \sqrt{\frac{i (m-2u) \left(b + 2 d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2} (h + k + 2), \frac{i (m-2u) \left(b + 2 d \sqrt{z}\right)^2}{4d} \right) \right) + \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}$$

$$4^k (m - 2u)(i b (m - 2u))^{-h-k+2n} \left(i (m - 2u)\left(b + 2 d \sqrt{z}\right)\right)^{h+k} \left(-\frac{i (m-2u) \left(b + 2 d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(b (m - 2u) \left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h + k + 1), -\frac{i (m-2u) \left(b + 2 d \sqrt{z}\right)^2}{4d} \right) - 2 i d \right.$$

$$\left.\left.\left. \sqrt{-\frac{i (m-2u) \left(b + 2 d \sqrt{z}\right)^2}{d}}\ \Gamma\left(\frac{1}{2} (h + k + 2), -\frac{i (m-2u) \left(b + 2 d \sqrt{z}\right)^2}{4d} \right) \right) \right) \right) -$$

$$i^{-m}\, 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i(2 g s - g v)} \binom{v}{s} \left(e^{-\frac{i (b(m-2u)+c(v-2s))^2}{4 d (m-2u)}} \left(d^2 (m-2u)^2\right)^{-2n-1} \left(\left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k \right.\right.\right.$$

$$(i(b(m-2u)+c(v-2s)))^{-h-k+2n} \left(i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((-b(m-2u)-c(v-2s))\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\left(i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2\right) \Big/ \right.$$

$$\left.(4d(m-2u))\right) + 2 d\, i\, (m-2u)\, \Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left. -\left(i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2\right) \Big/ (4d(m-2u))\right)$$

$$\left.\left.\sqrt{\left(-\frac{1}{d(m-2u)}\left(i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2\right)\right)}\right)\right)$$

$$(-i\, d(m-2u))^{2n} + (-1)^m e^{\frac{1}{2} i \left(\frac{(b(m-2u)+c(v-2s))^2}{d(m-2u)} + 8 g s - 4 g v\right)} (i\, d(m-2u))^{2n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}$$

$$4^k (-i(b(m-2u)+c(v-2s)))^{-h-k+2n} \left(-i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)\right)^{h+k}$$

$$\left(\frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{d(m-2u)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((-b(m-2u)-c(v-2s))\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{4d(m-2u)}\right) -$$

$$2\, i\, d(m-2u) \sqrt{\frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{d(m-2u)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b(m-2u)+2d\sqrt{z}\,(m-2u)+c(v-2s)\right)^2}{4d(m-2u)}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{(dm-2du)^2}\Bigg((-1)^m e^{\frac{i(bm+2cs-2bu-cv)^2}{4dm-8du}}(-i(dm-2du))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k$$

$$(-i(bm+2cs-2bu-cv))^{-h-k+2n}\left(-i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)^2}{dm-2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-bm-2cs+2bu+cv)\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)^2}{4dm-8du}\right)-$$

$$2i(dm-2du)\sqrt{\frac{i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)^2}{dm-2du}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)^2}{4dm-8du}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(dm-2du)^2}\Bigg(e^{i\left(g(4s-2v)-\frac{(bm+2cs-2bu-cv)^2}{4dm-8du}\right)}(i(dm-2du))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k$$

$$(i(bm+2cs-2bu-cv))^{-h-k+2n}\left(i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)^2}{dm-2du}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-bm-2cs+2bu+cv)\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)^2}{4dm-8du}\right)+$$

$$2i(dm-2du)\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)^2}{4dm-8du}\right)$$

$$\left.\left.\left.\left.\sqrt{-\frac{i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)^2}{dm-2du}}\right)\right)\right)\right) /; n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r + d z + e\right) \cos^v\left(c z^r + g\right)$

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$$\int z^n \sin^m\left(b z^2 + d z + e\right)\cos^v\left(c z^2 + g\right) dz ==$$

$$2^{-m-v-1}\left(\frac{2 z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m \bmod 2-1)(v \bmod 2-1)}{n+1} - z^{n+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s} e^{-i g(2s-v)}\left(c^2(v-2s)^2 z^4\right)^{\frac{1}{2}(-n-1)}\right.$$

$$\left(\Gamma\left(\frac{n+1}{2}, i c(2s-v)z^2\right)\left(-i c(2s-v)z^2\right)^{\frac{n+1}{2}} + e^{2 i g(2s-v)}\left(i c(2s-v)z^2\right)^{\frac{n+1}{2}}\Gamma\left(\frac{n+1}{2}, -i c(2s-v)z^2\right)\right)+$$

$$i^{-m}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-\frac{1}{4} i\left(\frac{(m-2k)d^2}{b}+4e(2k+m)\right)}(i b(2k-m))^{-n-1}\binom{m}{k}$$

$$\left(e^{2 i e m}\sum_{q=0}^{n} 2^{q-n}(i d)^{n-q}(m-2k)^{n+1}(-i(d+2bz))^{q+1}\left(\frac{i(2k-m)(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\right.$$

$$\Gamma\left(\frac{q+1}{2}, \frac{i(2k-m)(d+2bz)^2}{4b}\right) + e^{\frac{1}{2} i\left(\frac{(m-2k)d^2}{b}+8ek+2m\pi\right)}\sum_{q=0}^{n} 2^{q-n}(i d)^{n-q}(m-2k)^{n+1}$$

$$\left.(-i(d+2bz))^{q+1}\left(-\frac{i(2k-m)(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(2k-m)(d+2bz)^2}{4b}\right)\right)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-i(2ek-em+2gs-gv)}\binom{v}{s}\left(e^{\frac{i(2dk-dm)^2}{8bk-4bm-8cs+4cv}-2ig(v-2s)}\left(\sum_{q=0}^{n} 2^{q-n}(i(2dk-dm))^{n-q}\right.\right.$$

$$(-i(d(2k-m)+2(2bk-bm-2cs+cv)z))^{q+1}$$

$$\left(\frac{i(d(2k-m)+2(2bk-bm-2cs+cv)z)^2}{2bk-bm-2cs+cv}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2}, \frac{i\,(d\,(2\,k-m)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)\Bigg)(-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}+$$

$$e^{i\left(-\frac{(2\,d\,k-d\,m)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}+e\,(4\,k-2\,m)+m\,\pi\right)}\,(i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n}\,(-i\,(2\,d\,k-d\,m))^{n-q}\,(i\,(d\,(2\,k-m)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(2\,k-m)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg($$

$$\frac{q+1}{2}, -\frac{i\,(d\,(2\,k-m)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\Bigg)+$$

$$e^{\frac{i\,d^2\,(m-2\,k)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}}\,(-i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n} 2^{q-n}\,(i\,(2\,d\,k-d\,m))^{n-q}\,(-i\,(2\,d\,k+4\,b\,z\,k-d\,m-$$

$$2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}\left(\frac{i\,(d\,(m-2\,k)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i\,(d\,(m-2\,k)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)+$$

$$e^{i\left(-\frac{d^2\,(m-2\,k)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}+e\,(4\,k-2\,m)-2\,g\,(v-2\,s)+m\,\pi\right)}\,(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n}\,(-i\,(2\,d\,k-d\,m))^{n-q}\,(i\,(2\,d\,k+4\,b\,z\,k-d\,m-2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(m-2\,k)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg(\frac{q+1}{2},$$

$$-\frac{i\,(d\,(m-2\,k)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m\!\left(\sqrt{z}\,b+d\,z+e\right)\cos^v\!\left(\sqrt{z}\,c+g\right)dz=$$

$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}+4\,(-1)^n\,c^{-2\,(n+1)}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}e^{-i\,g\,(2\,s-v)}\,(v-2\,s)^{-2\,n-2}\left(e^{2\,i\,g\,(2\,s-v)}\,\Gamma\!\left(2\,(n+1),\,-i\,c\,(2\,s-v)\,\sqrt{z}\right)+\Gamma\!\left(2\,(n+1),\,i\,c\,(2\,s-v)\,\sqrt{z}\right)\right)+$$

$$i^{-m} 4^{-n} d^{-2(n+1)} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{n+u} e^{-\frac{i\left(b^2+4 d e\right)(m-2u)}{4d}} (m-2u)^{-2(n+1)} \binom{m}{u}$$

$$\Bigg((-1)^m e^{\frac{i b^2 (m-2u)}{2d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (m-2u)(-i b (m-2u))^{-h-k+2n} \left(-i (m-2u)\left(b + 2 d \sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i (m-2u)\left(b+2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \Bigg(b (m-2u)\left(b + 2 d \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i (m-2u)\left(b+2 d \sqrt{z}\right)^2}{4d}\right) + 2 \sqrt{\frac{i (m-2u)\left(b+2 d \sqrt{z}\right)^2}{d}}\; d\, i$$

$$\Gamma\left(\frac{1}{2}(h+k+2), \frac{i (m-2u)\left(b+2 d \sqrt{z}\right)^2}{4d}\right)\Bigg) + e^{2 i e (m-2u)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (m-2u)$$

$$(i b (m-2u))^{-h-k+2n} \left(i (m-2u)\left(b + 2 d \sqrt{z}\right)\right)^{h+k} \left(-\frac{i (m-2u)\left(b+2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \Bigg(b (m-2u)\left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{i (m-2u)\left(b+2 d \sqrt{z}\right)^2}{4d}\right) -$$

$$2 i d \sqrt{-\frac{i (m-2u)\left(b+2 d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i (m-2u)\left(b+2 d \sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg) -$$

$$i^{-m} 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i(e m + 2 g s - 2 e u - g v)} \binom{v}{s} \Bigg(e^{-\frac{i (b (m-2u) + c (v-2s))^2}{4 d (m-2u)}} \left(d^2 (m-2u)^2\right)^{-2n-1}$$

$$\Bigg(e^{2 i e (m-2u)} \Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b (m-2u) + c (v-2s)))^{-h-k+2n} \left(i \left(b (m-2u) + 2 d \sqrt{z}\, (m-2u) + \right.\right.$$

$$c\,(v-2\,s)\Big)\Big)^{h+k}\left(-\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((-b\,(m-2\,u)-c\,(v-2\,s))\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)$$

$$\Gamma\Big(\frac{1}{2}\,(h+k+1),\,-\left(i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2\right)\Big/$$

$$(4\,d\,(m-2\,u))\Big)+2\,d\,i\,(m-2\,u)\,\Gamma\Big(\frac{1}{2}\,(h+k+2),$$

$$-\left(i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2\right)\Big/(4\,d\,(m-2\,u))\Big)$$

$$\sqrt{\left(-\frac{1}{d\,(m-2\,u)}\left(i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2\right)\right)}\Bigg)\Bigg)$$

$$(-i\,d\,(m-2\,u))^{2\,n}+(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{(b\,(m-2\,u)+c\,(v-2\,s))^2}{d\,(m-2\,u)}+8\,g\,s-4\,g\,v\right)}\,(i\,d\,(m-2\,u))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}$$

$$4^k\,(-i\,(b\,(m-2\,u)+c\,(v-2\,s)))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2}{d\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b\,(m-2\,u)-c\,(v-2\,s))\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,u)}\right)-$$

$$2\,i\,d\,(m-2\,u)\sqrt{\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2}{d\,(m-2\,u)}}$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)+2\,d\,\sqrt{z}\,\,(m-2\,u)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,u)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\Bigg((-1)^m\,e^{\frac{i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{4\,d\,m-8\,d\,u}}\,(-i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(-i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\,\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\,\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\,\right)^2}{4\,d\,m-8\,d\,u}\right)-$$

$$2\,i\,(d\,m-2\,d\,u)\sqrt{\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\,\right)^2}{d\,m-2\,d\,u}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\,\right)^2}{4\,d\,m-8\,d\,u}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(d\,m-2\,d\,u)^2}\Bigg(e^{i\left(-\frac{(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{4\,d\,m-8\,d\,u}+2\,e\,(m-2\,u)+g\,(4\,s-2\,v)\right)}\,(i\,(d\,m-2\,d\,u))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\,\right)^2}{d\,m-2\,d\,u}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m-2\,d\,u)\,\sqrt{z}\,\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)^2}{4dm-8du}\right)+$$

$$2i(dm-2du)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)^2}{4dm-8du}\right)$$

$$\left.\left.\left.\left.\sqrt{-\frac{i\left(b(m-2u)+c(2s-v)+2(dm-2du)\sqrt{z}\right)^2}{dm-2du}}\right)\right)\right)\right)\;/;\; n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z)\cos^v\left(c\,z^r+f\,z\right)$

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$$\int z^n \sin^m(d\,z)\cos^v\left(c\,z^2+f\,z\right)dz =$$

$$2^{-m-v-1}\left(\frac{2z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m \bmod 2-1)(v \bmod 2-1)}{n+1}+2\,i^{1-m}d^{-2n-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k(2k-m)^{-2n-1}\right.$$

$$\binom{m}{k}\left(\Gamma(n+1, i\,d(2k-m)z)(-i\,d(2k-m))^n+(-1)^{m-1}(i\,d(2k-m))^n\,\Gamma(n+1,-i\,d(2k-m)z)\right)+$$

$$(-1)^n(i\,c)^{-n-1}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i f^2(2s-v)}{4c}}\binom{v}{s}\left(e^{\frac{i f^2(2s-v)}{2c}}\sum_{q=0}^{n}(-1)^q 2^{q-n}(i\,f)^{n-q}(i(f+2cz))^{q+1}\right.$$

$$\left(\frac{i(2s-v)(f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(2s-v)(f+2cz)^2}{4c}\right)+\sum_{q=0}^{n}(-1)^q 2^{q-n}(i\,f)^{n-q}$$

$$\left.(i(f+2cz))^{q+1}\left(-\frac{i(2s-v)(f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(2s-v)(f+2cz)^2}{4c}\right)\right)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{\frac{i(2dk-dm-2fs+fv)^2}{4cv-8cs}}\left(\sum_{q=0}^{n}2^{q-n}(i(2dk-dm-2fs+fv))^{n-q}(-i(d(2k-m)+\right.\right.$$

$$f(v-2s)+2(cv-2cs)z))^{q+1}\left(\frac{i(d(2k-m)+f(v-2s)+2(cv-2cs)z)^2}{cv-2cs}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(d(2k-m)+f(v-2s)+2(cv-2cs)z)^2}{4cv-8cs}\right)\right)(-i(cv-2cs))^{-n-1}+$$

$$e^{i\left(m\pi-\frac{(2dk-dm-2fs+fv)^2}{4cv-8cs}\right)}(i(cv-2cs))^{-n-1}\sum_{q=0}^{n}2^{q-n}(-i(2dk-dm-2fs+fv))^{n-q}(i(d(2k-m)+$$

$$f(v-2s)+2(cv-2cs)z))^{q+1}\left(-\frac{i(d(2k-m)+f(v-2s)+2(cv-2cs)z)^2}{cv-2cs}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i(d(2k-m)+f(v-2s)+2(cv-2cs)z)^2}{4cv-8cs}\right)+e^{\frac{i(d(m-2k)+f(v-2s))^2}{8cs-4cv}}$$

$$(-i(2cs-cv))^{-n-1}\sum_{q=0}^{n}2^{q-n}(i(2dk-dm+2fs-fv))^{n-q}(-i(2dk-dm+2fs-fv+$$

$$4csz-2cvz))^{q+1}\left(\frac{i(d(m-2k)+f(v-2s)+2(cv-2cs)z)^2}{2cs-cv}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\right.$$

$$\left.\frac{i(d(m-2k)+f(v-2s)+2(cv-2cs)z)^2}{8cs-4cv}\right)+e^{i\left(m\pi-\frac{(d(m-2k)+f(v-2s))^2}{8cs-4cv}\right)}(i(2cs-cv))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}(-i(2dk-dm+2fs-fv))^{n-q}(i(2dk-dm+2fs-fv+4csz-2cvz))^{q+1}$$

$$\left(-\frac{i(d(m-2k)+f(v-2s)+2(cv-2cs)z)^2}{2cs-cv}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\right.$$

$$\left.\left.\left.-\frac{i(d(m-2k)+f(v-2s)+2(cv-2cs)z)^2}{8cs-4cv}\right)\right)\right)\Big/;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m(dz)\cos^v\left(\sqrt{z}\,c+fz\right)dz=$$

$$2^{-m-v-1}\left(\frac{2z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)(v\bmod 2-1)}{n+1}+2\,i\,d^{-2n-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-\frac{1}{2}im\pi}(2k-m)^{-2n-1}\right.$$

$$\binom{m}{k}\left((-i\,d(2k-m))^n\,\Gamma(n+1,\,i\,d(2k-m)z)-e^{im\pi}(i\,d(2k-m))^n\,\Gamma(n+1,\,-i\,d(2k-m)z)\right)+$$

$$\frac{1}{c}\left(i\left(-\frac{1}{4}\right)^n f^{-2(n+1)}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{ic^2(2s-v)}{4f}}(v-2s)^{-2n-2}\binom{v}{s}\right.$$

$$\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(2\,s-v))^{-h-k+2\,n+1}\left(i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)-\right.$$

$$\left.2\,i\,f\,\sqrt{-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)-$$

$$e^{\frac{i\,c^2\,(2\,s-v)}{2\,f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(2\,s-v))^{-h-k+2\,n+1}\left(-i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(c\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+\right.$$

$$\left.\left.\left.\left.2\,\sqrt{\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)\right)\right)\right)-$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left(\left((-1)^m\,e^{\frac{i\,(2\,c\,s-c\,v)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}}\,(-i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2\,n}\right.\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(2\,c\,s-c\,v))^{-h-k+2\,n}\left(-i\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2}{d\,m+2\,f\,s-2\,d\,u-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left((c\,v-2\,c\,s)\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)-$$

$$2i(dm+2fs-2du-fv)\sqrt{\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{dm+2fs-2du-fv}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)\right)\right)\right)\Big/$$

$$(dm+2fs-2du-fv)^2+\left(e^{-\frac{i(2cs-cv)^2}{4dm+8fs-8du-4fv}}(i(dm+2fs-2du-fv))^{-2n}\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i(2cs-cv))^{-h-k+2n}\left(i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{dm+2fs-2du-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((cv-2cs)\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)+2i(dm+2fs-2du-fv)$$

$$\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)$$

$$\left.\left.\sqrt{\left(-\left(i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2\right)\Big/(dm+2fs-2du-fv)\right)}\right)\right)\Big/$$

$$(dm+2fs-2du-fv)^2+e^{-\frac{ic^2(v-2s)^2}{4(d(m-2u)+f(v-2s))}}\left((d(m-2u)+f(v-2s))^2\right)^{-2n-1}$$

$$\left(\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(ic(v-2s))^{-h-k+2n}\left(i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)\right)^{h+k}\right.\right.$$

$$\left(-\left(i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2\right)\Big/(d(m-2u)+f(v-2s))\right)^{\frac{1}{2}(-h-k-1)}$$
$$\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,(d(m-2u)+f(v-2s))$$
$$\sqrt{\left(-\left(i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2\right)\Big/(d(m-2u)+f(v-2s))\right)}$$
$$\Gamma\Bigg(\frac{1}{2}(h+k+2),\, -\left(i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2\right)\Big/$$
$$(4(d(m-2u)+f(v-2s)))\Bigg)-c(v-2s)\Big(c(v-2s)+$$
$$2(d(m-2u)+f(v-2s))\sqrt{z}\Big)\Gamma\Bigg(\frac{1}{2}(h+k+1),\, -\Big(i\Big(c(v-2s)+2(d$$
$$(m-2u)+f(v-2s))\sqrt{z}\Big)^2\Big)\Big/(4(d(m-2u)+f(v-2s)))\Bigg)\Bigg)\Bigg)$$

$$(-i(d(m-2u)+f(v-2s)))^{2n}+(-1)^m e^{\frac{i c^2 (v-2s)^2}{2(d(m-2u)+f(v-2s))}}(i(d(m-2u)+f(v-2s)))^{2n}$$
$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i\,c(v-2s))^{-h-k+2n}\left(-i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)\right)^{h+k}$$
$$\left(\frac{i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2}{d(m-2u)+f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$
$$\binom{n}{k}\Bigg(-c(v-2s)\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)$$
$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2}{4(d(m-2u)+f(v-2s))}\right)-$$
$$2\,i\,(d(m-2u)+f(v-2s))\sqrt{\left(\left(i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2\right)\Big/\right.}$$
$$\left.(d(m-2u)+f(v-2s))\right)\Gamma\Bigg(\frac{1}{2}(h+k+2),$$
$$\frac{i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2}{4(d(m-2u)+f(v-2s))}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\cos^v(c\,z^r+f\,z)$

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$$\int z^n \sin^m(d\,z+e)\cos^\nu\left(c\,z^2+f\,z\right)dz = 2^{-m-\nu-1}$$

$$\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2-1)(\nu \bmod 2-1)}{n+1} + 2\,i\,d^{-2n-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-\frac{1}{2}i(\pi m+2e(2k+m))}(2k-m)^{-2n-1}\right.$$

$$\binom{m}{k}\left(e^{2iem}(-i\,d\,(2k-m))^n\,\Gamma(n+1,\,i\,d\,(2k-m)\,z)-e^{i(4ek+m\pi)}(i\,d\,(2k-m))^n\,\Gamma(n+1,\,-i\,d\,(2k-m)\,z)\right)+$$

$$(-1)^n(i\,c)^{-n-1}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-\frac{i f^2(2s-\nu)}{4c}}\binom{\nu}{s}\left(e^{\frac{i f^2(2s-\nu)}{2c}}\sum_{q=0}^{n}(-1)^q\,2^{q-n}(i\,f)^{n-q}(i\,(f+2\,c\,z))^{q+1}\right.$$

$$\left(\frac{i\,(2s-\nu)(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(2s-\nu)(f+2\,c\,z)^2}{4c}\right)+\sum_{q=0}^{n}(-1)^q\,2^{q-n}(i\,f)^{n-q}$$

$$\left.(i\,(f+2\,c\,z))^{q+1}\left(-\frac{i\,(2s-\nu)(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(2s-\nu)(f+2\,c\,z)^2}{4c}\right)\right)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{-i(2ek-em)}\binom{\nu}{s}\left(e^{\frac{i(2dk-dm-2fs+f\nu)^2}{4c\nu-8cs}}\left(\sum_{q=0}^{n}2^{q-n}(i\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu))^{n-q}(-i\,(d\,(2k-m)+\right.\right.$$

$$f\,(\nu-2s)+2\,(c\,\nu-2\,c\,s)\,z))^{q+1}\left(\frac{i\,(d\,(2k-m)+f\,(\nu-2s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{c\,\nu-2\,c\,s}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(d\,(2k-m)+f\,(\nu-2s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{4\,c\,\nu-8\,c\,s}\right)\right)\right.$$

$$(-i\,(c\,\nu-2\,c\,s))^{-n-1}+e^{i\left(-\frac{(2dk-dm-2fs+f\nu)^2}{4c\nu-8cs}+e(4k-2m)+m\pi\right)}(i\,(c\,\nu-2\,c\,s))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}(-i\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu))^{n-q}(i\,(d\,(2k-m)+f\,(\nu-2s)+2\,(c\,\nu-2\,c\,s)\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(2k-m)+f\,(\nu-2s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{c\,\nu-2\,c\,s}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\right.$$

$$\left.-\frac{i\,(d\,(2k-m)+f\,(\nu-2s)+2\,(c\,\nu-2\,c\,s)\,z)^2}{4\,c\,\nu-8\,c\,s}\right)+e^{\frac{i(d(m-2k)+f(\nu-2s))^2}{8cs-4c\nu}}(-i\,(2\,c\,s-c\,\nu))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}(i\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu))^{n-q}(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu+4\,c\,s\,z-2\,c\,\nu\,z))^{q+1}$$

$$\left(\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\right.$$

$$\left.\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{8\,c\,s-4\,c\,v}\right)+e^{i\left(-\frac{(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,c\,s-4\,c\,v}+e\,(4\,k-2\,m)+m\,\pi\right)}$$

$$(i\,(2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}\,(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v+$$

$$4\,c\,s\,z-2\,c\,v\,z))^{q+1}\left(-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg($$

$$\left.\left.\left.\frac{q+1}{2},-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{8\,c\,s-4\,c\,v}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m(d\,z+e)\cos^v\left(\sqrt{z}\;c+f\,z\right)dz = 2^{-m-v-1}$$

$$\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}+2\,i\,d^{-2\,n-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{1}{2}i\,(\pi\,m+2\,e\,(2\,k+m))}\,(2\,k-m)^{-2\,n-1}\right.$$

$$\binom{m}{k}\left(e^{2\,i\,e\,m}\,(-i\,d\,(2\,k-m))^n\,\Gamma(n+1,\,i\,d\,(2\,k-m)\,z)-e^{i\,(4\,e\,k+m\,\pi)}\,(i\,d\,(2\,k-m))^n\,\Gamma(n+1,\,-i\,d\,(2\,k-m)\,z)\right)+$$

$$\frac{1}{c}\Bigg(i\left(-\frac{1}{4}\right)^n f^{-2\,(n+1)}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i\,c^2\,(2\,s-v)}{4\,f}}\,(v-2\,s)^{-2\,n-2}\binom{v}{s}$$

$$\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(2\,s-v))^{-h-k+2\,n+1}\left(i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(c\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)-\right.$$

$$\left.2\,i\,f\,\sqrt{-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)-$$

$$e^{\frac{i c^2 (2 s-v)}{2 f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i c (2 s-v))^{-h-k+2 n+1} \left(-i (2 s-v) \left(c+2 f \sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i (2 s-v) \left(c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left(c (2 s-v) \left(c+2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i (2 s-v) \left(c+2 f \sqrt{z}\right)^2}{4 f}\right)+\right.$$

$$\left.\left.\left. 2 \sqrt{\frac{i (2 s-v) \left(c+2 f \sqrt{z}\right)^2}{f}} f i \Gamma\left(\frac{1}{2}(h+k+2), \frac{i (2 s-v) \left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right)\right)-$$

$$i^{-m} 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i (e m-2 e u)} \binom{v}{s} \left(\left((-1)^m e^{\frac{i (2 c s-c v)^2}{4 d m+8 f s-8 d u-4 f v}} (-i (d m+2 f s-2 d u-f v))^{-2 n}\right.\right.$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (2 c s-c v))^{-h-k+2 n} \left(-i \left(c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i \left(c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right)^2}{d m+2 f s-2 d u-f v}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}$$

$$\binom{n}{k} \left((c v-2 c s) \left(c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right)^2}{4 d m+8 f s-8 d u-4 f v}\right)-$$

$$2 i (d m+2 f s-2 d u-f v) \sqrt{\frac{i \left(c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right)^2}{d m+2 f s-2 d u-f v}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right)^2}{4 d m+8 f s-8 d u-4 f v}\right)\right)\right)\right) \Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+\left(e^{i\left(2\,e\,(m-2\,u)-\frac{(2\,c\,s-c\,v)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}\right)}\,(i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2\,n}\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(2\,c\,s-c\,v))^{-h-k+2\,n}\left(i\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\right)^2}{d\,m+2\,f\,s-2\,d\,u-f\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((c\,v-2\,c\,s)\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\right)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}\right)+2\,i\,(d\,m+2\,f\,s-2\,d\,u-f\,v)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\right)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}\right)$$

$$\left.\left.\sqrt{\left(-\left(i\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\right)^2\right)\Big/(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)}\,\right)\right)\Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}}\left((d\,(m-2\,u)+f\,(v-2\,s))^2\right)^{-2\,n-1}$$

$$\left(e^{2\,i\,e\,(m-2\,u)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)\right)^{h+k}\right.\right.$$

$$\left(-\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))\right.$$

$$\sqrt{\left(-\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)}$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2\right)\Big/\right.$$

$$\left.(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\right)-c\,(v-2\,s)\left(c\,(v-2\,s)+\right.$$

$$\left.2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\left(i\left(c\,(v-2\,s)+2\,(d\right.\right.\right.$$

$$(m-2u)+f(v-2s))\sqrt{z}\Big)^2\Big)\Big/(4(d(m-2u)+f(v-2s)))\Big)\Big)\Big)$$

$$(-i(d(m-2u)+f(v-2s)))^{2n}+(-1)^m e^{\frac{i c^2 (v-2s)^2}{2(d(m-2u)+f(v-2s))}}(i(d(m-2u)+f(v-2s)))^{2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i c(v-2s))^{-h-k+2n}\left(-i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2}{d(m-2u)+f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(-c(v-2s)\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2}{4(d(m-2u)+f(v-2s))}\right)-$$

$$2i(d(m-2u)+f(v-2s))\sqrt{\left(\left(i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2\right)\Big/\right.}$$

$$\left.(d(m-2u)+f(v-2s))\right)\Gamma\Bigg(\frac{1}{2}(h+k+2),$$

$$\frac{i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2}{4(d(m-2u)+f(v-2s))}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b z^r)\cos^v(c z^r + f z)$

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$$\int z^n \sin^m(b z^2)\cos^v(c z^2+f z)\,dz =$$

$$2^{-m-v-1}\Bigg(\frac{2z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m \bmod 2-1)(v \bmod 2-1)}{n+1}-z^{n+1}i^{-m}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\left(b^2(m-2k)^2z^4\right)^{\frac{1}{2}(-n-1)}\binom{m}{k}$$

$$\left(\Gamma\left(\frac{n+1}{2},i b(2k-m)z^2\right)\left(-i b(2k-m)z^2\right)^{\frac{n+1}{2}}+(-1)^m\left(i b(2k-m)z^2\right)^{\frac{n+1}{2}}\Gamma\left(\frac{n+1}{2},-i b(2k-m)z^2\right)\right)+$$

$$(-1)^n(i c)^{-n-1}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i f^2(2s-v)}{4c}}\binom{v}{s}\Bigg(e^{\frac{i f^2(2s-v)}{2c}}\sum_{q=0}^{n}(-1)^q 2^{q-n}(i f)^{n-q}(i(f+2cz))^{q+1}$$

$$\left(\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)+\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}$$

$$(i\,(f+2\,c\,z))^{q+1}\left(-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)\Bigg)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(e^{\frac{i\,(f\,v-2\,f\,s)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}}\Bigg(\sum_{q=0}^{n}2^{q-n}\,(i\,(f\,v-2\,f\,s))^{n-q}\,(-i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)$$

$$z))^{q+1}\left(\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\Bigg(\frac{q+1}{2},$$

$$\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\Bigg)\Bigg)(-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}+$$

$$e^{i\left(m\,\pi-\frac{(f\,v-2\,f\,s)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)}(i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(f\,v-2\,f\,s))^{n-q}\,(i\,(f\,(v-2\,s)+2\,(2\,b\,k-$$

$$b\,m-2\,c\,s+c\,v)\,z))^{q+1}\left(-\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)+e^{\frac{i\,f^2\,(v-2\,s)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}}$$

$$(-i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,f\,s-f\,v))^{n-q}\,(-i\,(2\,f\,s+4\,c\,z\,s-f\,v+4\,b\,k\,z-$$

$$2\,b\,m\,z-2\,c\,v\,z))^{q+1}\left(\frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\Bigg($$

$$\frac{q+1}{2},\,\frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\Bigg)+e^{i\left(m\,\pi-\frac{f^2\,(v-2\,s)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)}$$

$$(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,f\,s-f\,v))^{n-q}\,(i\,(2\,f\,s+4\,c\,z\,s-f\,v+4\,b\,k\,z-$$

$$2\,b\,m\,z-2\,c\,v\,z))^{q+1}\left(-\frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\Bigg($$

$$\frac{q+1}{2},\,-\frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b\right) \cos^v\left(\sqrt{z}\, c + f\, z\right) dz = 2^{-m-v-1} \left(\frac{2\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (m \bmod 2 - 1)\, (v \bmod 2 - 1)}{n+1} + 4\, b^{-2\,(n+1)} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+n}\, e^{-\frac{1}{2}\, i\, m\, \pi} \right.$$

$$(2\,k - m)^{2\,(n-1)}\, (m - 2\,k)^{-4\,n} \binom{m}{k} \left(e^{i\, m\, \pi}\, \Gamma\left(2\,(n+1), -i\, b\, (2\,k - m) \sqrt{z}\right) + \Gamma\left(2\,(n+1), i\, b\, (2\,k - m) \sqrt{z}\right) \right) +$$

$$\frac{1}{c} \left(i \left(-\frac{1}{4}\right)^n f^{-2\,(n+1)} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-\frac{i\, c^2\, (2\,s - v)}{4\,f}}\, (v - 2\,s)^{-2\,n-2} \binom{v}{s} \right.$$

$$\left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, c\, (2\,s - v))^{-h-k+2\,n+1} \left(i\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right) \right)^{h+k} \left(-\frac{i\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}\,(-h-k-1)} \right.$$

$$\binom{k}{h} \binom{n}{k} \left(c\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right) \Gamma\left(\frac{1}{2}\, (h + k + 1), -\frac{i\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right)^2}{4\, f} \right) - \right.$$

$$\left. 2\, i\, f \sqrt{-\frac{i\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}\, (h + k + 2), -\frac{i\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right)^2}{4\, f} \right) \right) -$$

$$e^{\frac{i\, c^2\, (2\,s - v)}{2\, f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\, c\, (2\,s - v))^{-h-k+2\,n+1} \left(-i\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right) \right)^{h+k}$$

$$\left(\frac{i\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}\,(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left(c\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right) \Gamma\left(\frac{1}{2}\, (h + k + 1), \frac{i\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right)^2}{4\, f} \right) + \right.$$

$$\left.\left.\left.\left. 2 \sqrt{\frac{i\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right)^2}{f}}\; f\, i\, \Gamma\left(\frac{1}{2}\, (h + k + 2), \frac{i\, (2\,s - v) \left(c + 2\, f \sqrt{z}\right)^2}{4\, f} \right) \right) \right) \right) -$$

$$\left(-\frac{1}{4}\right)^n i^{-m} f^{-2(n+1)} \sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^u \binom{m}{u} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (v-2s)^{-2(n+1)} \binom{v}{s} \left(e^{-\frac{i(b(m-2u)+c(v-2s))^2}{4f(v-2s)}} \left((-1)^m e^{\frac{i(b(m-2u)+c(v-2s))^2}{2f(v-2s)}}\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-i(b(m-2u)+c(v-2s)))^{-h-k+2n} \left(-i\left(b(m-2u)+c(v-2s)+\right.\right.$$

$$\left.\left.2 f(v-2s)\sqrt{z}\right)\right)^{h+k} \left(\frac{i\left(b(m-2u)+c(v-2s)+2 f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b(m-2u)-c(v-2s))\left(b(m-2u)+c(v-2s)+2 f(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b(m-2u)+c(v-2s)+2 f(v-2s)\sqrt{z}\right)^2}{4 f(v-2s)}\right) -$$

$$2 i f(v-2s)\sqrt{\frac{i\left(b(m-2u)+c(v-2s)+2 f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(b(m-2u)+c(v-2s)+2 f(v-2s)\sqrt{z}\right)^2}{4 f(v-2s)}\right)\right)\right) + \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k$$

$$(i(b(m-2u)+c(v-2s)))^{-h-k+2n} \left(i\left(b(m-2u)+c(v-2s)+2 f(v-2s)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b(m-2u)+c(v-2s)+2 f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((-b(m-2u)-c(v-2s))\left(b(m-2u)+c(v-2s)+2 f(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b(m-2u)+c(v-2s)+2 f(v-2s)\sqrt{z}\right)^2}{4 f(v-2s)}\right) +$$

$$2 f i (v-2s)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b(m-2u)+c(v-2s)+2 f(v-2s)\sqrt{z}\right)^2}{4 f(v-2s)}\right)$$

$$\sqrt{-\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\Bigg)\Bigg)+e^{-\frac{i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{8\,f\,s-4\,f\,v}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}$$

$$4^k\,(i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)+$$

$$2\,i\,(2\,f\,s-f\,v)\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)$$

$$\sqrt{-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}}\Bigg)+$$

$$(-1)^m\,e^{\frac{i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{8\,f\,s-4\,f\,v}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b(m-2u)+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)-$$

$$2i(2fs-fv)\sqrt{\frac{i\left(b(m-2u)+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{2fs-fv}}\;\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.\left.\left.\frac{i\left(b(m-2u)+c(2s-v)+2(2fs-fv)\sqrt{z}\right)^2}{8fs-4fv}\right)\right)\right)\right)\right) /;\; n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin^m(b z^r+e)\cos^v(c z^r+f z)$

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$$\int z^n\sin^m(b z^2+e)\cos^v(c z^2+f z)\,dz =$$

$$2^{-m-v-1}\left(\frac{2z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m \bmod 2-1)(v \bmod 2-1)}{n+1} - z^{n+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-\frac{1}{2}i(\pi m+2e(2k+m))}\right.$$

$$\left(b^2(m-2k)^2z^4\right)^{\frac{1}{2}(-n-1)}\binom{m}{k}\left(e^{2iem}\,\Gamma\left(\frac{n+1}{2}, i\,b(2k-m)z^2\right)\left(-i\,b(2k-m)z^2\right)^{\frac{n+1}{2}}+e^{i(4ek+m\pi)}\right.$$

$$\left.\left.\left(i\,b(2k-m)z^2\right)^{\frac{n+1}{2}}\Gamma\left(\frac{n+1}{2}, -i\,b(2k-m)z^2\right)\right)\right)+(-1)^n(i\,c)^{-n-1}\binom{m}{\frac{m}{2}}(m \bmod 2-1)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i f^2(2s-v)}{4c}}\binom{v}{s}\left(e^{\frac{i f^2(2s-v)}{2c}}\sum_{q=0}^{n}(-1)^q 2^{q-n}(i\,f)^{n-q}(i(f+2cz))^{q+1}\left(\frac{i(2s-v)(f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\right.$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(2s-v)(f+2cz)^2}{4c}\right)+\sum_{q=0}^{n}(-1)^q 2^{q-n}(i\,f)^{n-q}(i(f+2cz))^{q+1}$$

$$\left.\left(-\frac{i(2s-v)(f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(2s-v)(f+2cz)^2}{4c}\right)\right)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i(2ek-em)}\binom{v}{s}\left(e^{\frac{i(fv-2fs)^2}{8bk-4bm-8cs+4cv}}\left(\sum_{q=0}^{n}2^{q-n}(i(fv-2fs))^{n-q}(-i(f(v-2s)+2(2bk-bm-\right.\right.\right.$$

$$2cs+cv)z))^{q+1}\left(\frac{i(f(v-2s)+2(2bk-bm-2cs+cv)z)^2}{2bk-bm-2cs+cv}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2}, \frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)\Bigg)(-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}+$$

$$e^{i\left(-\frac{(f\,v-2\,f\,s)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}+e\,(4\,k-2\,m)+m\,\pi\right)}\,(i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n}\,(-i\,(f\,v-2\,f\,s))^{n-q}\,(i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z))^{q+1}$$

$$\left(-\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\left(\frac{q+1}{2},\right.$$

$$\left.-\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)+e^{\frac{i\,f^2\,(v-2\,s)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}}$$

$$(-i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n} 2^{q-n}\,(i\,(2\,f\,s-f\,v))^{n-q}\,(-i\,(2\,f\,s+4\,c\,z\,s-f\,v+4\,b\,k\,z-$$

$$2\,b\,m\,z-2\,c\,v\,z))^{q+1}\left(\frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\Bigg($$

$$\frac{q+1}{2}, \frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\Bigg)+e^{i\left(-\frac{f^2\,(v-2\,s)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}+e\,(4\,k-2\,m)+m\,\pi\right)}$$

$$(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n} 2^{q-n}\,(-i\,(2\,f\,s-f\,v))^{n-q}\,(i\,(2\,f\,s+4\,c\,z\,s-f\,v+4\,b\,k\,z-$$

$$2\,b\,m\,z-2\,c\,v\,z))^{q+1}\left(-\frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\Bigg($$

$$\frac{q+1}{2}, -\frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\,\sin^m\left(\sqrt{z}\,b+e\right)\cos^v\left(\sqrt{z}\,c+f\,z\right)dz = 2^{-m-v-1}$$

$$\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}+4\,b^{-2\,(n+1)}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+n}\,e^{-\frac{1}{2}\,i\,(\pi\,m+2\,e\,(2\,k+m))}\,(2\,k-m)^{2\,(n-1)}\right.$$

$$(m-2\,k)^{-4\,n}\binom{m}{k}\left(e^{i\,(4\,e\,k+m\,\pi)}\,\Gamma\left(2\,(n+1),\,-i\,b\,(2\,k-m)\,\sqrt{z}\right)+e^{2\,i\,e\,m}\,\Gamma\left(2\,(n+1),\,i\,b\,(2\,k-m)\,\sqrt{z}\right)\right)+$$

$$\frac{1}{c}\left(i\left(-\frac{1}{4}\right)^n f^{-2(n+1)}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-\frac{i c^2(2s-v)}{4f}}(v-2s)^{-2n-2}\binom{v}{s}\right.$$

$$\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i c(2s-v))^{-h-k+2n+1}\left(i(2s-v)\left(c+2f\sqrt{z}\right)\right)^{h+k}\left(-\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c(2s-v)\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)-\right.$$

$$\left.\left.2\,i\,f\sqrt{-\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right)-$$

$$e^{\frac{i c^2(2s-v)}{2f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i c(2s-v))^{-h-k+2n+1}\left(-i(2s-v)\left(c+2f\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(c(2s-v)\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)+\right.$$

$$\left.\left.\left.\left.2\sqrt{\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right)\right)\right)+$$

$$\left(-\frac{1}{4}\right)^n i^{-m} f^{-2(n+1)}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i(e m-2 e u)}(v-2s)^{-2(n+1)}\binom{v}{s}\left(e^{-\frac{i(b(m-2u)+c(v-2s))^2}{4f(v-2s)}}\left(-(-1)^m e^{\frac{i(b(m-2u)+c(v-2s))^2}{2f(v-2s)}}\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i(b(m-2u)+c(v-2s)))^{-h-k+2n}\left(-i\left(b(m-2u)+c(v-2s)+\right.\right.$$

$$\left.\left.2f(v-2s)\sqrt{z}\right)\right)^{h+k}\left(\frac{i\left(b(m-2u)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((-b(m-2u)-c(v-2s))\left(b(m-2u)+c(v-2s)+2f(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b(m-2u)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)-$$

$$2 i f(v-2s)\sqrt{\frac{i\left(b(m-2u)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\ \Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.\frac{i\left(b(m-2u)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\right)-e^{2ie(m-2u)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k$$

$$(i(b(m-2u)+c(v-2s)))^{-h-k+2n}\left(i\left(b(m-2u)+c(v-2s)+2f(v-2s)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b(m-2u)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b(m-2u)-c(v-2s))\left(b(m-2u)+c(v-2s)+2f(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b(m-2u)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)+$$

$$2 f i(v-2s)\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b(m-2u)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)$$

$$\left.\left.\sqrt{\left(-\frac{1}{f(v-2s)}\left(i\left(b(m-2u)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2\right)\right)}\right)\right)-$$

$$e^{i\left(2e(m-2u)-\frac{(bm+2cs-2bu-cv)^2}{8fs-4fv}\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i(bm+2cs-2bu-cv))^{-h-k+2n}$$

$$\left(i\left(b(m-2u)+c(2s-v)+2(2fs-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)+$$

$$2\,i\,(2\,f\,s-f\,v)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)$$

$$\sqrt{-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}}\Bigg)-$$

$$(-1)^m\,e^{\frac{i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{8\,f\,s-4\,f\,v}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)-$$

$$2\,i\,(2\,f\,s-f\,v)\,\sqrt{\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{2\,f\,s-f\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)\Bigg)\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + d z) \cos^v(c z^r + f z)$

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$$\int z^n \sin^m\left(b z^2 + d z\right) \cos^v\left(c z^2 + f z\right) dz = 2^{-m-v-1} \left(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (m \bmod 2 - 1)(v \bmod 2 - 1)}{n+1} + i^{-m} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{i d^2 (m-2k)}{4b}} \right.$$

$$(i b (2k-m))^{-n-1} \binom{m}{k} \left(\sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (m-2k)^{n+1} (-i (d + 2 b z))^{q+1} \left(\frac{i (2k-m)(d + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \right.$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2k-m)(d+2bz)^2}{4b} \right) + e^{\frac{1}{2} i \left(\frac{(m-2k) d^2}{b} + 2 m \pi \right)} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (m-2k)^{n+1}$$

$$\left. (-i (d + 2 b z))^{q+1} \left(-\frac{i (2k-m)(d+2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2k-m)(d+2bz)^2}{4b} \right) \right) +$$

$$(-1)^n (i c)^{-n-1} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-\frac{i f^2 (2s-v)}{4c}} \binom{v}{s} \left(e^{\frac{i f^2 (2s-v)}{2c}} \sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q} (i (f + 2 c z))^{q+1} \right.$$

$$\left(\frac{i (2s-v)(f+2cz)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2s-v)(f+2cz)^2}{4c} \right) + \sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q}$$

$$\left. (i (f + 2 c z))^{q+1} \left(-\frac{i (2s-v)(f+2cz)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2s-v)(f+2cz)^2}{4c} \right) \right) -$$

$$i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{\frac{i (2dk - dm - 2fs + fv)^2}{8bk - 4bm - 8cs + 4cv}} \left(\sum_{q=0}^{n} 2^{q-n} (i (2dk - dm - 2fs + fv))^{n-q} \right. \right.$$

$$(-i (d (2k-m) + f (v-2s) + 2 (2bk - bm - 2cs + cv) z))^{q+1}$$

$$\left(\left(i (d (2k-m) + f (v-2s) + 2 (2bk - bm - 2cs + cv) z)^2 \right) / (2bk - bm - 2cs + cv) \right)^{\frac{1}{2}(-q-1)}$$

$$\left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d (2k-m) + f (v-2s) + 2 (2bk - bm - 2cs + cv) z)^2}{8bk - 4bm - 8cs + 4cv} \right) \right)$$

$$(-i (2bk - bm - 2cs + cv))^{-n-1} + e^{i \left(m \pi - \frac{(2dk - dm - 2fs + fv)^2}{8bk - 4bm - 8cs + 4cv} \right)} (i (2bk - bm - 2cs + cv))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n} (-i (2dk - dm - 2fs + fv))^{n-q} (i (d (2k-m) + f (v-2s) + 2 (2bk - bm - 2cs + cv) z))^{q+1}$$

$$\left(-\left(i (d (2k-m) + f (v-2s) + 2 (2bk - bm - 2cs + cv) z)^2 \right) / (2bk - bm - 2cs + cv) \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)+$$

$$e^{\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}}\,(-i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}$$

$$(-i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(\left(i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2\right)/(2\,b\,k-b\,m+2\,c\,s-c\,v)\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)+$$

$$e^{i\left(m\,\pi-\frac{(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)}\,(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}$$

$$(i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(-\left(i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2\right)/\right.$$

$$\left.(2\,b\,k-b\,m+2\,c\,s-c\,v)\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\right.$$

$$\left.\left.\left.-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m\left(\sqrt{z}\;b+d\,z\right)\cos^v\left(\sqrt{z}\;c+f\,z\right)dz=$$

$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}+i^{-m}\,4^{-n}\,d^{-2\,(n+1)}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\right.$$

$$\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{n+u}\,e^{-\frac{i\,b^2\,(m-2\,u)}{4\,d}}\,(m-2\,u)^{-2\,(n+1)}\binom{m}{u}\left((-1)^m\,e^{\frac{i\,b^2\,(m-2\,u)}{2\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(m-2\,u)\right.$$

$$(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(-i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(b\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1), \frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$2\sqrt{\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}}\; d\, i\,\Gamma\left(\frac{1}{2}(h+k+2),\, \frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg) + \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}$$

$$4^k (m-2u)(i\,b\,(m-2u))^{-h-k+2n}\left(i(m-2u)\left(b+2d\sqrt{z}\right)\right)^{h+k}\left(-\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b(m-2u)\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{4d}\right) - 2\,i\,d$$

$$\sqrt{-\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)\Bigg) +$$

$$\frac{1}{c}\Bigg((4^{-n}\, i)\binom{m}{\frac{m}{2}}(m \bmod 2 - 1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-\frac{i c^2 (2s-v)}{4f}}\left(f^2(v-2s)^2\right)^{-2n-1}\binom{v}{s}\Bigg((-i\, f\,(2s-v))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}$$

$$4^k (i\,c\,(2s-v))^{-h-k+2n+1}\left(i(2s-v)\left(c+2f\sqrt{z}\right)\right)^{h+k}\left(-\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(c(2s-v)\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right) -$$

$$2\, i\, f\sqrt{-\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg) -$$

$$e^{\frac{i c^2 (2s-v)}{2f}}(i\, f\,(2s-v))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\, 4^k(-i\,c\,(2s-v))^{-h-k+2n+1}\left(-i(2s-v)\left(c+2f\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(c\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+\right.$$

$$\left.2\,\sqrt{\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)\Bigg)\Bigg)\Bigg)+$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(-\Bigg(e^{-\frac{i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}}\,(i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\right.\right.$$

$$\left.\left.\sqrt{z}\right)\right)^{h+k}\left(-\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2\right)\Big/\right.$$

$$\left.(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\Big((-b\,m-2\,c\,s+2\,b\,u+c\,v)$$

$$\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2\right)\Big/\right.$$

$$\left.(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\right)+2\,i\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$-\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2\right)\Big/$$

$$\left.(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\right)\sqrt{\left(-\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+\right.\right.\right.}$$

$$\left.\left.\left.2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2\right)\Big/(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)\Big)\Bigg)\Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+e^{-\frac{i\,(b\,(m-2\,u)+c\,(v-2\,s))^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}}\left((d\,(m-2\,u)+f\,(v-2\,s))^2\right)^{-2\,n-1}$$

$$\Bigg(-(-1)^m\,e^{\frac{i\,(b\,(m-2\,u)+c\,(v-2\,s))^2}{2\,(d\,(m-2\,u)+f\,(v-2\,s))}}\,(i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,(m-2\,u)+c\,(v-2\,s)))^{-h-k+2\,n}$$

$$\left(-i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/\right.$$

$$\left.(d\,(m-2\,u)+f\,(v-2\,s))\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Big((-b\,(m-2\,u)-c\,(v-2\,s))\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/\right.$$

$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Big)-2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))$$

$$\sqrt{\Big(\Big(i\,\big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\big)^2\Big)\Big/}$$

$$(d\,(m-2\,u)+f\,(v-2\,s))\Big)\,\Gamma\Big(\frac{1}{2}\,(h+k+2),\,\Big(i\,\big(b\,(m-2\,u)+c\,(v-2\,s)+$$

$$2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\big)^2\Big)\Big/(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Big)\Big)-$$

$$(-i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,(m-2\,u)+c\,(v-2\,s)))^{-h-k+2\,n}$$

$$\Big(i\,\big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\big)\Big)^{h+k}$$

$$\Big(-\Big(i\,\big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\big)^2\Big)\Big/$$

$$(d\,(m-2\,u)+f\,(v-2\,s))\Big)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Big((-b\,(m-2\,u)-c\,(v-2\,s))\,\big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\big)$$

$$\Gamma\Big(\frac{1}{2}\,(h+k+1),\,-\Big(i\,\big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\big)^2\Big)\Big/$$

$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Big)+2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))\,\Gamma\Big(\frac{1}{2}\,(h+k+2),$$

$$-\Big(i\,\big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\big)^2\Big)\Big/$$

$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Big)\sqrt{\Big(-\Big(i\,\big(b\,(m-2\,u)+c\,(v-2\,s)+}$$

$$2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\big)^2\Big)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\Big)\Big)\Big)-$$

$$\Big((-1)^m\,e^{\frac{i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}}\,(-i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m+2\,c\,s-2\,b\,u-$$

$$c\,v))^{-h-k+2\,n}\,\Big(-i\,\big(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\big)\Big)^{h+k}$$

$$\Big(\Big(i\,\big(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\big)^2\Big)\Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)\Big)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Big((-b\,m-2\,c\,s+2\,b\,u+c\,v)\,\big(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\big)$$

$$\Gamma\Big(\frac{1}{2}\,(h+k+1),\,\Big(i\,\big(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\big)^2\Big)\Big/$$

$$(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\Big)-2\,i\,(d\,m+2\,f\,s-2\,d\,u-f\,v)$$

$$\sqrt{\Big(\Big(i\,\big(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\big)^2\Big)\Big/}$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)\Big)\Gamma\Big(\frac{1}{2}\,(h+k+2),$$
$$\Big(i\,\big(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\big)^2\Big)\Big/(4\,d\,m+8\,f\,s-$$
$$8\,d\,u-4\,f\,v)\Big)\Big)\Big)\Big/(d\,m+2\,f\,s-2\,d\,u-f\,v)^2\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin^m(b\,z^r+d\,z+e)\cos^v(c\,z^r+f\,z)$

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$$\int z^n\sin^m(b\,z^2+d\,z+e)\cos^v(c\,z^2+f\,z)\,dz=$$
$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}+i^{-m}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{1}{4}\,i\left(\frac{(m-2\,k)\,d^2}{b}+4\,e\,(2\,k+m)\right)}\right.$$
$$(i\,b\,(2\,k-m))^{-n-1}\binom{m}{k}\left(e^{2\,i\,e\,m}\sum_{q=0}^{n}2^{q-n}\,(i\,d)^{n-q}\,(m-2\,k)^{n+1}\,(-i\,(d+2\,b\,z))^{q+1}\left(\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\right.$$
$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)+e^{\frac{1}{2}\,i\left(\frac{(m-2\,k)\,d^2}{b}+8\,e\,k+2\,m\,\pi\right)}\sum_{q=0}^{n}2^{q-n}\,(i\,d)^{n-q}\,(m-2\,k)^{n+1}$$
$$\left.(-i\,(d+2\,b\,z))^{q+1}\left(-\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)\right)+$$
$$(-1)^n\,(i\,c)^{-n-1}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i\,f^2\,(2\,s-v)}{4\,c}}\binom{v}{s}\left(e^{\frac{i\,f^2\,(2\,s-v)}{2\,c}}\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}\right.$$
$$\left(\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)+\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}$$
$$\left.(i\,(f+2\,c\,z))^{q+1}\left(-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)\right)-$$
$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(2\,k-m)\,e}\binom{v}{s}\left(e^{\frac{i\,(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\right.\right.$$
$$(-i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z))^{q+1}$$

$$\left(\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)\Bigg)$$

$$(-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}+e^{i\left(-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}+e\,(4\,k-2\,m)+m\,\pi\right)}\,(i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\,(i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg($$

$$\frac{q+1}{2},\,-\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\Bigg)+$$

$$e^{\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}}\,(-i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}$$

$$(-i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg($$

$$\frac{q+1}{2},\,\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\Bigg)+$$

$$e^{i\left(-\frac{(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}+e\,(4\,k-2\,m)+m\,\pi\right)}\,(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}$$

$$(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}\,(i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg(\frac{q+1}{2},$$

$$-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\,\sin^m\!\left(\sqrt{z}\,b+d\,z+e\right)\cos^v\!\left(\sqrt{z}\,c+f\,z\right)dz=$$

$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}+i^{-m}\,4^{-n}\,d^{-2\,(n+1)}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\right.$$

$$\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{n+u}\,e^{-\frac{i\left(b^2+4\,d\,e\right)(m-2\,u)}{4\,d}}\,(m-2\,u)^{-2\,(n+1)}\binom{m}{u}\Bigg((-1)^m\,e^{\frac{i\,b^2\,(m-2\,u)}{2\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(m-2\,u)$$

$$(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(-i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\,\sqrt{\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\,d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{2\,i\,e\,(m-2\,u)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(m-2\,u)\,(i\,b\,(m-2\,u))^{-h-k+2\,n}\left(i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(b\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\,\sqrt{-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\,(m-2\,u)\left(b+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{c}\Bigg(i\left(-\frac{1}{4}\right)^n f^{-2\,(n+1)}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i\,c^2\,(2\,s-v)}{4\,f}}\,(v-2\,s)^{-2\,n-2}\binom{v}{s}$$

$$\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(2\,s-v))^{-h-k+2\,n+1}\left(i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(c\,(2s-v)\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\,(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)-\right.$$

$$\left.2\,i\,f\sqrt{-\frac{i\,(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\,(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)-$$

$$e^{\frac{i\,c^2(2s-v)}{2f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(2s-v))^{-h-k+2n+1}\left(-i\,(2s-v)\left(c+2f\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\,(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(c\,(2s-v)\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\,(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)+\right.$$

$$\left.\left.\left.\left.2\sqrt{\frac{i\,(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\,(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right)\right)\right)-$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(e\,m-2\,e\,u)}\binom{v}{s}\left(\left((-1)^m\,e^{\frac{i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}}\,(-i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2n}\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2n}\left(-i\left(b\,(m-2u)+c\,(2s-v)+\right.\right.$$

$$\left.\left.2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)\right)^{h+k}\left(\left(i\left(b\,(m-2u)+c\,(2s-v)+2\,(d\,m+2\,f\,s-\right.\right.\right.$$

$$\left.\left.\left.2\,d\,u-f\,v)\sqrt{z}\right)^2\right)\Big/(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2u)+c\,(2s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\left(i\left(b\,(m-2u)+c\,(2s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)^2\right)\Big/\right.$$

$$\left.(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\right)-2\,i\,(d\,m+2\,f\,s-2\,d\,u-f\,v)$$

$$\sqrt{\left(\left(i\left(b\,(m-2u)+c\,(2s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)^2\right)\Big/\right.}$$

$$\left.(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)\Gamma\left(\frac{1}{2}(h+k+2),\,\left(i\left(b\,(m-2u)+c\,(2s-v)+\right.\right.\right.$$

$$2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\Big)^2\Big)\Big/(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\Big)\Big)\Big)\Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+\Bigg(e^{i\left(2\,e\,(m-2\,u)-\frac{(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}\right)}\,(i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}$$

$$\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\Big(-\Big(i\Big(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\Big)^2\Big)\Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)\Big)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Big((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}\,(h+k+1),\,-\Big(i\Big(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\Big)^2\Big)\Big/$$

$$(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\Big)+2\,i\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\Gamma\Big(\frac{1}{2}\,(h+k+2),$$

$$-\Big(i\Big(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\Big)^2\Big)\Big/$$

$$(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\Big)\sqrt{\Big(-\Big(i\Big(b\,(m-2\,u)+c\,(2\,s-v)+}$$

$$2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\Big)^2\Big)\Big/(d\,m+2\,f\,s-2\,d\,u-f\,v)\Big)\Big)\Big)\Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+e^{-\frac{i\,(b\,(m-2\,u)+c\,(v-2\,s))^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}}\left((d\,(m-2\,u)+f\,(v-2\,s))^2\right)^{-2\,n-1}$$

$$\Bigg(e^{2\,i\,e\,(m-2\,u)}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,(m-2\,u)+c\,(v-2\,s)))^{-h-k+2\,n}$$

$$\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)\right)^{h+k}$$

$$\Big(-\Big(i\Big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\Big)^2\Big)\Big/$$

$$(d\,(m-2\,u)+f\,(v-2\,s))\Big)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Big((-b\,(m-2\,u)-c\,(v-2\,s))\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}\,(h+k+1),\,-\Big(i\Big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\Big)^2\Big)\Big/$$

$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Big)+2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))\,\Gamma\Big(\frac{1}{2}\,(h+k+2),$$

$$-\Big(i\Big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\Big)^2\Big)\Big/$$

$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Big)\sqrt{\Big(-\Big(i\Big(b\,(m-2\,u)+c\,(v-2\,s)+}$$

$$2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\Big)^2\Big)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\Big)\Big)\Big)$$

$$(-i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}+(-1)^m\,e^{\frac{i\,(b\,(m-2\,u)+c\,(v-2\,s))^2}{2\,(d\,(m-2\,u)+f\,(v-2\,s))}}\,(i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,(m-2\,u)+c\,(v-2\,s)))^{-h-k+2\,n}$$

$$\Big(-i\,\Big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\Big)\Big)^{h+k}$$

$$\Big(\Big(i\,\Big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\Big)^2\Big)\Big/$$

$$(d\,(m-2\,u)+f\,(v-2\,s))\Big)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Big((-b\,(m-2\,u)-c\,(v-2\,s))\,\Big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\Big)$$

$$\Gamma\Big(\frac{1}{2}\,(h+k+1),\,\Big(i\,\Big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\Big)^2\Big)\Big/$$

$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Big)-2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))$$

$$\sqrt{\Big(\Big(i\,\Big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\Big)^2\Big)\Big/}$$

$$(d\,(m-2\,u)+f\,(v-2\,s))\Big)\,\Gamma\Big(\frac{1}{2}\,(h+k+2),$$

$$\Big(i\,\Big(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\Big)^2\Big)\Big/$$

$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Big)\Big)\Big)\Big)\Bigg)\Bigg/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin^m(d\,z)\cos^v(c\,z^r+f\,z+g)$

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$$\int z^n\sin^m(d\,z)\cos^v(c\,z^2+f\,z+g)\,dz=$$

$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}+2\,i\,d^{-2\,n-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{1}{2}\,i\,m\,\pi}\,(2\,k-m)^{-2\,n-1}\right.$$

$$\binom{m}{k}\Big((-i\,d\,(2\,k-m))^n\,\Gamma(n+1,\,i\,d\,(2\,k-m)\,z)-e^{i\,m\,\pi}\,(i\,d\,(2\,k-m))^n\,\Gamma(n+1,\,-i\,d\,(2\,k-m)\,z)\Big)+$$

$$(-1)^n\,(i\,c)^{-n-1}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i\left(f^2-4\,c\,g\right)(2\,s-v)}{4\,c}}\binom{v}{s}\Bigg(e^{\frac{i\left(f^2-4\,c\,g\right)(2\,s-v)}{2\,c}}\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}$$

$$\left(\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)+\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}$$

$$(i\,(f+2\,c\,z))^{q+1}\left(-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)\Bigg)\Bigg)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(2\,g\,s-g\,v)}\binom{v}{s}\Bigg(e^{\frac{i\,(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{4\,c\,v-8\,c\,s}-2\,i\,g\,(v-2\,s)}\Bigg(\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}$$

$$(-i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z))^{q+1}$$

$$\left(\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{c\,v-2\,c\,s}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\right.$$

$$\left.\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{4\,c\,v-8\,c\,s}\right)\Bigg)(-i\,(c\,v-2\,c\,s))^{-n-1}+e^{i\left(m\,\pi-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{4\,c\,v-8\,c\,s}\right)}$$

$$(i\,(c\,v-2\,c\,s))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\,(i\,(d\,(2\,k-m)+f\,(v-2\,s)+$$

$$2\,(c\,v-2\,c\,s)\,z))^{q+1}\left(-\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{c\,v-2\,c\,s}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg($$

$$\frac{q+1}{2},-\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{4\,c\,v-8\,c\,s}\Bigg)+e^{\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,c\,s-4\,c\,v}}\,(-i\,(2\,c\,s-c\,v))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}\,(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\right.$$

$$\left.\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{8\,c\,s-4\,c\,v}\right)+e^{i\left(-\frac{(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,c\,s-4\,c\,v}-2\,g\,(v-2\,s)+m\,\pi\right)}\,(i\,(2\,c\,s-c\,v))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}\,(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\right.$$

$$\left.-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{8\,c\,s-4\,c\,v}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n \sin^m(d\,z)\cos^v\left(\sqrt{z}\;c+f\,z+g\right)dz = 2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m \bmod 2-1)(v \bmod 2-1)}{n+1}+\frac{1}{c}\left(i\,(-1)^n\,4^{-n}\,f^{-2(n+1)}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\right.\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-\frac{i\left(c^2-4\,f\,g\right)(2\,s-v)}{4\,f}}\,(v-2\,s)^{-2\,n-2}\binom{v}{s}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(2\,s-v))^{-h-k+2\,n+1}\left(i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(c\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)-2\,i\,f\,\sqrt{-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)\right)-e^{\frac{i\left(c^2-4\,f\,g\right)(2\,s-v)}{2\,f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(-i\,c\,(2\,s-v))^{-h-k+2\,n+1}\left(-i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}\left(\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(c\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+\right.$$

$$\left.\left.\left.\left.2\,\sqrt{\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\right)\right)\right)\right)-$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(2\,g\,s-g\,v)}\binom{v}{s}\left(\left(\left((-1)^m\,e^{\frac{i\,(2\,c\,s-c\,v)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}}\,(-i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2\,n}\right.\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(2\,c\,s-c\,v))^{-h-k+2\,n}\left(-i\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{dm+2fs-2du-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left((cv-2cs)\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)-$$

$$2i(dm+2fs-2du-fv)\sqrt{\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{dm+2fs-2du-fv}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)\right)\right)\right)\Big/$$

$$(dm+2fs-2du-fv)^2+\left(e^{i\left(g(4s-2v)-\frac{(2cs-cv)^2}{4dm+8fs-8du-4fv}\right)}(i(dm+2fs-2du-fv))^{-2n}\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i(2cs-cv))^{-h-k+2n}\left(i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{dm+2fs-2du-fv}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((cv-2cs)\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)+2i(dm+2fs-2du-fv)$$

$$\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)$$

$$\sqrt{\left(-\left(i\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\,\right)^2\right)\Big/(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)}\Bigg)\Bigg)\Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}}\left((d\,(m-2\,u)+f\,(v-2\,s))^2\right)^{-2\,n-1}$$

$$\Bigg(\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(-\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{\left(-\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\right.\right.\right.}$$

$$\left.\left.\left.\sqrt{z}\,\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)\,\Gamma\Bigg(\frac{1}{2}\,(h+k+2),$$

$$-\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2\right)\Big/(4\,(d\,(m-2\,u)+$$

$$f\,(v-2\,s)))\Bigg)-c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)$$

$$\Gamma\Bigg(\frac{1}{2}\,(h+k+1),\,-\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2\right)\Big/$$

$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Bigg)\Bigg)\Bigg)\,(-i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}+$$

$$(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{c^2\,(v-2\,s)^2}{d\,(m-2\,u)+f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}\,(i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(-i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(\frac{i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d\,(m-2\,u)+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(-c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)\Gamma\Bigg(\frac{1}{2}\,(h+k+1),$$

$$\frac{i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}\Bigg)-2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))$$

$$\sqrt{\left(\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)}$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(c(v-2s)+2(d(m-2u)+f(v-2s))\sqrt{z}\right)^2}{4(d(m-2u)+f(v-2s))}\right)\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2\,i^{1-m}\,d^{-2n-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k(2k-m)^{-2n-1}\binom{m}{k}\Big(\Gamma(n+1,\ i\,d(2k-m)z)(-i\,d(2k-m))^n+$$

$$(-1)^{m-1}(i\,d(2k-m))^n\,\Gamma(n+1,\ -i\,d(2k-m)z)\Big)\Bigg)\ /;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\cos^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n\sin^m(d\,z+e)\cos^v\left(c\,z^2+f\,z+g\right)dz = 2^{-m-v-1}\Bigg(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m \bmod 2-1)(v \bmod 2-1)}{n+1}+$$

$$\frac{1}{d^{2n+1}}\Bigg((2\,i)\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(2k-m)^{2n+1}}\Big((-1)^k\binom{m}{k}e^{-\frac{1}{2}i(\pi m+2e(2k+m))}$$

$$\left(e^{2iem}(-i\,d(2k-m))^n\,\Gamma(n+1,\ i\,d(2k-m)z)-e^{i(4ek+m\pi)}(i\,d(2k-m))^n\,\Gamma(n+1,\ -i\,d(2k-m)z)\right)\Big)\Bigg)+$$

$$(-1)^n(i\,c)^{-n-1}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i\left(f^2-4cg\right)(2s-v)}{4c}}\binom{v}{s}\Bigg(e^{\frac{i\left(f^2-4cg\right)(2s-v)}{2c}}\sum_{q=0}^{n}(-1)^q\,2^{q-n}(i\,f)^{n-q}(i(f+2cz))^{q+1}$$

$$\left(\frac{i(2s-v)(f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\ \frac{i(2s-v)(f+2cz)^2}{4c}\right)+\sum_{q=0}^{n}(-1)^q\,2^{q-n}(i\,f)^{n-q}$$

$$(i(f+2cz))^{q+1}\left(-\frac{i(2s-v)(f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\ -\frac{i(2s-v)(f+2cz)^2}{4c}\right)\Bigg)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i(2ek-em+2gs-gv)}\binom{v}{s}\Bigg(e^{\frac{i(2dk-dm-2fs+fv)^2}{4cv-8cs}-2ig(v-2s)}$$

$$\Bigg(\sum_{q=0}^{n}2^{q-n}(i(2dk-dm-2fs+fv))^{n-q}(-i(d(2k-m)+f(v-2s)+2(cv-2cs)z))^{q+1}$$

$$\left(\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{c\,v-2\,c\,s}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{4\,c\,v-8\,c\,s}\right)\Bigg)$$

$$(-i\,(c\,v-2\,c\,s))^{-n-1}+e^{i\left(-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{4\,c\,v-8\,c\,s}+e\,(4\,k-2\,m)+m\,\pi\right)}\,(i\,(c\,v-2\,c\,s))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\,(i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z))^{q+1}$$

$$\left(-\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{c\,v-2\,c\,s}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\right.$$

$$\left.-\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{4\,c\,v-8\,c\,s}\right)+e^{\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,c\,s-4\,c\,v}}\,(-i\,(2\,c\,s-c\,v))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}\,(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\right.$$

$$\left.\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{8\,c\,s-4\,c\,v}\right)+e^{i\left(-\frac{(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,c\,s-4\,c\,v}+e\,(4\,k-2\,m)-2\,g\,(v-2\,s)+m\,\pi\right)}$$

$$(i\,(2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}\,(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v+$$

$$4\,c\,s\,z-2\,c\,v\,z))^{q+1}\left(-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg($$

$$\left.\left.\left.\frac{q+1}{2},\,-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,v-2\,c\,s)\,z)^2}{8\,c\,s-4\,c\,v}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m(d\,z+e)\cos^v\!\left(\sqrt{z}\;c+f\,z+g\right)dz==$$

$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}+\frac{1}{c}\left(i\left(-\frac{1}{4}\right)^n f^{-2\,(n+1)}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\right.\right.$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-\frac{i\left(c^2-4fg\right)(2s-\nu)}{4f}} (\nu-2s)^{-2n-2} \binom{\nu}{s} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c (2s-\nu))^{-h-k+2n+1} \left(i(2s-\nu)\left(c+2f\sqrt{z}\right)\right)^{h+k} \right.$$

$$\left(-\frac{i(2s-\nu)\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(c(2s-\nu)\left(c+2f\sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i(2s-\nu)\left(c+2f\sqrt{z}\right)^2}{4f}\right) - 2 i f \sqrt{-\frac{i(2s-\nu)\left(c+2f\sqrt{z}\right)^2}{f}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i(2s-\nu)\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right) - e^{\frac{i\left(c^2-4fg\right)(2s-\nu)}{2f}} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k$$

$$(-i c (2s-\nu))^{-h-k+2n+1} \left(-i(2s-\nu)\left(c+2f\sqrt{z}\right)\right)^{h+k} \left(\frac{i(2s-\nu)\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k} \left(c(2s-\nu)\left(c+2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i(2s-\nu)\left(c+2f\sqrt{z}\right)^2}{4f}\right) + \right.$$

$$\left.\left.\left.\left. 2\sqrt{\frac{i(2s-\nu)\left(c+2f\sqrt{z}\right)^2}{f}}\, f\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i(2s-\nu)\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right)\right)\right) +$$

$$\frac{1}{d^{2n+1}} \left((2 i) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(2k-m)^{2n+1}} \left((-1)^k \binom{m}{k} e^{-\frac{1}{2} i (\pi m + 2e(2k+m))} \right.\right.$$

$$\left.\left. \left(e^{2iem} (-i d (2k-m))^n \Gamma(n+1, i d (2k-m) z) - e^{i(4ek+m\pi)} (i d (2k-m))^n \Gamma(n+1, -i d (2k-m) z) \right) \right) \right) -$$

$$i^{-m} 4^{-n} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i(em+2gs-2eu-g\nu)} \binom{\nu}{s} \left(\left(\left((-1)^m e^{\frac{i(2cs-c\nu)^2}{4dm+8fs-8du-4f\nu}} (-i(dm+2fs-2du-f\nu))^{-2n} \right.\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (-i(2cs-c\nu))^{-h-k+2n} \left(-i\left(c(2s-\nu)+2(dm+2fs-2du-f\nu)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{dm+2fs-2du-fv}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((cv-2cs)\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$\left.\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)-2i(dm+2fs-2du-fv)$$

$$\sqrt{\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{dm+2fs-2du-fv}}\;\Gamma\left(\frac{1}{2}(h+k+2),\right.$$

$$\left.\left.\left.\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)\right)\right)\Big/(dm+2fs-2du-fv)^2+$$

$$\left(e^{i\left(-\frac{(2cs-cv)^2}{4dm+8fs-8du-4fv}+2e(m-2u)+g(4s-2v)\right)}(i(dm+2fs-2du-fv))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k\right.$$

$$(i(2cs-cv))^{-h-k+2n}\left(i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{dm+2fs-2du-fv}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((cv-2cs)\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)+2i(dm+2fs-2du-fv)$$

$$\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\right)^2}{4dm+8fs-8du-4fv}\right)$$

$$\sqrt{\left(-\left(i\left(c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2\right)\Big/(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)}\Bigg)\Bigg)\Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}}\left((d\,(m-2\,u)+f\,(v-2\,s))^2\right)^{-2\,n-1}$$

$$\Bigg(e^{2\,i\,e\,(m-2\,u)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(v-2\,s))^{-h-k+2\,n}\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{\left(-\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\right.\right.\right.}$$

$$\left.\left.\left.\sqrt{z}\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)\Gamma\Bigg(\frac{1}{2}\,(h+k+2),$$

$$-\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/(4\,(d\,(m-2\,u)+$$

$$f\,(v-2\,s)))\Bigg)-c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)$$

$$\Gamma\Bigg(\frac{1}{2}\,(h+k+1),\,-\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/$$

$$(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Bigg)\Bigg)\Bigg)(-i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}+$$

$$(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{c^2\,(v-2\,s)^2}{d\,(m-2\,u)+f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}\,(i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(-i\,c\,(v-2\,s))^{-h-k+2\,n}\left(-i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,(m-2\,u)+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(-c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}\right)-$$

$$2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{\left(\left(i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2\right)\Big/\,(d\,(m-2\,u)+f\,(v-2\,s))\right)}\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin^m(b\,z^r)\cos^v(c\,z^r+f\,z+g)$

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$$\int z^n\sin^m(b\,z^2)\cos^v(c\,z^2+f\,z+g)\,dz==$$

$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}-z^{n+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{1}{2}\,i\,m\,\pi}\left(b^2\,(m-2\,k)^2\,z^4\right)^{\frac{1}{2}\,(-n-1)}\right.$$

$$\binom{m}{k}\left(\Gamma\!\left(\frac{n+1}{2},\,i\,b\,(2\,k-m)\,z^2\right)\left(-i\,b\,(2\,k-m)\,z^2\right)^{\frac{n+1}{2}}+e^{i\,m\,\pi}\left(i\,b\,(2\,k-m)\,z^2\right)^{\frac{n+1}{2}}\Gamma\!\left(\frac{n+1}{2},\,-i\,b\,(2\,k-m)\,z^2\right)\right)+$$

$$(-1)^n\,(i\,c)^{-n-1}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i\left(f^2-4\,c\,g\right)(2\,s-v)}{4\,c}}\binom{v}{s}\left(e^{\frac{i\left(f^2-4\,c\,g\right)(2\,s-v)}{2\,c}}\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}\right.$$

$$\left(\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}\,(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)+\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}$$

$$\left.(i\,(f+2\,c\,z))^{q+1}\left(-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}\,(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)\right)-$$

$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(2\,g\,s-g\,v)}\binom{v}{s}\left(e^{\frac{i\,(f\,v-2\,f\,s)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}-2\,i\,g\,(v-2\,s)}\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(f\,v-2\,f\,s))^{n-q}\,(-i\,(f\,(v-2\,s)+2\,(2\,b\,k-\right.\right.$$

$$b\,m-2\,c\,s+c\,v)\,z))^{q+1}\left(\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m-2\,c\,s+c\,v}\right)^{\frac{1}{2}\,(-q-1)}$$

$$\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)\Bigg)$$

$$(-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}+e^{i\left(m\,\pi-\frac{(f\,v-2\,f\,s)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)}\,(i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n} (-i (f v - 2 f s))^{n-q} (i (f (v-2 s) + 2 (2 b k - b m - 2 c s + c v) z))^{q+1}$$

$$\left(-\frac{i (f (v-2 s) + 2 (2 b k - b m - 2 c s + c v) z)^2}{2 b k - b m - 2 c s + c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2},\right.$$

$$\left.-\frac{i (f (v-2 s) + 2 (2 b k - b m - 2 c s + c v) z)^2}{8 b k - 4 b m - 8 c s + 4 c v}\right) + e^{\frac{i f^2 (v-2 s)^2}{8 b k - 4 b m + 8 c s - 4 c v}}$$

$$(-i (2 b k - b m + 2 c s - c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (i (2 f s - f v))^{n-q} (-i (2 f s + 4 c z s - f v + 4 b k z -$$

$$2 b m z - 2 c v z))^{q+1} \left(\frac{i (f (v-2 s) + 2 (-2 b k + b m - 2 c s + c v) z)^2}{2 b k - b m + 2 c s - c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\right.$$

$$\left.\frac{q+1}{2}, \frac{i (f (v-2 s) + 2 (-2 b k + b m - 2 c s + c v) z)^2}{8 b k - 4 b m + 8 c s - 4 c v}\right) + e^{i\left(-\frac{f^2 (v-2 s)^2}{8 b k - 4 b m + 8 c s - 4 c v} - 2 g (v - 2 s) + m \pi\right)}$$

$$(i (2 b k - b m + 2 c s - c v))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-i (2 f s - f v))^{n-q} (i (2 f s + 4 c z s - f v + 4 b k z -$$

$$2 b m z - 2 c v z))^{q+1} \left(-\frac{i (f (v-2 s) + 2 (-2 b k + b m - 2 c s + c v) z)^2}{2 b k - b m + 2 c s - c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\right.$$

$$\left.\left.\left.\frac{q+1}{2}, -\frac{i (f (v-2 s) + 2 (-2 b k + b m - 2 c s + c v) z)^2}{8 b k - 4 b m + 8 c s - 4 c v}\right)\right)\right) /; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(b \sqrt{z}\right) \cos^v\left(\sqrt{z}\, c + f z + g\right) dz ==$$

$$2^{-m-v-1} \left(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (m \bmod 2 - 1)(v \bmod 2 - 1)}{n+1} + 4 i^{-m} b^{-2(n+1)} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\right.$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+n} (m - 2 k)^{-2 n - 2} \binom{m}{k} \left((-1)^m \Gamma\left(2 (n+1), -i b (2 k - m) \sqrt{z}\right) + \Gamma\left(2 (n+1), i b (2 k - m) \sqrt{z}\right)\right) +$$

$$\frac{1}{c} \left(i\, 4^{-n} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-\frac{i (c^2 - 4 f g)(2 s - v)}{4 f}} \left(f^2 (v - 2 s)^2\right)^{-2 n - 1} \binom{v}{s}\right.$$

$$\left((-i f (2 s - v))^{2 n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i c (2 s - v))^{-h-k+2 n+1} \left(i (2 s - v) \left(c + 2 f \sqrt{z}\right)\right)^{h+k}\right.$$

$$\left(-\frac{i (2 s - v) \left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c (2 s - v) \left(c + 2 f \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2} (h + k + 1), -\frac{i (2 s - v) \left(c + 2 f \sqrt{z}\right)^2}{4 f}\right) - 2 i f \sqrt{-\frac{i (2 s - v) \left(c + 2 f \sqrt{z}\right)^2}{f}}$$

$$\left.\left.\Gamma\left(\frac{1}{2} (h + k + 2), -\frac{i (2 s - v) \left(c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) - e^{\frac{i \left(c^2 - 4 f g\right) (2 s - v)}{2 f}} (i f (2 s - v))^{2 n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}$$

$$4^k (-i c (2 s - v))^{-h-k+2 n+1} \left(-i (2 s - v) \left(c + 2 f \sqrt{z}\right)\right)^{h+k} \left(\frac{i (2 s - v) \left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2} (-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(c (2 s - v) \left(c + 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h + k + 1), \frac{i (2 s - v) \left(c + 2 f \sqrt{z}\right)^2}{4 f}\right) + \right.$$

$$\left.\left.\left.\left. 2 \sqrt{\frac{i (2 s - v) \left(c + 2 f \sqrt{z}\right)^2}{f}} f i \Gamma\left(\frac{1}{2} (h + k + 2), \frac{i (2 s - v) \left(c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right)\right)\right) -$$

$$i^{-m} (-1)^n 4^{-n} f^{-2 (n+1)} \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i (2 g s - g v)} \binom{v}{s} (v - 2 s)^{-2 (n+1)} \left(e^{-\frac{i (b (m - 2 u) + c (v - 2 s))^2}{4 f (v - 2 s)}}\right.$$

$$\left((-1)^m e^{\frac{1}{2} i \left(\frac{(b (m - 2 u) + c (v - 2 s))^2}{f (v - 2 s)} + 8 g s - 4 g v\right)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-i (b (m - 2 u) + c (v - 2 s)))^{-h-k+2 n}\right.$$

$$\left(-i \left(b (m - 2 u) + c (v - 2 s) + 2 f (v - 2 s) \sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i \left(b (m - 2 u) + c (v - 2 s) + 2 f (v - 2 s) \sqrt{z}\right)^2}{f (v - 2 s)}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left((-b\,(m-2\,u)-c\,(v-2\,s))\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)-$$

$$2\,i\,f\,(v-2\,s)\,\sqrt{\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}}$$

$$\left.\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)\right)+\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(i\,(b\,(m-2\,u)+c\,(v-2\,s)))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b\,(m-2\,u)-c\,(v-2\,s))\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,i\,(v-2\,s)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\left.\left.\sqrt{-\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}}\,\right)\right)+$$

$$(-1)^m\,e^{\frac{i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{8\,f\,s-4\,f\,v}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\,\sqrt{z}\,\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)-$$

$$2\,i\,(2\,f\,s-f\,v)\sqrt{\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}}$$

$$\left.\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)\right)+$$

$$e^{i\left(g\,(4\,s-2\,v)-\frac{(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{8\,f\,s-4\,f\,v}\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}$$

$$\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)+$$

$$2\,i\,(2\,f\,s-f\,v)\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)$$

$$\left.\left.\left.\sqrt{-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}}\right)\right)\right)\,/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + e) \cos^v(c z^r + f z + g)$

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$$\int z^n \sin^m(b z^2 + e) \cos^v(c z^2 + f z + g) \, dz =$$

$$2^{-m-v-1} \left(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (m \bmod 2 - 1)(v \bmod 2 - 1)}{n+1} - \binom{v}{\frac{v}{2}} (1 - v \bmod 2) z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} e^{-\frac{1}{2} i (\pi m + 2 e (2k+m))} \right.$$

$$\left(b^2 (m-2k)^2 z^4\right)^{\frac{1}{2}(-n-1)} \left(e^{2 i e m} \Gamma\left(\frac{n+1}{2}, i b (2k-m) z^2\right) \left(-i b (2k-m) z^2\right)^{\frac{n+1}{2}} + e^{i (4 e k + m \pi)} \right.$$

$$\left. \left(i b (2k-m) z^2\right)^{\frac{n+1}{2}} \Gamma\left(\frac{n+1}{2}, -i b (2k-m) z^2\right)\right) + (-1)^n (i c)^{-n-1} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1)$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-\frac{i \left(f^2 - 4 c g\right)(2s-v)}{4c}} \binom{v}{s} \left(e^{\frac{i \left(f^2 - 4 c g\right)(2s-v)}{2c}} \sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q} (i (f + 2 c z))^{q+1} \left(\frac{i (2s-v)(f+2cz)^2}{c} \right)^{\frac{1}{2}(-q-1)} \right.$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2s-v)(f+2cz)^2}{4c}\right) + \sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q} (i (f+2cz))^{q+1}$$

$$\left. \left(-\frac{i (2s-v)(f+2cz)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2s-v)(f+2cz)^2}{4c}\right) \right) -$$

$$i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-i (2ek - em + 2gs - gv)} \binom{v}{s} \left(e^{\frac{i (f v - 2 f s)^2}{8bk - 4bm - 8cs + 4cv} - 2 i g (v - 2s)} \right.$$

$$\left(\sum_{q=0}^{n} 2^{q-n} (i (f v - 2 f s))^{n-q} (-i (f (v-2s) + 2 (2bk - bm - 2cs + cv) z))^{q+1} \right.$$

$$\left(\frac{i (f (v-2s) + 2 (2bk - bm - 2cs + cv) z)^2}{2bk - bm - 2cs + cv} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q}$$

$$\left. \Gamma\left(\frac{q+1}{2}, \frac{i (f (v-2s) + 2 (2bk - bm - 2cs + cv) z)^2}{8bk - 4bm - 8cs + 4cv} \right) \right) (-i (2bk - bm - 2cs + cv))^{-n-1} +$$

$$e^{i \left(-\frac{(f v - 2 f s)^2}{8bk - 4bm - 8cs + 4cv} + e (4k - 2m) + m \pi \right)} (i (2bk - bm - 2cs + cv))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n} (-i (f v - 2 f s))^{n-q} (i (f (v-2s) + 2 (2bk - bm - 2cs + cv) z))^{q+1}$$

$$\left(-\frac{i (f (v-2s) + 2 (2bk - bm - 2cs + cv) z)^2}{2bk - bm - 2cs + cv} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\Bigg($$

$$\frac{q+1}{2}, -\frac{i\,(f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\Bigg)+$$

$$e^{\frac{i\,f^2\,(v-2\,s)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}}\,(-i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,f\,s-f\,v))^{n-q}\,(-i\,(2\,f\,s+4\,c\,z\,s-f\,v+$$

$$4\,b\,k\,z-2\,b\,m\,z-2\,c\,v\,z))^{q+1}\left(\frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\!\left(\frac{q+1}{2}, \frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)+$$

$$e^{i\left(-\frac{f^2\,(v-2\,s)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}-2\,g\,(v-2\,s)+e\,(4\,k-2\,m)+m\,\pi\right)}\,(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,f\,s-f\,v))^{n-q}\,(i\,(2\,f\,s+4\,c\,z\,s-f\,v+4\,b\,k\,z-2\,b\,m\,z-2\,c\,v\,z))^{q+1}$$

$$\left(-\frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\right.$$

$$\left.\left.\left.-\frac{i\,(f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)\right)\right)\Bigg/;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\sin^m\!\left(\sqrt{z}\;b+e\right)\cos^v\!\left(\sqrt{z}\;c+f\,z+g\right)dz==$$

$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}+4\,b^{-2\,(n+1)}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+n}\binom{m}{k}e^{-\frac{1}{2}i\,(\pi\,m+2\,e\,(2\,k+m))}\right.$$

$$(2\,k-m)^{2\,(n-1)}\,(m-2\,k)^{-4\,n}\left(e^{i\,(4\,e\,k+m\,\pi)}\,\Gamma\!\left(2\,(n+1),\,-i\,b\,(2\,k-m)\,\sqrt{z}\right)+e^{2\,i\,e\,m}\,\Gamma\!\left(2\,(n+1),\,i\,b\,(2\,k-m)\,\sqrt{z}\right)\right)+$$

$$\frac{1}{c}\left((4^{-n}\,i)\,(-1)^n\,f^{-2\,(n+1)}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i\left(c^2-4\,f\,g\right)(2\,s-v)}{4\,f}}\,(v-2\,s)^{-2\,n-2}\binom{v}{s}\right.$$

$$\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,c\,(2\,s-v))^{-h-k+2\,n+1}\left(i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}\left(-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)-\right.$$

$$2\,i\,f\sqrt{-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)-$$

$$e^{\frac{i\left(c^2-4\,f\,g\right)(2\,s-v)}{2\,f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(2\,s-v))^{-h-k+2\,n+1}\left(-i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(c\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\sqrt{\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\,(2\,s-v)\left(c+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)\Bigg)+$$

$$i^{-m}\,4^{-n}\,(-1)^n\,f^{-2\,(n+1)}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(e\,m+2\,g\,s-2\,e\,u-g\,v)}\binom{v}{s}(v-2\,s)^{-2\,(n+1)}$$

$$\Bigg(e^{-\frac{i\,(b\,(m-2\,u)+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}}\Bigg(-(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{(b\,(m-2\,u)+c\,(v-2\,s))^2}{f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(-i\,(b\,(m-2\,u)+c\,(v-2\,s)))^{-h-k+2\,n}\left(-i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b\,(m-2\,u)-c\,(v-2\,s))\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-$$

$$2\,i\,f\,(v-2\,s)\sqrt{\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)-e^{2\,i\,e\,(m-2\,u)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(i\,(b\,(m-2\,u)+c\,(v-2\,s)))^{-h-k+2\,n}\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b\,(m-2\,u)-c\,(v-2\,s))\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),-\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,i\,(v-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+k+2),-\frac{i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\left.\left.\sqrt{\left(-\frac{1}{f\,(v-2\,s)}\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2\right)\right)}\right)\right)-$$

$$(-1)^m\,e^{\frac{i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{8\,f\,s-4\,f\,v}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)-$$

$$2\,i\,(2\,f\,s-f\,v)\sqrt{\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)\right)\right)-$$

$$e^{i\left(-\frac{(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{8\,f\,s-4\,f\,v}+2\,e\,(m-2\,u)+g\,(4\,s-2\,v)\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}$$

$$\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((-b\,m-2\,c\,s+2\,b\,u+c\,v)\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)+$$

$$2\,i\,(2\,f\,s-f\,v)\,\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{8\,f\,s-4\,f\,v}\right)$$

$$\left.\left.\left.\sqrt{-\frac{i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(2\,f\,s-f\,v)\sqrt{z}\right)^2}{2\,f\,s-f\,v}}\right)\right)\right)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\sin^m\left(b\,z^r+d\,z\right)\cos^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \sin^m\left(b z^2 + d z\right) \cos^\nu\left(c z^2 + f z + g\right) dz = 2^{-m-\nu-1} \left(\frac{2 z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (m \bmod 2 - 1)(\nu \bmod 2 - 1)}{n+1} + i^{-m} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{i d^2 (m-2k)}{4b}} \right.$$

$$(i b (2k-m))^{-n-1} \binom{m}{k} \left(\sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (m-2k)^{n+1} (-i (d + 2 b z))^{q+1} \left(\frac{i (2k-m)(d+2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \right.$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2k-m)(d+2bz)^2}{4b} \right) + e^{\frac{1}{2} i \left(\frac{(m-2k) d^2}{b} + 2 m \pi \right)} \sum_{q=0}^{n} 2^{q-n} (i d)^{n-q} (m-2k)^{n+1}$$

$$\left. (-i (d + 2 b z))^{q+1} \left(-\frac{i (2k-m)(d+2bz)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2k-m)(d+2bz)^2}{4b} \right) \right) +$$

$$(-1)^n (i c)^{-n-1} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-\frac{i \left(f^2 - 4 c g\right)(2s-\nu)}{4c}} \binom{\nu}{s} \left(e^{\frac{i \left(f^2 - 4 c g\right)(2s-\nu)}{2c}} \sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q} (i (f + 2 c z))^{q+1} \right.$$

$$\left(\frac{i (2s-\nu)(f+2cz)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2s-\nu)(f+2cz)^2}{4c} \right) + \sum_{q=0}^{n} (-1)^q 2^{q-n} (i f)^{n-q}$$

$$\left. (i (f + 2 c z))^{q+1} \left(-\frac{i (2s-\nu)(f+2cz)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2s-\nu)(f+2cz)^2}{4c} \right) \right) -$$

$$i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i (2 g s - g \nu)} \binom{\nu}{s} \left(e^{\frac{i (2dk - dm - 2fs + f\nu)^2}{8bk - 4bm - 8cs + 4c\nu} - 2 i g (\nu - 2s)} \left(\sum_{q=0}^{n} 2^{q-n} (i (2dk - dm - 2fs + f\nu))^{n-q} \right. \right.$$

$$(-i (d (2k-m) + f (\nu - 2s) + 2 (2bk - bm - 2cs + c\nu) z))^{q+1}$$

$$\left(\left(i (d (2k-m) + f (\nu - 2s) + 2 (2bk - bm - 2cs + c\nu) z)^2 \right) / (2bk - bm - 2cs + c\nu) \right)^{\frac{1}{2}(-q-1)}$$

$$\left. \left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d (2k-m) + f (\nu - 2s) + 2 (2bk - bm - 2cs + c\nu) z)^2}{8bk - 4bm - 8cs + 4c\nu} \right) \right) \right)$$

$$(-i (2bk - bm - 2cs + c\nu))^{-n-1} + e^{i \left(m \pi - \frac{(2dk - dm - 2fs + f\nu)^2}{8bk - 4bm - 8cs + 4c\nu} \right)} (i (2bk - bm - 2cs + c\nu))^{-n-1}$$

$$\sum_{q=0}^{n} 2^{q-n} (-i (2dk - dm - 2fs + f\nu))^{n-q} (i (d (2k-m) + f (\nu - 2s) + 2 (2bk - bm - 2cs + c\nu) z))^{q+1}$$

$$\left(-\left(i (d (2k-m) + f (\nu - 2s) + 2 (2bk - bm - 2cs + c\nu) z)^2 \right) / (2bk - bm - 2cs + c\nu) \right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d (2k-m) + f (\nu - 2s) + 2 (2bk - bm - 2cs + c\nu) z)^2}{8bk - 4bm - 8cs + 4c\nu} \right) +$$

$$e^{\frac{i(d(m-2k)+f(v-2s))^2}{8bk-4bm+8cs-4cv}}(-i(2bk-bm+2cs-cv))^{-n-1}\sum_{q=0}^{n}2^{q-n}(i(2dk-dm+2fs-fv))^{n-q}$$
$$(-i(2dk+4bzk-dm+2fs-fv-2bmz+4csz-2cvz))^{q+1}$$
$$\left(\left(i(d(m-2k)+f(v-2s)+2(-2bk+bm-2cs+cv)z)^2\right)/(2bk-bm+2cs-cv)\right)^{\frac{1}{2}(-q-1)}$$
$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(d(m-2k)+f(v-2s)+2(-2bk+bm-2cs+cv)z)^2}{8bk-4bm+8cs-4cv}\right)+$$
$$e^{i\left(-\frac{(d(m-2k)+f(v-2s))^2}{8bk-4bm+8cs-4cv}-2g(v-2s)+m\pi\right)}(i(2bk-bm+2cs-cv))^{-n-1}\sum_{q=0}^{n}2^{q-n}$$
$$(-i(2dk-dm+2fs-fv))^{n-q}(i(2dk+4bzk-dm+2fs-fv-2bmz+4csz-2cvz))^{q+1}$$
$$\left(-\left(i(d(m-2k)+f(v-2s)+2(-2bk+bm-2cs+cv)z)^2\right)/\right.$$
$$\left.(2bk-bm+2cs-cv)\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\right.$$
$$\left.\left.-\frac{i(d(m-2k)+f(v-2s)+2(-2bk+bm-2cs+cv)z)^2}{8bk-4bm+8cs-4cv}\right)\right)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\sin^m\left(\sqrt{z}\,b+dz\right)\cos^v\left(\sqrt{z}\,c+fz+g\right)dz=$$
$$2^{-m-v-1}\left(\frac{2z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)(v\bmod 2-1)}{n+1}+i^{-m}4^{-n}d^{-2(n+1)}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\right.$$
$$\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{n+u}e^{-\frac{ib^2(m-2u)}{4d}}(m-2u)^{-2(n+1)}\binom{m}{u}\left((-1)^m e^{\frac{ib^2(m-2u)}{2d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(m-2u)\right.$$
$$(-ib(m-2u))^{-h-k+2n}\left(-i(m-2u)\left(b+2d\sqrt{z}\right)\right)^{h+k}\left(\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$
$$\binom{k}{h}\binom{n}{k}\left(b(m-2u)\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$
$$\left.\left.2\sqrt{\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}}\,d\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)+\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\right.$$

$$4^k (m-2u) (i\, b (m-2u))^{-h-k+2n} \left(i (m-2u) \left(b+2d\sqrt{z}\right)\right)^{h+k} \left(-\frac{i (m-2u) \left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(b (m-2u)\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{4d}\right) - 2 i d\right.$$

$$\left.\left.\sqrt{-\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i(m-2u)\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)+$$

$$\frac{1}{c}\left(i\left(-\frac{1}{4}\right)^n f^{-2(n+1)}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-\frac{i\left(c^2-4fg\right)(2s-v)}{4f}}(v-2s)^{-2n-2}\binom{v}{s}\right.$$

$$\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k (i\, c(2s-v))^{-h-k+2n+1}\left(i(2s-v)\left(c+2f\sqrt{z}\right)\right)^{h+k}\left(-\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c(2s-v)\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)-\right.$$

$$\left.\left.2 i f\sqrt{-\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right)-$$

$$e^{\frac{i\left(c^2-4fg\right)(2s-v)}{2f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-i\, c(2s-v))^{-h-k+2n+1}\left(-i(2s-v)\left(c+2f\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(c(2s-v)\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)+\right.$$

$$2\sqrt{\frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{f}}\; f\,i\,\Gamma\left(\frac{1}{2}(h+k+2), \frac{i(2s-v)\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)\Bigg)\Bigg) -$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i(2gs-gv)}\binom{v}{s}\Bigg(\Bigg((-1)^m\,e^{\frac{i(bm+2cs-2bu-cv)^2}{4dm+8fs-8du-4fv}}\,(-i(dm+2fs-2du-fv))^{-2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i(bm+2cs-2bu-cv))^{-h-k+2n}\Big(-i\Big(b(m-2u)+c(2s-v)+$$

$$2(dm+2fs-2du-fv)\sqrt{z}\Big)\Big)^{h+k}\Bigg(\Bigg(i\Big(b(m-2u)+c(2s-v)+2(dm+2fs-$$

$$2du-fv)\sqrt{z}\Big)^2\Bigg)\Big/(dm+2fs-2du-fv)\Bigg)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Big((-bm-2cs+2bu+cv)\Big(b(m-2u)+c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\Big)$$

$$\Gamma\Bigg(\frac{1}{2}(h+k+1), \Big(i\Big(b(m-2u)+c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\Big)^2\Big)\Big/$$

$$(4dm+8fs-8du-4fv)\Bigg)-2i(dm+2fs-2du-fv)$$

$$\sqrt{\Big(\Big(i\Big(b(m-2u)+c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\Big)^2\Big)\Big/}$$

$$(dm+2fs-2du-fv)\Big)\,\Gamma\Bigg(\frac{1}{2}(h+k+2), \Big(i\Big(b(m-2u)+c(2s-v)+$$

$$2(dm+2fs-2du-fv)\sqrt{z}\Big)^2\Big)\Big/(4dm+8fs-8du-4fv)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$(dm+2fs-2du-fv)^2+\Bigg(e^{i\left(g(4s-2v)-\frac{(bm+2cs-2bu-cv)^2}{4dm+8fs-8du-4fv}\right)}\,(i(dm+2fs-2du-fv))^{-2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i(bm+2cs-2bu-cv))^{-h-k+2n}$$

$$\Big(i\Big(b(m-2u)+c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\Big)\Big)^{h+k}$$

$$\Bigg(-\Big(i\Big(b(m-2u)+c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\Big)^2\Big)\Big/$$

$$(dm+2fs-2du-fv)\Bigg)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Big((-bm-2cs+2bu+cv)\Big(b(m-2u)+c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\Big)$$

$$\Gamma\Bigg(\frac{1}{2}(h+k+1), -\Big(i\Big(b(m-2u)+c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\Big)^2\Big)\Big/$$

$$(4dm+8fs-8du-4fv)\Bigg)+2i(dm+2fs-2du-fv)\,\Gamma\Bigg(\frac{1}{2}(h+k+2),$$

$$-\Big(i\Big(b(m-2u)+c(2s-v)+2(dm+2fs-2du-fv)\sqrt{z}\Big)^2\Big)\Big/$$

$$(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\Big)\sqrt{\left(-\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\,\sqrt{z}\right)^2\right)\Big/(d\,m+2\,f\,s-2\,d\,u-f\,v)\right)}\Bigg)\Big/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+e^{-\frac{i\,(b\,(m-2\,u)+c\,(v-2\,s))^2}{4\,(d\,(m-2\,u)+f\,(v-2\,s))}}\left((d\,(m-2\,u)+f\,(v-2\,s))^2\right)^{-2\,n-1}$$

$$\Bigg(\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,(b\,(m-2\,u)+c\,(v-2\,s)))^{-h-k+2\,n}$$

$$\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(-\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b\,(m-2\,u)-c\,(v-2\,s))\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\right)+2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.-\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\right)\sqrt{\left(-\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)}\Bigg)\Bigg)$$

$$(-i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}+(-1)^m\,e^{\frac{1}{2}\,i\left(\frac{(b\,(m-2\,u)+c\,(v-2\,s))^2}{d\,(m-2\,u)+f\,(v-2\,s)}+8\,g\,s-4\,g\,v\right)}$$

$$(i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,(m-2\,u)+c\,(v-2\,s)))^{-h-k+2\,n}$$

$$\left(-i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/(d\,(m-2\,u)+f\,(v-2\,s))\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((-b\,(m-2\,u)-c\,(v-2\,s))\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\right)-2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))$$

$$\sqrt{\left(\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right)\Big/\right.}$$

$$(d\,(m-2\,u)+f\,(v-2\,s))\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$
$$\left.\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2\right)\Big/\right.$$
$$\left.(4\,(d\,(m-2\,u)+f\,(v-2\,s)))\Big)\Big)\Big)\Big)\right)\Bigg)\,/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m\!\left(b\,z^r+d\,z+e\right)\cos^v\!\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \sin^m\!\left(b\,z^2+d\,z+e\right)\cos^v\!\left(c\,z^2+f\,z+g\right)dz =$$
$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\,(m \bmod 2-1)\,(v \bmod 2-1)}{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}+i^{-m}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{1}{4}\,i\left(\frac{(m-2\,k)\,d^2}{b}+4\,e\,(2\,k+m)\right)}\right.$$
$$(i\,b\,(2\,k-m))^{-n-1}\binom{m}{k}\left(e^{2\,i\,e\,m}\sum_{q=0}^{n}2^{q-n}\,(i\,d)^{n-q}\,(m-2\,k)^{n+1}\,(-i\,(d+2\,b\,z))^{q+1}\left(\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\right.$$
$$\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)+e^{\frac{1}{2}\,i\left(\frac{(m-2\,k)\,d^2}{b}+8\,e\,k+2\,m\,\pi\right)}\sum_{q=0}^{n}2^{q-n}\,(i\,d)^{n-q}\,(m-2\,k)^{n+1}$$
$$\left.(-i\,(d+2\,b\,z))^{q+1}\left(-\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(2\,k-m)\,(d+2\,b\,z)^2}{4\,b}\right)\right)+$$
$$(-1)^n\,(i\,c)^{-n-1}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{i\left(f^2-4\,c\,g\right)(2\,s-v)}{4\,c}}\binom{v}{s}\left(e^{\frac{i\left(f^2-4\,c\,g\right)(2\,s-v)}{2\,c}}\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}\,(i\,(f+2\,c\,z))^{q+1}\right.$$
$$\left(\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)+\sum_{q=0}^{n}(-1)^q\,2^{q-n}\,(i\,f)^{n-q}$$
$$\left.(i\,(f+2\,c\,z))^{q+1}\left(-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(2\,s-v)\,(f+2\,c\,z)^2}{4\,c}\right)\right)-$$
$$i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(2\,e\,k-e\,m+2\,g\,s-g\,v)}\binom{v}{s}\left(e^{\frac{i\,(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}-2\,i\,g\,(v-2\,s)}\right.$$
$$\left(\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\,(-i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z))^{q+1}\right.$$

$$\left(\left(i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2\right)\big/(2\,b\,k-b\,m-2\,c\,s+c\,v)\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)\Bigg)\Bigg)$$

$$(-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}+e^{i\left(-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}+e\,(4\,k-2\,m)+m\,\pi\right)}\,(i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-1}$$

$$\sum_{q=0}^{n}2^{q-n}\,(-i\,(2\,d\,k-d\,m-2\,f\,s+f\,v))^{n-q}\,(i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z))^{q+1}$$

$$\left(-\left(i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2\right)\big/(2\,b\,k-b\,m-2\,c\,s+c\,v)\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(d\,(2\,k-m)+f\,(v-2\,s)+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)+$$

$$e^{\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}}\,(-i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}\,(i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}$$

$$(-i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(\left(i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2\right)\big/(2\,b\,k-b\,m+2\,c\,s-c\,v)\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)+$$

$$e^{i\left(-\frac{(d\,(m-2\,k)+f\,(v-2\,s))^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}+e\,(4\,k-2\,m)-2\,g\,(v-2\,s)+m\,\pi\right)}\,(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-1}\sum_{q=0}^{n}2^{q-n}$$

$$(-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v))^{n-q}\,(i\,(2\,d\,k+4\,b\,z\,k-d\,m+2\,f\,s-f\,v-2\,b\,m\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(-\left(i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2\right)\big/(2\,b\,k-b\,m+2\,c\,s-c\,v)\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{i\,(d\,(m-2\,k)+f\,(v-2\,s)+2\,(-2\,b\,k+b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m\!\left(\sqrt{z}\;b+d\,z+e\right)\cos^v\!\left(\sqrt{z}\;c+f\,z+g\right)dz=$$

$$2^{-m-v-1}\left(\frac{2\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)}{n+1}+i^{-m}\,4^{-n}\,d^{-2\,(n+1)}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\right.$$

$$\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{n+u}\,e^{-\frac{i\left(b^2+4\,d\,e\right)(m-2\,u)}{4\,d}}\,(m-2\,u)^{-2\,(n+1)}\binom{m}{u}\left((-1)^m\,e^{\frac{i\,b^2\,(m-2\,u)}{2\,d}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(m-2\,u)\right.$$

$$(-i\, b\, (m-2\, u))^{-h-k+2\, n} \left(-i\, (m-2\, u) \left(b+2\, d \sqrt{z}\right)\right)^{h+k} \left(\frac{i\, (m-2\, u) \left(b+2\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(b\, (m-2\, u) \left(b+2\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),\, \frac{i\, (m-2\, u) \left(b+2\, d \sqrt{z}\right)^2}{4\, d}\right)+\right.$$

$$\left.\left. 2 \sqrt{\frac{i\, (m-2\, u) \left(b+2\, d \sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+k+2),\, \frac{i\, (m-2\, u) \left(b+2\, d \sqrt{z}\right)^2}{4\, d}\right)\right)\right)+$$

$$e^{2\, i\, e\, (m-2\, u)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (m-2\, u)\, (i\, b\, (m-2\, u))^{-h-k+2\, n} \left(i\, (m-2\, u) \left(b+2\, d \sqrt{z}\right)\right)^{h+k}$$

$$\left(-\frac{i\, (m-2\, u) \left(b+2\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k}$$

$$\left(b\, (m-2\, u) \left(b+2\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{i\, (m-2\, u) \left(b+2\, d \sqrt{z}\right)^2}{4\, d}\right)-\right.$$

$$\left.\left.\left. 2\, i\, d \sqrt{-\frac{i\, (m-2\, u) \left(b+2\, d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+k+2),\, -\frac{i\, (m-2\, u) \left(b+2\, d \sqrt{z}\right)^2}{4\, d}\right)\right)\right)\right)+$$

$$\frac{1}{c} \left(\left(4^{-n}\, i\, (-1)^n\, f^{-2\,(n+1)}\right) \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{-\frac{i\left(c^2-4\, f\, g\right)(2\, s-v)}{4\, f}}\, (v-2\, s)^{-2\, n-2} \binom{v}{s}\right.$$

$$\left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i\, c\, (2\, s-v))^{-h-k+2\, n+1} \left(i\, (2\, s-v) \left(c+2\, f \sqrt{z}\right)\right)^{h+k} \left(-\frac{i\, (2\, s-v) \left(c+2\, f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h} \binom{n}{k} \left(c\, (2\, s-v) \left(c+2\, f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1),\, -\frac{i\, (2\, s-v) \left(c+2\, f \sqrt{z}\right)^2}{4\, f}\right)-\right.$$

$$2\,i\,f\sqrt{-\frac{i\,(2\,s-v)\left(c+2\,f\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\,(2\,s-v)\left(c+2\,f\sqrt{z}\right)^2}{4\,f}\right)\Bigg)-$$

$$e^{\frac{i\left(c^2-4\,f\,g\right)(2\,s-v)}{2\,f}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,c\,(2\,s-v))^{-h-k+2\,n+1}\left(-i\,(2\,s-v)\left(c+2\,f\sqrt{z}\right)\right)^{h+k}$$

$$\left(\frac{i\,(2\,s-v)\left(c+2\,f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(c\,(2\,s-v)\left(c+2\,f\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\,(2\,s-v)\left(c+2\,f\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\sqrt{\frac{i\,(2\,s-v)\left(c+2\,f\sqrt{z}\right)^2}{f}}\;f\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\,(2\,s-v)\left(c+2\,f\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)\Bigg)\Bigg)-$$

$$i^{-m}\,4^{-n}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-i\,(e\,m+2\,g\,s-2\,e\,u-g\,v)}\binom{v}{s}\Bigg(\Bigg((-1)^m\,e^{\frac{i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}{4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v}}\,(-i\,(d\,m+2\,f\,s-2\,d\,u-f\,v))^{-2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-h-k+2\,n}$$

$$\left(-i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)\right)^{h+k}$$

$$\Bigg(\Bigg(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)^2\Bigg)\Bigg/$$

$$(d\,m+2\,f\,s-2\,d\,u-f\,v)\Bigg)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Big(-(b\,m+2\,c\,s-2\,b\,u-c\,v)$$

$$\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+k+1),$$

$$\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)^2\right)\Big/(4\,d\,m+8\,f\,s-$$

$$8\,d\,u-4\,f\,v)\Bigg)-2\,i\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{\Bigg(\Bigg(i\Big(b\,(m-2\,u)+c\,(2\,s-v)+}$$

$$\overline{2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\Big)^2\Bigg)\Bigg/(d\,m+2\,f\,s-2\,d\,u-f\,v)\Bigg)}$$

$$\Gamma\Bigg(\frac{1}{2}\,(h+k+2),\,\left(i\left(b\,(m-2\,u)+c\,(2\,s-v)+2\,(d\,m+2\,f\,s-2\,d\,u-f\,v)\sqrt{z}\right)^2\right)\Big/$$

$$(4\,d\,m+8\,f\,s-8\,d\,u-4\,f\,v)\Bigg)\Bigg)\Bigg)\Bigg/(d\,m+2\,f\,s-2\,d\,u-f\,v)^2+$$

$$\Bigg(e^{i\left(-\frac{(b m+2 c s-2 b u-c v)^2}{4 d m+8 f s-8 d u-4 f v}+2 e (m-2 u)+g (4 s-2 v)\right)} (i (d m+2 f s-2 d u-f v))^{-2 n} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b m+2 c s-2 b u-c v))^{-h-k+2 n} \left(i \left(b (m-2 u)+c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right)\right)^{h+k} \left(-\left(i \left(b (m-2 u)+c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right)^2\right) \Big/ (d m+2 f s-2 d u-f v)\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \Bigg(2 i (d m+2 f s-2 d u-f v) \sqrt{\left(-\left(i \left(b (m-2 u)+c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right)^2\right) \Big/ (d m+2 f s-2 d u-f v)\right)} \Gamma\left(\frac{1}{2} (h+k+2), -\left(i \left(b (m-2 u)+c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right)^2\right) \Big/ (4 d m+8 f s-8 d u-4 f v)\right) - (b m+2 c s-2 b u-c v) \left(b (m-2 u)+c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), -\left(i \left(b (m-2 u)+c (2 s-v)+2 (d m+2 f s-2 d u-f v) \sqrt{z}\right)^2\right) \Big/ (4 d m+8 f s-8 d u-4 f v)\right)\Bigg)\Bigg) \Big/ (d m+2 f s-2 d u-f v)^2 + e^{-\frac{i (b (m-2 u)+c (v-2 s))^2}{4 (d (m-2 u)+f (v-2 s))}} \left((d (m-2 u)+f (v-2 s))^2\right)^{-2 n-1} \Bigg(e^{2 i e (m-2 u)} \Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (i (b (m-2 u)+c (v-2 s)))^{-h-k+2 n} \left(i \left(b (m-2 u)+c (v-2 s)+2 (d (m-2 u)+f (v-2 s)) \sqrt{z}\right)\right)^{h+k} \left(-\left(i \left(b (m-2 u)+c (v-2 s)+2 (d (m-2 u)+f (v-2 s)) \sqrt{z}\right)^2\right) \Big/ (d (m-2 u)+f (v-2 s))\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \Bigg(2 i (d (m-2 u)+f (v-2 s)) \sqrt{\left(-\left(i \left(b (m-2 u)+c (v-2 s)+2 (d (m-2 u)+f (v-2 s)) \sqrt{z}\right)^2\right) \Big/ (d (m-2 u)+f (v-2 s))\right)} \Gamma\left(\frac{1}{2} (h+k+2), -\left(i \left(b (m-2 u)+c (v-2 s)+2 (d (m-2 u)+f (v-2 s)) \sqrt{z}\right)^2\right) \Big/ (4 (d (m-2 u)+f (v-2 s)))\right) - (b (m-2 u)+c (v-2 s)) \left(b (m-2 u)+c (v-2 s)+2 (d (m-2 u)+f (v-2 s)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), -\left(i \left(b (m-2 u)+c (v-2 s)+2 (d (m-2 u)+f (v-2 s)) \sqrt{z}\right)^2\right) \Big/ (4 (d (m-2 u)+f (v-2 s)))\right)\Bigg)\Bigg) (-i (d (m-2 u)+f (v-2 s)))^{2 n} + (-1)^m e^{\frac{1}{2} i \left(\frac{(b (m-2 u)+c (v-2 s))^2}{d (m-2 u)+f (v-2 s)}+8 g s-4 g v\right)}$$

$$(i\,(d\,(m-2\,u)+f\,(v-2\,s)))^{2\,n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-i\,(b\,(m-2\,u)+c\,(v-2\,s)))^{-h-k+2\,n}$$

$$\left(-i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)\right)^{h+k}$$

$$\left(\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right) \Big/ (d\,(m-2\,u)+f\,(v-2\,s))\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\Bigg(-(b\,(m-2\,u)+c\,(v-2\,s))\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\ \left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right) \Big/ (4\,(d\,(m-2\,u)+f\,(v-2\,s)))\right) - 2\,i\,(d\,(m-2\,u)+f\,(v-2\,s))$$

$$\sqrt{\left(\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right) \Big/ (d\,(m-2\,u)+f\,(v-2\,s))\right)}\ \Gamma\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left(i\left(b\,(m-2\,u)+c\,(v-2\,s)+2\,(d\,(m-2\,u)+f\,(v-2\,s))\,\sqrt{z}\right)^2\right) \Big/ (4\,(d\,(m-2\,u)+f\,(v-2\,s)))\right)\Bigg) \Bigg) \;/;\; n\in\mathbb{N} \land m\in\mathbb{N}^+ \land v\in\mathbb{N}^+$$

Involving rational functions of the direct function, trigonometric and a power functions

Involving sin and power

Involving $z^n \sin(c\,z)$

01.07.21.2573.01

$$\int \frac{z \sin(c\,z)}{(a+b\cos(c\,z))^2}\,dz = \frac{1}{b\,c^2}\left(\frac{c\,z}{a+b\cos(c\,z)} + \frac{2}{\sqrt{b^2-a^2}} \tanh^{-1}\left(\frac{(a-b)\tan\left(\frac{c\,z}{2}\right)}{\sqrt{b^2-a^2}}\right)\right)$$

01.07.21.2574.01

$$\int \frac{z \sin(z)}{(\cos(z)-1)^2}\,dz = -\frac{1}{2}\csc^2\left(\frac{z}{2}\right)(z+\sin(z))$$

01.07.21.2575.01

$$\int \frac{z \sin(z)}{(\cos(z)+1)^2}\,dz = \frac{1}{2}\sec^2\left(\frac{z}{2}\right)(z-\sin(z))$$

Involving rational functions of sin and power

Involving $z\sin(2cz)\,(a\sin(cz)+b\cos(cz))^{-n}$

01.07.21.2576.01

$$\int \frac{z\sin(2cz)}{a\sin(cz)+b\cos(cz)}\,dz = \frac{2}{c^2}\left(\frac{2ab\tan^{-1}\left(\frac{b}{a}\right)}{(a^2+b^2)^{3/2}}\tanh^{-1}\left(\frac{b\tan\left(\frac{cz}{2}\right)-a}{\sqrt{a^2+b^2}}\right)+\frac{(a-bcz)\cos(cz)}{a^2+b^2}+\frac{(b+acz)\sin(cz)}{a^2+b^2}-\frac{1}{(a^2+b^2)\sqrt{\frac{b^2}{a^2}+1}}\right.$$
$$\left.\left(b\left(\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)\left(\log\left(1-e^{i\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)}\right)-\log\left(1+e^{i\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)}\right)\right)+i\left(\mathrm{Li}_2\left(-e^{i\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)}\right)-\mathrm{Li}_2\left(e^{i\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)}\right)\right)\right)\right)\right)$$

01.07.21.2577.01

$$\int \frac{z\sin(2cz)}{(a\sin(cz)+b\cos(cz))^2}\,dz = \frac{z^2a}{b^3+a^2b}+\frac{2(acz-b\log(b\cos(cz)+a\sin(cz)))a}{(a^2+b^2)^2c^2}-\frac{2z\sin(cz)a}{(a-ib)(a+ib)c(b\cos(cz)+a\sin(cz))}-\frac{1}{b(a^2+b^2)^2c^2}$$
$$\left(a^2\left(a\sqrt{\frac{b^2}{a^2}+1}\;c^2e^{i\tan^{-1}\left(\frac{b}{a}\right)}z^2-2bc\log\left(1-e^{2i\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)}\right)z-ibc\pi z-b\pi\log\left(1+e^{-2icz}\right)+b\pi\log(\cos(cz))+\right.\right.$$
$$\left.\left.2b\tan^{-1}\left(\frac{b}{a}\right)\left(icz-\log\left(1-e^{2i\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)}\right)+\log\left(\sin\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)\right)\right)+bi\,\mathrm{Li}_2\left(e^{2i\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)}\right)\right)\right)+\frac{1}{(a^2+b^2)^2c^2}$$
$$\left(b\left(a\sqrt{\frac{b^2}{a^2}+1}\;c^2e^{i\tan^{-1}\left(\frac{b}{a}\right)}z^2-2bc\log\left(1-e^{2i\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)}\right)z-ibc\pi z-b\pi\log\left(1+e^{-2icz}\right)+b\pi\log(\cos(cz))+\right.\right.$$
$$\left.\left.2b\tan^{-1}\left(\frac{b}{a}\right)\left(icz-\log\left(1-e^{2i\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)}\right)+\log\left(\sin\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)\right)\right)+bi\,\mathrm{Li}_2\left(e^{2i\left(cz+\tan^{-1}\left(\frac{b}{a}\right)\right)}\right)\right)\right)$$

Involving functions of the direct function, trigonometric and exponential functions

Involving powers of the direct function, trigonometric and exponential functions

Involving sin and exp

Involving $e^{pz}\sin(cz)\cos^{\nu}(az)$

01.07.21.2578.01

$$\int e^{p z} \sin(c z) \cos^{\nu}(a z) \, dz = \frac{1}{2} \left(1 + e^{2 i a z}\right)^{-\nu} \cos^{\nu}(a z) \left(\frac{e^{i (-c - i p) z}}{-c - i p - a \nu} \, {}_2F_1\left(-\frac{c + i p + a \nu}{2 a}, -\nu; -\frac{c + i p + a (\nu - 2)}{2 a}; -e^{2 i a z}\right) - \frac{e^{i (c - i p) z}}{c - i p - a \nu} \, {}_2F_1\left(\frac{c - i p - a \nu}{2 a}, -\nu; \frac{-\nu a + 2 a - i p + c}{2 a}; -e^{2 i a z}\right)\right)$$

01.07.21.2579.01

$$\int e^{p z} \sin(c z) \cos^{\nu}(a z) \, dz = i \, 2^{-\nu - 1} \left(\left(\frac{e^{(p + i c) z}}{p + i c} + \frac{e^{(p - i c) z}}{i c - p}\right) \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) + \sum_{s=0}^{\left\lfloor \frac{\nu - 1}{2} \right\rfloor} \left(\frac{e^{-(-p - i c - 2 i a s + i a \nu) z}}{-p - i c - 2 i a s + i a \nu} - \frac{e^{-(-p + i c + 2 i a s - i a \nu) z}}{-p + i c + 2 i a s - i a \nu} + \frac{e^{-(-p - i c + 2 i a s - i a \nu) z}}{-p - i c + 2 i a s - i a \nu} - \frac{e^{-(-p + i c - 2 i a s + i a \nu) z}}{-p + i c - 2 i a s + i a \nu} \right) \binom{\nu}{s} \right) /; \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sin^{\mu}(c z + d) \cos^{\nu}(a z)$

01.07.21.2580.01

$$\int e^{p z} \sin(d + c z) \cos^{\nu}(a z) \, dz = -\frac{1}{2} e^{i d} \left(1 + e^{-2 i a z}\right)^{-\nu} \cos^{\nu}(a z) \left(\frac{e^{-2 i d - i c z + p z}}{c + i p - a \nu} \, {}_2F_1\left(\frac{c + i p - a \nu}{2 a}, -\nu; \frac{-\nu a + 2 a + c + i p}{2 a}; -e^{-2 i a z}\right) + \frac{e^{(i c + p) z}}{c - i p + a \nu} \, {}_2F_1\left(-\frac{c - i p + a \nu}{2 a}, -\nu; -\frac{c - i p + a (\nu - 2)}{2 a}; -e^{-2 i a z}\right)\right)$$

01.07.21.2581.01

$$\int e^{p z} \sin(d + c z) \cos^{\nu}(a z) \, dz = i \, 2^{-\nu - 1} e^{-i d} \left(\left(\frac{e^{2 i d + (i c + p) z}}{i c + p} + \frac{e^{(-i c + p) z}}{i c - p}\right) \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) + \sum_{s=0}^{\left\lfloor \frac{\nu - 1}{2} \right\rfloor} \left(-\frac{e^{-(i c - p - 2 i a s + i a \nu) z}}{i c - p - 2 i a s + i a \nu} + \frac{e^{2 i d - (-i c - p + 2 i a s - i a \nu) z}}{-i c - p + 2 i a s - i a \nu} - \frac{e^{-(i c - p + 2 i a s - i a \nu) z}}{i c - p + 2 i a s - i a \nu} + \frac{e^{2 i d - (-i c - p - 2 i a s + i a \nu) z}}{-i c - p - 2 i a s + i a \nu} \right) \binom{\nu}{s} \right) /; \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sin(c z) \cos^{\nu}(a z + b)$

01.07.21.2582.01

$$\int e^{p z} \sin(c z) \cos^{\nu}(b + a z) \, dz = -\frac{1}{2} \left(1 + e^{-2 i (b + a z)}\right)^{-\nu} \cos^{\nu}(b + a z) \left(\frac{e^{(-i c + p) z} \, {}_2F_1\left(\frac{c + i p - a \nu}{2 a}, -\nu; \frac{-\nu a + 2 a + c + i p}{2 a}; -e^{-2 i (b + a z)}\right)}{c + i p - a \nu} + \frac{e^{(i c + p) z} \, {}_2F_1\left(-\frac{c - i p + a \nu}{2 a}, -\nu; -\frac{c - i p + a (\nu - 2)}{2 a}; -e^{-2 i (b + a z)}\right)}{c - i p + a \nu} \right)$$

01.07.21.2583.01

$$\int e^{p z} \sin(c z) \cos^{\nu}(b + a z) \, dz = i \, 2^{-\nu-1} \left(\left(\frac{e^{(i c+p) z}}{i c + p} + \frac{e^{(-i c+p) z}}{i c - p} \right) \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) + \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-2 b i s - i b \nu} \left(-\frac{e^{4 i b s-(i c-p-2 i a s+i a \nu) z}}{i c - p - 2 i a s + i a \nu} + \frac{e^{2 i b \nu-(-i c-p+2 i a s-i a \nu) z}}{-i c - p + 2 i a s - i a \nu} - \frac{e^{2 i b \nu-(i c-p+2 i a s-i a \nu) z}}{i c - p + 2 i a s - i a \nu} + \frac{e^{4 i b s-(-i c-p-2 i a s+i a \nu) z}}{-i c - p - 2 i a s + i a \nu} \right) \binom{\nu}{s} \right) /; \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sin(c z + d) \cos^{\nu}(a z + b)$

01.07.21.2584.01

$$\int e^{p z} \sin(d + c z) \cos^{\nu}(b + a z) \, dz = -\frac{1}{2} e^{i d} \left(1 + e^{-2 i (b+a z)}\right)^{-\nu} \cos^{\nu}(b + a z) \left(\frac{e^{-2 i d-i c z+p z}}{c + i p - a \nu} \, {}_2F_1\left(\frac{c + i p - a \nu}{2 a}, -\nu; \frac{-\nu a + 2 a + c + i p}{2 a}; -e^{-2 i (b+a z)} \right) + \frac{e^{(i c+p) z}}{c - i p + a \nu} \, {}_2F_1\left(-\frac{c - i p + a \nu}{2 a}, -\nu; -\frac{c - i p + a (\nu - 2)}{2 a}; -e^{-2 i (b+a z)} \right) \right)$$

01.07.21.2585.01

$$\int e^{p z} \sin(c z + d) \cos^{\nu}(a z + b) \, dz = i \, 2^{-\nu-1} \left(e^{-i d} \left(\frac{e^{2 i d+(i c+p) z}}{i c + p} + \frac{e^{(-i c+p) z}}{i c - p} \right) \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) + \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i d-2 i b s-i b \nu} \left(-\frac{e^{4 i b s-(i c-p-2 i a s+i a \nu) z}}{i c - p - 2 i a s + i a \nu} + \frac{e^{2 (i d+i b \nu)-(-i c-p+2 i a s-i a \nu) z}}{-i c - p + 2 i a s - i a \nu} - \frac{e^{2 i b \nu-(i c-p+2 i a s-i a \nu) z}}{i c - p + 2 i a s - i a \nu} + \frac{e^{2 i d+4 i b s-(-i c-p-2 i a s+i a \nu) z}}{-i c - p - 2 i a s + i a \nu} \right) \binom{\nu}{s} \right) /; \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin\left(b z^2\right) \cos^{\nu}(c z)$

01.07.21.2586.01

$$\int e^{p z^2} \sin(b z^2) \cos^v(c z)\, dz = 2^{-v-2} \sqrt{\pi} \left(\frac{1}{b^2+p^2} \left(\left(\binom{v}{\frac{v}{2}} \right) \left(\sqrt{-i b + p}\, (b - i p) \operatorname{erfi}\left(\sqrt{-i b + p}\, z \right) + \sqrt{i b + p}\, (b + i p) \operatorname{erfi}\left(\sqrt{i b + p}\, z \right) \right) (v \bmod 2 - 1) \right) + i \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{b^2+p^2} \left(\binom{v}{s} \left(e^{\frac{c^2 (v-2s)^2}{4(-i b+p)}} \sqrt{-i b + p}\, (b - i p) \operatorname{erf}\left(\frac{c (v - 2 s) + 2 (b + i p) z}{2 \sqrt{-i b + p}} \right) + e^{\frac{c^2 (v-2s)^2}{4(-i b+p)}} \sqrt{-i b + p}\, (i b + p) \operatorname{erfi}\left(\frac{c\, i (v - 2 s) + 2 (-i b + p) z}{2 \sqrt{-i b + p}} \right) + e^{\frac{c^2 (v-2s)^2}{4(i b+p)}}\, i \sqrt{i b + p}\, (b + i p) \operatorname{erfi}\left(\frac{-i c (v - 2 s) + 2 i b z + 2 p z}{2 \sqrt{i b + p}} \right) + e^{\frac{c^2 (v-2s)^2}{4(i b+p)}}\, i \sqrt{i b + p}\, (b + i p) \operatorname{erfi}\left(\frac{c\, i (v - 2 s) + 2 (i b + p) z}{2 \sqrt{i b + p}} \right) \right) \right) \right) /;\ v \in \mathbb{N}^+$$

01.07.21.2587.01

$$\int e^{p \sqrt{z}} \sin(b \sqrt{z}) \cos^v(c z)\, dz = 2^{-v-2} \left(-\frac{1}{(b^2+p^2)^2} \left(8 e^{p \sqrt{z}} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \left(\left(\left(\sqrt{z}\, p + 1 \right) b^2 + p^2 \left(p \sqrt{z} - 1 \right) \right) \sin(b \sqrt{z}) - b \left(\sqrt{z}\, b^2 - 2 p + p^2 \sqrt{z} \right) \cos(b \sqrt{z}) \right) \right) - i \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(-\frac{e^{-\frac{i (b+i p)^2}{c (8 s - 4 v)}} (b + i p) \sqrt{\pi}\, \operatorname{erf}\left(\frac{b + i p + 2 c (v - 2 s) \sqrt{z}}{2 \sqrt{i c (2 s - v)}} \right)}{(i c (2 s - v))^{3/2}} + \frac{e^{-\frac{i (b-i p)^2}{c (8 s - 4 v)}} (i b + p) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-i b - p + 2 i c (v - 2 s) \sqrt{z}}{2 \sqrt{i c (2 s - v)}} \right)}{(i c (2 s - v))^{3/2}} + \frac{e^{\frac{i (b+i p)^2}{c (8 s - 4 v)}} (b + i p) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-i b + p + 2 i c (v - 2 s) \sqrt{z}}{2 \sqrt{i c (v - 2 s)}} \right)}{c (2 s - v) \sqrt{i c (v - 2 s)}} + \frac{e^{\frac{i (b-i p)^2}{c (8 s - 4 v)}} (b - i p) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{i b + p + 2 i c (v - 2 s) \sqrt{z}}{2 \sqrt{i c (v - 2 s)}} \right)}{c (2 s - v) \sqrt{i c (v - 2 s)}} + \frac{8 e^{p \sqrt{z}}\, i \sin(b \sqrt{z}) \sin(c (2 s - v) z)}{c (2 s - v)} \right) \right) /;\ v \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin(b z) \cos^v(c z)$

01.07.21.2588.01

$$\int e^{p z^2} \sin(b z) \cos^{\nu}(c z)\, dz = \frac{1}{\sqrt{p}} 2^{-\nu-2} \sqrt{\pi} \left(e^{\frac{b^2}{4p}} \binom{\nu}{\frac{\nu}{2}} \left(\operatorname{erf}\left(\frac{b+2 i p z}{2\sqrt{p}}\right) + \operatorname{erf}\left(\frac{b-2 i p z}{2\sqrt{p}}\right)\right) - e^{\frac{b^2}{4p}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2) \left(\operatorname{erf}\left(\frac{b+2 i p z}{2\sqrt{p}}\right) + \operatorname{erf}\left(\frac{b-2 i p z}{2\sqrt{p}}\right)\right) + \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{\frac{b^2+c^2(\nu-2s)^2}{2p}} \binom{\nu}{s} \left(e^{-\frac{(b+2cs-c\nu)^2}{4p}} \operatorname{erf}\left(\frac{b-2cs+c\nu+2 i p z}{2\sqrt{p}}\right) + e^{-\frac{(b-2cs+c\nu)^2}{4p}} \operatorname{erf}\left(\frac{b+2cs-c\nu+2 i p z}{2\sqrt{p}}\right) + e^{-\frac{(b+2cs-c\nu)^2}{4p}} \operatorname{erf}\left(\frac{b-2cs+c\nu-2 i p z}{2\sqrt{p}}\right) + e^{-\frac{(b-2cs+c\nu)^2}{4p}} \operatorname{erf}\left(\frac{b+2cs-c\nu-2 i p z}{2\sqrt{p}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2589.01

$$\int e^{p \sqrt{z}} \sin(b z) \cos^{\nu}(c z)\, dz = i\, 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(\frac{4 e^{p\sqrt{z}}\, i \cos(b z)}{b} - \frac{e^{-\frac{i p^2}{4b}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p-2 i b \sqrt{z}}{2\sqrt{-i b}}\right)}{(-i b)^{3/2}} - \frac{e^{\frac{i p^2}{4b} - i\pi} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p+2 i b \sqrt{z}}{2\sqrt{i b}}\right)}{(i b)^{3/2}} \right) (1 - \nu \bmod 2) - i\, 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(2 e^{p\sqrt{z}} \left(\frac{2\cosh((-i b + 2 i c s - i c \nu) z)}{i b + i c(\nu - 2s)} + \frac{2\cosh((i b + 2 i c s - i c \nu) z)}{i b + 2 i c s - i c \nu} \right) + \frac{e^{-\frac{p^2}{4(i b + i c(\nu-2s))} - i\pi} p\sqrt{\pi} \operatorname{erfi}\left(\frac{p + 2(i b + i c(\nu-2s))\sqrt{z}}{2\sqrt{i b + i c(\nu-2s)}}\right)}{(i b + i c(\nu-2s))^{3/2}} + \frac{e^{-\frac{p^2}{4(-i b - i c(\nu-2s))}} p\sqrt{\pi} \operatorname{erfi}\left(\frac{p + 2(-i b - i c(\nu-2s))\sqrt{z}}{2\sqrt{-i b - i c(\nu-2s)}}\right)}{(-i b - i c(\nu-2s))^{3/2}} - \frac{e^{i\pi - \frac{p^2}{4(-i b + i c(\nu-2s))}} p\sqrt{\pi} \operatorname{erfi}\left(\frac{p + 2(-i b + i c(\nu-2s))\sqrt{z}}{2\sqrt{-i b + i c(\nu-2s)}}\right)}{(-i b + i c(\nu-2s))^{3/2}} - \frac{e^{-\frac{p^2}{4(i b - i c(\nu-2s))}} p\sqrt{\pi} \operatorname{erfi}\left(\frac{p + 2(i b - i c(\nu-2s))\sqrt{z}}{2\sqrt{i b - i c(\nu-2s)}}\right)}{(i b - i c(\nu-2s))^{3/2}} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sin(b z^r) \cos^{\nu}(c z)$

01.07.21.2590.01

$$\int e^{p z} \sin(b z^2) \cos^{\nu}(c z)\, dz = \frac{1}{b}\left(2^{-\nu-2}\sqrt{\pi}\left(e^{-\frac{i p^2}{4 b}}\binom{\nu}{\frac{\nu}{2}}\left(\sqrt{-i b}\,\operatorname{erfi}\left(\frac{p-2 i b z}{2\sqrt{-i b}}\right)+\sqrt{i b}\, e^{\frac{i p^2}{2 b}}\operatorname{erfi}\left(\frac{p+2 i b z}{2\sqrt{i b}}\right)\right)(\nu \bmod 2-1)-\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\right.\right.$$
$$\left(\sqrt{-i b}\, e^{-\frac{i (p+c i (\nu-2 s))^2}{4 b}}\operatorname{erfi}\left(\frac{p+c i (\nu-2 s)-2 i b z}{2\sqrt{-i b}}\right)+\sqrt{-i b}\, e^{-\frac{i (p-i c (\nu-2 s))^2}{4 b}}\operatorname{erfi}\left(\frac{p-i(-2 c s+c \nu+2 b z)}{2\sqrt{-i b}}\right)+\right.$$
$$\sqrt{i b}\, e^{\frac{i (p+c i (\nu-2 s))^2}{4 b}}\operatorname{erfi}\left(\frac{p+i(-2 c s+c \nu+2 b z)}{2\sqrt{i b}}\right)+$$
$$\left.\left.\left.\sqrt{i b}\, e^{\frac{i (p-i c (\nu-2 s))^2}{4 b}}\operatorname{erfi}\left(\frac{p+i(2 c s-c \nu+2 b z)}{2\sqrt{i b}}\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2591.01

$$\int e^{p z} \sin\left(b\sqrt{z}\right) \cos^{\nu}(c z)\, dz = 2^{-\nu-2}\left(\frac{b\, e^{\frac{b^2}{4 p}-i\pi}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{i b+2 p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}+\frac{b\, e^{\frac{b^2}{4 p}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{i b-2 p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}+\frac{4 e^{p z}\sin\left(b\sqrt{z}\right)}{p}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)+$$
$$2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{b\, e^{\frac{b^2}{4(p+c i(\nu-2 s))}+i\pi}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-i b+2(p+c i(\nu-2 s))\sqrt{z}}{2\sqrt{p+c i(\nu-2 s)}}\right)}{(p+c i(\nu-2 s))^{3/2}}+\frac{b\, e^{\frac{b^2}{4(p+c i(\nu-2 s))}-i\pi}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{i b+2(p+c i(\nu-2 s))\sqrt{z}}{2\sqrt{p+c i(\nu-2 s)}}\right)}{(p+c i(\nu-2 s))^{3/2}}+\right.$$
$$\frac{b\, e^{\frac{b^2}{4(p-i c(\nu-2 s))}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-i b+2(i c(\nu-2 s)-p)\sqrt{z}}{2\sqrt{p-i c(\nu-2 s)}}\right)}{(p-i c(\nu-2 s))^{3/2}}+\frac{b\, e^{\frac{b^2}{4(p-i c(\nu-2 s))}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{i b+2(i c(\nu-2 s)-p)\sqrt{z}}{2\sqrt{p-i c(\nu-2 s)}}\right)}{(p-i c(\nu-2 s))^{3/2}}+$$
$$\left.\frac{8 e^{p z}\sin\left(b\sqrt{z}\right)(p\cos(c(2 s-\nu) z)-c(\nu-2 s)\sin(c(2 s-\nu) z))}{(p+2 i c s-i c \nu)(p+c i(\nu-2 s))}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sin(b z) \cos^{\nu}(c z^r)$

01.07.21.2592.01

$$\int e^{p z} \sin(b z) \cos^{\nu}(c z^2)\, dz = \frac{2^{-\nu} e^{p z} (1-\nu \bmod 2)(p \sin(b z) - b\cos(b z))}{b^2+p^2} \binom{\nu}{\frac{\nu}{2}} + \frac{i\, 2^{-\nu-2}\sqrt{\pi}}{c} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\nu-2s} \left(\binom{\nu}{s} \left(e^{-\frac{i\left((-i b+p)^2-2 c \pi (\nu-2s)\right)}{4 c (\nu-2s)}} \sqrt{-i c (\nu-2s)}\, \operatorname{erfi}\left(\frac{-i b+p-2 i c (\nu-2s) z}{2\sqrt{-i c (\nu-2s)}} \right) + e^{-\frac{i\left((i b+p)^2+2 c \pi (\nu-2s)\right)}{4 c (\nu-2s)}} \sqrt{-i c (\nu-2s)}\, \operatorname{erfi}\left(\frac{i b+p-2 i c (\nu-2s) z}{2\sqrt{-i c (\nu-2s)}} \right) - e^{\frac{i\left((-i b+p)^2+2 c \pi (\nu-2s)\right)}{4 c (\nu-2s)}} \sqrt{i c (\nu-2s)}\, \operatorname{erfi}\left(\frac{-i b+p+2 i c (\nu-2s) z}{2\sqrt{i c (\nu-2s)}} \right) - e^{\frac{i\left((i b+p)^2-2 c \pi (\nu-2s)\right)}{4 c (\nu-2s)}} \sqrt{i c (\nu-2s)}\, \operatorname{erfi}\left(\frac{i b+p+2 i c (\nu-2s) z}{2\sqrt{i c (\nu-2s)}} \right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2593.01

$$\int e^{p z} \sin(b z) \cos^{\nu}\left(c \sqrt{z}\right) dz = 2^{-\nu-1}\, i \left(\frac{e^{(-i b+p) z}}{-i b+p} - \frac{e^{(i b+p) z}}{i b+p} \right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) + 2^{-\nu-2}\, i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{4 e^{(-i b+p) z} \cos\left(c (2s-\nu)\sqrt{z}\right)}{-i b+p} - \frac{4 e^{(i b+p) z} \cos\left(c (2s-\nu)\sqrt{z}\right)}{i b+p} - \frac{\left(i c \sqrt{\pi}\right) e^{-\frac{(2 i c s - i c \nu)^2}{4(-i b+p)}} (2s-\nu)\, \operatorname{erfi}\left(\frac{2\sqrt{z}\, (-i b+p) + c\, i (2s-\nu)}{2\sqrt{-i b+p}} \right)}{(-i b+p)^{3/2}} + \frac{e^{i\pi - \frac{(i c \nu - 2 i c s)^2}{4(-i b+p)}} \left(i c \sqrt{\pi}\right) (\nu-2s)\, \operatorname{erfi}\left(\frac{2\sqrt{z}\, (-i b+p) + c\, i (\nu-2s)}{2\sqrt{-i b+p}} \right)}{(-i b+p)^{3/2}} + \frac{e^{-\frac{(2 i c s - i c \nu)^2}{4(i b+p)}} \left(i c \sqrt{\pi}\right) (2s-\nu)\, \operatorname{erfi}\left(\frac{2\sqrt{z}\, (i b+p) + c\, i (2s-\nu)}{2\sqrt{i b+p}} \right)}{(i b+p)^{3/2}} - \frac{\left(i c \sqrt{\pi}\right) e^{\frac{c^2 (\nu-2s)^2}{4(i b+p)} - i\pi} (\nu-2s)\, \operatorname{erfi}\left(\frac{2\sqrt{z}\, (i b+p) + c\, i (\nu-2s)}{2\sqrt{i b+p}} \right)}{(i b+p)^{3/2}} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin(b z) \cos^{\nu}(c z^r)$

01.07.21.2594.01

$$\int e^{p z^2} \sin(b z) \cos^{\nu}(c z^2) \, dz = \frac{2^{-\nu-2} \sqrt{\pi} \, (1 - \nu \bmod 2)}{\sqrt{p}} \binom{\nu}{\frac{\nu}{2}} \left(e^{-\frac{-b^2 - 2 \pi i p}{4 p}} \operatorname{erfi}\left(\frac{-i b + 2 p z}{2 \sqrt{p}} \right) + e^{-\frac{2 \pi i p - b^2}{4 p}} \operatorname{erfi}\left(\frac{i b + 2 p z}{2 \sqrt{p}} \right) \right) +$$
$$2^{-\nu-2} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(e^{-\frac{-b^2 - 2 i \pi (p + c i (\nu - 2 s))}{4 (p + c i (\nu - 2 s))}} \sqrt{p + c i (\nu - 2 s)} \, (p - i c (\nu - 2 s)) \operatorname{erfi}\left(\frac{-i b + 2 (p + c i (\nu - 2 s)) z}{2 \sqrt{p + c i (\nu - 2 s)}} \right) + \right.\right.$$
$$\left. e^{-\frac{2 i \pi (p - i c (\nu - 2 s)) - b^2}{4 (p - i c (\nu - 2 s))}} (p + c i (\nu - 2 s)) \sqrt{p - i c (\nu - 2 s)} \operatorname{erfi}\left(\frac{i b + 2 p z - 2 i c (\nu - 2 s) z}{2 \sqrt{p - i c (\nu - 2 s)}} \right) \right) \Big/$$
$$((p - i c (\nu - 2 s)) (p + c i (\nu - 2 s))) + \left(e^{-\frac{2 i \pi (p + c i (\nu - 2 s)) - b^2}{4 (p + c i (\nu - 2 s))}} \sqrt{p + c i (\nu - 2 s)} \, (p - i c (\nu - 2 s)) \right.$$
$$\operatorname{erfi}\left(\frac{i b + 2 (p + c i (\nu - 2 s)) z}{2 \sqrt{p + c i (\nu - 2 s)}} \right) + e^{-\frac{-b^2 - 2 i \pi (p - i c (\nu - 2 s))}{4 (p - i c (\nu - 2 s))}} (p + c i (\nu - 2 s)) \sqrt{p - i c (\nu - 2 s)}$$
$$\left.\left. \operatorname{erfi}\left(\frac{-i b + 2 p z - 2 i c (\nu - 2 s) z}{2 \sqrt{p - i c (\nu - 2 s)}} \right) \right) \Big/ ((p - i c (\nu - 2 s)) (p + c i (\nu - 2 s))) \right) /; \nu \in \mathbb{N}^+$$

01.07.21.2595.01

$$\int e^{p\sqrt{z}}\sin(b\,z)\cos^{\nu}\!\left(c\sqrt{z}\right)dz = 2^{-\nu-1}\left(-\frac{2\,e^{p\sqrt{z}}\cos(b\,z)}{b}+\frac{e^{\frac{i p^2}{4b}}\,i\,p\sqrt{\pi}\,\operatorname{erfi}\!\left(\frac{p+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{2\,(i\,b)^{3/2}}-\frac{i\,e^{-\frac{i p^2}{4b}}\,p\sqrt{\pi}\,\operatorname{erfi}\!\left(\frac{p-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{2\,(-i\,b)^{3/2}}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)+$$

$$2^{-\nu-1}\,i\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{i\,e^{-i\,b\,z}\left(e^{(p-i\,c\,(\nu-2\,s))\sqrt{z}}+e^{(p+c\,i\,(\nu-2\,s))\sqrt{z}}\right)\left(1+e^{2\,i\,b\,z}\right)}{b}-\right.$$

$$\frac{\sqrt{\pi}\;e^{-\frac{i\,(p-i\,c\,(\nu-2\,s))^2}{4b}}\,(p-i\,c\,(\nu-2\,s))\operatorname{erfi}\!\left(\frac{p-i\,c\,(\nu-2\,s)-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{2\,(-i\,b)^{3/2}}-$$

$$\frac{\sqrt{\pi}\;e^{-\frac{i\,(p+c\,i\,(\nu-2\,s))^2}{4b}}\,(p+c\,i\,(\nu-2\,s))\operatorname{erfi}\!\left(\frac{p+i\,c\,(\nu-2\,s)-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{2\,(-i\,b)^{3/2}}+$$

$$\frac{\sqrt{\pi}\;e^{\frac{i\,(p-i\,c\,(\nu-2\,s))^2}{4b}}\,(p-i\,c\,(\nu-2\,s))\operatorname{erfi}\!\left(\frac{p-i\,c\,(\nu-2\,s)+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{2\,(i\,b)^{3/2}}+$$

$$\left.\frac{\sqrt{\pi}\;e^{\frac{i\,(p+c\,i\,(\nu-2\,s))^2}{4b}}\,(p+c\,i\,(\nu-2\,s))\operatorname{erfi}\!\left(\frac{p+i\,c\,(\nu-2\,s)+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{2\,(i\,b)^{3/2}}\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $e^{p\,z}\sin\left(b\,z^r\right)\cos^{\nu}\left(c\,z^r\right)$

01.07.21.2596.01

$$\int e^{p z} \sin(b z^2) \cos^\nu(c z^2)\, dz = \frac{1}{b}\left(i\, 2^{-\nu-2} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\sqrt{-i b}\, e^{-\frac{i(p^2-2 b \pi)}{4 b}} \operatorname{erfi}\left(\frac{p-2 i b z}{2\sqrt{-i b}}\right) - \sqrt{i b}\, e^{\frac{i(p^2-2 b \pi)}{4 b}} \operatorname{erfi}\left(\frac{p+2 i b z}{2\sqrt{i b}}\right)\right)(1-\nu \bmod 2)\right) + 2^{-\nu-2}\sqrt{\pi} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(\left(\left(e^{-\frac{p^2-2 i \pi(-i b+i c(\nu-2 s))}{4(-i b+i c(\nu-2 s))}} \sqrt{-i b+i c(\nu-2 s)}\, (i b-i c(\nu-2 s)) \operatorname{erfi}\left(\frac{p+2(-i b+i c(\nu-2 s)) z}{2\sqrt{-i b+i c(\nu-2 s)}}\right) + e^{-\frac{p^2+2 i \pi(i b-i c(\nu-2 s))}{4(i b-i c(\nu-2 s))}} (-i b+i c(\nu-2 s)) \sqrt{i b-i c(\nu-2 s)}\, \operatorname{erfi}\left(\frac{p-2(-i b+i c(\nu-2 s)) z}{2\sqrt{i b-i c(\nu-2 s)}}\right)\right) \Big/ ((i b-i c(\nu-2 s))(-i b+i c(\nu-2 s))) + \left(e^{-\frac{p^2+2 i \pi(i b+i c(\nu-2 s))}{4(i b+i c(\nu-2 s))}} \sqrt{i b+i c(\nu-2 s)}\, (-i b-i c(\nu-2 s)) \operatorname{erfi}\left(\frac{p+2(i b+i c(\nu-2 s)) z}{2\sqrt{i b+i c(\nu-2 s)}}\right) + e^{-\frac{p^2-2 i \pi(-i b-i c(\nu-2 s))}{4(-i b-i c(\nu-2 s))}} (i b+i c(\nu-2 s)) \sqrt{-i b-i c(\nu-2 s)}\, \operatorname{erfi}\left(\frac{p-2(i b+i c(\nu-2 s)) z}{2\sqrt{-i b-i c(\nu-2 s)}}\right)\right) \Big/ ((-i b-i c(\nu-2 s))(i b+i c(\nu-2 s)))\right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2597.01

$$\int e^{p z} \sin(b\sqrt{z}) \cos^\nu(c\sqrt{z})\, dz = 2^{-\nu-2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{4 i\, e^{-\frac{1}{2}(i\pi)+p z} \sin(b\sqrt{z})}{p} - \frac{\left(\sqrt{\pi}\, b\right) e^{\frac{b^2}{4 p}} \left(\operatorname{erfi}\left(\frac{-i b+2 p\sqrt{z}}{2\sqrt{p}}\right) + \operatorname{erfi}\left(\frac{i b+2 p\sqrt{z}}{2\sqrt{p}}\right)\right)}{p^{3/2}}\right) - 2^{-\nu-2}\, i \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \left(\frac{1}{p^{3/2}}\left(e^{\frac{(b+c(\nu-2 s))^2}{4 p}} \sqrt{\pi}\, (b+c(\nu-2 s)) \left(\operatorname{erf}\left(\frac{b-2 c s+c \nu-2 i p\sqrt{z}}{2\sqrt{p}}\right) - \operatorname{erf}\left(\frac{b-2 c s+c \nu+2 i p\sqrt{z}}{2\sqrt{p}}\right)\right)\right) + \frac{1}{p^{3/2}}\left(e^{\frac{(b+2 c s-c \nu)^2}{4 p}} \sqrt{\pi}\, (b+2 c s-c \nu) \left(\operatorname{erf}\left(\frac{b+2 c s-c \nu-2 i p\sqrt{z}}{2\sqrt{p}}\right) - \operatorname{erf}\left(\frac{b+2 c s-c \nu+2 i p\sqrt{z}}{2\sqrt{p}}\right)\right)\right) + \frac{4 e^{p z}\, i \left(\sin((b+2 c s-c \nu)\sqrt{z}) + \sin((b+c(\nu-2 s))\sqrt{z})\right)}{p}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin(b z^r) \cos^\nu(c z^r)$

01.07.21.2598.01

$$\int e^{p z^r} \sin(b z^r) \cos^v(c z^r)\, dz = -\frac{i\, 2^{-v-1} z}{r} \left(\binom{v}{\frac{v}{2}} \left(((-i b - p) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-i b - p) z^r\right) - ((i b - p) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (i b - p) z^r\right) \right) (v \bmod 2 - 1) + \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(-\Gamma\left(\frac{1}{r}, (-i b - p - 2 i c s + i c v) z^r\right) ((-i b - p - 2 i c s + i c v) z^r)^{-1/r} + ((i b - p - 2 i c s + i c v) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (i b - p - 2 i c s + i c v) z^r\right) - ((-i b - p + 2 i c s - i c v) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-i b - p + 2 i c s - i c v) z^r\right) + ((i b - p + 2 i c s - i c v) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (i b - p + 2 i c s - i c v) z^r\right) \right) \right) /; v \in \mathbb{N}^+$$

01.07.21.2599.01

$$\int e^{p z^2} \sin(b z^2) \cos^v(c z^2)\, dz = 2^{-v-2}\, i \left(\frac{\operatorname{erfi}\left(\sqrt{-i b + p}\; z\right)}{\sqrt{-i b + p}} - \frac{\operatorname{erfi}\left(\sqrt{i b + p}\; z\right)}{\sqrt{i b + p}} \right) \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) + 2^{-v-2}\, i \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{\operatorname{erfi}\left(\sqrt{-i b + p + i c (v - 2 s)}\; z\right)}{\sqrt{-i b + p + i c (v - 2 s)}} + \frac{\operatorname{erfi}\left(\sqrt{-i b + p - i c (v - 2 s)}\; z\right)}{\sqrt{-i b + p - i c (v - 2 s)}} - \frac{\operatorname{erfi}\left(\sqrt{i b + p + i c (v - 2 s)}\; z\right)}{\sqrt{i b + p + i c (v - 2 s)}} - \frac{\operatorname{erfi}\left(\sqrt{i b + p - i c (v - 2 s)}\; z\right)}{\sqrt{i b + p - i c (v - 2 s)}} \right) /; v \in \mathbb{N}^+$$

01.07.21.2600.01

$$\int e^{p \sqrt{z}} \sin\left(b \sqrt{z}\right) \cos^v\left(c \sqrt{z}\right) dz = 2^{-v}\, i \left(\frac{e^{(-i b + p) \sqrt{z}} \left((-i b + p) \sqrt{z} - 1\right)}{(-i b + p)^2} - \frac{e^{(i b + p) \sqrt{z}} \left((i b + p) \sqrt{z} - 1\right)}{(i b + p)^2} \right) \binom{v}{\frac{v}{2}} (1 - v \bmod 2) + 2^{-v}\, i \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left(\frac{e^{(-i b + p + i c (v - 2 s)) \sqrt{z}} \left((-i b + p + i c (v - 2 s)) \sqrt{z} - 1\right)}{(-i b + p + i c (v - 2 s))^2} + \frac{e^{(-i b + p - i c (v - 2 s)) \sqrt{z}} \left((-i b + p - i c (v - 2 s)) \sqrt{z} - 1\right)}{(-i b + p - i c (v - 2 s))^2} - \frac{e^{(i b + p + i c (v - 2 s)) \sqrt{z}} \left((i b + p + i c (v - 2 s)) \sqrt{z} - 1\right)}{(i b + p + i c (v - 2 s))^2} - \frac{e^{(i b + p - i c (v - 2 s)) \sqrt{z}} \left((i b + p - i c (v - 2 s)) \sqrt{z} - 1\right)}{(i b + p - i c (v - 2 s))^2} \right) \binom{v}{s} /; v \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \sin(a z^r + q) \cos^\nu(c z^r + g)$

01.07.21.2601.01

$$\int e^{b z^r+e} \sin(a z^r + q) \cos^\nu(c z^r + g)\, dz = -\frac{2^{-\nu-1} z}{r} \left(\binom{\nu}{\frac{\nu}{2}} \left(e^{e+i q - \frac{i\pi}{2}} \Gamma\left(\frac{1}{r}, (-b - i a) z^r\right) ((-b - i a) z^r)^{-1/r} + e^{e - i q + \frac{i\pi}{2}} ((i a - b) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i a - b) z^r\right)\right) (1 - \nu \bmod 2) + \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{e+i q + 2 i g s - i g \nu - \frac{i\pi}{2}} \Gamma\left(\frac{1}{r}, (-b - i a - 2 i c s + i c \nu) z^r\right) ((-b - i a - 2 i c s + i c \nu) z^r)^{-1/r} + e^{e - i q + 2 i g s - i g \nu + \frac{i\pi}{2}} ((-b + i a - 2 i c s + i c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b + i a - 2 i c s + i c \nu) z^r\right) + e^{e + i q - 2 i g s + i g \nu - \frac{i\pi}{2}} ((-b - i a + 2 i c s - i c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b - i a + 2 i c s - i c \nu) z^r\right) + e^{e - i q - 2 i g s + i g \nu + \frac{i\pi}{2}} ((-b + i a + 2 i c s - i c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b + i a + 2 i c s - i c \nu) z^r\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.2602.01

$$\int e^{b z^2+e} \sin(a z^2 + q) \cos^\nu(c z^2 + g)\, dz = 2^{-\nu-2} \left(\frac{e^{-2 i q} \operatorname{erfi}\left(\sqrt{b - i a}\, z\right)}{\sqrt{b - i a}} - \frac{\operatorname{erfi}\left(\sqrt{b + i a}\, z\right)}{\sqrt{b + i a}} \right) \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, i\, e^{e + i q} + 2^{-\nu-2}\, i \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{e^{e - i q + g i (\nu - 2 s)} \operatorname{erfi}\left(\sqrt{b - i a + c i (\nu - 2 s)}\, z\right)}{\sqrt{b - i a + c i (\nu - 2 s)}} + \frac{e^{e - i q - i g (\nu - 2 s)} \operatorname{erfi}\left(\sqrt{b - i a - i c (\nu - 2 s)}\, z\right)}{\sqrt{b - i a - i c (\nu - 2 s)}} - \frac{e^{e + i q + g i (\nu - 2 s)} \operatorname{erfi}\left(\sqrt{b + i a + c i (\nu - 2 s)}\, z\right)}{\sqrt{b + i a + c i (\nu - 2 s)}} - \frac{e^{e + i q - i g (\nu - 2 s)} \operatorname{erfi}\left(\sqrt{b + i a - i c (\nu - 2 s)}\, z\right)}{\sqrt{b + i a - i c (\nu - 2 s)}} \right) /; \nu \in \mathbb{N}^+$$

01.07.21.2603.01

$$\int e^{\sqrt{z}\, b+e} \sin\left(\sqrt{z}\, a+q\right) \cos^{\nu}\left(\sqrt{z}\, c+g\right) dz = 2^{-\nu} \left(\frac{e^{\sqrt{z}\,(b-i a)+e-i q} \left((b-i a)\sqrt{z}-1\right)}{(b-i a)^2} - \frac{e^{\sqrt{z}\,(b+i a)+e+i q} \left((b+i a)\sqrt{z}-1\right)}{(b+i a)^2} \right) i \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) + 2^{-\nu}\, i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\frac{e^{e-i q+g i (\nu-2 s)+(b-i a+c i (\nu-2 s))\sqrt{z}} \left((b-i a+c i (\nu-2 s))\sqrt{z}-1\right)}{(b-i a+c i (\nu-2 s))^2} + \frac{e^{e-i q-i g (\nu-2 s)+(b-i a-i c (\nu-2 s))\sqrt{z}} \left((b-i a-i c (\nu-2 s))\sqrt{z}-1\right)}{(b-i a-i c (\nu-2 s))^2} - \frac{e^{e+i q+g i (\nu-2 s)+(b+i a+c i (\nu-2 s))\sqrt{z}} \left((b+i a+c i (\nu-2 s))\sqrt{z}-1\right)}{(b+i a+c i (\nu-2 s))^2} - \frac{e^{e+i q-i g (\nu-2 s)+(b+i a-i c (\nu-2 s))\sqrt{z}} \left((b+i a-i c (\nu-2 s))\sqrt{z}-1\right)}{(b+i a-i c (\nu-2 s))^2} \right) \binom{\nu}{s} /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \sin\left(a z^r+p z+q\right) \cos^{\nu}\left(c z^r+f z+g\right)$

01.07.21.2604.01

$$\int e^{b z^2+d z+e} \sin\left(a z^2 + p z + q\right) \cos^\nu\left(c z^2 + f z + g\right) dz = \frac{1}{a^2+b^2}\left(2^{-\nu-2}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}\left(\sqrt{b-i a}\,(b+i a)\,e^{-\frac{(d-i p)^2-4(b-i a)\left(e-i q+\frac{i\pi}{2}\right)}{4(b-i a)}}\operatorname{erfi}\left(\frac{d-i p-2 i a z+2 b z}{2\sqrt{b-i a}}\right)+\right.\right.$$
$$\left.(b-i a)\sqrt{b+i a}\,e^{-\frac{(d+i p)^2-4(b+i a)\left(e+i q-\frac{i\pi}{2}\right)}{4(b+i a)}}\operatorname{erfi}\left(\frac{d+i p+2(b+i a)z}{2\sqrt{b+i a}}\right)\right)(1-\nu \bmod 2)+$$
$$2^{-\nu-2}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\left(e^{-\frac{(d-i p+f i(\nu-2s))^2-4(b-i a+c i(\nu-2s))\left(e-i q+g i(\nu-2s)+\frac{i\pi}{2}\right)}{4(b-i a+c i(\nu-2s))}}\sqrt{b-i a+c i(\nu-2s)}\,(b+i a-i c(\nu-2s))\operatorname{erfi}\left(\right.\right.\right.$$
$$\left.\frac{d-i p+f i(\nu-2s)+2(b-i a+c i(\nu-2s))z}{2\sqrt{b-i a+c i(\nu-2s)}}\right)+e^{-\frac{(d+i p-i f(\nu-2s))^2-4(b+i a-i c(\nu-2s))\left(e+i q-i g(\nu-2s)-\frac{i\pi}{2}\right)}{4(b+i a-i c(\nu-2s))}}(b-i a+$$
$$\left.c i(\nu-2s))\sqrt{b+i a-i c(\nu-2s)}\operatorname{erfi}\left(\frac{d+i p-i f(\nu-2s)+2 b z-2(-i a+i c(\nu-2s))z}{2\sqrt{b+i a-i c(\nu-2s)}}\right)\right)\Big/$$
$$((b+i a-i c(\nu-2s))(b-i a+c i(\nu-2s)))+\left(e^{-\frac{(d+i p+f i(\nu-2s))^2-4(b+i a+c i(\nu-2s))\left(e+i q+g i(\nu-2s)-\frac{i\pi}{2}\right)}{4(b+i a+c i(\nu-2s))}}\right.$$
$$\sqrt{b+i a+c i(\nu-2s)}\,(b-i a-i c(\nu-2s))\operatorname{erfi}\left(\frac{d+i p+f i(\nu-2s)+2(b+i a+c i(\nu-2s))z}{2\sqrt{b+i a+c i(\nu-2s)}}\right)+$$
$$e^{-\frac{(d-i p-i f(\nu-2s))^2-4(b-i a-i c(\nu-2s))\left(e-i q-i g(\nu-2s)+\frac{i\pi}{2}\right)}{4(b-i a-i c(\nu-2s))}}(b+i a+c i(\nu-2s))\sqrt{b-i a-i c(\nu-2s)}$$
$$\left.\operatorname{erfi}\left(\frac{d-i p-i f(\nu-2s)+2 b z-2(i a+i c(\nu-2s))z}{2\sqrt{b-i a-i c(\nu-2s)}}\right)\right)\Big/$$
$$\left.((b-i a-i c(\nu-2s))(b+i a+c i(\nu-2s)))\right)\ /;\ \nu\in\mathbb{N}^+$$

01.07.21.2605.01

$$\int e^{\sqrt{z}\, b+d z+e} \sin\left(\sqrt{z}\, a+p z+q\right) \cos^{\nu}\left(\sqrt{z}\, c+f z+g\right) dz = 2^{-\nu-2} e^{e-i q+\frac{i\pi}{2}} \left(\sqrt{\pi} \left(\frac{(b+i a)\, e^{2 i q-\frac{(b+i a)^2}{4(d+i p)}} \operatorname{erfi}\left(\frac{b+i a+2(d+i p)\sqrt{z}}{2\sqrt{d+i p}}\right)}{(d+i p)^{3/2}} - \frac{(b-i a)\, e^{-\frac{(b-i a)^2}{4(d-i p)}} \operatorname{erfi}\left(\frac{b-i a+2(d-i p)\sqrt{z}}{2\sqrt{d-i p}}\right)}{(d-i p)^{3/2}}\right) - \frac{2 e^{\sqrt{z}\,(b+i a)+2 i q+(d+i p) z}}{d+i p} + \frac{2 e^{\sqrt{z}\,(b-i a)+(d-i p) z}}{d-i p}\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) + 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{e-i q-i g(\nu-2 s)+\frac{i\pi}{2}} \left(\left(e^{-\frac{(b+i a+c i(\nu-2 s))^2}{4(d+i p-2 i f s+i f \nu)}+2 i q+2 g i(\nu-2 s)} \sqrt{\pi}\, (b+i a+c i(\nu-2 s)) \operatorname{erfi}\left(\frac{b+i a+c i(\nu-2 s)+2(d+i p-2 i f s+i f \nu)\sqrt{z}}{2\sqrt{d+i p-2 i f s+i f \nu}}\right)\right) \Big/ (d+i p-2 i f s+i f \nu)^{3/2} - \frac{2 e^{2 i q+2 g i(\nu-2 s)+(d+i p-2 i f s+i f \nu) z+(b+i a-2 i c s+i c \nu)\sqrt{z}}}{d+i p-2 i f s+i f \nu} + \frac{2 e^{\sqrt{z}\,(b-i a+2 i c s-i c \nu)+(d-i p+2 i f s-i f \nu) z}}{d-i p+2 i f s-i f \nu} - \left(e^{-\frac{(b-i a+2 i c s-i c \nu)^2}{4(d-i p+2 i f s-i f \nu)}} \sqrt{\pi}\, (b-i a+2 i c s-i c \nu) \operatorname{erfi}\left(\frac{b-i a+c i(2 s-\nu)+2(d-i p+2 i f s-i f \nu)\sqrt{z}}{2\sqrt{d-i p+2 i f s-i f \nu}}\right)\right) \Big/ (d-i p+2 i f s-i f \nu)^{3/2}\right) + e^{e+i q-i g(\nu-2 s)-\frac{i\pi}{2}} \left(\frac{1}{(d-i p-2 i f s+i f \nu)^{3/2}} \left(e^{-\frac{(b-i a-2 i c s+i c \nu)^2}{4(d-i p-2 i f s+i f \nu)}-2 i q+2 g i(\nu-2 s)} \sqrt{\pi}\, (b-i a-2 i c s+i c \nu) \operatorname{erfi}\left(\frac{b-i a+c i(\nu-2 s)+2(d-i p-2 i f s+i f \nu)\sqrt{z}}{2\sqrt{d-i p-2 i f s+i f \nu}}\right)\right) - \frac{2 e^{-2 i q+2 g i(\nu-2 s)+(d-i p-2 i f s+i f \nu) z+(b-i a-2 i c s+i c \nu)\sqrt{z}}}{d-i p-2 i f s+i f \nu} + \frac{2 e^{\sqrt{z}\,(b+i a+2 i c s-i c \nu)+(d+i p+2 i f s-i f \nu) z}}{d+i p+2 i f s-i f \nu} - \left(e^{-\frac{(b+i a+2 i c s-i c \nu)^2}{4(d+i p+2 i f s-i f \nu)}} \sqrt{\pi}\, (b+i a+2 i c s-i c \nu) \operatorname{erfi}\left(\frac{b+i a+c i(2 s-\nu)+2(d+i p+2 i f s-i f \nu)\sqrt{z}}{2\sqrt{d+i p+2 i f s-i f \nu}}\right)\right) \Big/ (d+i p+2 i f s-i f \nu)^{3/2}\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving sin and rational functions of exp

Involving $\sin(e\,z)\cos^{\nu}(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

01.07.21.2606.01

$$\int \frac{\sin(e\,z)\cos^{\nu}(c\,z)}{\left(a+b\,e^{d\,z}\right)^{n}}\,dz = i\,2^{-\nu-1}\,a^{-n}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Bigg(\frac{1}{-i\,e-2\,i\,c\,s+i\,c\,\nu}\left(e^{(-i\,e-2\,i\,c\,s+i\,c\,\nu)\,z}\,{}_2F_1\!\left(\frac{-i\,e-2\,i\,c\,s+i\,c\,\nu}{d},n;\frac{d-i\,e-2\,i\,c\,s+i\,c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)+e^{(i\,e+2\,i\,c\,s-i\,c\,\nu)\,z}\,{}_2F_1\!\left(\frac{i\,e+2\,i\,c\,s-i\,c\,\nu}{d},n;\frac{d+i\,e+2\,i\,c\,s-i\,c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)+\frac{1}{-i\,e+2\,i\,c\,s-i\,c\,\nu}\left(e^{(i\,e-2\,i\,c\,s+i\,c\,\nu)\,z}\,{}_2F_1\!\left(\frac{i\,e-2\,i\,c\,s+i\,c\,\nu}{d},n;\frac{d+i\,e-2\,i\,c\,s+i\,c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)+e^{(-i\,e+2\,i\,c\,s-i\,c\,\nu)\,z}\,{}_2F_1\!\left(\frac{-i\,e+2\,i\,c\,s-i\,c\,\nu}{d},n;\frac{d-i\,e+2\,i\,c\,s-i\,c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)\Bigg)-\frac{2^{-\nu-1}\,a^{-n}\,(1-\nu\bmod 2)}{e}\binom{\nu}{\frac{\nu}{2}}\left(e^{i\,e\,z}\,{}_2F_1\!\left(\frac{i\,e}{d},n;\frac{d+i\,e}{d};-\frac{b\,e^{d\,z}}{a}\right)+e^{-i\,e\,z}\,{}_2F_1\!\left(-\frac{i\,e}{d},n;\frac{d-i\,e}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)\;/;\;n\in\mathbb{N}^{+}\land\nu\in\mathbb{N}^{+}$$

Involving $e^{p\,z}\sin(e\,z)\cos^{\nu}(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

01.07.21.2607.01

$$\int \frac{e^{p z} \sin(e z) \cos^{v}(c z)}{\left(a + b e^{d z}\right)^{n}} \, dz = = $$

$$i\, 2^{-v-1} a^{-n} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\left(e^{(-i e + p - 2 i c s + i c v) z} (-i e - p - 2 i c s + i c v)\, {}_2F_1\!\left(\frac{-i e + p - 2 i c s + i c v}{d}, n; \frac{d - i e + p - 2 i c s + i c v}{d}; -\frac{b e^{d z}}{a} \right) + e^{(i e + p + 2 i c s - i c v) z} (-i e + p - 2 i c s + i c v)\, {}_2F_1\!\left(\frac{i e + p + 2 i c s - i c v}{d}, n; \frac{d + i e + p + 2 i c s - i c v}{d}; -\frac{b e^{d z}}{a} \right) \right) \Big/ ((-i e - p - 2 i c s + i c v)(-i e + p - 2 i c s + i c v)) + \left(e^{(i e + p - 2 i c s + i c v) z} (-i e + p + 2 i c s - i c v)\, {}_2F_1\!\left(\frac{i e + p - 2 i c s + i c v}{d}, n; \frac{d + i e + p - 2 i c s + i c v}{d}; -\frac{b e^{d z}}{a} \right) + e^{(-i e + p + 2 i c s - i c v) z} (-i e - p + 2 i c s - i c v)\, {}_2F_1\!\left(\frac{-i e + p + 2 i c s - i c v}{d}, n; \frac{d - i e + p + 2 i c s - i c v}{d}; -\frac{b e^{d z}}{a} \right) \right) \Big/ ((-i e - p + 2 i c s - i c v)(-i e + p + 2 i c s - i c v)) \right) - \frac{i\, 2^{-v-1} a^{-n}}{(i e - p)(i e + p)} \binom{v}{\frac{v}{2}} \left(e^{(-i e + p) z} (i e + p)\, {}_2F_1\!\left(\frac{-i e + p}{d}, n; \frac{d - i e + p}{d}; -\frac{b e^{d z}}{a} \right) + e^{(i e + p) z} (i e - p)\, {}_2F_1\!\left(\frac{i e + p}{d}, n; \frac{d + i e + p}{d}; -\frac{b e^{d z}}{a} \right) \right) (1 - v \bmod 2) \;/;\; n \in \mathbb{N}^{+} \bigwedge v \in \mathbb{N}^{+}$$

Involving sin and algebraic functions of exp

Involving $\left(a + b e^{d z}\right)^{\beta} \sin(e z) \cos^{v}(c z)$

01.07.21.2608.01

$$\int \left(a+b\,e^{d z}\right)^{\beta} \sin(e\,z)\cos^{\nu}(c\,z)\,dz = i\,2^{-\nu-1}\left(a+b\,e^{d z}\right)^{\beta}\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{1}{-i\,e-2\,i\,c\,s+i\,c\,\nu}\left(e^{(-i\,e-2\,i\,c\,s+i\,c\,\nu)\,z}\,{}_2F_1\!\left(\frac{-i\,e-2\,i\,c\,s+i\,c\,\nu}{d},\,-\beta;\,\frac{d-i\,e-2\,i\,c\,s+i\,c\,\nu}{d};\,-\frac{b\,e^{d z}}{a}\right)+\right.\right.$$

$$\left.e^{(i\,e+2\,i\,c\,s-i\,c\,\nu)\,z}\,{}_2F_1\!\left(\frac{i\,e+2\,i\,c\,s-i\,c\,\nu}{d},\,-\beta;\,\frac{d+i\,e+2\,i\,c\,s-i\,c\,\nu}{d};\,-\frac{b\,e^{d z}}{a}\right)\right)+$$

$$\frac{1}{-i\,e+2\,i\,c\,s-i\,c\,\nu}\left(e^{(i\,e-2\,i\,c\,s+i\,c\,\nu)\,z}\,{}_2F_1\!\left(\frac{i\,e-2\,i\,c\,s+i\,c\,\nu}{d},\,-\beta;\,\frac{d+i\,e-2\,i\,c\,s+i\,c\,\nu}{d};\,-\frac{b\,e^{d z}}{a}\right)+\right.$$

$$\left.\left.e^{(-i\,e+2\,i\,c\,s-i\,c\,\nu)\,z}\,{}_2F_1\!\left(\frac{-i\,e+2\,i\,c\,s-i\,c\,\nu}{d},\,-\beta;\,\frac{d-i\,e+2\,i\,c\,s-i\,c\,\nu}{d};\,-\frac{b\,e^{d z}}{a}\right)\right)\right)-$$

$$\frac{2^{-\nu-1}}{e}\left(a+b\,e^{d z}\right)^{\beta}\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}\binom{\nu}{\frac{\nu}{2}}\left(e^{i\,e\,z}\,{}_2F_1\!\left(\frac{i\,e}{d},\,-\beta;\,\frac{d+i\,e}{d};\,-\frac{b\,e^{d z}}{a}\right)+e^{-i\,e\,z}\,{}_2F_1\!\left(-\frac{i\,e}{d},\,-\beta;\,\frac{d-i\,e}{d};\,-\frac{b\,e^{d z}}{a}\right)\right)$$

$$(1-\nu \bmod 2)\;/;\;\nu\in\mathbb{N}^{+}$$

Involving $e^{p z}\left(a+b\,e^{d z}\right)^{\beta}\sin(e\,z)\cos^{\nu}(c\,z)$

01.07.21.2609.01

$$\int e^{pz}\left(a+b\,e^{dz}\right)^{\beta}\sin(e\,z)\cos^{\nu}(c\,z)\,dz = i\,2^{-\nu-1}\left(a+b\,e^{dz}\right)^{\beta}\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Bigg(\Bigg(e^{(-i e+p-2 i c s+i c\nu)z}\,(-i e-p-2 i c s+i c \nu)\,{}_2F_1\left(\frac{-i e+p-2 i c s+i c\nu}{d},-\beta;\frac{d-i e+p-2 i c s+i c \nu}{d};-\frac{b\,e^{dz}}{a}\right)+e^{(i e+p+2 i c s-i c\nu)z}\,(-i e+p-2 i c s+i c\nu)\,{}_2F_1\left(\frac{i e+p+2 i c s-i c\nu}{d},-\beta;\frac{d+i e+p+2 i c s-i c\nu}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Big/\left((-i e-p-2 i c s+i c\nu)(-i e+p-2 i c s+i c\nu)\right)+\Bigg(e^{(i e+p-2 i c s+i c\nu)z}\,(-i e+p+2 i c s-i c\nu)\,{}_2F_1\left(\frac{i e+p-2 i c s+i c\nu}{d},-\beta;\frac{d+i e+p-2 i c s+i c\nu}{d};-\frac{b\,e^{dz}}{a}\right)+e^{(-i e+p+2 i c s-i c\nu)z}\,(-i e-p+2 i c s-i c\nu)\,{}_2F_1\left(\frac{-i e+p+2 i c s-i c\nu}{d},-\beta;\frac{d-i e+p+2 i c s-i c\nu}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Big/\left((-i e-p+2 i c s-i c\nu)(-i e+p+2 i c s-i c\nu)\right)\Bigg)-\frac{i\,2^{-\nu-1}}{(i e-p)(i e+p)}\left(a+b\,e^{dz}\right)^{\beta}\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\binom{\nu}{\frac{\nu}{2}}\Bigg(e^{(-i e+p)z}\,(i e+p)\,{}_2F_1\left(\frac{-i e+p}{d},-\beta;\frac{d-i e+p}{d};-\frac{b\,e^{dz}}{a}\right)+e^{(i e+p)z}\,(i e-p)\,{}_2F_1\left(\frac{i e+p}{d},-\beta;\frac{d+i e+p}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)(1-\nu \bmod 2)\;/;\;\nu\in\mathbb{N}^+$$

Involving powers of sin and exp

Involving $e^{pz}\sin^{\mu}(c\,z)\cos^{\nu}(a\,z)$

01.07.21.2610.01

$$\int e^{pz}\sin^{m}(c\,z)\cos^{\nu}(a\,z)\,dz = \frac{2^{-m-\nu}\,e^{pz}\,(1-m \bmod 2)(1-\nu \bmod 2)}{p}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}-i^{-m}\,2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{(p-2 i c k+i c m)z}}{-p+2 i c k-i c m}+\frac{e^{i m\pi-(-p-2 i c k+i c m)z}}{-p-2 i c k+i c m}\right)\binom{m}{k}-2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(\frac{e^{(p+a i(\nu-2s))z}}{-p-i a(\nu-2s)}+\frac{e^{(p+2 i a s-i a\nu)z}}{-p-2 i a s+i a\nu}\right)\binom{\nu}{s}-i^{-m}\,2^{-m-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\left(e^{i m\pi}\left(\frac{e^{(p+2 i c k-i c m-2 i a s+i a\nu)z}}{-p-2 i c k+i c m+2 i a s-i a\nu}+\frac{e^{(p-i c(m-2k)+2 i a s-i a\nu)z}}{-p+c\,i(m-2k)-2 i a s+i a\nu}\right)+\frac{e^{(p-2 i c k+i c m+2 i a s-i a\nu)z}}{-p+2 i c k-i c m-2 i a s+i a\nu}+\frac{e^{(p-2 i c k+i c m-2 i a s+i a\nu)z}}{-p+2 i c k-i c m+2 i a s-i a\nu}\right)\binom{m}{k}\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.07.21.2611.01

$$\int e^{p z} \sin^{\mu}(c z) \cos^{\nu}(a z)\, dz = 2^{-\nu} \sin^{\mu}(c z) \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{e^{(p+a i (\nu-2 s)) z}}{p + a i (\nu - 2 s) - i c \mu}\, {}_2F_1\left(-\frac{i (p + a i (\nu - 2 s) - i c \mu)}{2 c}, -\mu; 1 - \frac{i (p + a i (\nu - 2 s) - i c \mu)}{2 c}; e^{2 i c z}\right) + \left(e^{(p - i a (\nu - 2 s)) z}\, {}_2F_1\left(-\frac{i (p - i a (\nu - 2 s) - i c \mu)}{2 c}, -\mu; 1 - \frac{i (p - i a (\nu - 2 s) - i c \mu)}{2 c}; e^{2 i c z}\right)\right) \Big/ (p - i a (\nu - 2 s) - i c \mu) \right) \right) \left(1 - e^{2 i c z}\right)^{-\mu} + \frac{2^{-\nu} e^{p z} \left(1 - e^{2 i c z}\right)^{-\mu} (1 - \nu \bmod 2) \sin^{\mu}(c z)}{p - i c \mu} \binom{\nu}{\frac{\nu}{2}}\, {}_2F_1\left(-\frac{i (p - i c \mu)}{2 c}, -\mu; 1 - \frac{i (p - i c \mu)}{2 c}; e^{2 i c z}\right) /; \nu \in \mathbb{N}$$

01.07.21.2612.01

$$\int e^{p z} \sin^{m}(c z) \cos^{\nu}(a z)\, dz = 2^{-m} \cos^{\nu}(a z) \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{m+s} \binom{m}{s} \left(\left(e^{\frac{i \pi m}{2} + (p + c i (m - 2 s)) z}\, {}_2F_1\left(-\frac{i (p + c i (m - 2 s) - i a \nu)}{2 a}, -\nu; 1 - \frac{i (p + c i (m - 2 s) - i a \nu)}{2 a}; -e^{2 i a z}\right)\right) \Big/ (p + c i (m - 2 s) - i a \nu) + \left(e^{(p - i c (m - 2 s)) z - \frac{i m \pi}{2}}\, {}_2F_1\left(-\frac{i (p - i c (m - 2 s) - i a \nu)}{2 a}, -\nu; 1 - \frac{i (p - i c (m - 2 s) - i a \nu)}{2 a}; -e^{2 i a z}\right)\right) \Big/ (p - i c (m - 2 s) - i a \nu) \right) \right) \left(1 + e^{2 i a z}\right)^{-\nu} + \frac{1}{p - i a \nu} \left(2^{-m} e^{p z} \left(1 + e^{2 i a z}\right)^{-\nu} \binom{m}{\frac{m}{2}} \cos^{\nu}(a z)\, {}_2F_1\left(-\frac{i (p - i a \nu)}{2 a}, -\nu; 1 - \frac{i (p - i a \nu)}{2 a}; -e^{2 i a z}\right) (1 - m \bmod 2) \right) /; m \in \mathbb{N}$$

Involving $e^{p z} \sin^{\mu}(c z + d) \cos^{\nu}(a z)$

01.07.21.2613.01

$$\int e^{p z} \sin^m(d + c z) \cos^\nu(a z) \, dz = \frac{2^{-m-\nu} e^{p z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} -$$

$$i^{-m} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-i d (2k+m)} \left(\frac{e^{2 i d m - (2 i c k - i c m - p) z}}{2 i c k - i c m - p} + \frac{e^{4 i d k - (-2 c i k + i c m - p) z + i m \pi}}{-2 c i k + i c m - p} \right) \binom{m}{k} -$$

$$2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\frac{e^{-(-p - i a (\nu - 2 s)) z}}{-p - i a (\nu - 2 s)} + \frac{e^{-(-p - 2 i a s + i a \nu) z}}{-p - 2 i a s + i a \nu} \right) \binom{\nu}{s} -$$

$$i^{-m} 2^{-m-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-2 d i k - i d m} \left(e^{2 i d m} \left(\frac{e^{-(2 i c k - i c m - p + 2 i a s - i a \nu) z}}{2 i c k - i c m - p + 2 i a s - i a \nu} + \frac{e^{-(2 i c k - i c m - p - 2 i a s + i a \nu) z}}{2 i c k - i c m - p - 2 i a s + i a \nu} \right) + \right.$$

$$\left. e^{4 i d k + i m \pi} \left(\frac{e^{-(-2 c i k + i c m - p + 2 i a s - i a \nu) z}}{-2 c i k + i c m - p + 2 i a s - i a \nu} + \frac{e^{-(c i (m - 2k) - p - 2 i a s + i a \nu) z}}{c i (m - 2k) - p - 2 i a s + i a \nu} \right) \right) \binom{m}{k} /; m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.2614.01

$$\int e^{p z} \sin^\mu(d + c z) \cos^\nu(a z) \, dz = 2^{-\nu} \left(\left(1 - e^{2 (i d + i c z)}\right)^{-\mu} \sin^\mu(d + c z) \right.$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(e^{(p + a i (\nu - 2 s)) z} \, {}_2F_1\left(-\frac{i (p - 2 i a s + i a \nu - i c \mu)}{2 c}, -\mu; \frac{1}{2} \left(-\frac{i (p - 2 i a s + i a \nu)}{c} - \mu + 2 \right); e^{2 i (d + c z)} \right) \right) \Big/ \right.$$

$$(p - 2 i a s + i a \nu - i c \mu) + \left(e^{(p + 2 i a s - i a \nu) z} \, {}_2F_1\left(-\frac{i (p + 2 i a s - i a \nu - i c \mu)}{2 c}, -\mu; \right. \right.$$

$$\left. \left. \left. -\frac{i (p + 2 i a s - i a \nu - i c (\mu - 2))}{2 c}; e^{2 i (d + c z)} \right) \right) \Big/ (p + 2 i a s - i a \nu - i c \mu) \right) - \frac{1}{p - i c \mu}$$

$$\left. \left(e^{p z} \left(1 - e^{2 (i d + i c z)}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{i p + c \mu}{2 c}, -\mu; \frac{1}{2} \left(-\frac{i p}{c} - \mu + 2 \right); e^{2 i (d + c z)} \right) (\nu \bmod 2 - 1) \sin^\mu(d + c z) \right) \right) /; \nu \in \mathbb{N}^+$$

01.07.21.2615.01

$$\int e^{p z} \sin^m(d + c z) \cos^\nu(a z)\, dz = 2^{-m} \left(-\frac{1}{p - i a \nu} \left(e^{p z} \left(1 + e^{2 i a z}\right)^{-\nu} \binom{m}{\frac{m}{2}} \cos^\nu(a z)\, {}_2F_1\left(-\frac{i (p - i a \nu)}{2 a}, -\nu; \frac{1}{2} \left(-\frac{i p}{a} - \nu + 2 \right); -e^{2 i a z} \right) (m \bmod 2 - 1) \right) + i^{-m} \left(1 + e^{-2 i a z}\right)^{-\nu} \cos^\nu(a z) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{i d (m - 2 k)} \binom{m}{k} \left(\left(e^{i (4 d k + 2 c z k - 2 d m - c m z - i p z + m \pi)}\, {}_2F_1\left(\frac{i (2 i c k - i c m + p + i a \nu)}{2 a}, -\nu; \frac{i (2 i c k - i c m + p + a i (\nu - 2))}{2 a}; -e^{-2 i a z} \right) \right) \Big/ (c i (2 k - m) + p + i a \nu) + \left(e^{(c i (m - 2 k) + p) z}\, {}_2F_1\left(\frac{i (c i (m - 2 k) + p + i a \nu)}{2 a}, -\nu; \frac{i (-2 c i k + i c m + p + a i (\nu - 2))}{2 a}; -e^{-2 i a z} \right) \right) \Big/ (c i (m - 2 k) + p + i a \nu) \right) \right) /;\ m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^\mu(c z) \cos^\nu(a z + b)$

01.07.21.2616.01

$$\int e^{p z} \sin^m(c z) \cos^\nu(b + a z)\, dz = \frac{2^{-m-\nu} e^{p z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} - i^{-m} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{-(2 i c k - i c m - p) z}}{2 i c k - i c m - p} + \frac{e^{i m \pi - (-2 c i k + i c m - p) z}}{-2 c i k + i c m - p} \right) \binom{m}{k} - 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i b (2 s + \nu)} \left(\frac{e^{2 i b \nu - (-p - i a (\nu - 2 s)) z}}{-p - i a (\nu - 2 s)} + \frac{e^{4 i b s - (-p - 2 i a s + i a \nu) z}}{-p - 2 i a s + i a \nu} \right) \binom{\nu}{s} - i^{-m} 2^{-m-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-2 b i s - i b \nu} \left(e^{i m \pi} \left(\frac{e^{2 i b \nu - (-2 c i k + i c m - p + 2 i a s - i a \nu) z}}{-2 c i k + i c m - p + 2 i a s - i a \nu} + \frac{e^{4 i b s - (c i (m - 2 k) - p - 2 i a s + i a \nu) z}}{c i (m - 2 k) - p - 2 i a s + i a \nu} \right) + \frac{e^{4 i b s - (2 i c k - i c m - p - 2 i a s + i a \nu) z}}{2 i c k - i c m - p - 2 i a s + i a \nu} + \frac{e^{2 i b \nu - (2 i c k - i c m - p + 2 i a s - i a \nu) z}}{2 i c k - i c m - p + 2 i a s - i a \nu} \right) \binom{m}{k} /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2617.01

$$\int e^{pz}\sin^{\mu}(cz)\cos^{\nu}(b+az)\,dz = 2^{-\nu}\Bigg(\left(1-e^{2icz}\right)^{-\mu}\sin^{\mu}(cz)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{2ibs-ib\nu}\binom{\nu}{s}\Bigg(\Bigg(e^{2bi(\nu-2s)+(p+ai(\nu-2s))z}\,{}_2F_1\left(-\frac{i(p-2ias+ia\nu-ic\mu)}{2c},-\mu;\frac{1}{2}\left(-\frac{i(p-2ias+ia\nu)}{c}-\mu+2\right);e^{2icz}\right)\Bigg)\Big/(p-2ias+ia\nu-ic\mu)+\left(e^{(p+2ias-ia\nu)z}\,{}_2F_1\left(-\frac{i(p+2ias-ia\nu-ic\mu)}{2c},-\mu;-\frac{i(p+2ias-ia\nu-ic(\mu-2))}{2c};e^{2icz}\right)\right)\Big/(p+2ias-ia\nu-ic\mu)\Bigg)-\frac{1}{p-ic\mu}\left(e^{pz}\left(1-e^{2icz}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}}{}_2F_1\left(-\frac{ip+c\mu}{2c},-\mu;\frac{1}{2}\left(-\frac{ip}{c}-\mu+2\right);e^{2icz}\right)(\nu\bmod 2-1)\sin^{\mu}(cz)\right)\Bigg)\,/;\,\nu\in\mathbb{N}^{+}$$

01.07.21.2618.01

$$\int e^{pz}\sin^{m}(cz)\cos^{\nu}(b+az)\,dz = 2^{-m}\Bigg(-\frac{1}{p-ia\nu}\left(e^{pz}\left(1+e^{2(ib+iaz)}\right)^{-\nu}\binom{m}{\frac{m}{2}}\cos^{\nu}(b+az)\,{}_2F_1\left(\frac{i(p-ia\nu)}{2a},-\nu;\frac{1}{2}\left(-\frac{ip}{a}-\nu+2\right);-e^{2(ib+iaz)}\right)(m\bmod 2-1)\right)+i^{-m}\left(1+e^{-2(ib+iaz)}\right)^{-\nu}\cos^{\nu}(b+az)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k}\binom{m}{k}\Bigg(\left(e^{i(-czm+\pi m+2ckz-ipz)}\,{}_2F_1\left(\frac{i(2ick-icm+p+ia\nu)}{2a},-\nu;\frac{i(2ick-icm+p+ai(\nu-2))}{2a};-e^{-2(ib+iaz)}\right)\right)\Big/(ci(2k-m)+p+ia\nu)+\left(e^{(ci(m-2k)+p)z}\,{}_2F_1\left(\frac{i(ci(m-2k)+p+ia\nu)}{2a},-\nu;\frac{i(-2cik+icm+p+ai(\nu-2))}{2a};-e^{-2(ib+iaz)}\right)\right)\Big/(ci(m-2k)+p+ia\nu)\Bigg)\Bigg)\,/;\,m\in\mathbb{N}^{+}$$

Involving $e^{pz}\sin^{\mu}(cz+d)\cos^{\nu}(az+b)$

01.07.21.2619.01

$$\int e^{p z} \sin^{m}(d + c z) \cos^{\nu}(b + a z)\, dz = \frac{2^{-m-\nu} e^{p z} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} -$$

$$i^{-m} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-i d (2k+m)} \left(\frac{e^{2 i d m - (2 i c k - i c m - p) z}}{2 i c k - i c m - p} + \frac{e^{4 i d k - (-2 c i k + i c m - p) z + i m \pi}}{-2 c i k + i c m - p} \right) \binom{m}{k} - i^{-m} 2^{-m-\nu}$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-2 d i k - i d m - 2 i b s - i b \nu} \Bigg(e^{2 i d m} \left(\frac{e^{2 i b \nu - (2 i c k - i c m - p + 2 i a s - i a \nu) z}}{2 i c k - i c m - p + 2 i a s - i a \nu} + \frac{e^{4 i b s - (2 i c k - i c m - p - 2 i a s + i a \nu) z}}{2 i c k - i c m - p - 2 i a s + i a \nu} \right) +$$

$$e^{4 i d k + i m \pi} \left(\frac{e^{2 i b \nu - (-2 c i k + i c m - p + 2 i a s - i a \nu) z}}{-2 c i k + i c m - p + 2 i a s - i a \nu} + \frac{e^{4 i b s - (c i (m - 2k) - p - 2 i a s + i a \nu) z}}{c i (m - 2k) - p - 2 i a s + i a \nu} \right) \Bigg) \binom{m}{k} -$$

$$2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i b (2 s + \nu)} \left(\frac{e^{2 i b \nu - (-p - i a (\nu - 2 s)) z}}{-p - i a (\nu - 2 s)} + \frac{e^{4 i b s - (-p - 2 i a s + i a \nu) z}}{-p - 2 i a s + i a \nu} \right) \binom{\nu}{s} /; m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.2620.01

$$\int e^{p z} \sin^{\mu}(d + c z) \cos^{\nu}(b + a z)\, dz =$$

$$2^{-\nu} \Bigg(\left(1 - e^{2 (i d + i c z)}\right)^{-\mu} \sin^{\mu}(d + c z) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{2 i b s - i b \nu} \binom{\nu}{s} \Bigg(\Bigg(e^{2 b i (\nu - 2 s) + (p + a i (\nu - 2 s)) z} {}_2F_1\Bigg(-\frac{i (p - 2 i a s + i a \nu - i c \mu)}{2 c}, -\mu; \frac{1}{2}$$

$$\left(-\frac{i (p - 2 i a s + i a \nu)}{c} - \mu + 2 \right); e^{2 i (d + c z)} \Bigg) \Bigg) \Big/ (p - 2 i a s + i a \nu - i c \mu) +$$

$$\Bigg(e^{(p + 2 i a s - i a \nu) z} {}_2F_1\Bigg(-\frac{i (p + 2 i a s - i a \nu - i c \mu)}{2 c}, -\mu; -\frac{i (p + 2 i a s - i a \nu - i c (\mu - 2))}{2 c}; e^{2 i (d + c z)} \Bigg) \Bigg) \Big/$$

$$(p + 2 i a s - i a \nu - i c \mu) \Bigg) - \frac{1}{p - i c \mu}$$

$$\left(e^{p z} \left(1 - e^{2 (i d + i c z)}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{i p + c \mu}{2 c}, -\mu; \frac{1}{2} \left(-\frac{i p}{c} - \mu + 2 \right); e^{2 i (d + c z)} \right) (\nu \bmod 2 - 1) \sin^{\mu}(d + c z) \right) \Bigg) /; \nu \in \mathbb{N}^+$$

01.07.21.2621.01

$$\int e^{p z} \sin^m(d + c z) \cos^\nu(b + a z)\, dz = 2^{-m} \left(-\frac{1}{p - i a \nu} \left(e^{p z} \left(1 + e^{2 (i b + i a z)}\right)^{-\nu} \binom{m}{\frac{m}{2}} \cos^\nu(b + a z)\, {}_2F_1\!\left(-\frac{i (p - i a \nu)}{2 a}, -\nu; \frac{1}{2} \left(-\frac{i p}{a} - \nu + 2 \right); -e^{2 (i b + i a z)} \right) (m \bmod 2 - 1) \right) + i^{-m} \left(1 + e^{-2 (i b + i a z)}\right)^{-\nu} \cos^\nu(b + a z) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{i d (m - 2 k)} \binom{m}{k} \left(\frac{1}{c i (2 k - m) + p + i a \nu} \left(e^{i (4 d k + 2 c z k - 2 d m - c m z - i p z + m \pi)}\, {}_2F_1\!\left(\frac{i (2 i c k - i c m + p + i a \nu)}{2 a}, -\nu; \frac{i (2 i c k - i c m + p + a i (\nu - 2))}{2 a}; -e^{-2 (i b + i a z)} \right) \right) + \left(e^{(c i (m - 2 k) + p) z}\, {}_2F_1\!\left(\frac{i (c i (m - 2 k) + p + i a \nu)}{2 a}, -\nu; \frac{i (-2 c i k + i c m + p + a i (\nu - 2))}{2 a}; -e^{-2 (i b + i a z)} \right) \right) \Big/ (c i (m - 2 k) + p + i a \nu) \right) \right) /; m \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin^m(b z^r) \cos^\nu(c z)$

01.07.21.2622.01

$$\int e^{p z^2} \sin^m(b z^2) \cos^\nu(c z)\, dz = \frac{2^{-m-\nu-1} \sqrt{\pi}\, \operatorname{erfi}(\sqrt{p}\, z)(1 - m \bmod 2)(1 - \nu \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} +$$

$$\frac{1}{\sqrt{p}} \left(2^{-m-\nu-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{c^2 (\nu-2s)^2}{4p}} \operatorname{erfi}\left(\frac{2 p z - i c (\nu - 2 s)}{2 \sqrt{p}} \right) + e^{\frac{c^2 (\nu-2s)^2}{4p}} \operatorname{erfi}\left(\frac{c i (\nu - 2 s) + 2 p z}{2 \sqrt{p}} \right) \right) \right) +$$

$$i^{-m} 2^{-m-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^k \binom{m}{k} \left((-1)^m \sqrt{p - i b (m - 2 k)}\, (b i (m - 2 k) + p) \operatorname{erfi}\left(\frac{2 p z - 2 i b (m - 2 k) z}{2 \sqrt{p - i b (m - 2 k)}} \right) + \right.\right.$$

$$\left.\left. (p - i b (m - 2 k)) \sqrt{b i (m - 2 k) + p}\, \operatorname{erfi}\left(\sqrt{b i (m - 2 k) + p}\, z \right) \right) \right) \Big/$$

$$((p - i b (m - 2 k)) (b i (m - 2 k) + p)) + 2^{-m-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s}$$

$$\left(\left(\left(e^{-\frac{2 i m (p - i b (2 k - m)) \pi - c^2 (\nu - 2 s)^2}{4 (p - i b (2 k - m))}} \sqrt{p - i b (2 k - m)}\, (b i (2 k - m) + p) \operatorname{erfi}\left(\frac{-i c (\nu - 2 s) - 2 i b (2 k - m) z + 2 p z}{2 \sqrt{p - i b (2 k - m)}} \right) + \right.\right.\right.$$

$$e^{-\frac{-c^2 (\nu - 2 s)^2 - 2 i m (b i (2 k - m) + p) \pi}{4 (b i (2 k - m) + p)}} (p - i b (2 k - m)) \sqrt{b i (2 k - m) + p}$$

$$\left.\left. \operatorname{erfi}\left(\frac{c i (\nu - 2 s) + 2 (b i (2 k - m) + p) z}{2 \sqrt{b i (2 k - m) + p}} \right) \right) \right) \Big/ ((p - i b (2 k - m)) (b i (2 k - m) + p)) +$$

$$\left(e^{-\frac{-c^2 (\nu - 2 s)^2 - 2 i m (p - i b (m - 2 k)) \pi}{4 (p - i b (m - 2 k))}} \sqrt{p - i b (m - 2 k)}\, (b i (m - 2 k) + p) \operatorname{erfi}\left(\frac{-i c (\nu - 2 s) - 2 i b (m - 2 k) z + 2 p z}{2 \sqrt{p - i b (m - 2 k)}} \right) + \right.$$

$$e^{-\frac{2 i m (b i (m - 2 k) + p) \pi - c^2 (\nu - 2 s)^2}{4 (b i (m - 2 k) + p)}} (p - i b (m - 2 k)) \sqrt{b i (m - 2 k) + p}$$

$$\left.\left. \operatorname{erfi}\left(\frac{c i (\nu - 2 s) + 2 (b i (m - 2 k) + p) z}{2 \sqrt{b i (m - 2 k) + p}} \right) \right) \Big/ ((p - i b (m - 2 k)) (b i (m - 2 k) + p)) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2623.01

$$\int e^{p\sqrt{z}} \sin^m\!\left(b\sqrt{z}\right)\cos^\nu(c\,z)\,dz = \frac{2^{-m-\nu+1}\,e^{p\sqrt{z}}\left(p\sqrt{z}-1\right)(1-m \bmod 2)(1-\nu \bmod 2)}{p^2}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}} +$$

$$2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Bigg(\frac{2\,i\,e^{p\sqrt{z}-i\,c\,(\nu-2s)\,z}}{c\,(\nu-2s)} - \frac{2\,i\,e^{\sqrt{z}\,p+c\,i\,(\nu-2s)\,z}}{c\,(\nu-2s)} -$$

$$\frac{e^{-\frac{i\,p^2}{4c(\nu-2s)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-2\,i\,c\,(\nu-2s)\sqrt{z}}{2\sqrt{-i\,c\,(\nu-2s)}}\right)}{(-i\,c\,(\nu-2s))^{3/2}} - \frac{e^{\frac{i\,p^2}{4c(\nu-2s)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+2\,c\,i\,(\nu-2s)\sqrt{z}}{2\sqrt{i\,c\,(\nu-2s)}}\right)}{(i\,c\,(\nu-2s))^{3/2}}\Bigg) +$$

$$2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\Bigg((-1)^k\,e^{p\sqrt{z}}\binom{m}{k}\Big(\left(\sqrt{z}\,p^3-p^2+b^2\,(m-2k)^2\left(\sqrt{z}\,p+1\right)\right)\cos\left(\frac{m\,\pi}{2}-b\,(m-2k)\sqrt{z}\right)+$$

$$b\,(m-2k)\left(-b^2\sqrt{z}\,(m-2k)^2+2\,p-p^2\sqrt{z}\right)\sin\left(\frac{m\,\pi}{2}-b\,(m-2k)\sqrt{z}\right)\Big)\Bigg)\Big/$$

$$\left((i\,b\,(m-2k)-p)^2\,(b\,i\,(m-2k)+p)^2\right)+i^{-m}\,2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\Bigg(\frac{2\,i\,e^{(p-i\,b\,(2k-m))\sqrt{z}-i\,c\,(\nu-2s)\,z}}{c\,(\nu-2s)} -$$

$$\frac{2\,i\,e^{i\,\pi\,m+c\,i\,(\nu-2s)\,z+(b\,i\,(2k-m)+p)\sqrt{z}}}{c\,(\nu-2s)} + \frac{e^{-\frac{i\,(2\,b\,k-b\,m+i\,p)^2}{c\,(8s-4\nu)}}\,(-2\,b\,i\,k+i\,b\,m+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b\,i\,(2k-m)-p+2\,c\,i\,(\nu-2s)\sqrt{z}}{2\sqrt{i\,c\,(2s-\nu)}}\right)}{(i\,c\,(2s-\nu))^{3/2}} -$$

$$\left(i\,e^{\frac{i\,(b\,(m-2k)+i\,p)^2}{c\,(8s-4\nu)}+i\,m\,\pi}\,(b\,i\,(2k-m)+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b\,i\,(2k-m)+p+2\,c\,i\,(\nu-2s)\sqrt{z}}{2\sqrt{i\,c\,(\nu-2s)}}\right)\right)\Big/$$

$$\left(c\,(2s-\nu)\sqrt{i\,c\,(\nu-2s)}\right)+(-1)^m\Bigg(\frac{2\,i\,e^{(p-i\,b\,(m-2k))\sqrt{z}-i\,c\,(\nu-2s)\,z}}{c\,(\nu-2s)} - \frac{2\,i\,e^{-i\,\pi\,m+c\,i\,(\nu-2s)\,z+(b\,i\,(m-2k)+p)\sqrt{z}}}{c\,(\nu-2s)} +$$

$$\frac{1}{(i\,c\,(2s-\nu))^{3/2}}\left(e^{-\frac{i\,(b\,(m-2k)+i\,p)^2}{c\,(8s-4\nu)}}\,(b\,i\,(2k-m)+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b\,i\,(m-2k)-p+2\,c\,i\,(\nu-2s)\sqrt{z}}{2\sqrt{i\,c\,(2s-\nu)}}\right)\right) -$$

$$\left(i\,e^{\frac{i\,(b\,i\,(m-2k)+p)^2}{4c(\nu-2s)}-i\,m\,\pi}\,(-2\,b\,i\,k+i\,b\,m+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b\,i\,(m-2k)+p+2\,c\,i\,(\nu-2s)\sqrt{z}}{2\sqrt{i\,c\,(\nu-2s)}}\right)\right)\Big/$$

$$\left(c\,(2s-\nu)\sqrt{i\,c\,(\nu-2s)}\right)\Bigg)\Bigg)\ /;\ m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $e^{p z^r} \sin^m(b z) \cos^v(c z)$

01.07.21.2624.01

$$\int e^{p z^2} \sin^m(b z) \cos^v(c z) \, dz = \frac{2^{-m-v-1} \sqrt{\pi} \, \text{erfi}\left(\sqrt{p} \, z\right) (1 - m \bmod 2) (1 - v \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} + \frac{1}{\sqrt{p}} \Bigg(2^{-m-v-1} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{-b^2 (m-2k)^2 - 2\pi i m p}{4p}} \text{erfi}\left(\frac{2 p z - i b (m - 2k)}{2\sqrt{p}} \right) + e^{-\frac{2\pi i m p - b^2 (m-2k)^2}{4p}} \text{erfi}\left(\frac{b i (m - 2k) + 2 p z}{2\sqrt{p}} \right) \right) \Bigg) +$$

$$\frac{1}{\sqrt{p}} \left(2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{\frac{c^2 (v-2s)^2}{4p}} \text{erfi}\left(\frac{2 p z - i c (v - 2s)}{2\sqrt{p}} \right) + e^{\frac{c^2 (v-2s)^2}{4p}} \text{erfi}\left(\frac{c i (v - 2s) + 2 p z}{2\sqrt{p}} \right) \right) \right) +$$

$$\frac{1}{\sqrt{p}} \Bigg(2^{-m-v-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \Bigg(e^{-\frac{(b i (2k-m) + c i (v-2s))^2 - 2\pi i m p}{4p}} \text{erfi}\left(\frac{b i (2k - m) + c i (v - 2s) + 2 p z}{2\sqrt{p}} \right) +$$

$$e^{-\frac{(b i (m-2k) + c i (v-2s))^2 + 2\pi i m p}{4p}} \text{erfi}\left(\frac{b i (m - 2k) + c i (v - 2s) + 2 p z}{2\sqrt{p}} \right) +$$

$$e^{-\frac{(-i b (2k-m) - i c (v-2s))^2 + 2\pi i m p}{4p}} \text{erfi}\left(\frac{-i b (2k - m) - i c (v - 2s) + 2 p z}{2\sqrt{p}} \right) +$$

$$e^{-\frac{(-i b (m-2k) - i c (v-2s))^2 - 2\pi i m p}{4p}} \text{erfi}\left(\frac{-i b (m - 2k) - i c (v - 2s) + 2 p z}{2\sqrt{p}} \right) \Bigg) \Bigg) /; m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.07.21.2625.01

$$\int e^{p\sqrt{z}}\sin^m(b\,z)\cos^\nu(c\,z)\,dz = \frac{2^{-m-\nu+1}\,e^{p\sqrt{z}}\left(p\sqrt{z}-1\right)(1-m\bmod 2)(1-\nu\bmod 2)}{p^2}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}+$$
$$2^{-m-\nu-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{\frac{i\,m\,\pi}{2}}\binom{m}{k}\left(\frac{2\,i\,e^{p\sqrt{z}-i\,b\,(m-2\,k)\,z}}{b\,(m-2\,k)}-\frac{2\,i\,e^{-i\,\pi\,m+b\,i\,(m-2\,k)\,z+p\sqrt{z}}}{b\,(m-2\,k)}-\right.$$
$$\left.\frac{e^{-\frac{i\,p^2}{4\,b\,(m-2\,k)}}\,p\sqrt{\pi}\;\mathrm{erfi}\left(\frac{p-2\,i\,b\,(m-2\,k)\sqrt{z}}{2\sqrt{-i\,b\,(m-2\,k)}}\right)}{(-i\,b\,(m-2\,k))^{3/2}}-\frac{e^{\frac{i\,p^2}{4\,b\,(m-2\,k)}-i\,m\,\pi}\,p\sqrt{\pi}\;\mathrm{erfi}\left(\frac{2\,b\,i\sqrt{z}\,(m-2\,k)+p}{2\sqrt{i\,b\,(m-2\,k)}}\right)}{(i\,b\,(m-2\,k))^{3/2}}\right)+$$
$$2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\frac{2\,i\,e^{p\sqrt{z}-i\,c\,(\nu-2\,s)\,z}}{c\,(\nu-2\,s)}-\frac{2\,i\,e^{\sqrt{z}\,p+c\,i\,(\nu-2\,s)\,z}}{c\,(\nu-2\,s)}-\frac{e^{-\frac{i\,p^2}{4\,c\,(\nu-2\,s)}}\,p\sqrt{\pi}\;\mathrm{erfi}\left(\frac{p-2\,i\,c\,(\nu-2\,s)\sqrt{z}}{2\sqrt{-i\,c\,(\nu-2\,s)}}\right)}{(-i\,c\,(\nu-2\,s))^{3/2}}-\right.$$
$$\left.\frac{e^{\frac{i\,p^2}{4\,c\,(\nu-2\,s)}}\,p\sqrt{\pi}\;\mathrm{erfi}\left(\frac{p+2\,c\,i\,(\nu-2\,s)\sqrt{z}}{2\sqrt{i\,c\,(\nu-2\,s)}}\right)}{(i\,c\,(\nu-2\,s))^{3/2}}\right)+i^{-m}\,2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left((-1)^m\left(\frac{2\,e^{-i\,\pi\,m+(b\,i\,(m-2\,k)+c\,i\,(\nu-2\,s))\,z+p\sqrt{z}}}{b\,i\,(m-2\,k)+c\,i\,(\nu-2\,s)}-\frac{e^{-\frac{p^2}{4\,(b\,i\,(m-2\,k)+c\,i\,(\nu-2\,s))}-i\,m\,\pi}\,p\sqrt{\pi}\;\mathrm{erfi}\left(\frac{p+2\,(b\,i\,(m-2\,k)+c\,i\,(\nu-2\,s))\sqrt{z}}{2\sqrt{b\,i\,(m-2\,k)+c\,i\,(\nu-2\,s)}}\right)}{(b\,i\,(m-2\,k)+c\,i\,(\nu-2\,s))^{3/2}}+\right.\right.$$
$$\left.\frac{2\,e^{\sqrt{z}\,p+(-i\,b\,(m-2\,k)-i\,c\,(\nu-2\,s))\,z}}{-i\,b\,(m-2\,k)-i\,c\,(\nu-2\,s)}-\frac{e^{-\frac{p^2}{4\,(-i\,b\,(m-2\,k)-i\,c\,(\nu-2\,s))}}\,p\sqrt{\pi}\;\mathrm{erfi}\left(\frac{p+2\,(-i\,b\,(m-2\,k)-i\,c\,(\nu-2\,s))\sqrt{z}}{2\sqrt{-i\,b\,(m-2\,k)-i\,c\,(\nu-2\,s)}}\right)}{(-i\,b\,(m-2\,k)-i\,c\,(\nu-2\,s))^{3/2}}\right)+$$
$$\frac{2\,e^{i\,\pi\,m+(b\,i\,(2\,k-m)+c\,i\,(\nu-2\,s))\,z+p\sqrt{z}}}{b\,i\,(2\,k-m)+c\,i\,(\nu-2\,s)}-\frac{e^{i\,m\,\pi-\frac{p^2}{4\,(b\,i\,(2\,k-m)+c\,i\,(\nu-2\,s))}}\,p\sqrt{\pi}\;\mathrm{erfi}\left(\frac{p+2\,(b\,i\,(2\,k-m)+c\,i\,(\nu-2\,s))\sqrt{z}}{2\sqrt{b\,i\,(2\,k-m)+c\,i\,(\nu-2\,s)}}\right)}{(b\,i\,(2\,k-m)+c\,i\,(\nu-2\,s))^{3/2}}+$$
$$\left.\frac{2\,e^{\sqrt{z}\,p+(-i\,b\,(2\,k-m)-i\,c\,(\nu-2\,s))\,z}}{-i\,b\,(2\,k-m)-i\,c\,(\nu-2\,s)}-\frac{e^{-\frac{p^2}{4\,(-i\,b\,(2\,k-m)-i\,c\,(\nu-2\,s))}}\,p\sqrt{\pi}\;\mathrm{erfi}\left(\frac{p+2\,(-i\,b\,(2\,k-m)-i\,c\,(\nu-2\,s))\sqrt{z}}{2\sqrt{-i\,b\,(2\,k-m)-i\,c\,(\nu-2\,s)}}\right)}{(-i\,b\,(2\,k-m)-i\,c\,(\nu-2\,s))^{3/2}}\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $e^{p\,z}\sin^m\left(b\,z^r\right)\cos^\nu(c\,z)$

01.07.21.2626.01

$$\int e^{p z} \sin^m\left(b z^2\right) \cos^\nu(c z)\, dz = \frac{2^{-m-\nu} e^{p z} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} +$$

$$2^{-m-\nu+1} e^{p z} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{\binom{\nu}{s} (-p \cos(c (\nu - 2 s) z) - c (\nu - 2 s) \sin(c (\nu - 2 s) z))}{(i c (\nu - 2 s) - p)(p + c i (\nu - 2 s))} + \frac{1}{b} \Bigg(i\, 2^{-m-\nu-1} \sqrt{\pi}$$

$$\binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{m - 2 k} \left((-1)^k \binom{m}{k} \left(e^{-\frac{i\left(p^2 - 2 b m (m - 2 k) \pi\right)}{4 b (m - 2 k)}} \sqrt{-i b (m - 2 k)}\ \operatorname{erfi}\left(\frac{p - 2 i b (m - 2 k) z}{2 \sqrt{-i b (m - 2 k)}}\right) - \right.\right.$$

$$\left.\left. e^{\frac{i\left(p^2 - 2 b m (m - 2 k) \pi\right)}{4 b (m - 2 k)}} \sqrt{i b (m - 2 k)}\ \operatorname{erfi}\left(\frac{p + 2 b i (m - 2 k) z}{2 \sqrt{i b (m - 2 k)}}\right)\right)\right)\Bigg) + \frac{1}{b} \Bigg(i\, 2^{-m-\nu-1} \sqrt{\pi}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{1}{2 k - m} \left(\binom{\nu}{s} \left(e^{-\frac{i\left((p - i c (\nu - 2 s))^2 + 2 b (2 k - m) m \pi\right)}{4 b (2 k - m)}} \sqrt{-i b (2 k - m)}\ \operatorname{erfi}\left(\frac{p - i c (\nu - 2 s) - 2 i b (2 k - m) z}{2 \sqrt{-i b (2 k - m)}}\right) - \right.\right.$$

$$e^{\frac{i\left((p + c i (\nu - 2 s))^2 + 2 b (2 k - m) m \pi\right)}{4 b (2 k - m)}} \sqrt{i b (2 k - m)}\ \operatorname{erfi}\left(\frac{p + c i (\nu - 2 s) + 2 b i (2 k - m) z}{2 \sqrt{i b (2 k - m)}}\right) -$$

$$e^{-\frac{i\left((p - i c (\nu - 2 s))^2 - 2 b m (m - 2 k) \pi\right)}{4 b (m - 2 k)}} \sqrt{-i b (m - 2 k)}\ \operatorname{erfi}\left(\frac{p - i c (\nu - 2 s) - 2 i b (m - 2 k) z}{2 \sqrt{-i b (m - 2 k)}}\right) +$$

$$\left.\left. e^{\frac{i\left((p + c i (\nu - 2 s))^2 - 2 b m (m - 2 k) \pi\right)}{4 b (m - 2 k)}} \sqrt{i b (m - 2 k)}\ \operatorname{erfi}\left(\frac{p + c i (\nu - 2 s) + 2 b i (m - 2 k) z}{2 \sqrt{i b (m - 2 k)}}\right)\right)\right)\Bigg) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2627.01

$$
\begin{aligned}
&\int e^{p z} \sin^m\!\left(b \sqrt{z}\right) \cos^\nu(c z)\, dz = \\
&\frac{2^{-m-\nu} e^{p z} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left(\frac{e^{(p - i c (\nu - 2 s)) z}}{p - i c (\nu - 2 s)} + \frac{e^{(p + c i (\nu - 2 s)) z}}{p + c i (\nu - 2 s)} \right) \binom{\nu}{s} + \\
&2^{-m-\nu-1} e^{\frac{i m \pi}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-\frac{i b\, e^{\frac{b^2 (m-2k)^2}{4 p} - i m \pi} (m - 2 k) \sqrt{\pi}\, \operatorname{erfi}\!\left(\frac{b i (m-2k) + 2 p \sqrt{z}}{2 \sqrt{p}} \right)}{p^{3/2}} + \right. \\
&\left. \frac{2 e^{p z - i b (m-2k) \sqrt{z}}}{p} + \frac{2 e^{-i \pi m + p z + b i (m-2k) \sqrt{z}}}{p} - \frac{i b\, e^{\frac{b^2 (m-2k)^2}{4 p}} (m - 2 k) \sqrt{\pi}\, \operatorname{erfi}\!\left(\frac{i b (m-2k) - 2 p \sqrt{z}}{2 \sqrt{p}} \right)}{p^{3/2}} \right) + \\
&i^{-m} 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left((-1)^m \left(\frac{2 e^{-i \pi m + (p + c i (\nu - 2 s)) z + b i (m-2k) \sqrt{z}}}{p + c i (\nu - 2 s)} - \right. \right. \\
&\frac{i b\, e^{\frac{b^2 (m-2k)^2}{4 (p + c i (\nu - 2 s))} - i m \pi} (m - 2 k) \sqrt{\pi}\, \operatorname{erfi}\!\left(\frac{b i (m-2k) + 2 (p + c i (\nu - 2 s)) \sqrt{z}}{2 \sqrt{p + c i (\nu - 2 s)}} \right)}{(p + c i (\nu - 2 s))^{3/2}} + \frac{2 e^{(p - i c (\nu - 2 s)) z - i b (m-2k) \sqrt{z}}}{p - i c (\nu - 2 s)} - \\
&\left. \frac{i b\, e^{\frac{b^2 (m-2k)^2}{4 (p - i c (\nu - 2 s))}} (m - 2 k) \sqrt{\pi}\, \operatorname{erfi}\!\left(\frac{b i (m-2k) + 2 (i c (\nu - 2 s) - p) \sqrt{z}}{2 \sqrt{p - i c (\nu - 2 s)}} \right)}{(p - i c (\nu - 2 s))^{3/2}} \right) + \frac{2 e^{b i \sqrt{z} (2k - m) + (p + c i (\nu - 2 s)) z + i m \pi}}{p + c i (\nu - 2 s)} - \\
&\frac{i b\, e^{\frac{b^2 (2k-m)^2}{4 (p + c i (\nu - 2 s))} + i m \pi} (2 k - m) \sqrt{\pi}\, \operatorname{erfi}\!\left(\frac{b i (2k-m) + 2 (p + c i (\nu - 2 s)) \sqrt{z}}{2 \sqrt{p + c i (\nu - 2 s)}} \right)}{(p + c i (\nu - 2 s))^{3/2}} + \frac{2 e^{(p - i c (\nu - 2 s)) z - i b (2k-m) \sqrt{z}}}{p - i c (\nu - 2 s)} - \\
&\left. \frac{i b\, e^{\frac{b^2 (2k-m)^2}{4 (p - i c (\nu - 2 s))}} (2 k - m) \sqrt{\pi}\, \operatorname{erfi}\!\left(\frac{b i (2k-m) + 2 (i c (\nu - 2 s) - p) \sqrt{z}}{2 \sqrt{p - i c (\nu - 2 s)}} \right)}{(p - i c (\nu - 2 s))^{3/2}} \right) /;\ m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+
\end{aligned}
$$

Involving $e^{p z} \sin^m(b z) \cos^\nu\left(c z^r\right)$

01.07.21.2628.01

$$\int e^{p z} \sin^m(b z) \cos^v\left(c z^2\right) dz = 2^{-m-v+1} e^{p z} \binom{v}{\frac{v}{2}}$$

$$\left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{(p - i b (m-2k)) (b i (m-2k) + p)} \binom{m}{k} \left(p \cos\left(\frac{m\pi}{2} - b(m-2k) z\right) - b(m-2k) \sin\left(\frac{m\pi}{2} - b(m-2k) z\right)\right)\right)$$

$$(1 - v \bmod 2) + \frac{2^{-m-v} e^{p z} (1 - m \bmod 2)(1 - v \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} +$$

$$\frac{1}{c} \left(i\, 2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{v - 2s} \binom{v}{s} \left(e^{-\frac{i p^2}{4 c (v-2s)}} \sqrt{-i c (v-2s)}\; \mathrm{erfi}\left(\frac{p - 2 i c (v-2s) z}{2 \sqrt{-i c (v-2s)}}\right) - \right.\right.$$

$$\left.\left. e^{\frac{i p^2}{4 c (v-2s)}} \sqrt{i c (v-2s)}\; \mathrm{erfi}\left(\frac{p + 2 c i (v-2s) z}{2 \sqrt{i c (v-2s)}}\right)\right)\right) + \frac{1}{c} \left(i\, 2^{-m-v-1} \sqrt{\pi}\right.$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{v - 2s} \left(\binom{v}{s} \left(e^{-\frac{i\left((p - i b (2k-m))^2 + 2 c m \pi (v-2s)\right)}{4 c (v-2s)}} \sqrt{-i c (v-2s)}\; \mathrm{erfi}\left(\frac{-i b (2k-m) + p - 2 i c (v-2s) z}{2 \sqrt{-i c (v-2s)}}\right) + \right.\right.$$

$$e^{-\frac{i\left((p - i b (m-2k))^2 - 2 c m \pi (v-2s)\right)}{4 c (v-2s)}} \sqrt{-i c (v-2s)}\; \mathrm{erfi}\left(\frac{-i b (m-2k) + p - 2 i c (v-2s) z}{2 \sqrt{-i c (v-2s)}}\right) -$$

$$e^{\frac{i\left((b i (2k-m) + p)^2 + 2 c m \pi (v-2s)\right)}{4 c (v-2s)}} \sqrt{i c (v-2s)}\; \mathrm{erfi}\left(\frac{b i (2k-m) + p + 2 c i (v-2s) z}{2 \sqrt{i c (v-2s)}}\right) -$$

$$\left.\left.\left. e^{\frac{i\left((b i (m-2k) + p)^2 - 2 c m \pi (v-2s)\right)}{4 c (v-2s)}} \sqrt{i c (v-2s)}\; \mathrm{erfi}\left(\frac{b i (m-2k) + p + 2 c i (v-2s) z}{2 \sqrt{i c (v-2s)}}\right)\right)\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2629.01

$$
\begin{aligned}
&\int e^{p z} \sin^m(b z) \cos^v\left(c \sqrt{z}\right) dz = 2^{-m-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{\frac{i m \pi}{2}} \left(\frac{e^{(b i (m-2k)+p) z - i m \pi}}{b i (m-2k)+p} + \frac{e^{(p - i b (m-2k)) z}}{p - i b (m-2k)} \right) \binom{m}{k} + \\
&\frac{2^{-m-v} e^{p z} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{p} + 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{4 e^{p z} \cos\left(c (v - 2 s) \sqrt{z}\right)}{p} - \right. \\
&\left. \frac{1}{p^{3/2}} i c e^{\frac{c^2 (v-2s)^2}{4 p}} \sqrt{\pi} (2 s - v) \left(\operatorname{erfi}\left(\frac{2 \sqrt{z} p + c i (2 s - v)}{2 \sqrt{p}} \right) - \operatorname{erfi}\left(\frac{2 \sqrt{z} p + c i (v - 2 s)}{2 \sqrt{p}} \right) \right) \right) + \\
&2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{1}{2} i m \pi} \left(\frac{2 e^{i \pi m + (2 i b k - i b m + p) z + (i c v - 2 i c s) \sqrt{z}}}{2 i b k - i b m + p} + \frac{2 e^{\sqrt{z} (2 i c s - i c v) + (-2 b i k + i b m + p) z}}{-2 b i k + i b m + p} - \right. \right. \\
&\left(i c \sqrt{\pi} \left(e^{i m \pi - \frac{(i c v - 2 i c s)^2}{4 (2 i b k - i b m + p)}} (v - 2 s) \operatorname{erfi}\left(\frac{2 \sqrt{z} (2 i b k - i b m + p) + c i (v - 2 s)}{2 \sqrt{2 i b k - i b m + p}} \right) \right) \right) \Big/ \\
&(2 i b k - i b m + p)^{3/2} - \left(i c \sqrt{\pi} \left(e^{-\frac{(2 i c s - i c v)^2}{4 (-2 b i k + i b m + p)}} (2 s - v) \right. \right. \\
&\left. \left. \left. \operatorname{erfi}\left(\frac{2 \sqrt{z} (-2 b i k + i b m + p) + c i (2 s - v)}{2 \sqrt{-2 b i k + i b m + p}} \right) \right) \right) \Big/ (-2 b i k + i b m + p)^{3/2} \right) + \\
&e^{\frac{i m \pi}{2}} \left(\frac{2 e^{\sqrt{z} (2 i c s - i c v) + (2 i b k - i b m + p) z}}{2 i b k - i b m + p} + \frac{2 e^{-i \pi m + (-2 b i k + i b m + p) z + (i c v - 2 i c s) \sqrt{z}}}{-2 b i k + i b m + p} - \left(i c \sqrt{\pi} \right. \right. \\
&\left. \left(e^{-\frac{(2 i c s - i c v)^2}{4 (2 i b k - i b m + p)}} (2 s - v) \operatorname{erfi}\left(\frac{2 \sqrt{z} (2 i b k - i b m + p) + c i (2 s - v)}{2 \sqrt{2 i b k - i b m + p}} \right) \right) \right) \Big/ (2 i b k - i b m + p)^{3/2} - \\
&\left(i c \sqrt{\pi} \left(e^{\frac{c^2 (v-2s)^2}{4 (-2 b i k + i b m + p)} - i m \pi} (v - 2 s) \operatorname{erfi}\left(\frac{2 \sqrt{z} (-2 b i k + i b m + p) + c i (v - 2 s)}{2 \sqrt{-2 b i k + i b m + p}} \right) \right) \right) \Big/ \\
&\left. \left. (-2 b i k + i b m + p)^{3/2} \right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+
\end{aligned}
$$

Involving $e^{p z^r} \sin^m(b z) \cos^v\left(c z^r\right)$

01.07.21.2630.01

$$\int e^{p z^2} \sin^m(b z) \cos^v\left(c z^2\right) dz = \frac{2^{-m-v-1}\sqrt{\pi}\ \text{erfi}\left(\sqrt{p}\ z\right)(1-m \bmod 2)(1-v \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} + 2^{-m-v-1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(\binom{v}{s}\left((p+c\,i\,(v-2s))\sqrt{p-i\,c\,(v-2s)}\ \text{erfi}\left(\frac{2pz-2\,i\,c\,(v-2s)\,z}{2\sqrt{p-i\,c\,(v-2s)}}\right)+\sqrt{p+c\,i\,(v-2s)}\ (p-i\,c\,(v-2s))\ \text{erfi}\left(\sqrt{p+c\,i\,(v-2s)}\ z\right)\right)\right) \Big/ ((p-i\,c\,(v-2s))(p+c\,i\,(v-2s))) + \frac{1}{\sqrt{p}}\left(2^{-m-v-1}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1-v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{-b^2(m-2k)^2-2\pi\,i\,m\,p}{4p}}\ \text{erfi}\left(\frac{2pz-i\,b\,(m-2k)}{2\sqrt{p}}\right)+e^{-\frac{2\pi\,i\,m\,p-b^2(m-2k)^2}{4p}}\ \text{erfi}\left(\frac{b\,i\,(m-2k)+2pz}{2\sqrt{p}}\right)\right)\right) + 2^{-m-v-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\left(e^{-\frac{-b^2(2k-m)^2-2\,i\,m\,\pi\,(p+c\,i\,(v-2s))}{4(p+c\,i\,(v-2s))}}\sqrt{p+c\,i\,(v-2s)}\ (p-i\,c\,(v-2s))\ \text{erfi}\left(\frac{b\,i\,(2k-m)+2\,(p+c\,i\,(v-2s))\,z}{2\sqrt{p+c\,i\,(v-2s)}}\right)+e^{-\frac{2\,i\,m\,\pi\,(p-i\,c\,(v-2s))-b^2(2k-m)^2}{4(p-i\,c\,(v-2s))}}(p+c\,i\,(v-2s))\sqrt{p-i\,c\,(v-2s)}\ \text{erfi}\left(\frac{-i\,b\,(2k-m)+2pz-2\,i\,c\,(v-2s)\,z}{2\sqrt{p-i\,c\,(v-2s)}}\right)\right)\Big/((p-i\,c\,(v-2s))(p+c\,i\,(v-2s))) + \left(e^{-\frac{2\,i\,m\,\pi\,(p+c\,i\,(v-2s))-b^2(m-2k)^2}{4(p+c\,i\,(v-2s))}}\sqrt{p+c\,i\,(v-2s)}\ (p-i\,c\,(v-2s))\ \text{erfi}\left(\frac{b\,i\,(m-2k)+2\,(p+c\,i\,(v-2s))\,z}{2\sqrt{p+c\,i\,(v-2s)}}\right)+e^{-\frac{-b^2(m-2k)^2-2\,i\,m\,\pi\,(p-i\,c\,(v-2s))}{4(p-i\,c\,(v-2s))}}(p+c\,i\,(v-2s))\sqrt{p-i\,c\,(v-2s)}\ \text{erfi}\left(\frac{-i\,b\,(m-2k)+2pz-2\,i\,c\,(v-2s)\,z}{2\sqrt{p-i\,c\,(v-2s)}}\right)\right)\Big/((p-i\,c\,(v-2s))(p+c\,i\,(v-2s)))\right) /;\ m\in\mathbb{N}^+ \land v\in\mathbb{N}^+$$

01.07.21.2631.01

$$\int e^{p\sqrt{z}}\sin^m(b\,z)\cos^\nu\left(c\sqrt{z}\right)dz = 2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i m\pi}{2}}\left(\frac{i\,e^{p\sqrt{z}-i b(m-2k)z}}{b(m-2k)}-\frac{e^{-\frac{i p^2}{4b(m-2k)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-2 i b(m-2k)\sqrt{z}}{2\sqrt{-i b(m-2k)}}\right)}{2(-i\,b(m-2k))^{3/2}}\right)+\right.\right.$$
$$\left.\left.e^{-\frac{1}{2}i m\pi}\left(-\frac{i\,e^{\sqrt{z}\,p+b\,i(m-2k)z}}{b(m-2k)}-\frac{e^{\frac{i p^2}{4b(m-2k)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{2 b\,i\sqrt{z}\,(m-2k)+p}{2\sqrt{i\,b(m-2k)}}\right)}{2(i\,b(m-2k))^{3/2}}\right)\right)\right)(1-\nu\bmod 2)+$$
$$\frac{2^{-m-\nu+1}e^{p\sqrt{z}}\left(p\sqrt{z}-1\right)\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)}{p^2}+2^{-m-\nu+2}e^{p\sqrt{z}}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\left(p^2+c^2(\nu-2s)^2\right)^2}\left(\binom{\nu}{s}\left(\left(\sqrt{z}\,p^3-p^2+c^2(\nu-2s)^2\sqrt{z}\,p+c^2(\nu-2s)^2\right)\cos\left(c(2s-\nu)\sqrt{z}\right)+\right.\right.$$
$$\left.\left.c(2s-\nu)\left(\sqrt{z}\,p^2-2p+c^2(\nu-2s)^2\sqrt{z}\right)\sin\left(c(2s-\nu)\sqrt{z}\right)\right)\right)+$$
$$2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{i m\pi}{2}}\left(\frac{i\,e^{(p+c\,i(\nu-2s))\sqrt{z}-i b(m-2k)z}}{b(m-2k)}-\left(e^{-\frac{i(p+c\,i(\nu-2s))^2}{4b(m-2k)}}\sqrt{\pi}\,(p+c\,i(\nu-2s))\right.\right.\right.$$
$$\left.\left.\operatorname{erfi}\left(\frac{-2 i b\sqrt{z}\,(m-2k)+p+c\,i(\nu-2s)}{2\sqrt{-i\,b(m-2k)}}\right)\right)\Big/\left(2(-i\,b(m-2k))^{3/2}\right)\right)+$$
$$e^{\frac{i m\pi}{2}}\left(\frac{i\,e^{(p-i c(\nu-2s))\sqrt{z}-i b(m-2k)z}}{b(m-2k)}-\left(e^{-\frac{i(p-i c(\nu-2s))^2}{4b(m-2k)}}\sqrt{\pi}\,(p-i\,c(\nu-2s))\right.\right.$$
$$\left.\left.\operatorname{erfi}\left(\frac{-2 i b\sqrt{z}\,(m-2k)+p-i\,c(\nu-2s)}{2\sqrt{-i\,b(m-2k)}}\right)\right)\Big/\left(2(-i\,b(m-2k))^{3/2}\right)\right)+$$
$$e^{-\frac{1}{2}i m\pi}\left(-\frac{i\,e^{\sqrt{z}\,(p+c\,i(\nu-2s))+b\,i(m-2k)z}}{b(m-2k)}-\left(e^{\frac{i(p+c\,i(\nu-2s))^2}{4b(m-2k)}}\sqrt{\pi}\,(p+c\,i(\nu-2s))\right.\right.$$
$$\left.\left.\operatorname{erfi}\left(\frac{2 b\,i\sqrt{z}\,(m-2k)+p+c\,i(\nu-2s)}{2\sqrt{i\,b(m-2k)}}\right)\right)\Big/\left(2(i\,b(m-2k))^{3/2}\right)\right)+$$
$$e^{-\frac{1}{2}i m\pi}\left(-\frac{i\,e^{\sqrt{z}\,(p-i c(\nu-2s))+b\,i(m-2k)z}}{b(m-2k)}-\left(e^{\frac{i(p-i c(\nu-2s))^2}{4b(m-2k)}}\sqrt{\pi}\,(p-i\,c(\nu-2s))\right.\right.$$
$$\left.\left.\left.\operatorname{erfi}\left(\frac{2 b\,i\sqrt{z}\,(m-2k)+p-i\,c(\nu-2s)}{2\sqrt{i\,b(m-2k)}}\right)\right)\Big/\left(2(i\,b(m-2k))^{3/2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $e^{p z} \sin^m(b z^r) \cos^v(c z^r)$

01.07.21.2632.01

$$\int e^{p z} \sin^m(b z^2) \cos^v(c z^2)\, dz = \frac{2^{-m-v} e^{p z} (1 - m \bmod 2)(1 - v \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} + \frac{1}{b}\left(i\, 2^{-m-v-1} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{m - 2k} \left((-1)^k \binom{m}{k} \left(e^{-\frac{i(p^2 - 2 b m (m-2k)\pi)}{4 b (m-2k)}} \sqrt{-i b (m-2k)}\, \operatorname{erfi}\left(\frac{p - 2 i b (m-2k) z}{2\sqrt{-i b (m-2k)}}\right) - e^{\frac{i(p^2 - 2 b m (m-2k)\pi)}{4 b (m-2k)}} \sqrt{i b (m-2k)}\, \operatorname{erfi}\left(\frac{p + 2 b i (m-2k) z}{2\sqrt{i b (m-2k)}}\right)\right)\right)\right) + \frac{1}{c}\left(i\, 2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{v - 2s} \left(\binom{v}{s} \left(e^{-\frac{i p^2}{4 c (v-2s)}} \sqrt{-i c (v-2s)}\, \operatorname{erfi}\left(\frac{p - 2 i c (v-2s) z}{2\sqrt{-i c (v-2s)}}\right) - e^{\frac{i p^2}{4 c (v-2s)}} \sqrt{i c (v-2s)}\, \operatorname{erfi}\left(\frac{p + 2 c i (v-2s) z}{2\sqrt{i c (v-2s)}}\right)\right)\right)\right) + 2^{-m-v-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\left(e^{-\frac{p^2 - 2 i m \pi (b i (2k-m) + c i (v-2s))}{4 (b i (2k-m) + c i (v-2s))}} \sqrt{b i (2k-m) + c i (v-2s)}\, (-i b (2k-m) - i c (v-2s))\, \operatorname{erfi}\left(\frac{p + 2 (b i (2k-m) + c i (v-2s)) z}{2\sqrt{b i (2k-m) + c i (v-2s)}}\right) + e^{-\frac{p^2 + 2 i m \pi (-i b (2k-m) - i c (v-2s))}{4 (-i b (2k-m) - i c (v-2s))}} (b i (2k-m) + c i (v-2s)) \sqrt{-i b (2k-m) - i c (v-2s)}\, \operatorname{erfi}\left(\frac{p - 2 (b i (2k-m) + c i (v-2s)) z}{2\sqrt{-i b (2k-m) - i c (v-2s)}}\right)\right) \Big/ ((-i b (2k-m) - i c (v-2s))(b i (2k-m) + c i (v-2s))) + \left(e^{-\frac{p^2 + 2 i m \pi (b i (m-2k) + c i (v-2s))}{4 (b i (m-2k) + c i (v-2s))}} \sqrt{b i (m-2k) + c i (v-2s)}\, (-i b (m-2k) - i c (v-2s))\, \operatorname{erfi}\left(\frac{p + 2 (b i (m-2k) + c i (v-2s)) z}{2\sqrt{b i (m-2k) + c i (v-2s)}}\right) + e^{-\frac{p^2 - 2 i m \pi (-i b (m-2k) - i c (v-2s))}{4 (-i b (m-2k) - i c (v-2s))}} (b i (m-2k) + c i (v-2s)) \sqrt{-i b (m-2k) - i c (v-2s)}\, \operatorname{erfi}\left(\frac{p - 2 (b i (m-2k) + c i (v-2s)) z}{2\sqrt{-i b (m-2k) - i c (v-2s)}}\right)\right) \Big/ ((-i b (m-2k) - i c (v-2s))(b i (m-2k) + c i (v-2s)))\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2633.01

$$\int e^{pz}\sin^m\left(b\sqrt{z}\right)\cos^\nu\left(c\sqrt{z}\right)dz = 2^{-m-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{\frac{i m\pi}{2}}\binom{m}{k}\left(\frac{4 e^{pz-\frac{i m\pi}{2}}\cos\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)}{p}+\right.\right.$$

$$\left.\left.\sqrt{\pi}\left(-\frac{e^{-\frac{(2ibk-ibm)^2}{4p}}(2ibk-ibm)\,\mathrm{erfi}\left(\frac{bi(2k-m)+2p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}-\frac{ib\,e^{\frac{b^2(m-2k)^2}{4p}-im\pi}(m-2k)\,\mathrm{erfi}\left(\frac{bi(m-2k)+2p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}\right)\right)\right)$$

$$(1-\nu\bmod 2)+\frac{2^{-m-\nu}e^{pz}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)}{p}+2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\sqrt{\pi}\left(-\frac{e^{-\frac{(2ics-ic\nu)^2}{4p}}(2ics-ic\nu)\,\mathrm{erfi}\left(\frac{2\sqrt{z}\,p+ci(2s-\nu)}{2\sqrt{p}}\right)}{p^{3/2}}-\frac{ic\,e^{\frac{c^2(\nu-2s)^2}{4p}}(\nu-2s)\,\mathrm{erfi}\left(\frac{2\sqrt{z}\,p+ci(\nu-2s)}{2\sqrt{p}}\right)}{p^{3/2}}\right)+\right.$$

$$\left.\frac{4e^{pz}\cos\left(c(\nu-2s)\sqrt{z}\right)}{p}\right)+2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{-\frac{1}{2}im\pi}\left(\frac{4e^{\frac{i\pi m}{2}+pz}\cos\left(\frac{\pi m}{2}+(2bk-bm-2cs+c\nu)\sqrt{z}\right)}{p}-\frac{1}{p^{3/2}}\left(e^{-\frac{(-2bik+ibm+2ics-ic\nu)^2}{4p}}\sqrt{\pi}\,(-2bik+ib\right.\right.\right.$$

$$\left.m+2ics-ic\nu)\,\mathrm{erfi}\left(\frac{bi(m-2k)+ci(2s-\nu)+2p\sqrt{z}}{2\sqrt{p}}\right)\right)-\frac{1}{p^{3/2}}\left(e^{im\pi-\frac{(2ibk-ibm-2ics+ic\nu)^2}{4p}}\right.$$

$$\left.\left.\left.\sqrt{\pi}\,(2ibk-ibm-2ics+ic\nu)\,\mathrm{erfi}\left(\frac{bi(2k-m)+ci(\nu-2s)+2p\sqrt{z}}{2\sqrt{p}}\right)\right)\right)+\right.$$

$$e^{\frac{im\pi}{2}}\left(\frac{4e^{pz-\frac{im\pi}{2}}\cos\left(\frac{\pi m}{2}+(2bk-bm+2cs-c\nu)\sqrt{z}\right)}{p}-\frac{1}{p^{3/2}}\left(e^{-\frac{(2ibk-ibm+2ics-ic\nu)^2}{4p}}\sqrt{\pi}\,(2ibk-ibm+\right.\right.$$

$$\left.2ics-ic\nu)\,\mathrm{erfi}\left(\frac{bi(2k-m)+ci(2s-\nu)+2p\sqrt{z}}{2\sqrt{p}}\right)\right)-\frac{1}{p^{3/2}}\left(e^{-\frac{(bi(m-2k)+ci(\nu-2s))^2}{4p}-im\pi}\sqrt{\pi}\right.$$

$$\left.\left.\left.\left.(bi(m-2k)+ci(\nu-2s))\,\mathrm{erfi}\left(\frac{bi(m-2k)+ci(\nu-2s)+2p\sqrt{z}}{2\sqrt{p}}\right)\right)\right)\right)\right)\ /;\ m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $e^{p z^r} \sin^m(b z^r) \cos^\nu(c z^r)$

01.07.21.2634.01

$$\int e^{p z^r} \sin^m(b z^r) \cos^\nu(c z^r)\, dz = \frac{1}{r}\left(2^{-m-\nu} z \left(-(-p z^r)^{-1/r} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{1}{r}, -p z^r\right)(m \bmod 2 - 1)(\nu \bmod 2 - 1) + i^{-m} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \right.\right.$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{1}{r}, (-2 b i k + i b m - p) z^r\right) ((-2 b i k + i b m - p) z^r)^{-1/r} + \right.$$

$$\left.\left. ((2 i b k - i b m - p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m - p) z^r\right)\right) +$$

$$\binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma\left(\frac{1}{r}, (-p - 2 i c s + i c \nu) z^r\right) ((-p - 2 i c s + i c \nu) z^r)^{-1/r} + \right.$$

$$\left. ((-p - i c (\nu - 2 s)) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-p - i c (\nu - 2 s)) z^r\right)\right) - i^{-m}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\Gamma\left(\frac{1}{r}, (2 i b k - i b m - p - 2 i c s + i c \nu) z^r\right) ((2 i b k - i b m - p - 2 i c s + i c \nu) z^r)^{-1/r} + \right.$$

$$(-1)^m \left(\Gamma\left(\frac{1}{r}, (-2 b i k + i b m - p - 2 i c s + i c \nu) z^r\right) ((-2 b i k + i b m - p - 2 i c s + i c \nu) z^r)^{-1/r} + \right.$$

$$\left. ((-2 b i k + i b m - p + 2 i c s - i c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-2 b i k + i b m - p + 2 i c s - i c \nu) z^r\right)\right) +$$

$$((2 i b k - i b m - p + 2 i c s - i c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m - p + 2 i c s - i c \nu)\right.$$

$$\left.\left.\left.\left. z^r\right)\right)\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2635.01

$$\int e^{b z^2} \sin^m(b z^2) \cos^v(c z^2)\, dz = \frac{2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) (1 - m \bmod 2)(1 - v \bmod 2)}{\sqrt{b}} +$$

$$2^{-m-v-1} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{1}{2} i m \pi} \binom{m}{k} \left(\frac{e^{i m \pi} \operatorname{erfi}\left(\sqrt{i (2k - m) b + b}\, z\right)}{\sqrt{i (2k - m) b + b}} + \frac{\operatorname{erfi}\left(\sqrt{b - i b (2k - m)}\, z\right)}{\sqrt{b - i b (2k - m)}} \right) +$$

$$2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{\operatorname{erfi}\left(\sqrt{b + c i (2s - v)}\, z\right)}{\sqrt{b + c i (2s - v)}} + \frac{\operatorname{erfi}\left(\sqrt{b - 2 i c s + i c v}\, z\right)}{\sqrt{b - 2 i c s + i c v}} \right) +$$

$$2^{-m-v-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{e^{-\frac{1}{2} i m \pi} \operatorname{erfi}\left(\sqrt{i (m - 2k) b + b + c i (v - 2s)}\, z\right)}{\sqrt{i (m - 2k) b + b + c i (v - 2s)}} + \right.$$

$$\frac{e^{\frac{i m \pi}{2}} \operatorname{erfi}\left(\sqrt{-i (m - 2k) b + b + c i (v - 2s)}\, z\right)}{\sqrt{-i (m - 2k) b + b + c i (v - 2s)}} + \frac{e^{-\frac{1}{2} i m \pi} \operatorname{erfi}\left(\sqrt{i (m - 2k) b + b - i c (v - 2s)}\, z\right)}{\sqrt{i (m - 2k) b + b - i c (v - 2s)}} +$$

$$\left. \frac{e^{\frac{i m \pi}{2}} \operatorname{erfi}\left(\sqrt{-i (m - 2k) b + b - i c (v - 2s)}\, z\right)}{\sqrt{-i (m - 2k) b + b - i c (v - 2s)}} \right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2636.01

$$\int e^{b\sqrt{z}}\sin^m\left(b\sqrt{z}\right)\cos^v\left(c\sqrt{z}\right)dz = \frac{2^{-m-v+1}e^{b\sqrt{z}}\left(b\sqrt{z}-1\right)\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{b^2}+2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{(i(m-2k)b+b)\sqrt{z}-\frac{i m\pi}{2}}\left((i(m-2k)b+b)\sqrt{z}-1\right)}{(i(m-2k)b+b)^2}+\frac{e^{\frac{i\pi m}{2}+(b-ib(m-2k))\sqrt{z}}\left((b-ib(m-2k))\sqrt{z}-1\right)}{(b-ib(m-2k))^2}\right)\binom{m}{k}+$$
$$2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(\frac{e^{(b+ci(v-2s))\sqrt{z}}\left((b+ci(v-2s))\sqrt{z}-1\right)}{(b+ci(v-2s))^2}+\frac{e^{(b-ic(v-2s))\sqrt{z}}\left((b-ic(v-2s))\sqrt{z}-1\right)}{(b-ic(v-2s))^2}\right)$$
$$\binom{v}{s}+2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(\left(e^{(i(m-2k)b+b+ci(v-2s))\sqrt{z}-\frac{i m\pi}{2}}\left((i(m-2k)b+b+ci(v-2s))\sqrt{z}-1\right)\right)\Big/\right.$$
$$(i(m-2k)b+b+ci(v-2s))^2+\left(e^{\frac{i\pi m}{2}+(-i(m-2k)b+b+ci(v-2s))\sqrt{z}}\right.$$
$$\left.\left((-i(m-2k)b+b+ci(v-2s))\sqrt{z}-1\right)\right)\Big/(-i(m-2k)b+b+ci(v-2s))^2+$$
$$\left(e^{(i(m-2k)b+b-ic(v-2s))\sqrt{z}-\frac{i m\pi}{2}}\left((i(m-2k)b+b-ic(v-2s))\sqrt{z}-1\right)\right)\Big/(i(m-2k)b+b-ic(v-2s))^2+$$
$$\left(e^{\frac{i\pi m}{2}+(-i(m-2k)b+b-ic(v-2s))\sqrt{z}}\left((-i(m-2k)b+b-ic(v-2s))\sqrt{z}-1\right)\right)\Big/$$
$$\left.(-i(m-2k)b+b-ic(v-2s))^2\right)\binom{v}{s}\ /;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $e^{b z^r+e}\sin^m\left(a z^r+q\right)\cos^v\left(c z^r+g\right)$

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$$\int e^{b z^r+e} \sin^m(a z^r+q) \cos^v(c z^r+g)\, dz = -\frac{1}{r}\Bigg(2^{-m-v} z\Bigg(e^e \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right)(1-m \bmod 2)(1-v \bmod 2)(-b z^r)^{-1/r} + \binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k \binom{m}{k}\Big(e^{e+2 i k q-i m q+\frac{i m \pi}{2}} \Gamma\left(\frac{1}{r}, (-b-2 i a k+i a m) z^r\right)((-b-2 i a k+i a m) z^r)^{-1/r} +$$

$$e^{e-2 i k q+i m q-\frac{i m \pi}{2}}((-b+2 i a k-i a m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 i a k-i a m) z^r\right)\Big)\Bigg) +$$

$$\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Big(e^{e+2 i g s-i g v} \Gamma\left(\frac{1}{r}, (-b-2 i c s+i c v) z^r\right)((-b-2 i c s+i c v) z^r)^{-1/r} +$$

$$e^{e-2 i g s+i g v}((-b+2 i c s-i c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 i c s-i c v) z^r\right)\Big)\Big) +$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Big(e^{e+2 i k q-i m q+2 i g s-i g v+\frac{i m \pi}{2}} \Gamma\left(\frac{1}{r}, (-b-2 i a k+i a m-2 i c s+i c v) z^r\right)$$

$$((-b-2 i a k+i a m-2 i c s+i c v) z^r)^{-1/r} + e^{e-2 i k q+i m q+2 i g s-i g v-\frac{i m \pi}{2}}$$

$$((-b+2 i a k-i a m-2 i c s+i c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 i a k-i a m-2 i c s+i c v) z^r\right) +$$

$$e^{e+2 i k q-i m q-2 i g s+i g v+\frac{i m \pi}{2}}((-b-2 i a k+i a m+2 i c s-i c v) z^r)^{-1/r} \Gamma\Big(\frac{1}{r}, (-b-2 i a k+i a m+$$

$$2 i c s-i c v) z^r\Big) + e^{e-2 i k q+i m q-2 i g s+i g v-\frac{i m \pi}{2}}((-b+2 i a k-i a m+2 i c s-i c v) z^r)^{-1/r}$$

$$\Gamma\left(\frac{1}{r}, (-b+2 i a k-i a m+2 i c s-i c v) z^r\right)\Big)\Bigg) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int e^{b z^2+e} \sin^m\left(a z^2+q\right) \cos^v\left(c z^2+g\right) dz = \frac{2^{-m-v-1} e^e \sqrt{\pi} (1-m \bmod 2)(1-v \bmod 2)}{\sqrt{b}} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) + 2^{-m-v-1} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{e-i(-2k-m)q-\frac{i m \pi}{2}} \binom{m}{k} \left(\frac{e^{2i\left(\frac{m\pi}{2}-m q\right)} \operatorname{erfi}\left(\sqrt{b+a i (2k-m)}\, z\right)}{\sqrt{b+a i (2k-m)}} + \frac{e^{-4 i k q} \operatorname{erfi}\left(\sqrt{b-i a (2k-m)}\, z\right)}{\sqrt{b-i a (2k-m)}} \right) +$$

$$2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} e^{e-i g (2s+v)} \binom{v}{s} \left(\frac{e^{4 i g s} \operatorname{erfi}\left(\sqrt{b+c i (2s-v)}\, z\right)}{\sqrt{b+c i (2s-v)}} + \frac{e^{2 i g v} \operatorname{erfi}\left(\sqrt{b-2 i c s+i c v}\, z\right)}{\sqrt{b-2 i c s+i c v}} \right) +$$

$$2^{-m-v-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\frac{e^{e+i(m-2k)q+g i (v-2s)-\frac{i m \pi}{2}} \operatorname{erfi}\left(\sqrt{b+a i (m-2k)+c i (v-2s)}\, z\right)}{\sqrt{b+a i (m-2k)+c i (v-2s)}} + \right.$$

$$\frac{e^{e-i(m-2k)q+g i (v-2s)+\frac{i m \pi}{2}} \operatorname{erfi}\left(\sqrt{b-i a (m-2k)+c i (v-2s)}\, z\right)}{\sqrt{b-i a (m-2k)+c i (v-2s)}} +$$

$$\frac{e^{e+i(m-2k)q-i g (v-2s)-\frac{i m \pi}{2}} \operatorname{erfi}\left(\sqrt{b+a i (m-2k)-i c (v-2s)}\, z\right)}{\sqrt{b+a i (m-2k)-i c (v-2s)}} +$$

$$\left. \frac{e^{e-i(m-2k)q-i g (v-2s)+\frac{i m \pi}{2}} \operatorname{erfi}\left(\sqrt{b-i a (m-2k)-i c (v-2s)}\, z\right)}{\sqrt{b-i a (m-2k)-i c (v-2s)}} \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int e^{\sqrt{z}\, b+e} \sin^m\left(\sqrt{z}\, a+q\right) \cos^v\left(\sqrt{z}\, c+g\right) dz = \frac{2^{-m-v+1} e^{\sqrt{z}\, b+e}\left(b\sqrt{z}-1\right)\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)}{b^2} +$$

$$2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{e+i(m-2k)q+(b+a i(m-2k))\sqrt{z}-\frac{i m\pi}{2}}\left((b+a i(m-2k))\sqrt{z}-1\right)}{(b+a i(m-2k))^2}+\right.$$

$$\left.\frac{e^{e-i(m-2k)q+(b-i a(m-2k))\sqrt{z}+\frac{i m\pi}{2}}\left((b-i a(m-2k))\sqrt{z}-1\right)}{(b-i a(m-2k))^2}\right)\binom{m}{k} + 2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(\frac{e^{e+g i(v-2s)+(b+c i(v-2s))\sqrt{z}}\left((b+c i(v-2s))\sqrt{z}-1\right)}{(b+c i(v-2s))^2}+\frac{e^{e-i g(v-2s)+(b-i c(v-2s))\sqrt{z}}\left((b-i c(v-2s))\sqrt{z}-1\right)}{(b-i c(v-2s))^2}\right)\binom{v}{s}+$$

$$2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(\left(e^{e+i(m-2k)q+g i(v-2s)+(b+a i(m-2k)+c i(v-2s))\sqrt{z}-\frac{i m\pi}{2}}\left((b+a i(m-2k)+c i(v-2s))\sqrt{z}-1\right)\right)\Big/\right.$$

$$(b+a i(m-2k)+c i(v-2s))^2+\left(e^{e-i(m-2k)q+g i(v-2s)+(b-i a(m-2k)+c i(v-2s))\sqrt{z}+\frac{i m\pi}{2}}\right.$$

$$\left.\left((b-i a(m-2k)+c i(v-2s))\sqrt{z}-1\right)\right)\Big/(b-i a(m-2k)+c i(v-2s))^2+$$

$$\left(e^{e+i(m-2k)q-i g(v-2s)+(b+a i(m-2k)-i c(v-2s))\sqrt{z}-\frac{i m\pi}{2}}\left((b+a i(m-2k)-i c(v-2s))\sqrt{z}-1\right)\right)\Big/$$

$$(b+a i(m-2k)-i c(v-2s))^2+\left(e^{e-i(m-2k)q-i g(v-2s)+(b-i a(m-2k)-i c(v-2s))\sqrt{z}+\frac{i m\pi}{2}}\right.$$

$$\left.\left.\left((b-i a(m-2k)-i c(v-2s))\sqrt{z}-1\right)\right)\Big/(b-i a(m-2k)-i c(v-2s))^2\right)\binom{v}{s} /; m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $e^{b z^r+d z+e}\sin^m\left(a z^r+p z+q\right)\cos^v\left(c z^r+f z+g\right)$

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$$\int e^{b z^2+d z+e}\sin^m\left(a z^2+p z+q\right)\cos^v\left(c z^2+f z+g\right) dz =$$

$$2^{-m-v-1}\sqrt{\pi}\binom{v}{\frac{v}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\left((-1)^k\binom{m}{k}\left(e^{-\frac{(d+i(m-2k)p)^2-4(b+a i(m-2k))\left(e+i(m-2k)q-\frac{i m\pi}{2}\right)}{4(b+a i(m-2k))}}\sqrt{b+a i(m-2k)}\,(b-i a(m-2k))\right.\right.\right.$$

$$\operatorname{erfi}\left(\frac{d+i(m-2k)p+2(b+a i(m-2k))z}{2\sqrt{b+a i(m-2k)}}\right)+e^{-\frac{(d-i(m-2k)p)^2-4(b-i a(m-2k))\left(e-i(m-2k)q+\frac{i m\pi}{2}\right)}{4(b-i a(m-2k))}}$$

$$\left.\left.(b+a i(m-2k))\sqrt{b-i a(m-2k)}\,\operatorname{erfi}\left(\frac{d-i(m-2k)p+2bz-2i a(m-2k)z}{2\sqrt{b-i a(m-2k)}}\right)\right)\right)\Big/$$

$$\left.((b - i\, a\,(m-2k))\,(b + a\, i\,(m-2k)))\right)(1 - v \bmod 2) + \frac{2^{-m-v-1}\, e^{-\frac{d^2-4be}{4b}}\, \sqrt{\pi}\,(1 - m \bmod 2)\,(1 - v \bmod 2)}{\sqrt{b}}$$

$$\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} \operatorname{erfi}\left(\frac{d + 2bz}{2\sqrt{b}}\right) + 2^{-m-v-1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(\binom{v}{s}\left(e^{-\frac{(d+f\,i\,(v-2s))^2-4\,(b+c\,i\,(v-2s))\,(e+g\,i\,(v-2s))}{4\,(b+c\,i\,(v-2s))}}\sqrt{b + c\, i\,(v-2s)}\,(b - i\, c\,(v-2s))\right.\right.$$

$$\operatorname{erfi}\left(\frac{d + f\, i\,(v-2s) + 2\,(b + c\, i\,(v-2s))\, z}{2\sqrt{b + c\, i\,(v-2s)}}\right) + e^{-\frac{(d-i\,f\,(v-2s))^2-4\,(b-i\,c\,(v-2s))\,(e-i\,g\,(v-2s))}{4\,(b-i\,c\,(v-2s))}}$$

$$\left.\left.\left.(b + c\, i\,(v-2s))\sqrt{b - i\, c\,(v-2s)}\, \operatorname{erfi}\left(\frac{d - i\, f\,(v-2s) + 2bz - 2\, i\, c\,(v-2s)\, z}{2\sqrt{b - i\, c\,(v-2s)}}\right)\right)\right)\right/$$

$$((b - i\, c\,(v-2s))\,(b + c\, i\,(v-2s))) + 2^{-m-v-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}$$

$$\left(\left(\left(e^{-\frac{(d+i\,(2k-m)\,p+f\,i\,(v-2s))^2-4\,(b+a\,i\,(2k-m)+c\,i\,(v-2s))\left(e+i\,(2k-m)\,q+g\,i\,(v-2s)+\frac{i\,m\,\pi}{2}\right)}{4\,(b+a\,i\,(2k-m)+c\,i\,(v-2s))}}\sqrt{b + a\, i\,(2k-m) + c\, i\,(v-2s)}\,(b - i\, a\,(2k-m) -\right.\right.\right.$$

$$i\, c\,(v-2s))\operatorname{erfi}\left(\frac{d + i\,(2k-m)\, p + f\, i\,(v-2s) + 2\,(b + a\, i\,(2k-m) + c\, i\,(v-2s))\, z}{2\sqrt{b + a\, i\,(2k-m) + c\, i\,(v-2s)}}\right) +$$

$$e^{-\frac{(d-i\,(2k-m)\,p-i\,f\,(v-2s))^2-4\,(b-i\,a\,(2k-m)-i\,c\,(v-2s))\left(e-i\,(2k-m)\,q-i\,g\,(v-2s)-\frac{i\,m\,\pi}{2}\right)}{4\,(b-i\,a\,(2k-m)-i\,c\,(v-2s))}}(b + a\, i\,(2k-m) + c\, i\,(v-2s))$$

$$\sqrt{b - i\, a\,(2k-m) - i\, c\,(v-2s)}\, \operatorname{erfi}\left((d - i\,(2k-m)\, p - i\, f\,(v-2s) + 2bz -\right.$$

$$\left.\left.\left.2\,(a\, i\,(2k-m) + c\, i\,(v-2s))\, z)\middle/\left(2\sqrt{b - i\, a\,(2k-m) - i\, c\,(v-2s)}\right)\right)\right)\right/$$

$$((b - i\, a\,(2k-m) - i\, c\,(v-2s))\,(b + a\, i\,(2k-m) + c\, i\,(v-2s))) +$$

$$\left(e^{-\frac{(d+i\,(m-2k)\,p+f\,i\,(v-2s))^2-4\,(b+a\,i\,(m-2k)+c\,i\,(v-2s))\left(e+i\,(m-2k)\,q+g\,i\,(v-2s)-\frac{i\,m\,\pi}{2}\right)}{4\,(b+a\,i\,(m-2k)+c\,i\,(v-2s))}}\sqrt{b + a\, i\,(m-2k) + c\, i\,(v-2s)}\,(b - i\, a\,(m-2k) -\right.$$

$$i\, c\,(v-2s))\operatorname{erfi}\left(\frac{d + i\,(m-2k)\, p + f\, i\,(v-2s) + 2\,(b + a\, i\,(m-2k) + c\, i\,(v-2s))\, z}{2\sqrt{b + a\, i\,(m-2k) + c\, i\,(v-2s)}}\right) +$$

$$e^{-\frac{(d-i\,(m-2k)\,p-i\,f\,(v-2s))^2-4\,(b-i\,a\,(m-2k)-i\,c\,(v-2s))\left(e-i\,(m-2k)\,q-i\,g\,(v-2s)+\frac{i\,m\,\pi}{2}\right)}{4\,(b-i\,a\,(m-2k)-i\,c\,(v-2s))}}(b + a\, i\,(m-2k) + c\, i\,(v-2s))$$

$$\sqrt{b - i\, a\,(m-2k) - i\, c\,(v-2s)}\, \operatorname{erfi}\left((d - i\,(m-2k)\, p - i\, f\,(v-2s) + 2bz -\right.$$

$$\left.\left.2\,(a\, i\,(m-2k) + c\, i\,(v-2s))\, z)\middle/\left(2\sqrt{b - i\, a\,(m-2k) - i\, c\,(v-2s)}\right)\right)\right)\Big/$$

$$\left.((b - i\, a\,(m-2k) - i\, c\,(v-2s))\,(b + a\, i\,(m-2k) + c\, i\,(v-2s)))\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int e^{\sqrt{z}\,b+d\,z+e}\sin^m\left(\sqrt{z}\,a+p\,z+q\right)\cos^\nu\left(\sqrt{z}\,c+f\,z+g\right)dz ==$$

$$2^{-m-\nu-2}\left(\frac{4\,e^{\sqrt{z}\,b+d\,z}}{d}-\frac{2\,b\,e^{-\frac{b^2}{4d}}\sqrt{\pi}\,\text{erfi}\left(\frac{b+2\,d\sqrt{z}}{2\sqrt{d}}\right)}{d^{3/2}}\right)e^e\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)\,(1-\nu\bmod 2)+$$

$$2^{-m-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{e-i\,(m-2\,k)\,q+\frac{i\,m\,\pi}{2}}\binom{m}{k}\left(\sqrt{\pi}\left(-\frac{1}{(d+i\,(m-2\,k)\,p)^{3/2}}\left(e^{-\frac{(b+a\,i\,(m-2\,k))^2}{4\,(d+i\,(m-2\,k)\,p)}+2\,i\,(m-2\,k)\,q-i\,m\,\pi}(b+a\,i\,(m-2\,k))\right.\right.\right.\right.$$

$$\left.\text{erfi}\left(\frac{b+a\,i\,(m-2\,k)+2\,(d-2\,i\,k\,p+i\,m\,p)\sqrt{z}}{2\sqrt{d+i\,(m-2\,k)\,p}}\right)\right)-\left(e^{-\frac{(b+2\,i\,a\,k-i\,a\,m)^2}{4\,(d+2\,i\,k\,p-i\,m\,p)}}(b+2\,i\,a\,k-i\,a\,m)\,\text{erfi}\left(\right.\right.$$

$$\left.\left.\left.\frac{b+a\,i\,(2\,k-m)+2\,(d+2\,i\,k\,p-i\,m\,p)\sqrt{z}}{2\sqrt{d+2\,i\,k\,p-i\,m\,p}}\right)\right)\bigg/(d+2\,i\,k\,p-i\,m\,p)^{3/2}\right)+$$

$$\left.\left.\frac{2\,e^{\sqrt{z}\,(b+a\,i\,(m-2\,k))+2\left(i\,(m-2\,k)\,q-\frac{i\,m\,\pi}{2}\right)+(d+i\,(m-2\,k)\,p)\,z}}{d+i\,(m-2\,k)\,p}+\frac{2\,e^{\sqrt{z}\,(b-i\,a\,(m-2\,k))+(d-i\,(m-2\,k)\,p)\,z}}{d-i\,(m-2\,k)\,p}\right)\right)$$

$$(1-\nu\bmod 2)+2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}e^{e-i\,g\,(\nu-2\,s)}\binom{\nu}{s}$$

$$\left(\sqrt{\pi}\left(-\frac{e^{-\frac{(b+2\,i\,c\,s-i\,c\,\nu)^2}{4\,(d+2\,i\,f\,s-i\,f\,\nu)}}(b+2\,i\,c\,s-i\,c\,\nu)\,\text{erfi}\left(\frac{b+c\,i\,(2\,s-\nu)+2\,(d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{2\sqrt{d+2\,i\,f\,s-i\,f\,\nu}}\right)}{(d+2\,i\,f\,s-i\,f\,\nu)^{3/2}}-\left(e^{2\,i\,g\,(\nu-2\,s)-\frac{(b+c\,i\,(\nu-2\,s))^2}{4\,(d+f\,i\,(\nu-2\,s))}}\right.\right.\right.$$

$$\left.\left.(b+c\,i\,(\nu-2\,s))\,\text{erfi}\left(\frac{b+c\,i\,(\nu-2\,s)+2\,(d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{2\sqrt{d+f\,i\,(\nu-2\,s)}}\right)\right)\bigg/(d+f\,i\,(\nu-2\,s))^{3/2}\right)+$$

$$\left.\frac{2\,e^{2\,g\,i\,(\nu-2\,s)+(d+f\,i\,(\nu-2\,s))\,z+(b+c\,i\,(\nu-2\,s))\sqrt{z}}}{d+f\,i\,(\nu-2\,s)}+\frac{2\,e^{\sqrt{z}\,(b-i\,c\,(\nu-2\,s))+(d-i\,f\,(\nu-2\,s))\,z}}{d-i\,f\,(\nu-2\,s)}\right)+2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{e-i\,(m-2\,k)\,q-i\,g\,(\nu-2\,s)+\frac{i\,m\,\pi}{2}}\left(\left(2\,e^{-i\,\pi\,m+2\,i\,(m-2\,k)\,q+2\,g\,i\,(\nu-2\,s)+(d-2\,i\,k\,p+i\,m\,p-2\,i\,f\,s+i\,f\,\nu)\,z+(b-2\,i\,a\,k+i\,a\,m-2\,i\,c\,s+i\,c\,\nu)\sqrt{z}}\right)\bigg/\right.\right.$$

$$(d-2\,i\,k\,p+i\,m\,p-2\,i\,f\,s+i\,f\,\nu)-\left(e^{-\frac{(b+a\,i\,(m-2\,k)+c\,i\,(\nu-2\,s))^2}{4\,(d-2\,i\,k\,p+i\,m\,p-2\,i\,f\,s+i\,f\,\nu)}+2\,i\,(m-2\,k)\,q+2\,g\,i\,(\nu-2\,s)-i\,m\,\pi}\right.$$

$$\sqrt{\pi}\,(b+a\,i\,(m-2k)+c\,i\,(v-2s))\,\mathrm{erfi}\Big(\Big(b+a\,i\,(m-2k)+c\,i\,(v-2s)+$$

$$2\,(d-2ikp+imp-2ifs+ifv)\sqrt{z}\Big)\Big/\Big(2\sqrt{d-2ikp+imp-2ifs+ifv}\Big)\Big)\Big)\Big/$$

$$(d-2ikp+imp-2ifs+ifv)^{3/2}+\frac{2\,e^{\sqrt{z}\,(b+2iak-iam+2ics-icv)+(d+2ikp-imp+2ifs-ifv)z}}{d+2ikp-imp+2ifs-ifv}-$$

$$\Big(e^{-\frac{(b+2iak-iam+2ics-icv)^2}{4(d+2ikp-imp+2ifs-ifv)}}\sqrt{\pi}\,(b+2iak-iam+2ics-icv)$$

$$\mathrm{erfi}\Big(\Big(b+a\,i\,(2k-m)+c\,i\,(2s-v)+2\,(d+2ikp-imp+2ifs-ifv)\sqrt{z}\Big)\Big/$$

$$\Big(2\sqrt{d+2ikp-imp+2ifs-ifv}\Big)\Big)\Big)\Big/(d+2ikp-imp+2ifs-ifv)^{3/2}\Big)+$$

$$e^{e-i(2k-m)q-ig(v-2s)-\frac{im\pi}{2}}\Big(\Big(2\,e^{-2iqm+i\pi m+4ikq+2gi(v-2s)+(d+2ikp-imp-2ifs+ifv)z+(b+2iak-iam-2ics+icv)\sqrt{z}}\Big)\Big/$$

$$(d+2ikp-imp-2ifs+ifv)-\Big(e^{-\frac{(b+2iak-iam-2ics+icv)^2}{4(d+2ikp-imp-2ifs+ifv)}+4ikq-2imq+2gi(v-2s)+im\pi}$$

$$\sqrt{\pi}\,(b+2iak-iam-2ics+icv)\,\mathrm{erfi}\Big(\Big(b+a\,i\,(2k-m)+c\,i\,(v-2s)+$$

$$2\,(d+2ikp-imp-2ifs+ifv)\sqrt{z}\Big)\Big/\Big(2\sqrt{d+2ikp-imp-2ifs+ifv}\Big)\Big)\Big)\Big/$$

$$(d+2ikp-imp-2ifs+ifv)^{3/2}+\frac{2\,e^{\sqrt{z}\,(b-2iak+iam+2ics-icv)+(d-2ikp+imp+2ifs-ifv)z}}{d-2ikp+imp+2ifs-ifv}-$$

$$\Big(e^{-\frac{(b-2iak+iam+2ics-icv)^2}{4(d-2ikp+imp+2ifs-ifv)}}\sqrt{\pi}\,(b-2iak+iam+2ics-icv)\,\mathrm{erfi}\Big(\Big(b+a\,i\,(m-2k)+c\,i\,(2s-v)+$$

$$2\,(d-2ikp+imp+2ifs-ifv)\sqrt{z}\Big)\Big/\Big(2\sqrt{d-2ikp+imp+2ifs-ifv}\Big)\Big)\Big)\Big/$$

$$(d-2ikp+imp+2ifs-ifv)^{3/2}\Big)\Big)\ /;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving powers of sin and rational functions of exp

Involving $\sin^m(e\,z)\cos^v(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

01.07.21.2642.01

$$\int\frac{\sin^m(e\,z)\cos^v(c\,z)}{\left(a+b\,e^{d\,z}\right)^n}\,dz = 2^{-m-v}$$

$$\Bigg(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Big(\Big(\Big(\Big(e^{(2iek-iem+2ics-icv)z}\,{}_2F_1\Big(\frac{2iek-iem+2ics-icv}{d},n;\frac{d+2iek-iem+2ics-icv}{d};$$

$$-\frac{b\,e^{d z}}{a}\right) - e^{(-2 e i k + i e m - 2 i c s + i c v) z}\, {}_2F_1\left(\frac{-2 e i k + i e m - 2 i c s + i c v}{d}, n;\right.$$

$$\left.\left.\frac{d - 2 i e k + i e m - 2 i c s + i c v}{d}; -\frac{b\,e^{d z}}{a}\right)\right) \Big/ (2 i e k - i e m + 2 i c s - i c v) +$$

$$\left(e^{(2 i e k - i e m - 2 i c s + i c v) z}\, {}_2F_1\left(\frac{2 i e k - i e m - 2 i c s + i c v}{d}, n; \frac{d + 2 i e k - i e m - 2 i c s + i c v}{d};\right.\right.$$

$$\left.-\frac{b\,e^{d z}}{a}\right) - e^{(-2 e i k + i e m + 2 i c s - i c v) z}\, {}_2F_1\left(\frac{-2 e i k + i e m + 2 i c s - i c v}{d}, n;\right.$$

$$\left.\left.\left.\frac{d - 2 i e k + i e m + 2 i c s - i c v}{d}; -\frac{b\,e^{d z}}{a}\right)\right) \Big/ (2 i e k - i e m - 2 i c s + i c v)\right) \cos\left(\frac{m \pi}{2}\right) +$$

$$i\left(\left(e^{(-2 e i k + i e m - 2 i c s + i c v) z}\, {}_2F_1\left(\frac{-2 e i k + i e m - 2 i c s + i c v}{d}, n; \frac{d - 2 i e k + i e m - 2 i c s + i c v}{d};\right.\right.\right.$$

$$\left.-\frac{b\,e^{d z}}{a}\right) + e^{(2 i e k - i e m + 2 i c s - i c v) z}\, {}_2F_1\left(\frac{2 i e k - i e m + 2 i c s - i c v}{d}, n;\right.$$

$$\left.\left.\frac{d + 2 i e k - i e m + 2 i c s - i c v}{d}; -\frac{b\,e^{d z}}{a}\right)\right) \Big/ (2 i e k - i e m + 2 i c s - i c v) +$$

$$\left(e^{(2 i e k - i e m - 2 i c s + i c v) z}\, {}_2F_1\left(\frac{2 i e k - i e m - 2 i c s + i c v}{d}, n; \frac{d + 2 i e k - i e m - 2 i c s + i c v}{d};\right.\right.$$

$$\left.-\frac{b\,e^{d z}}{a}\right) + e^{(-2 e i k + i e m + 2 i c s - i c v) z}\, {}_2F_1\left(\frac{-2 e i k + i e m + 2 i c s - i c v}{d}, n;\right.$$

$$\left.\left.\left.\left.\frac{d - 2 i e k + i e m + 2 i c s - i c v}{d}; -\frac{b\,e^{d z}}{a}\right)\right) \Big/ (2 i e k - i e m - 2 i c s + i c v)\right) \sin\left(\frac{m \pi}{2}\right)\right)\right)$$

$$a^{-n} - \frac{1}{d\, n}\left(2^{-m-v} a^{-n} \left(\frac{e^{-d z} a}{b} + 1\right)^n \left(\frac{e^{d z} b}{a} + 1\right)^{-n} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}}\, {}_2F_1\left(n, n; n+1; -\frac{a\, e^{-d z}}{b}\right)\right.$$

$$(m \bmod 2 -$$

$$1)\,(v \bmod 2 -$$

$$\left.1)\right) - \frac{1}{e}\left((2^{-m-v}\, i\right.$$

$$a^{-n}) \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{m - 2 k}\left((-1)^k \binom{m}{k} \left(e^{i e (m - 2 k) z - \frac{i m \pi}{2}}\, {}_2F_1\left(\frac{i e (m - 2 k)}{d}, n; \frac{d + e i (m - 2 k)}{d}; -\frac{b\, e^{d z}}{a}\right) -\right.\right.$$

$$e^{\frac{i m \pi}{2} - i e (m-2k) z} \, {}_2F_1\left(-\frac{i e (m-2k)}{d}, n; \frac{d - i e (m-2k)}{d}; -\frac{b e^{d z}}{a}\right)\Bigg)\Bigg)\Bigg)\Bigg) -$$

$$\frac{2^{-m-v} i a^{-n}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{v-2s} \binom{v}{s} \Bigg(e^{i c (v-2s) z} \, {}_2F_1\left(\frac{i c (v-2s)}{d}, n; \frac{d + c i (v-2s)}{d}; -\frac{b e^{d z}}{a}\right) -$$

$$e^{-i c (v-2s) z} \, {}_2F_1\left(-\frac{i c (v-2s)}{d}, n; \frac{d - i c (v-2s)}{d}; -\frac{b e^{d z}}{a}\right)\Bigg) /; n \in \mathbb{N}^+ \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving $e^{p z} \sin^m(e z) \cos^v(c z) \left(a + b e^{d z}\right)^{-n}$

01.07.21.2643.01

$$\int \frac{e^{p z} \sin^m(e z) \cos^v(c z)}{\left(a + b e^{d z}\right)^n} \, dz = 2^{-m-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \, a^{-n}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^k \binom{m}{k} \Bigg(e^{(e i (m-2k)+p) z - \frac{i m \pi}{2}} (i e (m-2k) - p) \, {}_2F_1\left(\frac{e i (m-2k) + p}{d}, n; \frac{d + e i (m-2k) + p}{d}; -\frac{b e^{d z}}{a}\right) -\right.$$

$$e^{\frac{i \pi m}{2} + (p - i e (m-2k)) z} (e i (m-2k) + p) \, {}_2F_1\left(\frac{p - i e (m-2k)}{d}, n; \frac{d - i e (m-2k) + p}{d}; -\frac{b e^{d z}}{a}\right)\Bigg)\Bigg) \Big/$$

$$((i e (m-2k) - p) (e i (m-2k) + p)) + 2^{-m-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \, a^{-n}$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left(\binom{v}{s} \Bigg(e^{(p + c i (v-2s)) z} (i c (v-2s) - p) \, {}_2F_1\left(\frac{p + c i (v-2s)}{d}, n; \frac{d + p + c i (v-2s)}{d}; -\frac{b e^{d z}}{a}\right) -\right.$$

$$e^{(p - i c (v-2s)) z} (p + c i (v-2s)) \, {}_2F_1\left(\frac{p - i c (v-2s)}{d}, n; \frac{d + p - i c (v-2s)}{d}; -\frac{b e^{d z}}{a}\right)\Bigg)\Bigg) \Big/$$

$$((i c (v-2s) - p) (p + c i (v-2s))) + 2^{-m-v} a^{-n} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \Bigg(\Bigg(\Bigg(e^{(2 i e k - i e m + p + 2 i c s - i c v) z} (2 i e k - i e m - p + 2 i c s - i c v)$$

$$ {}_2F_1\left(\frac{2 i e k - i e m + p + 2 i c s - i c v}{d}, n; \frac{d + 2 i e k - i e m + p + 2 i c s - i c v}{d}; -\frac{b e^{d z}}{a}\right) -$$

$$e^{(-2 e i k + i e m + p - 2 i c s + i c v) z} (2 i e k - i e m + p + 2 i c s - i c v) \, {}_2F_1\Bigg(\frac{-2 e i k + i e m + p - 2 i c s + i c v}{d},$$

$$n; \frac{d - 2 i e k + i e m + p - 2 i c s + i c v}{d}; -\frac{b e^{d z}}{a}\Bigg)\Bigg) \Big/ ((2 i e k - i e m - p + 2 i c s - i c v)$$

$$(2 i e k - i e m + p + 2 i c s - i c v)) + \Bigg(e^{(2 i e k - i e m + p - 2 i c s + i c v) z} (2 i e k - i e m - p - 2 i c s + i c v)$$

$$
{}_2F_1\left(\frac{2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d},\,n;\,\frac{d+2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-
$$

$$
e^{(-2\,e\,i\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v)
$$

$$
{}_2F_1\left(\frac{-2\,e\,i\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d},\,n;\,\frac{d-2\,i\,e\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\Bigg)\Bigg)\Bigg/
$$

$$
((2\,i\,e\,k-i\,e\,m-p-2\,i\,c\,s+i\,c\,v)\,(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v))\Bigg)\cos\left(\frac{m\,\pi}{2}\right)+
$$

$$
i\Bigg(\Bigg(e^{(-2\,e\,i\,k+i\,e\,m+p-2\,i\,c\,s+i\,c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v)\,{}_2F_1\Bigg(\frac{-2\,e\,i\,k+i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d},
$$

$$
n;\,\frac{d-2\,i\,e\,k+i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\Bigg)+e^{(2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v)\,z}
$$

$$
(2\,i\,e\,k-i\,e\,m-p+2\,i\,c\,s-i\,c\,v)\,{}_2F_1\Bigg(\frac{2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d},\,n;
$$

$$
\frac{d+2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\Bigg)\Bigg)\Bigg/((2\,i\,e\,k-i\,e\,m-p+2\,i\,c\,s-i\,c\,v)
$$

$$
(2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v))+\Bigg(e^{(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m-p-2\,i\,c\,s+i\,c\,v)
$$

$$
{}_2F_1\left(\frac{2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d},\,n;\,\frac{d+2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)+
$$

$$
e^{(-2\,e\,i\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v)
$$

$$
{}_2F_1\left(\frac{-2\,e\,i\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d},\,n;\,\frac{d-2\,i\,e\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\Bigg)\Bigg/
$$

$$
((2\,i\,e\,k-i\,e\,m-p-2\,i\,c\,s+i\,c\,v)\,(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v))\Bigg)\sin\left(\frac{m\,\pi}{2}\right)\Bigg)+
$$

$$
\frac{2^{-m-v}\,a^{-n}\,e^{p\,z}\,(1-m \bmod 2)\,(1-v \bmod 2)}{p}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\,{}_2F_1\left(\frac{p}{d},\,n;\,\frac{d+p}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\,/;\,n\in\mathbb{N}^+\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+
$$

Involving powers of sin and algebraic functions of exp

Involving $\left(a+b\,e^{d\,z}\right)^{\beta}\sin^{m}(e\,z)\cos^{v}(c\,z)$

01.07.21.2644.01

$$\int \left(a+b\, e^{d z}\right)^{\beta} \sin^m(e z) \cos^{\nu}(c z)\, dz = 2^{-m-\nu} \left(a+b\, e^{d z}\right)^{\beta} \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\left(\left(\left(e^{(2 i e k - i e m + 2 i c s - i c \nu) z} \, _2F_1\left(\frac{2 i e k - i e m + 2 i c s - i c \nu}{d}, -\beta; \frac{d + 2 i e k - i e m + 2 i c s - i c \nu}{d}; -\frac{b\, e^{d z}}{a} \right) - e^{(-2 e i k + i e m - 2 i c s + i c \nu) z} \, _2F_1\left(\frac{-2 e i k + i e m - 2 i c s + i c \nu}{d}, -\beta; \frac{d - 2 i e k + i e m - 2 i c s + i c \nu}{d}; -\frac{b\, e^{d z}}{a} \right) \right) \Big/ (2 i e k - i e m + 2 i c s - i c \nu) + \left(e^{(2 i e k - i e m - 2 i c s + i c \nu) z} \, _2F_1\left(\frac{2 i e k - i e m - 2 i c s + i c \nu}{d}, -\beta; \frac{d + 2 i e k - i e m - 2 i c s + i c \nu}{d}; -\frac{b\, e^{d z}}{a} \right) - e^{(-2 e i k + i e m + 2 i c s - i c \nu) z} \, _2F_1\left(\frac{-2 e i k + i e m + 2 i c s - i c \nu}{d}, -\beta; \frac{d - 2 i e k + i e m + 2 i c s - i c \nu}{d}; -\frac{b\, e^{d z}}{a} \right) \right) \Big/ (2 i e k - i e m - 2 i c s + i c \nu) \right) \cos\left(\frac{m \pi}{2}\right) + i \left(\left(e^{(-2 e i k + i e m - 2 i c s + i c \nu) z} \, _2F_1\left(\frac{-2 e i k + i e m - 2 i c s + i c \nu}{d}, -\beta; \frac{d - 2 i e k + i e m - 2 i c s + i c \nu}{d}; -\frac{b\, e^{d z}}{a} \right) + e^{(2 i e k - i e m + 2 i c s - i c \nu) z} \, _2F_1\left(\frac{2 i e k - i e m + 2 i c s - i c \nu}{d}, -\beta; \frac{d + 2 i e k - i e m + 2 i c s - i c \nu}{d}; -\frac{b\, e^{d z}}{a} \right) \right) \Big/ (2 i e k - i e m + 2 i c s - i c \nu) + \left(e^{(2 i e k - i e m - 2 i c s + i c \nu) z} \, _2F_1\left(\frac{2 i e k - i e m - 2 i c s + i c \nu}{d}, -\beta; \frac{d + 2 i e k - i e m - 2 i c s + i c \nu}{d}; -\frac{b\, e^{d z}}{a} \right) + e^{(-2 e i k + i e m + 2 i c s - i c \nu) z} \, _2F_1\left(\frac{-2 e i k + i e m + 2 i c s - i c \nu}{d}, -\beta; \frac{d - 2 i e k + i e m + 2 i c s - i c \nu}{d}; -\frac{b\, e^{d z}}{a} \right) \right) \Big/ (2 i e k - i e m - 2 i c s + i c \nu) \right) \sin\left(\frac{m \pi}{2}\right) \right) \right)$$

$$\left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} + \frac{1}{d \beta} \left(2^{-m-\nu} \left(\frac{e^{-d z} a}{b} + 1 \right)^{-\beta} \left(a + b\, e^{d z}\right)^{\beta} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \, _2F_1\left(-\beta, -\beta; 1-\beta; -\frac{a\, e^{-d z}}{b}\right) (1 - m \bmod 2)(1 - \nu \bmod 2) \right) - \frac{1}{e} \left(i\, 2^{-m-\nu} \left(a + b\, e^{d z}\right)^{\beta} \right.$$

$$\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}$$

$$\binom{\nu}{\frac{\nu}{2}}$$

$$(1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{m-2k}$$

$$\left((-1)^k\binom{m}{k}\left(e^{i e (m-2k) z-\frac{i m\pi}{2}}\,{}_2F_1\!\left(\frac{i e (m-2k)}{d},-\beta;\frac{d+e i (m-2k)}{d};-\frac{b e^{dz}}{a}\right)-\right.\right.$$

$$\left.\left.e^{\frac{i m\pi}{2}-i e (m-2k) z}\,{}_2F_1\!\left(-\frac{i e (m-2k)}{d},-\beta;\frac{d-i e (m-2k)}{d};-\frac{b e^{dz}}{a}\right)\right)\right)-$$

$$\frac{1}{c}\left(i\,2^{-m-\nu}\left(a+b e^{dz}\right)^{\beta}\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\nu-2s}\right.$$

$$\left(\binom{\nu}{s}\left(e^{i c (\nu-2s) z}\,{}_2F_1\!\left(\frac{i c (\nu-2s)}{d},-\beta;\frac{d+c i (\nu-2s)}{d};-\frac{b e^{dz}}{a}\right)-\right.\right.$$

$$\left.\left.\left.e^{-i c (\nu-2s) z}\,{}_2F_1\!\left(-\frac{i c (\nu-2s)}{d},-\beta;\frac{d-i c (\nu-2s)}{d};-\frac{b e^{dz}}{a}\right)\right)\right)\right)\,/;\,m\in\mathbb{N}^+\bigwedge\nu\in\mathbb{N}^+$$

Involving $e^{pz}\left(a+b\,e^{dz}\right)^{\beta}\sin^m(e\,z)\cos^{\nu}(c\,z)$

01.07.21.2645.01

$$\int e^{pz}\left(a+b e^{dz}\right)^{\beta}\sin^m(e z)\cos^{\nu}(c z)\,dz = 2^{-m-\nu}\left(a+b e^{dz}\right)^{\beta}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\left((-1)^k\binom{m}{k}\left(e^{(e i (m-2k)+p) z-\frac{i m\pi}{2}}\,(i e (m-2k)-p)\,{}_2F_1\!\left(\frac{e i (m-2k)+p}{d},-\beta;\frac{d+e i (m-2k)+p}{d};-\frac{b e^{dz}}{a}\right)-\right.\right.$$

$$\left.\left.e^{\frac{i\pi m}{2}+(p-i e (m-2k)) z}\,(e i (m-2k)+p)\,{}_2F_1\!\left(\frac{p-i e (m-2k)}{d},-\beta;\frac{d-i e (m-2k)+p}{d};-\frac{b e^{dz}}{a}\right)\right)\right)\Big/$$

$$((i e (m-2k)-p)(e i (m-2k)+p))+2^{-m-\nu}\left(a+b e^{dz}\right)^{\beta}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left(\binom{\nu}{s}\left(e^{(p+c i (\nu-2s)) z}\,(i c (\nu-2s)-p)\,{}_2F_1\!\left(\frac{p+c i (\nu-2s)}{d},-\beta;\frac{d+p+c i (\nu-2s)}{d};-\frac{b e^{dz}}{a}\right)-\right.\right.$$

$$\left.\left.e^{(p-i c (\nu-2s)) z}\,(p+c i (\nu-2s))\,{}_2F_1\!\left(\frac{p-i c (\nu-2s)}{d},-\beta;\frac{d+p-i c (\nu-2s)}{d};-\frac{b e^{dz}}{a}\right)\right)\right)\Big/$$

$$((i\,c\,(v-2\,s)-p)\,(p+c\,i\,(v-2\,s)))+2^{-m-v}\left(a+b\,e^{d\,z}\right)^{\beta}\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\Bigg(\Bigg(\Bigg(e^{(2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m-p+2\,i\,c\,s-i\,c\,v)$$

$${}_2F_1\left(\frac{2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d},-\beta;\,\frac{d+2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d};-\frac{b\,e^{d\,z}}{a}\right)-$$

$$e^{(-2\,e\,i\,k+i\,e\,m+p-2\,i\,c\,s+i\,c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v)\,{}_2F_1\Bigg(\frac{-2\,e\,i\,k+i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d},$$

$$-\beta;\,\frac{d-2\,i\,e\,k+i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d};-\frac{b\,e^{d\,z}}{a}\Bigg)\Bigg)\Big/((2\,i\,e\,k-i\,e\,m-p+2\,i\,c\,s-i\,c\,v)$$

$$(2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v))+\Bigg(e^{(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m-p-2\,i\,c\,s+i\,c\,v)$$

$${}_2F_1\left(\frac{2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d},-\beta;\,\frac{d+2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d};-\frac{b\,e^{d\,z}}{a}\right)-$$

$$e^{(-2\,e\,i\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v)$$

$${}_2F_1\left(\frac{-2\,e\,i\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d},-\beta;\,\frac{d-2\,i\,e\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d};-\frac{b\,e^{d\,z}}{a}\right)\Bigg)\Big/$$

$$((2\,i\,e\,k-i\,e\,m-p-2\,i\,c\,s+i\,c\,v)\,(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v))\Bigg)\cos\left(\frac{m\,\pi}{2}\right)+$$

$$i\Bigg(\Bigg(\Bigg(e^{(-2\,e\,i\,k+i\,e\,m+p-2\,i\,c\,s+i\,c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v)\,{}_2F_1\Bigg(\frac{-2\,e\,i\,k+i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d},$$

$$-\beta;\,\frac{d-2\,i\,e\,k+i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d};-\frac{b\,e^{d\,z}}{a}\Bigg)+e^{(2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v)\,z}$$

$$(2\,i\,e\,k-i\,e\,m-p+2\,i\,c\,s-i\,c\,v)\,{}_2F_1\Bigg(\frac{2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d},-\beta;$$

$$\frac{d+2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d};-\frac{b\,e^{d\,z}}{a}\Bigg)\Bigg)\Big/((2\,i\,e\,k-i\,e\,m-p+2\,i\,c\,s-i\,c\,v)$$

$$(2\,i\,e\,k-i\,e\,m+p+2\,i\,c\,s-i\,c\,v))+\Bigg(e^{(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m-p-2\,i\,c\,s+i\,c\,v)$$

$${}_2F_1\left(\frac{2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d},-\beta;\,\frac{d+2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v}{d};-\frac{b\,e^{d\,z}}{a}\right)+$$

$$e^{(-2\,e\,i\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v)$$

$${}_2F_1\left(\frac{-2\,e\,i\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d},-\beta;\,\frac{d-2\,i\,e\,k+i\,e\,m+p+2\,i\,c\,s-i\,c\,v}{d};-\frac{b\,e^{d\,z}}{a}\right)\Bigg)\Big/$$

$$((2\,i\,e\,k-i\,e\,m-p-2\,i\,c\,s+i\,c\,v)\,(2\,i\,e\,k-i\,e\,m+p-2\,i\,c\,s+i\,c\,v))\Bigg)\sin\left(\frac{m\,\pi}{2}\right)\Bigg)+$$

$$\frac{2^{-m-v}\,e^{p\,z}\,(1-m\bmod 2)\,(1-v\bmod 2)}{p}\left(a+b\,e^{d\,z}\right)^{\beta}\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}$$

$$\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}\, {}_2F_1\left(\frac{p}{d}, -\beta; \frac{d+p}{d}; -\frac{b\,e^{d z}}{a}\right) /; m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving products of the direct function, trigonometric and exponential functions

Involving sin and exp

Involving $e^{p z} \sin(a z) \cos(b z) \cos(c z)$

01.07.21.2646.01

$$\int e^{p z} \sin(a z) \cos(b z) \cos(c z)\, dz = -\frac{1}{4} e^{p z} \left(\frac{(a-b-c)\cos((a-b-c) z) - p \sin((a-b-c) z)}{a^2 - 2 (b+c) a + b^2 + c^2 + p^2 + 2 b c} + \frac{(a+b-c)\cos((a+b-c) z) - p \sin((a+b-c) z)}{(a+b-c-i p)(a+b-c+i p)} + \frac{(a-b+c)\cos((a-b+c) z) - p \sin((a-b+c) z)}{(a-b+c-i p)(a-b+c+i p)} + \frac{(a+b+c)\cos((a+b+c) z) - p \sin((a+b+c) z)}{(a+b+c-i p)(a+b+c+i p)}\right)$$

Involving rational functions of sin and exp

Involving $\frac{e^{p z} \cos(d z) \cos(e z)}{a+b \sin(c z)}$

01.07.21.2647.01

$$\int \frac{e^{p z} \cos(e z) \cos(d z)}{a + b \sin(c z)} \, dz = \frac{1}{4} \left(-\left(i\, e^{(i c + i d + i e + p) z} \left(\left(a + \sqrt{a^2 - b^2}\right) {}_2F_1\left(-\frac{i (i c + i d + i e + p)}{c}, 1; 2 - \frac{i (i d + i e + p)}{c}; -\frac{i b e^{i c z}}{\sqrt{a^2 - b^2} - a}\right) + \left(\sqrt{a^2 - b^2} - a\right) {}_2F_1\left(-\frac{i (i c + i d + i e + p)}{c}, 1; 2 - \frac{i (i d + i e + p)}{c}; \frac{i b e^{i c z}}{a + \sqrt{a^2 - b^2}}\right)\right)\right) \Big/ \left(b \sqrt{a^2 - b^2} (i c + i d + i e + p)\right) - \left(i\, e^{(i c - i d + i e + p) z} \left(\left(a + \sqrt{a^2 - b^2}\right) {}_2F_1\left(-\frac{i (i c - i d + i e + p)}{c}, 1; 2 - \frac{i (-i d + i e + p)}{c}; -\frac{i b e^{i c z}}{\sqrt{a^2 - b^2} - a}\right) + \left(\sqrt{a^2 - b^2} - a\right) {}_2F_1\left(-\frac{i (i c - i d + i e + p)}{c}, 1; 2 - \frac{i (-i d + i e + p)}{c}; \frac{i b e^{i c z}}{a + \sqrt{a^2 - b^2}}\right)\right)\right) \Big/ \left(b \sqrt{a^2 - b^2} (i c - i d + i e + p)\right) - \left(i\, e^{(i c + i d - i e + p) z} \left(\left(a + \sqrt{a^2 - b^2}\right) {}_2F_1\left(-\frac{i (i c + i d - i e + p)}{c}, 1; 2 - \frac{i (i d - i e + p)}{c}; -\frac{i b e^{i c z}}{\sqrt{a^2 - b^2} - a}\right) + \left(\sqrt{a^2 - b^2} - a\right) {}_2F_1\left(-\frac{i (i c + i d - i e + p)}{c}, 1; 2 - \frac{i (i d - i e + p)}{c}; \frac{i b e^{i c z}}{a + \sqrt{a^2 - b^2}}\right)\right)\right) \Big/ \left(b \sqrt{a^2 - b^2} (i c + i d - i e + p)\right) - \left(i\, e^{(i c - i d - i e + p) z} \left(\left(a + \sqrt{a^2 - b^2}\right) {}_2F_1\left(-\frac{i (i c - i d - i e + p)}{c}, 1; 2 - \frac{i (-i d - i e + p)}{c}; -\frac{i b e^{i c z}}{\sqrt{a^2 - b^2} - a}\right) + \left(\sqrt{a^2 - b^2} - a\right) {}_2F_1\left(-\frac{i (i c - i d - i e + p)}{c}, 1; 2 - \frac{i (-i d - i e + p)}{c}; \frac{i b e^{i c z}}{a + \sqrt{a^2 - b^2}}\right)\right)\right) \Big/ \left(b \sqrt{a^2 - b^2} (i c - i d - i e + p)\right) \right)$$

Involving $e^{p z} \cos(d z) \cos(e z) (a + b \sin(c z))^{-n}$

01.07.21.2648.01

$$\int \frac{e^{p z} \cos(e z) \cos(d z)}{(a + b \sin(c z))^2} \, dz = \frac{1}{4} \left(\left(\left(i\, e^{(i c + i d + i e + p) z} \left(-a \left(a + \sqrt{a^2 - b^2}\right) {}_2F_1\left(-\frac{i (i c + i d + i e + p)}{c}, 1; 2 - \frac{i (i d + i e + p)}{c}; -\frac{i b e^{i c z}}{\sqrt{a^2 - b^2} - a}\right) + \right.\right.\right.\right.$$

$$a\left(a-\sqrt{a^2-b^2}\right)\,{}_2F_1\!\left(-\frac{i\,(i\,c+i\,d+i\,e+p)}{c},\,1;\,2-\frac{i\,(i\,d+i\,e+p)}{c};\,\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\;a-b^2\right)\,{}_2F_1\!\left(-\frac{i\,(i\,c+i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d+i\,e+p)}{c};\,-\frac{i\,b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+$$

$$\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right)\,{}_2F_1\!\left(-\frac{i\,(i\,c+i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d+i\,e+p)}{c};\,\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(b\left(a^2-b^2\right)^{3/2}(i\,c+i\,d+i\,e+p)\right)+\Bigg(i\,e^{(i\,c-i\,d+i\,e+p)\,z}\Bigg(-a\left(a+\sqrt{a^2-b^2}\right)$$

$${}_2F_1\!\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,-\frac{i\,b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+a\left(a-\sqrt{a^2-b^2}\right)$$

$${}_2F_1\!\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+\left(a^2+\sqrt{a^2-b^2}\;a-b^2\right)$$

$${}_2F_1\!\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,-\frac{i\,b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right)$$

$${}_2F_1\!\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg/\left(b\left(a^2-b^2\right)^{3/2}(i\,c-i\,d+i\,e+p)\right)+$$

$$\Bigg(i\,e^{(i\,c+i\,d-i\,e+p)\,z}\Bigg(-a\left(a+\sqrt{a^2-b^2}\right)\,{}_2F_1\!\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,-\frac{i\,b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+$$

$$a\left(a-\sqrt{a^2-b^2}\right)\,{}_2F_1\!\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2-b^2}\;a-b^2\right)\,{}_2F_1\!\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,-\frac{i\,b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+$$

$$\left(-a^2+\sqrt{a^2-b^2}\;a+b^2\right)\,{}_2F_1\!\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg/$$

$$\left(b\left(a^2-b^2\right)^{3/2}(i\,c+i\,d-i\,e+p)\right)+\Bigg(i\,e^{(i\,c-i\,d-i\,e+p)\,z}\Bigg(-a\left(a+\sqrt{a^2-b^2}\right)$$

$$ {}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,-\frac{i\,b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+a\left(a-\sqrt{a^2-b^2}\right) $$

$$ {}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+\left(a^2+\sqrt{a^2-b^2}\,a-b^2\right) $$

$$ {}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,-\frac{i\,b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\left(-a^2+\sqrt{a^2-b^2}\,a+b^2\right) $$

$$ {}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,\frac{i\,b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg/\left(b\left(a^2-b^2\right)^{3/2}\,(i\,c-i\,d-i\,e+p)\right) $$

Involving $\frac{e^{p\,z}\cos(d\,z)\cos(e\,z)}{a+b\sin^2(c\,z)}$

01.07.21.2649.01

$$\int \frac{e^{p z}\cos(e z)\cos(d z)}{a+b\sin^2(c z)}\,dz = \frac{1}{4}\Bigg(-\Bigg(e^{(-2 i c+i d+i e+p) z}\Bigg(\Big(2 a+2\sqrt{a+b}\sqrt{a}+b\Big)\,{}_2F_1\Big(\frac{i(i d+i e+p)}{2 c}+1,1;\frac{i(i d+i e+p)}{2 c}+2;-\frac{b e^{-2 i c z}}{-2 a+2\sqrt{a+b}\sqrt{a}-b}\Big)+$$
$$\Big(-2 a+2\sqrt{a+b}\sqrt{a}-b\Big)\,{}_2F_1\Big(\frac{i(i d+i e+p)}{2 c}+1,1;\frac{i(i d+i e+p)}{2 c}+2;-\frac{b e^{-2 i c z}}{-2 a-2\sqrt{a+b}\sqrt{a}-b}\Big)\Bigg)\Bigg)\Big/\Big(\sqrt{a}\,b\sqrt{a+b}\,(-2 i c+i d+i e+p)\Big)-$$
$$\Bigg(e^{(-2 i c-i d+i e+p) z}\Bigg(\Big(2 a+2\sqrt{a+b}\sqrt{a}+b\Big)\,{}_2F_1\Big(\frac{i(-i d+i e+p)}{2 c}+1,1;\frac{i(-i d+i e+p)}{2 c}+2;-\frac{b e^{-2 i c z}}{-2 a+2\sqrt{a+b}\sqrt{a}-b}\Big)+\Big(-2 a+2\sqrt{a+b}\sqrt{a}-b\Big)$$
$${}_2F_1\Big(\frac{i(-i d+i e+p)}{2 c}+1,1;\frac{i(-i d+i e+p)}{2 c}+2;-\frac{b e^{-2 i c z}}{-2 a-2\sqrt{a+b}\sqrt{a}-b}\Big)\Bigg)\Bigg)\Big/$$
$$\Big(\sqrt{a}\,b\sqrt{a+b}\,(-2 i c-i d+i e+p)\Big)-\Bigg(e^{(-2 i c+i d-i e+p) z}\Bigg(\Big(2 a+2\sqrt{a+b}\sqrt{a}+b\Big)$$
$${}_2F_1\Big(\frac{i(i d-i e+p)}{2 c}+1,1;\frac{i(i d-i e+p)}{2 c}+2;-\frac{b e^{-2 i c z}}{-2 a+2\sqrt{a+b}\sqrt{a}-b}\Big)+$$
$$\Big(-2 a+2\sqrt{a+b}\sqrt{a}-b\Big)\,{}_2F_1\Big(\frac{i(i d-i e+p)}{2 c}+1,1;\frac{i(i d-i e+p)}{2 c}+2;-\frac{b e^{-2 i c z}}{-2 a-2\sqrt{a+b}\sqrt{a}-b}\Big)\Bigg)\Bigg)\Big/$$
$$\Big(\sqrt{a}\,b\sqrt{a+b}\,(-2 i c+i d-i e+p)\Big)-\Bigg(e^{(-2 i c-i d-i e+p) z}$$
$$\Bigg(\Big(2 a+2\sqrt{a+b}\sqrt{a}+b\Big)\,{}_2F_1\Big(\frac{i(-i d-i e+p)}{2 c}+1,1;\frac{i(-i d-i e+p)}{2 c}+2;-\frac{b e^{-2 i c z}}{-2 a+2\sqrt{a+b}\sqrt{a}-b}\Big)+$$
$$\Big(-2 a+2\sqrt{a+b}\sqrt{a}-b\Big)\,{}_2F_1\Big(\frac{i(-i d-i e+p)}{2 c}+1,1;\frac{i(-i d-i e+p)}{2 c}+2;$$
$$-\frac{b e^{-2 i c z}}{-2 a-2\sqrt{a+b}\sqrt{a}-b}\Big)\Bigg)\Bigg)\Big/\Big(\sqrt{a}\,b\sqrt{a+b}\,(-2 i c-i d-i e+p)\Big)\Bigg)$$

Involving $e^{p z}\cos(d z)\cos(e z)\left(a+b\sin^2(c z)\right)^{-n}$

01.07.21.2650.01

$$\int \frac{e^{p z}\cos(e z)\cos(d z)}{\left(a+b\sin^2(c z)\right)^2}\,dz =$$
$$\frac{1}{4}\Bigg(-\Bigg(e^{(2 i c+i d+i e+p) z}\Bigg((2 a+b)\Big(2 a+2\sqrt{a+b}\sqrt{a}+b\Big)\,{}_2F_1\Big(1-\frac{i(i d+i e+p)}{2 c},1;2-\frac{i(i d+i e+p)}{2 c};$$

$$-\frac{b\,e^{2 i c z}}{-2 a+2 \sqrt{a+b}\,\sqrt{a}-b}\Bigg)+(2 a+b)\left(-2 a+2 \sqrt{a+b}\,\sqrt{a}-b\right)$$

$$ {}_2F_1\left(1-\frac{i\,(i\,d+i\,e+p)}{2 c}, 1; 2-\frac{i\,(i\,d+i\,e+p)}{2 c}; -\frac{b\,e^{2 i c z}}{-2 a-2 \sqrt{a+b}\,\sqrt{a}-b}\right)+$$

$$2 \sqrt{a}\,\Bigg(\left(-2 a^{3/2}-2 \sqrt{a+b}\,a-2 b \sqrt{a}-b \sqrt{a+b}\right) {}_2F_1\Bigg(1-\frac{i\,(i\,d+i\,e+p)}{2 c}, 2; 2-\frac{i\,(i\,d+i\,e+p)}{2 c};$$

$$-\frac{b\,e^{2 i c z}}{-2 a+2 \sqrt{a+b}\,\sqrt{a}-b}\Bigg)+\left(2 a^{3/2}-2 \sqrt{a+b}\,a+2 b \sqrt{a}-b \sqrt{a+b}\right)$$

$$ {}_2F_1\left(1-\frac{i\,(i\,d+i\,e+p)}{2 c}, 2; 2-\frac{i\,(i\,d+i\,e+p)}{2 c}; -\frac{b\,e^{2 i c z}}{-2 a-2 \sqrt{a+b}\,\sqrt{a}-b}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(2 a^{3/2} b\,(a+b)^{3/2} (2 i c+i d+i e+p)\right)-\Bigg(e^{(2 i c-i d+i e+p) z}\Bigg((2 a+b)\left(2 a+2 \sqrt{a+b}\,\sqrt{a}+b\right)$$

$$ {}_2F_1\left(1-\frac{i\,(-i\,d+i\,e+p)}{2 c}, 1; 2-\frac{i\,(-i\,d+i\,e+p)}{2 c}; -\frac{b\,e^{2 i c z}}{-2 a+2 \sqrt{a+b}\,\sqrt{a}-b}\right)+(2 a+b)\Big(-2 a+$$

$$2 \sqrt{a+b}\,\sqrt{a}-b\Big) {}_2F_1\left(1-\frac{i\,(-i\,d+i\,e+p)}{2 c}, 1; 2-\frac{i\,(-i\,d+i\,e+p)}{2 c}; -\frac{b\,e^{2 i c z}}{-2 a-2 \sqrt{a+b}\,\sqrt{a}-b}\right)+$$

$$2 \sqrt{a}\,\Bigg(\left(-2 a^{3/2}-2 \sqrt{a+b}\,a-2 b \sqrt{a}-b \sqrt{a+b}\right) {}_2F_1\Bigg(1-\frac{i\,(-i\,d+i\,e+p)}{2 c}, 2; 2-$$

$$\frac{i\,(-i\,d+i\,e+p)}{2 c}; -\frac{b\,e^{2 i c z}}{-2 a+2 \sqrt{a+b}\,\sqrt{a}-b}\Bigg)+\left(2 a^{3/2}-2 \sqrt{a+b}\,a+2 b \sqrt{a}-b \sqrt{a+b}\right)$$

$$ {}_2F_1\left(1-\frac{i\,(-i\,d+i\,e+p)}{2 c}, 2; 2-\frac{i\,(-i\,d+i\,e+p)}{2 c}; -\frac{b\,e^{2 i c z}}{-2 a-2 \sqrt{a+b}\,\sqrt{a}-b}\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(2 a^{3/2} b\,(a+b)^{3/2} (2 i c-i d+i e+p)\right)-\Bigg(e^{(2 i c+i d-i e+p) z}\Bigg((2 a+b)\left(2 a+2 \sqrt{a+b}\,\sqrt{a}+b\right)$$

$$ {}_2F_1\left(1-\frac{i\,(i\,d-i\,e+p)}{2 c}, 1; 2-\frac{i\,(i\,d-i\,e+p)}{2 c}; -\frac{b\,e^{2 i c z}}{-2 a+2 \sqrt{a+b}\,\sqrt{a}-b}\right)+(2 a+b)$$

$$\left(-2 a+2 \sqrt{a+b}\,\sqrt{a}-b\right) {}_2F_1\left(1-\frac{i\,(i\,d-i\,e+p)}{2 c}, 1; 2-\frac{i\,(i\,d-i\,e+p)}{2 c}; -\frac{b\,e^{2 i c z}}{-2 a-2 \sqrt{a+b}\,\sqrt{a}-b}\right)+$$

$$2 \sqrt{a}\,\Bigg(\left(-2 a^{3/2}-2 \sqrt{a+b}\,a-2 b \sqrt{a}-b \sqrt{a+b}\right) {}_2F_1\Bigg(1-\frac{i\,(i\,d-i\,e+p)}{2 c}, 2; 2-\frac{i\,(i\,d-i\,e+p)}{2 c};$$

$$-\frac{b\,e^{2 i c z}}{-2 a+2 \sqrt{a+b}\,\sqrt{a}-b}\Bigg)+\left(2 a^{3/2}-2 \sqrt{a+b}\,a+2 b \sqrt{a}-b \sqrt{a+b}\right)$$

$$ {}_2F_1\left(1-\frac{i\,(i\,d-i\,e+p)}{2 c}, 2; 2-\frac{i\,(i\,d-i\,e+p)}{2 c}; -\frac{b\,e^{2 i c z}}{-2 a-2 \sqrt{a+b}\,\sqrt{a}-b}\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(2 a^{3/2} b\,(a+b)^{3/2} (2 i c+i d-i e+p)\right)-\Bigg(e^{(2 i c-i d-i e+p) z}\Bigg((2 a+b)\left(2 a+2 \sqrt{a+b}\,\sqrt{a}+b\right)$$

$$ {}_2F_1\left(1-\frac{i(-i d-i e+p)}{2c}, 1; 2-\frac{i(-i d-i e+p)}{2c}; -\frac{b e^{2icz}}{-2a+2\sqrt{a+b}\sqrt{a}-b}\right)+ $$

$$ (2a+b)\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{i(-i d-i e+p)}{2c}, 1; 2-\frac{i(-i d-i e+p)}{2c}; \right. $$

$$ \left.-\frac{b e^{2icz}}{-2a-2\sqrt{a+b}\sqrt{a}-b}\right)+2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a+b}\,a-2b\sqrt{a}-b\sqrt{a+b}\right)\right. $$

$$ {}_2F_1\left(1-\frac{i(-i d-i e+p)}{2c}, 2; 2-\frac{i(-i d-i e+p)}{2c}; -\frac{b e^{2icz}}{-2a+2\sqrt{a+b}\sqrt{a}-b}\right)+ $$

$$ \left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(1-\frac{i(-i d-i e+p)}{2c}, 2; 2-\right. $$

$$ \left.\left.\left.\left.\frac{i(-i d-i e+p)}{2c}; -\frac{b e^{2icz}}{-2a-2\sqrt{a+b}\sqrt{a}-b}\right)\right)\right)\right)\Big/\left(2a^{3/2}\,b\,(a+b)^{3/2}\,(2ic-id-ie+p)\right) $$

Involving algebraic functions of sin and exp

Involving $e^{pz}\cos(dz)\cos(ez)(a+b\sin(cz))^{\beta}$

01.07.21.2651.01

$$ \int e^{pz}\cos(dz)\cos(ez)(a+b\sin(cz))^{\beta}\,dz = -\frac{1}{4}\,i\left(1+\frac{i b e^{icz}}{\sqrt{a^2-b^2}-a}\right)^{-\beta}\left(1-\frac{i b e^{icz}}{a+\sqrt{a^2-b^2}}\right)^{-\beta}(a+b\sin(cz))^{\beta} $$

$$ \left(\frac{e^{(id+ie+p)z}}{d+e-ip-c\beta}F_1\left(\frac{d+e-ip-c\beta}{c}; -\beta, -\beta; \frac{-\beta c+c+d+e-ip}{c}; \frac{i b e^{icz}}{a+\sqrt{a^2-b^2}}, \frac{i b e^{icz}}{a-\sqrt{a^2-b^2}}\right)-\right. $$

$$ \frac{e^{(-id+ie+p)z}}{d-e+ip+c\beta}F_1\left(-\frac{d-e+ip+c\beta}{c}; -\beta, -\beta; \frac{-\beta c+c-d+e-ip}{c}; \frac{i b e^{icz}}{a+\sqrt{a^2-b^2}}, \frac{i b e^{icz}}{a-\sqrt{a^2-b^2}}\right)- $$

$$ \frac{e^{-i(d+e+ip)z}}{d+e+ip+c\beta}F_1\left(-\frac{d+e+ip+c\beta}{c}; -\beta, -\beta; -\frac{d+e+ip+c(\beta-1)}{c}; \frac{i b e^{icz}}{a+\sqrt{a^2-b^2}}, \frac{i b e^{icz}}{a-\sqrt{a^2-b^2}}\right)- $$

$$ \left.\frac{e^{(id-ie+p)z}}{-d+e+ip+c\beta}F_1\left(-\frac{-d+e+ip+c\beta}{c}; -\beta, -\beta; \frac{-\beta c+c+d-e-ip}{c}; \frac{i b e^{icz}}{a+\sqrt{a^2-b^2}}, \frac{i b e^{icz}}{a-\sqrt{a^2-b^2}}\right)\right) $$

Involving $e^{pz}\cos(dz)\cos(ez)\left(a+b\sin^2(cz)\right)^{\beta}$

01.07.21.2652.01

$$\int e^{pz}\cos(dz)\cos(ez)\left(a+b\sin^2(cz)\right)^{\beta}\,dz = -\frac{1}{4}i\left(1-\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)^{-\beta}\left(1-\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}}\right)^{-\beta}\left(a-\frac{1}{4}b\,e^{-2icz}\left(-1+e^{2icz}\right)^2\right)^{\beta}$$
$$\left(\frac{e^{(id+ie+p)z}}{d+e-ip-2c\beta}F_1\left(\frac{d+e-ip-2c\beta}{2c};-\beta,-\beta;\frac{-2\beta c+2c+d+e-ip}{2c};\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}},\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)+\frac{e^{(id-ie+p)z}}{d-e-ip-2c\beta}F_1\left(-\frac{-d+e+ip+2c\beta}{2c};-\beta,-\beta;-\frac{-d+e+ip+2c(\beta-1)}{2c};\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}},\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)-\frac{e^{(-id+ie+p)z}}{d-e+ip+2c\beta}F_1\left(-\frac{d-e+ip+2c\beta}{2c};-\beta,-\beta;-\frac{d-e+ip+2c(\beta-1)}{2c};\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}},\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)-\frac{e^{-i(d+e+ip)z}}{d+e+ip+2c\beta}F_1\left(-\frac{d+e+ip+2c\beta}{2c};-\beta,-\beta;-\frac{d+e+ip+2c(\beta-1)}{2c};\frac{b\,e^{2icz}}{2a+b+2\sqrt{a(a+b)}},\frac{b\,e^{2icz}}{2a+b-2\sqrt{a(a+b)}}\right)\right)$$

Involving rational functions of the direct function, trigonometric and exponential functions

Involving sin and exp

Involving $\frac{e^{pz}\sin(dz)}{a+b\cos(cz)}$

01.07.21.2653.01

$$\int\frac{e^{pz}\sin(dz)}{a+b\cos(cz)}\,dz = \frac{1}{2b\sqrt{a^2-b^2}}\left(i\left(\frac{1}{c+d-ip}\left(i\,e^{(ic+id+p)z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d-ip}{c},1;\frac{2c+d-ip}{c};\frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d-ip}{c},1;\frac{2c+d-ip}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-\frac{1}{c-d-ip}\left(i\,e^{(ic-id+p)z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c-d-ip}{c},1;-\frac{-2c+d+ip}{c};\frac{b\,e^{icz}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c-d-ip}{c},1;-\frac{-2c+d+ip}{c};-\frac{b\,e^{icz}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)$$

Involving $e^{pz}\sin(dz)\left(a+b\cos(cz)\right)^{-n}$

01.07.21.2654.01

$$\int \frac{e^{p z}\sin(d z)}{(a+b\cos(c z))^2}\,dz = \frac{i}{2b\left(a^2-b^2\right)^{3/2}}\left(\frac{1}{i c - i d + p}\left(e^{(i c - i d + p) z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c-d-i p}{c}, 1; -\frac{-2c+d+i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c-d-i p}{c}, 1; -\frac{-2c+d+i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right) + \left(b^2-a^2\right)\left({}_2F_1\left(\frac{c-d-i p}{c}, 2; -\frac{-2c+d+i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) - {}_2F_1\left(\frac{c-d-i p}{c}, 2; -\frac{-2c+d+i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right) - a\sqrt{a^2-b^2}\left({}_2F_1\left(\frac{c-d-i p}{c}, 2; -\frac{-2c+d+i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + {}_2F_1\left(\frac{c-d-i p}{c}, 2; -\frac{-2c+d+i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right) - \frac{1}{i c + i d + p}\left(e^{(i c + i d + p) z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(\frac{c+d-i p}{c}, 1; \frac{2c+d-i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(\frac{c+d-i p}{c}, 1; \frac{2c+d-i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right) + \left(b^2-a^2\right)\left({}_2F_1\left(\frac{c+d-i p}{c}, 2; \frac{2c+d-i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) - {}_2F_1\left(\frac{c+d-i p}{c}, 2; \frac{2c+d-i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right) - a\sqrt{a^2-b^2}\left({}_2F_1\left(\frac{c+d-i p}{c}, 2; \frac{2c+d-i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right) + {}_2F_1\left(\frac{c+d-i p}{c}, 2; \frac{2c+d-i p}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)$$

Involving $\frac{e^{p z}\sin(d z)}{a+b\cos^2(c z)}$

01.07.21.2655.01

$$\int \frac{e^{p z} \sin(d z)}{a + b \cos^2(c z)} \, dz = \frac{i}{2 \sqrt{a} \, b \sqrt{a+b}} \left(\frac{1}{2 i c + i d + p} \left(e^{(2 i c + i d + p) z} \left(\left(2 a - 2 \sqrt{a+b} \sqrt{a} + b \right) {}_2F_1\left(\frac{2 c + d - i p}{2 c}, 1; \frac{4 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) - \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b \right) {}_2F_1\left(\frac{2 c + d - i p}{2 c}, 1; \frac{4 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) - \frac{1}{2 i c - i d + p} \left(e^{(2 i c - i d + p) z} \left(\left(2 a - 2 \sqrt{a+b} \sqrt{a} + b \right) {}_2F_1\left(1 - \frac{d + i p}{2 c}, 1; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) - \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b \right) {}_2F_1\left(1 - \frac{d + i p}{2 c}, 1; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) \right)$$

Involving $e^{p z} \sin(d z) \left(a + b \cos^2(c z)\right)^{-n}$

01.07.21.2656.01

$$\int \frac{e^{p z} \sin(d z)}{\left(a + b \cos^2(c z)\right)^2} \, dz = \frac{1}{4 a^{3/2} b (a+b)^{3/2}} \left(i \left(\frac{1}{2 i c + i d + p} \left(e^{(2 i c + i d + p) z} \left(-(2 a + b) \left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b \right) {}_2F_1\left(\frac{2 c + d - i p}{2 c}, 1; \frac{4 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) - (2 a + b) \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b \right) {}_2F_1\left(\frac{2 c + d - i p}{2 c}, 1; \frac{4 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) + 2 \sqrt{a} \left(\left(-2 a^{3/2} + 2 \sqrt{a+b} \, a - 2 b \sqrt{a} + b \sqrt{a+b} \right) {}_2F_1\left(\frac{2 c + d - i p}{2 c}, 2; \frac{4 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a^{3/2} + 2 \sqrt{a+b} \, a + 2 b \sqrt{a} + b \sqrt{a+b} \right) {}_2F_1\left(\frac{2 c + d - i p}{2 c}, 2; \frac{4 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) \right) - \frac{1}{2 i c - i d + p} \left(e^{(2 i c - i d + p) z} \left(-(2 a + b) \left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b \right) {}_2F_1\left(1 - \frac{d + i p}{2 c}, 1; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) - (2 a + b) \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b \right) {}_2F_1\left(1 - \frac{d + i p}{2 c}, 1; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) + 2 \sqrt{a} \left(\left(-2 a^{3/2} + 2 \sqrt{a+b} \, a - 2 b \sqrt{a} + b \sqrt{a+b} \right) {}_2F_1\left(1 - \frac{d + i p}{2 c}, 2; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a^{3/2} + 2 \sqrt{a+b} \, a + 2 b \sqrt{a} + b \sqrt{a+b} \right) {}_2F_1\left(1 - \frac{d + i p}{2 c}, 2; 2 - \frac{d + i p}{2 c}; -\frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) \right) \right)$$

Involving $\frac{e^{p z} \sin(d z) \cos(e z)}{a+b \cos(c z)}$

01.07.21.2657.01

$$\int \frac{e^{p z} \sin(d z) \cos(e z)}{a + b \cos(c z)} \, dz = -\frac{1}{4 b \sqrt{a^2 - b^2}} \left(\frac{1}{c + d - e - i p} \left(e^{i (c+d-e-i p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c + d - e - i p}{c}, 1; \frac{2 c + d - e - i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c + d - e - i p}{c}, 1; \frac{2 c + d - e - i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) - \frac{1}{c - d + e - i p} \left(e^{i (c-d+e-i p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c - d + e - i p}{c}, 1; \frac{2 c - d + e - i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c - d + e - i p}{c}, 1; \frac{2 c - d + e - i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) + \frac{1}{c + d + e - i p} \left(e^{i (c+d+e-i p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c + d + e - i p}{c}, 1; \frac{2 c + d + e - i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c + d + e - i p}{c}, 1; \frac{2 c + d + e - i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) + \frac{1}{-c + d + e + i p} \left(e^{(i c - i (d+e+i p)) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{-c + d + e + i p}{c}, 1; -\frac{-2 c + d + e + i p}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{-c + d + e + i p}{c}, 1; -\frac{-2 c + d + e + i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \right)$$

Involving $e^{p z} \sin(d z) \cosh(e z) (a + b \cos(c z))^{-n}$

01.07.21.2658.01

$$\int \frac{e^{p z} \sin(d z) \cos(e z)}{(a + b \cos(c z))^2} \, dz = -\frac{1}{4} i \left(\left(e^{(i c + i d + i e + p) z} \left(a \left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i (i c + i d + i e + p)}{c}, 1; 2 - \frac{i (i d + i e + p)}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + a \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i (i c + i d + i e + p)}{c}, 1; 2 - \frac{i (i d + i e + p)}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) + \right.\right.\right.$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d+i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}\;-a}\right)-\right.$$

$$\left.\left.{}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d+i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-$$

$$a\sqrt{a^2-b^2}\left({}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d+i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}\;-a}\right)+{}_2F_1\left(-\frac{i\,(i\,c+i\,d+i\,e+p)}{c},\right.\right.$$

$$\left.\left.\left.\left.\left.2;\,2-\frac{i\,(i\,d+i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)\Big/\left(b\left(a^2-b^2\right)^{3/2}(i\,c+i\,d+i\,e+p)\right)+$$

$$\left(e^{(i\,c+i\,d-i\,e+p)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}\;-a}\right)+\right.\right.$$

$$a\left(\sqrt{a^2-b^2}\;-a\right){}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}\;-a}\right)-\right.$$

$$\left.\left.{}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-$$

$$a\sqrt{a^2-b^2}\left({}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}\;-a}\right)+{}_2F_1\left(-\frac{i\,(i\,c+i\,d-i\,e+p)}{c},\right.\right.$$

$$\left.\left.\left.\left.\left.2;\,2-\frac{i\,(i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)\Big/\left(b\left(a^2-b^2\right)^{3/2}(i\,c+i\,d-i\,e+p)\right)-$$

$$\left(e^{(i\,c-i\,d+i\,e+p)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}\;-a}\right)+\right.\right.$$

$$a\left(\sqrt{a^2-b^2}\;-a\right){}_2F_1\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}\;-a}\right)-\right.$$

$$ {}_2F_1\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)-a\,\sqrt{a^2-b^2} $$

$$ \Bigg({}_2F_1\left(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\Bigg(-\frac{i\,(i\,c-i\,d+i\,e+p)}{c}, $$

$$ 2;\,2-\frac{i\,(-i\,d+i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\Bigg)\Bigg)\Bigg)\Bigg)\Big/\left(b\left(a^2-b^2\right)^{3/2}(i\,c-i\,d+i\,e+p)\right)- $$

$$ \Bigg(e^{(i\,c-i\,d-i\,e+p)\,z}\Bigg(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+ $$

$$ a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,1;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)+ $$

$$ \left(b^2-a^2\right)\Bigg({}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)- $$

$$ {}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)-a\,\sqrt{a^2-b^2} $$

$$ \Bigg({}_2F_1\left(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c},\,2;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\Bigg(-\frac{i\,(i\,c-i\,d-i\,e+p)}{c}, $$

$$ 2;\,2-\frac{i\,(-i\,d-i\,e+p)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\Bigg)\Bigg)\Bigg)\Bigg)\Big/\left(b\left(a^2-b^2\right)^{3/2}(i\,c-i\,d-i\,e+p)\right)\Bigg) $$

Involving $\frac{e^{p\,z}\sin(d\,z)\cos(e\,z)}{a+b\cos^2(c\,z)}$

01.07.21.2659.01

$$\int \frac{e^{pz}\sin(dz)\cos(ez)}{a+b\cos^2(cz)}\,dz == -\frac{1}{4\sqrt{a}\,b\sqrt{a+b}}\left(i\left(\frac{1}{2ic-id+ie+p}\left(e^{(2ic-id+ie+p)z}\left(\left(2a-2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c-d+e-ip}{2c},1;\frac{4c-d+e-ip}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c-d+e-ip}{2c},1;\frac{4c-d+e-ip}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{2c+d+e-ip}\left(ie^{i(2c+d+e-ip)z}\left(\left(2a-2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d+e-ip}{2c},1;\frac{4c+d+e-ip}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d+e-ip}{2c},1;\frac{4c+d+e-ip}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{-2c+d+e+ip}\left(ie^{(2ic-i(d+e+ip))z}\left(\left(2a-2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(-\frac{-2c+d+e+ip}{2c},1;-\frac{-4c+d+e+ip}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(-\frac{-2c+d+e+ip}{2c},1;-\frac{-4c+d+e+ip}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)-\frac{1}{2ic+id-ie+p}\left(e^{(2ic+id-ie+p)z}\left(\left(2a-2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d-e-ip}{2c},1;\frac{4c+d-e-ip}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d-e-ip}{2c},1;\frac{4c+d-e-ip}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right)\right)$$

Involving $e^{pz}\sin(dz)\cos(ez)\left(a+b\cos^2(cz)\right)^{-n}$

01.07.21.2660.01

$$\int \frac{e^{pz}\sin(dz)\cos(ez)}{\left(a+b\cos^2(cz)\right)^2}\,dz == -\frac{1}{4}i\Bigg(\Bigg(e^{(2ic-id+ie+p)z}\Bigg(-(2a+b)\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{i(-id+ie+p)}{2c},1;2-\frac{i(-id+ie+p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+(-2a-b)\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(1-\frac{i(-id+ie+p)}{2c},1;2-\frac{i(-id+ie+p)}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)+2\sqrt{a}\left(\left(-2a^{3/2}+2\sqrt{a+b}\,a-2b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(1-\frac{i(-id+ie+p)}{2c},2;2-\right.\right.$$

$$\frac{i(-i d+i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a+2 \sqrt{a+b} \sqrt{a}+b}\right)+\left(2 a^{3/2}+2 \sqrt{a+b}\, a+2 b \sqrt{a}+b \sqrt{a+b}\right)$$

$$\left.\left.\left.\left.{}_2F_1\left(1-\frac{i(-i d+i e+p)}{2 c}, 2; 2-\frac{i(-i d+i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a-2 \sqrt{a+b} \sqrt{a}+b}\right)\right)\right)\right)\right) \Big/$$

$$\left(2 a^{3/2} b (a+b)^{3/2} (2 i c-i d+i e+p)\right)+\left(e^{(2 i c-i d-i e+p) z}\left(-(2 a+b)\left(-2 a+2 \sqrt{a+b} \sqrt{a}-b\right)\right.\right.$$

$${}_2F_1\left(1-\frac{i(-i d-i e+p)}{2 c}, 1; 2-\frac{i(-i d-i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a+2 \sqrt{a+b} \sqrt{a}+b}\right)+(-2 a-b)$$

$$\left(2 a+2 \sqrt{a+b} \sqrt{a}+b\right){}_2F_1\left(1-\frac{i(-i d-i e+p)}{2 c}, 1; 2-\frac{i(-i d-i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a-2 \sqrt{a+b} \sqrt{a}+b}\right)+$$

$$2 \sqrt{a}\left(\left(-2 a^{3/2}+2 \sqrt{a+b}\, a-2 b \sqrt{a}+b \sqrt{a+b}\right){}_2F_1\left(1-\frac{i(-i d-i e+p)}{2 c}, 2; 2-\right.\right.$$

$$\frac{i(-i d-i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a+2 \sqrt{a+b} \sqrt{a}+b}\right)+\left(2 a^{3/2}+2 \sqrt{a+b}\, a+2 b \sqrt{a}+b \sqrt{a+b}\right)$$

$$\left.\left.\left.\left.{}_2F_1\left(1-\frac{i(-i d-i e+p)}{2 c}, 2; 2-\frac{i(-i d-i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a-2 \sqrt{a+b} \sqrt{a}+b}\right)\right)\right)\right)\right) \Big/$$

$$\left(2 a^{3/2} b (a+b)^{3/2} (2 i c-i d-i e+p)\right)-\left(e^{(2 i c+i d+i e+p) z}\left(-(2 a+b)\left(-2 a+2 \sqrt{a+b} \sqrt{a}-b\right)\right.\right.$$

$${}_2F_1\left(1-\frac{i(i d+i e+p)}{2 c}, 1; 2-\frac{i(i d+i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a+2 \sqrt{a+b} \sqrt{a}+b}\right)+(-2 a-b)$$

$$\left(2 a+2 \sqrt{a+b} \sqrt{a}+b\right){}_2F_1\left(1-\frac{i(i d+i e+p)}{2 c}, 1; 2-\frac{i(i d+i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a-2 \sqrt{a+b} \sqrt{a}+b}\right)+$$

$$2 \sqrt{a}\left(\left(-2 a^{3/2}+2 \sqrt{a+b}\, a-2 b \sqrt{a}+b \sqrt{a+b}\right){}_2F_1\left(1-\frac{i(i d+i e+p)}{2 c}, 2; 2-\right.\right.$$

$$\frac{i(i d+i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a+2 \sqrt{a+b} \sqrt{a}+b}\right)+\left(2 a^{3/2}+2 \sqrt{a+b}\, a+2 b \sqrt{a}+b \sqrt{a+b}\right)$$

$$\left.\left.\left.\left.{}_2F_1\left(1-\frac{i(i d+i e+p)}{2 c}, 2; 2-\frac{i(i d+i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a-2 \sqrt{a+b} \sqrt{a}+b}\right)\right)\right)\right)\right) \Big/$$

$$\left(2 a^{3/2} b (a+b)^{3/2} (2 i c+i d+i e+p)\right)-\left(e^{(2 i c+i d-i e+p) z}\left(-(2 a+b)\left(-2 a+2 \sqrt{a+b} \sqrt{a}-b\right)\right.\right.$$

$${}_2F_1\left(1-\frac{i(i d-i e+p)}{2 c}, 1; 2-\frac{i(i d-i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a+2 \sqrt{a+b} \sqrt{a}+b}\right)+(-2 a-b)$$

$$\left(2 a+2 \sqrt{a+b} \sqrt{a}+b\right){}_2F_1\left(1-\frac{i(i d-i e+p)}{2 c}, 1; 2-\frac{i(i d-i e+p)}{2 c};-\frac{b e^{2 i c z}}{2 a-2 \sqrt{a+b} \sqrt{a}+b}\right)+$$

$$2 \sqrt{a}\left(\left(-2 a^{3/2}+2 \sqrt{a+b}\, a-2 b \sqrt{a}+b \sqrt{a+b}\right)\right.$$

$$ {}_2F_1\left(1-\frac{i\,(i\,d-i\,e+p)}{2\,c},\,2;\,2-\frac{i\,(i\,d-i\,e+p)}{2\,c};\,-\frac{b\,e^{2\,i\,c\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+ $$
$$ \left(2\,a^{3/2}+2\,\sqrt{a+b}\,a+2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\right){}_2F_1\left(1-\frac{i\,(i\,d-i\,e+p)}{2\,c},\,2;\,2-\frac{i\,(i\,d-i\,e+p)}{2\,c};\right. $$
$$ \left.\left.\left.\left.\left.-\frac{b\,e^{2\,i\,c\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)\right)\right)\right)\right)\Big/\left(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(2\,i\,c+i\,d-i\,e+p)\right)\right) $$

Involving rational functions of sin and exp

Involving $e^{p\,z}(a\sinh(e\,z)+b\cosh(e\,z))^{-n}$

01.07.21.2661.01

$$ \int\frac{e^{p\,z}}{(a\sin(e\,z)+b\cos(e\,z))^2}\,dz = -\frac{4\,e^{(2\,i\,e+p)\,z}}{(a-i\,b)^2\,(2\,i\,e+p)}\,{}_2F_1\left(1-\frac{i\,p}{2\,e},\,2;\,2-\frac{i\,p}{2\,e};\,\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right) $$

01.07.21.2662.01

$$ \int\frac{e^{p\,z}}{a\sin(e\,z)+b\cos(e\,z)}\,dz = -\frac{2\,e^{(i\,e+p)\,z}}{(a-i\,b)\,(e-i\,p)}\,{}_2F_1\left(\frac{e-i\,p}{2\,e},\,1;\,\frac{3}{2}-\frac{i\,p}{2\,e};\,\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right) $$

01.07.21.2663.01

$$ \int\frac{e^{i\,e\,z}}{a\sin(e\,z)+b\cos(e\,z)}\,dz = \frac{\log\left(e^{2\,i\,e\,z}\,b+b-i\,a\,e^{2\,i\,e\,z}+i\,a\right)}{a\,e+i\,b\,e} $$

Involving $e^{p\,z}\sin(d\,z)\,(a\sin(e\,z)+b\cos(e\,z))^{-n}$

01.07.21.2664.01

$$ \int\frac{e^{p\,z}\sin(d\,z)}{a\sin(e\,z)+b\cos(e\,z)}\,dz = -\frac{1}{b+i\,a}\left(\frac{e^{(i\,d+i\,e+p)\,z}}{d+e-i\,p}\,{}_2F_1\left(\frac{d+e-i\,p}{2\,e},\,1;\,\frac{d+3\,e-i\,p}{2\,e};\,\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)+\right. $$
$$ \left.\frac{e^{(-i\,d+i\,e+p)\,z}}{d-e+i\,p}\,{}_2F_1\left(-\frac{d-e+i\,p}{2\,e},\,1;\,-\frac{d-3\,e+i\,p}{2\,e};\,\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right) $$

01.07.21.2665.01

$$ \int\frac{e^{p\,z}\sin(d\,z)}{(a\sin(e\,z)+b\cos(e\,z))^2}\,dz = \frac{2}{(a-i\,b)^2}\left(\frac{e^{(i\,d+2\,i\,e+p)\,z}}{d+2\,e-i\,p}\,{}_2F_1\left(\frac{d+2\,e-i\,p}{2\,e},\,2;\,\frac{d+4\,e-i\,p}{2\,e};\,\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)+\right. $$
$$ \left.\frac{e^{(-i\,d+2\,i\,e+p)\,z}}{d-2\,e+i\,p}\,{}_2F_1\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right) $$

Involving $e^{p\,z}\cos(d\,z)\,(a\sin(e\,z)+b\cos(e\,z))^{-n}$

01.07.21.2666.01

$$ \int\frac{e^{p\,z}\cos(d\,z)}{a\sin(e\,z)+b\cos(e\,z)}\,dz = \frac{1}{b+i\,a}\left(\frac{i\,e^{(-i\,d+i\,e+p)\,z}}{d-e+i\,p}\,{}_2F_1\left(-\frac{d-e+i\,p}{2\,e},\,1;\,-\frac{d-3\,e+i\,p}{2\,e};\,\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)-\right. $$
$$ \left.\frac{i\,e^{(i\,d+i\,e+p)\,z}}{d+e-i\,p}\,{}_2F_1\left(\frac{d+e-i\,p}{2\,e},\,1;\,\frac{d+3\,e-i\,p}{2\,e};\,\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right) $$

01.07.21.2667.01

$$\int \frac{e^{p z} \cos(d z)}{(a \sin(e z) + b \cos(e z))^2} \, dz = -\frac{2 i}{(a - i b)^2} \left(\frac{e^{(-i d + 2 i e + p) z}}{d - 2 e + i p} \, {}_2F_1\!\left(1 - \frac{d + i p}{2 e}, 2; 2 - \frac{d + i p}{2 e}; \frac{(a + i b) e^{2 i e z}}{a - i b}\right) - \frac{e^{(i d + 2 i e + p) z}}{d + 2 e - i p} \, {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; \frac{(a + i b) e^{2 i e z}}{a - i b}\right)\right)$$

Involving $e^{p z}(a + b \sinh(e z) + c \cosh(e z))^{-n}$

01.07.21.2668.01

$$\int \frac{e^{p z}}{a + b \sin(e z) + c \cos(e z)} \, dz = -\left(e^{(i e + p) z} \left(\left(a + \sqrt{a^2 - b^2 - c^2}\right) {}_2F_1\!\left(1 - \frac{i p}{e}, 1; 2 - \frac{i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) + \left(\sqrt{a^2 - b^2 - c^2} - a\right) {}_2F_1\!\left(1 - \frac{i p}{e}, 1; 2 - \frac{i p}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}\right)\right)\right) \Big/ \left((b - i c) \sqrt{a^2 - b^2 - c^2} \, (e - i p)\right)$$

01.07.21.2669.01

$$\int \frac{e^{p z}}{(a + b \sin(e z) + c \cos(e z))^2} \, dz = -\left(e^{(i e + p) z} \left(-{}_2F_1\!\left(1 - \frac{i p}{e}, 2; 2 - \frac{i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) a^2 + {}_2F_1\!\left(1 - \frac{i p}{e}, 2; 2 - \frac{i p}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}\right) a^2 + \left(a + \sqrt{a^2 - b^2 - c^2}\right) {}_2F_1\!\left(1 - \frac{i p}{e}, 1; 2 - \frac{i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) a + \left(\sqrt{a^2 - b^2 - c^2} - a\right) {}_2F_1\!\left(1 - \frac{i p}{e}, 1; 2 - \frac{i p}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}\right) a - \sqrt{a^2 - b^2 - c^2} \, {}_2F_1\!\left(1 - \frac{i p}{e}, 2; 2 - \frac{i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) a - \sqrt{a^2 - b^2 - c^2} \, {}_2F_1\!\left(1 - \frac{i p}{e}, 2; 2 - \frac{i p}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}\right) a + b^2 \, {}_2F_1\!\left(1 - \frac{i p}{e}, 2; 2 - \frac{i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) + c^2 \, {}_2F_1\!\left(1 - \frac{i p}{e}, 2; 2 - \frac{i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) - b^2 \, {}_2F_1\!\left(1 - \frac{i p}{e}, 2; 2 - \frac{i p}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}\right) - c^2 \, {}_2F_1\!\left(1 - \frac{i p}{e}, 2; 2 - \frac{i p}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}\right)\right)\right) \Big/ \left((b - i c) \left(a^2 - b^2 - c^2\right)^{3/2} (e - i p)\right)$$

Involving $e^{p z} \sin(d z) (a + b \sin(e z) + c \cos(e z))^{-n}$

01.07.21.2670.01

$$\int \frac{e^{p z} \sin(d z)}{a + b \sin(e z) + c \cos(e z)} \, dz = -\left(\frac{1}{d-e+i p}\left(e^{(-i d+i e+p) z}\left(\left(a+\sqrt{a^2-b^2-c^2}\right) {}_2F_1\left(\frac{-d+e-i p}{e}, 1; -\frac{d-2 e+i p}{e}; \frac{(c-i b) e^{i e z}}{\sqrt{a^2-b^2-c^2}-a}\right)+\left(\sqrt{a^2-b^2-c^2}-a\right) {}_2F_1\left(\frac{-d+e-i p}{e}, 1; -\frac{d-2 e+i p}{e}; \frac{i (b+i c) e^{i e z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)+\frac{1}{d+e-i p}\left(e^{(i d+i e+p) z}\left(\left(a+\sqrt{a^2-b^2-c^2}\right) {}_2F_1\left(\frac{d+e-i p}{e}, 1; \frac{d+2 e-i p}{e}; \frac{(c-i b) e^{i e z}}{\sqrt{a^2-b^2-c^2}-a}\right)+\left(\sqrt{a^2-b^2-c^2}-a\right) {}_2F_1\left(\frac{d+e-i p}{e}, 1; \frac{d+2 e-i p}{e}; \frac{i (b+i c) e^{i e z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)\right) \Big/ \left(2 (c+i b) \sqrt{a^2-b^2-c^2}\right)$$

01.07.21.2671.01

$$\int \frac{e^{p z} \sin(d z)}{(a + b \sin(e z) + c \cos(e z))^2} \, dz = -\left(\frac{1}{d-e+i p}\left(e^{(-i d+i e+p) z}\left(-{}_2F_1\left(\frac{-d+e-i p}{e}, 2; -\frac{d-2 e+i p}{e}; \frac{(c-i b) e^{i e z}}{\sqrt{a^2-b^2-c^2}-a}\right) a^2 + {}_2F_1\left(\frac{-d+e-i p}{e}, 2; -\frac{d-2 e+i p}{e}; \frac{i (b+i c) e^{i e z}}{a+\sqrt{a^2-b^2-c^2}}\right) a^2 + \left(a+\sqrt{a^2-b^2-c^2}\right) {}_2F_1\left(\frac{-d+e-i p}{e}, 1; -\frac{d-2 e+i p}{e}; \frac{(c-i b) e^{i e z}}{\sqrt{a^2-b^2-c^2}-a}\right) a + \left(\sqrt{a^2-b^2-c^2}-a\right) {}_2F_1\left(\frac{-d+e-i p}{e}, 1; -\frac{d-2 e+i p}{e}; \frac{i (b+i c) e^{i e z}}{a+\sqrt{a^2-b^2-c^2}}\right) a - \sqrt{a^2-b^2-c^2} \, {}_2F_1\left(\frac{-d+e-i p}{e}, 2; -\frac{d-2 e+i p}{e}; \frac{(c-i b) e^{i e z}}{\sqrt{a^2-b^2-c^2}-a}\right) a - \sqrt{a^2-b^2-c^2} \, {}_2F_1\left(\frac{-d+e-i p}{e}, 2; -\frac{d-2 e+i p}{e}; \frac{i (b+i c) e^{i e z}}{a+\sqrt{a^2-b^2-c^2}}\right) a + b^2 \, {}_2F_1\left(\frac{-d+e-i p}{e}, 2; -\frac{d-2 e+i p}{e}; \frac{(c-i b) e^{i e z}}{\sqrt{a^2-b^2-c^2}-a}\right) + \right.\right.\right.$$

$$c^2\,{}_2F_1\left(\frac{-d+e-i\,p}{e},\,2;\,-\frac{d-2\,e+i\,p}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}\,-a}\right)-b^2\,{}_2F_1\left(\frac{-d+e-i\,p}{e},\,2;\,-\frac{d-2\,e+i\,p}{e};\right.$$

$$\left.\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)-c^2\,{}_2F_1\left(\frac{-d+e-i\,p}{e},\,2;\,-\frac{d-2\,e+i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{d+e-i\,p}\left(e^{(i\,d+i\,e+p)\,z}\left(-{}_2F_1\left(\frac{d+e-i\,p}{e},\,2;\,\frac{d+2\,e-i\,p}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}\,-a}\right)a^2+\right.\right.$$

$${}_2F_1\left(\frac{d+e-i\,p}{e},\,2;\,\frac{d+2\,e-i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a^2+$$

$$\left(a+\sqrt{a^2-b^2-c^2}\right){}_2F_1\left(\frac{d+e-i\,p}{e},\,1;\,\frac{d+2\,e-i\,p}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}\,-a}\right)a+$$

$$\left(\sqrt{a^2-b^2-c^2}\,-a\right){}_2F_1\left(\frac{d+e-i\,p}{e},\,1;\,\frac{d+2\,e-i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a-$$

$$\sqrt{a^2-b^2-c^2}\,\,{}_2F_1\left(\frac{d+e-i\,p}{e},\,2;\,\frac{d+2\,e-i\,p}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}\,-a}\right)a-$$

$$\sqrt{a^2-b^2-c^2}\,\,{}_2F_1\left(\frac{d+e-i\,p}{e},\,2;\,\frac{d+2\,e-i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a+$$

$$b^2\,{}_2F_1\left(\frac{d+e-i\,p}{e},\,2;\,\frac{d+2\,e-i\,p}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}\,-a}\right)+$$

$$c^2\,{}_2F_1\left(\frac{d+e-i\,p}{e},\,2;\,\frac{d+2\,e-i\,p}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}\,-a}\right)-$$

$$b^2\,{}_2F_1\left(\frac{d+e-i\,p}{e},\,2;\,\frac{d+2\,e-i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)-$$

$$\left.\left.\left.c^2\,{}_2F_1\left(\frac{d+e-i\,p}{e},\,2;\,\frac{d+2\,e-i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)\right)\bigg/\left(2\,(c+i\,b)\left(a^2-b^2-c^2\right)^{3/2}\right)$$

Involving $e^{p\,z}\cos(d\,z)\,(a+b\sin(e\,z)+c\cos(e\,z))^{-n}$

01.07.21.2672.01

$$\int \frac{e^{p z} \cos(d z)}{a + b \sin(e z) + c \cos(e z)} \, dz = -\left(\frac{1}{d + e - i p} \left(i e^{(i d + i e + p) z} \left(\left(a + \sqrt{a^2 - b^2 - c^2} \right) {}_2F_1\left(\frac{d + e - i p}{e}, 1; \frac{d + 2 e - i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) + \left(\sqrt{a^2 - b^2 - c^2} - a \right) {}_2F_1\left(\frac{d + e - i p}{e}, 1; \frac{d + 2 e - i p}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}} \right) \right) \right) - \frac{1}{d - e + i p} \left(i e^{(-i d + i e + p) z} \left(\left(a + \sqrt{a^2 - b^2 - c^2} \right) {}_2F_1\left(\frac{-d + e - i p}{e}, 1; -\frac{d - 2 e + i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) + \left(\sqrt{a^2 - b^2 - c^2} - a \right) {}_2F_1\left(\frac{-d + e - i p}{e}, 1; -\frac{d - 2 e + i p}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}} \right) \right) \right) \right) \Big/ \left(2 (c + i b) \sqrt{a^2 - b^2 - c^2} \right)$$

01.07.21.2673.01

$$\int \frac{e^{p z} \cos(d z)}{(a + b \sin(e z) + c \cos(e z))^2} \, dz = -\left(\frac{1}{d + e - i p} \left(i e^{(i d + i e + p) z} \left(-{}_2F_1\left(\frac{d + e - i p}{e}, 2; \frac{d + 2 e - i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) a^2 + {}_2F_1\left(\frac{d + e - i p}{e}, 2; \frac{d + 2 e - i p}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}} \right) a^2 + \left(a + \sqrt{a^2 - b^2 - c^2} \right) {}_2F_1\left(\frac{d + e - i p}{e}, 1; \frac{d + 2 e - i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) a + \left(\sqrt{a^2 - b^2 - c^2} - a \right) {}_2F_1\left(\frac{d + e - i p}{e}, 1; \frac{d + 2 e - i p}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}} \right) a - \sqrt{a^2 - b^2 - c^2} \, {}_2F_1\left(\frac{d + e - i p}{e}, 2; \frac{d + 2 e - i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) a - \sqrt{a^2 - b^2 - c^2} \, {}_2F_1\left(\frac{d + e - i p}{e}, 2; \frac{d + 2 e - i p}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}} \right) a + b^2 \, {}_2F_1\left(\frac{d + e - i p}{e}, 2; \frac{d + 2 e - i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) + c^2 \, {}_2F_1\left(\frac{d + e - i p}{e}, 2; \frac{d + 2 e - i p}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) - b^2 \, {}_2F_1\left(\frac{d + e - i p}{e}, 2; \frac{d + 2 e - i p}{e};\right.$$

$$\left.\left.\left.\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)-c^2\,{}_2F_1\!\left(\frac{d+e-i\,p}{e},\,2;\,\frac{d+2\,e-i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)\right)-$$

$$\frac{1}{d-e+i\,p}\left(i\,e^{(-i\,d+i\,e+p)\,z}\left(-{}_2F_1\!\left(\frac{-d+e-i\,p}{e},\,2;\,-\frac{d-2\,e+i\,p}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}\;-a}\right)a^2+\right.\right.$$

$${}_2F_1\!\left(\frac{-d+e-i\,p}{e},\,2;\,-\frac{d-2\,e+i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a^2+$$

$$\left(a+\sqrt{a^2-b^2-c^2}\right){}_2F_1\!\left(\frac{-d+e-i\,p}{e},\,1;\,-\frac{d-2\,e+i\,p}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}\;-a}\right)a+$$

$$\left(\sqrt{a^2-b^2-c^2}\;-a\right){}_2F_1\!\left(\frac{-d+e-i\,p}{e},\,1;\,-\frac{d-2\,e+i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a-$$

$$\sqrt{a^2-b^2-c^2}\;{}_2F_1\!\left(\frac{-d+e-i\,p}{e},\,2;\,-\frac{d-2\,e+i\,p}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}\;-a}\right)a-$$

$$\sqrt{a^2-b^2-c^2}\;{}_2F_1\!\left(\frac{-d+e-i\,p}{e},\,2;\,-\frac{d-2\,e+i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a+$$

$$b^2\,{}_2F_1\!\left(\frac{-d+e-i\,p}{e},\,2;\,-\frac{d-2\,e+i\,p}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}\;-a}\right)+$$

$$c^2\,{}_2F_1\!\left(\frac{-d+e-i\,p}{e},\,2;\,-\frac{d-2\,e+i\,p}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}\;-a}\right)-$$

$$b^2\,{}_2F_1\!\left(\frac{-d+e-i\,p}{e},\,2;\,-\frac{d-2\,e+i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)-$$

$$\left.\left.\left.\left.c^2\,{}_2F_1\!\left(\frac{-d+e-i\,p}{e},\,2;\,-\frac{d-2\,e+i\,p}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)\right)\right)\Big/\left(2\,(c+i\,b)\left(a^2-b^2-c^2\right)^{3/2}\right)$$

Involving $e^{p\,z}\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{-n}$

01.07.21.2674.01

$$\int \frac{e^{p z}}{a \sin^2(e z) + b \cos^2(e z)} \, dz = -\left(i\, e^{(2 i e + p) z} \left(\left(\sqrt{-a} + i \sqrt{b}\right)^2 {}_2F_1\left(1 - \frac{i p}{2 e}, 1; 2 - \frac{i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) - \left(\sqrt{-a} - i \sqrt{b}\right)^2 {}_2F_1\left(1 - \frac{i p}{2 e}, 1; 2 - \frac{i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right)\right)\right) \Big/ \left(\sqrt{-a} \sqrt{b} \, (b-a) (2 i e + p)\right)$$

01.07.21.2675.01

$$\int \frac{e^{p z}}{\left(a \sin^2(e z) + b \cos^2(e z)\right)^2} \, dz = -\left(i\, e^{(2 i e + p) z} \left(\left(\sqrt{-a} - i \sqrt{b}\right)^2 (a+b)\, {}_2F_1\left(1 - \frac{i p}{2 e}, 1; 2 - \frac{i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right) - \left(\sqrt{-a} + i \sqrt{b}\right)^2 (a+b)\, {}_2F_1\left(1 - \frac{i p}{2 e}, 1; 2 - \frac{i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) - 2 i \sqrt{-a} \sqrt{b} \left({}_2F_1\left(1 - \frac{i p}{2 e}, 2; 2 - \frac{i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) \left(\sqrt{-a} + i \sqrt{b}\right)^2 + \left(\sqrt{-a} - i \sqrt{b}\right)^2 {}_2F_1\left(1 - \frac{i p}{2 e}, 2; 2 - \frac{i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right)\right)\right)\right) \Big/ \left(2 (-a)^{3/2} b^{3/2} (b-a) (2 i e + p)\right)$$

Involving $e^{p z} \sin(d z) \left(a \sin^2(e z) + b \cos^2(e z)\right)^{-n}$

01.07.21.2676.01

$$\int \frac{e^{p z} \sin(d z)}{a \sin^2(e z) + b \cos^2(e z)} \, dz = \frac{1}{2 \sqrt{-a} \sqrt{b} (b-a)} \left(\frac{1}{-i d + 2 i e + p} \left(e^{(-i d + 2 i e + p) z} \left(\left(\sqrt{-a} + i \sqrt{b} \right)^2 {}_2F_1\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b} \right)^2}\right) - \left(\sqrt{-a} - i \sqrt{b} \right)^2 {}_2F_1\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b} \right)^2}\right) \right) \right) - \frac{1}{i d + 2 i e + p} \left(e^{(i d + 2 i e + p) z} \left(\left(\sqrt{-a} + i \sqrt{b} \right)^2 {}_2F_1\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b} \right)^2}\right) - \left(\sqrt{-a} - i \sqrt{b} \right)^2 {}_2F_1\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b} \right)^2}\right) \right) \right) \right)$$

01.07.21.2677.01

$$\int \frac{e^{p z} \sin(d z)}{\left(a \sin^2(e z) + b \cos^2(e z)\right)^2} \, dz = \frac{1}{4 (-a)^{3/2} b^{3/2} (b - a)}$$
$$\left(\frac{1}{-i d + 2 i e + p} \left(e^{(-i d + 2 i e + p) z} \left(\left(\sqrt{-a} - i \sqrt{b}\right)^2 (a + b) \, {}_2F_1\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b - a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right) - \right.\right.\right.$$
$$\left(\sqrt{-a} + i \sqrt{b}\right)^2 (a + b) \, {}_2F_1\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b - a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) -$$
$$2 i \sqrt{-a} \sqrt{b} \left({}_2F_1\left(1 - \frac{d + i p}{2 e}, 2; 2 - \frac{d + i p}{2 e}; \frac{(b - a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) \left(\sqrt{-a} + i \sqrt{b}\right)^2 + \right.$$
$$\left.\left.\left.\left(\sqrt{-a} - i \sqrt{b}\right)^2 {}_2F_1\left(1 - \frac{d + i p}{2 e}, 2; 2 - \frac{d + i p}{2 e}; \frac{(b - a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right)\right)\right)\right) -$$
$$\frac{1}{i d + 2 i e + p} \left(e^{(i d + 2 i e + p) z} \left(\left(\sqrt{-a} - i \sqrt{b}\right)^2 (a + b) \, {}_2F_1\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b - a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right) - \right.\right.$$
$$\left(\sqrt{-a} + i \sqrt{b}\right)^2 (a + b) \, {}_2F_1\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b - a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) -$$
$$2 i \sqrt{-a} \sqrt{b} \left({}_2F_1\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; \frac{(b - a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) \left(\sqrt{-a} + i \sqrt{b}\right)^2 + \right.$$
$$\left.\left.\left.\left.\left(\sqrt{-a} - i \sqrt{b}\right)^2 {}_2F_1\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; \frac{(b - a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right)\right)\right)\right)\right)$$

Involving $e^{p z} \cos(d z) \left(a \sin^2(e z) + b \cos^2(e z)\right)^{-n}$

01.07.21.2678.01

$$\int \frac{e^{p z} \cos(d z)}{a \sin^2(e z) + b \cos^2(e z)} \, dz = -\frac{1}{2 \sqrt{-a} \sqrt{b} (b-a)} \left(i \left(\frac{1}{i d + 2 i e + p} \left(e^{(i d + 2 i e + p) z} \left(\left(\sqrt{-a} + i \sqrt{b} \right)^2 {}_2F_1\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b} \right)^2} \right) - \left(\sqrt{-a} - i \sqrt{b} \right)^2 {}_2F_1\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b} \right)^2} \right) \right) \right) + \frac{1}{-i d + 2 i e + p} \left(e^{(-i d + 2 i e + p) z} \left(\left(\sqrt{-a} + i \sqrt{b} \right)^2 {}_2F_1\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b} \right)^2} \right) - \left(\sqrt{-a} - i \sqrt{b} \right)^2 {}_2F_1\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b} \right)^2} \right) \right) \right) \right) \right)$$

01.07.21.2679.01

$$\int \frac{e^{p z}\cos(d z)}{\left(a \sin^2(e z)+b \cos^2(e z)\right)^2}\, dz = -\frac{1}{4 (-a)^{3/2} b^{3/2} (b-a)} \left(i \left(\frac{1}{i d+2 i e+p}\left(e^{(i d+2 i e+p) z}\left(\left(\sqrt{-a}-i\sqrt{b}\right)^2 (a+b)\, {}_2F_1\!\left(\frac{d+2 e-i p}{2 e}, 1; \frac{d+4 e-i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)-\left(\sqrt{-a}+i\sqrt{b}\right)^2 (a+b)\, {}_2F_1\!\left(\frac{d+2 e-i p}{2 e}, 1; \frac{d+4 e-i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-2 i \sqrt{-a}\sqrt{b}\left({}_2F_1\!\left(\frac{d+2 e-i p}{2 e}, 2; \frac{d+4 e-i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)\left(\sqrt{-a}+i\sqrt{b}\right)^2+\left(\sqrt{-a}-i\sqrt{b}\right)^2 {}_2F_1\!\left(\frac{d+2 e-i p}{2 e}, 2; \frac{d+4 e-i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\right)\right)\right)+\frac{1}{-i d+2 i e+p}\left(e^{(-i d+2 i e+p) z}\left(\left(\sqrt{-a}-i\sqrt{b}\right)^2 (a+b)\, {}_2F_1\!\left(1-\frac{d+i p}{2 e}, 1; 2-\frac{d+i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)-\left(\sqrt{-a}+i\sqrt{b}\right)^2 (a+b)\, {}_2F_1\!\left(1-\frac{d+i p}{2 e}, 1; 2-\frac{d+i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-2 i \sqrt{-a}\sqrt{b}\left({}_2F_1\!\left(1-\frac{d+i p}{2 e}, 2; 2-\frac{d+i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)\left(\sqrt{-a}+i\sqrt{b}\right)^2+\left(\sqrt{-a}-i\sqrt{b}\right)^2 {}_2F_1\!\left(1-\frac{d+i p}{2 e}, 2; 2-\frac{d+i p}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\right)\right)\right)\right)$$

Involving $e^{p z}\left(a+b \sin^2(e z)+c \cos^2(e z)\right)^{-n}$

01.07.21.2680.01

$$\int \frac{e^{p z}}{a+b\sin^2(e z)+c\cos^2(e z)}\,dz = \left(e^{(2 i e+p) z}\left(\left(-2 a-b-c+2\sqrt{(a+b)(a+c)}\right){}_2F_1\left(1-\frac{i p}{2 e}, 1; 2-\frac{i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a+b+c+2\sqrt{(a+b)(a+c)}}\right)+\left(2 a+b+c+2\sqrt{(a+b)(a+c)}\right){}_2F_1\left(1-\frac{i p}{2 e}, 1; 2-\frac{i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)\right)\Big/\left(\sqrt{(a+b)(a+c)}\,(c-b)(2 i e+p)\right)$$

01.07.21.2681.01

$$\int \frac{e^{p z}}{\left(a+b\sin^2(e z)+c\cos^2(e z)\right)^2}\,dz = -\left((c-b) e^{(2 i e+p) z}\left(2\sqrt{(a+b)(a+c)}\left(\frac{1}{2 a+b+c+2\sqrt{(a+b)(a+c)}}\,{}_2F_1\left(1-\frac{i p}{2 e}, 2; 2-\frac{i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a+b+c+2\sqrt{(a+b)(a+c)}}\right)+\frac{1}{2 a+b+c-2\sqrt{(a+b)(a+c)}}\,{}_2F_1\left(1-\frac{i p}{2 e}, 2; 2-\frac{i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)+\frac{2 a+b+c}{2 a+b+c+2\sqrt{(a+b)(a+c)}}\,{}_2F_1\left(1-\frac{i p}{2 e}, 1; 2-\frac{i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a+b+c+2\sqrt{(a+b)(a+c)}}\right)-\frac{2 a+b+c}{2 a+b+c-2\sqrt{(a+b)(a+c)}}\,{}_2F_1\left(1-\frac{i p}{2 e}, 1; 2-\frac{i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)\right)\Big/\left(2\left((a+b)(a+c)\right)^{3/2}(2 i e+p)\right)$$

Involving $e^{p z}\sin(d z)\left(a+b\sin^2(e z)+c\cos^2(e z)\right)^{-n}$

01.07.21.2682.01

$$\int \frac{e^{p z} \sin(d z)}{a + b \sin^2(e z) + c \cos^2(e z)} \, dz = -\Bigg(i \Bigg(\frac{1}{i d + 2 i e + p} \Bigg(e^{(i d + 2 i e + p) z} \Bigg(\Big(-2 a - b - c + 2 \sqrt{(a + b)(a + c)}\Big) {}_2F_1\Bigg(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b - c) e^{2 i e z}}{2 a + b + c + 2 \sqrt{(a + b)(a + c)}}\Bigg) + \Big(2 a + b + c + 2 \sqrt{(a + b)(a + c)}\Big) {}_2F_1\Bigg(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b - c) e^{2 i e z}}{2 a + b + c - 2 \sqrt{(a + b)(a + c)}}\Bigg)\Bigg)\Bigg) - \frac{1}{-i d + 2 i e + p} \Bigg(e^{(-i d + 2 i e + p) z} \Bigg(\Big(-2 a - b - c + 2 \sqrt{(a + b)(a + c)}\Big) {}_2F_1\Bigg(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b - c) e^{2 i e z}}{2 a + b + c + 2 \sqrt{(a + b)(a + c)}}\Bigg) + \Big(2 a + b + c + 2 \sqrt{(a + b)(a + c)}\Big) {}_2F_1\Bigg(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b - c) e^{2 i e z}}{2 a + b + c - 2 \sqrt{(a + b)(a + c)}}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg) \Big/ \Big(2 \sqrt{(a + b)(a + c)} \, (c - b)\Big)$$

01.07.21.2683.01

$$\int \frac{e^{p z} \sin(d z)}{\left(a + b \sin^2(e z) + c \cos^2(e z)\right)^2} \, dz = -\frac{1}{4 ((a+b)(a+c))^{3/2}} \Bigg(i (c-b) \Bigg(\frac{1}{-i d + 2 i e + p} \Bigg(e^{(-i d + 2 i e + p) z} \Bigg(2 \sqrt{(a+b)(a+c)} \Bigg(\frac{1}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}} \, {}_2F_1\!\left(1 - \frac{d + i p}{2 e}, 2; 2 - \frac{d + i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}}\right) + \frac{1}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}} \, {}_2F_1\!\left(1 - \frac{d + i p}{2 e}, 2; 2 - \frac{d + i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}}\right)\Bigg) + \frac{2 a + b + c}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}} \, {}_2F_1\!\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}}\right) - \frac{2 a + b + c}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}} \, {}_2F_1\!\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}}\right)\Bigg)\Bigg) - \frac{1}{i d + 2 i e + p} \Bigg(e^{(i d + 2 i e + p) z} \Bigg(2 \sqrt{(a+b)(a+c)} \Bigg(\frac{1}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}} \, {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}}\right) + \frac{1}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}} \, {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}}\right)\Bigg) + \frac{2 a + b + c}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}} \, {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}}\right) - \frac{2 a + b + c}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}} \, {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}}\right)\Bigg)\Bigg)\Bigg)$$

Involving $e^{p z} \cos(d z) \left(a + b \sin^2(e z) + c \cos^2(e z)\right)^{-n}$

01.07.21.2684.01

$$\int \frac{e^{p z} \cos(d z)}{a + b \sin^2(e z) + c \cos^2(e z)} \, dz = \frac{1}{2 \sqrt{(a+b)(a+c)} \, (c-b)} \left(\frac{1}{i d + 2 i e + p} \left(e^{(i d + 2 i e + p) z} \left(\left(-2 a - b - c + 2 \sqrt{(a+b)(a+c)} \right) {}_2F_1\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}} \right) + \left(2 a + b + c + 2 \sqrt{(a+b)(a+c)} \right) {}_2F_1\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}} \right) \right) \right) + \frac{1}{-i d + 2 i e + p} \left(e^{(-i d + 2 i e + p) z} \left(\left(-2 a - b - c + 2 \sqrt{(a+b)(a+c)} \right) {}_2F_1\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}} \right) + \left(2 a + b + c + 2 \sqrt{(a+b)(a+c)} \right) {}_2F_1\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}} \right) \right) \right) \right)$$

01.07.21.2685.01

$$\int \frac{e^{p z} \cos(d z)}{\left(a + b \sin^2(e z) + c \cos^2(e z)\right)^2} \, dz = \frac{1}{4 \left((a+b)(a+c)\right)^{3/2}}$$

$$\left((c-b)\left(-\frac{1}{i d + 2 i e + p}\left(e^{(i d + 2 i e + p) z}\left(2\sqrt{(a+b)(a+c)}\left(\frac{{}_2F_1\left(\frac{d+2e-ip}{2e}, 2; \frac{d+4e-ip}{2e}; \frac{(b-c)e^{2iez}}{2a+b+c+2\sqrt{(a+b)(a+c)}}\right)}{2a+b+c+2\sqrt{(a+b)(a+c)}} + \right.\right.\right.\right.\right.$$

$$\left.\frac{{}_2F_1\left(\frac{d+2e-ip}{2e}, 2; \frac{d+4e-ip}{2e}; \frac{(b-c)e^{2iez}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right) +$$

$$\frac{(2a+b+c)\,{}_2F_1\left(\frac{d+2e-ip}{2e}, 1; \frac{d+4e-ip}{2e}; \frac{(b-c)e^{2iez}}{2a+b+c+2\sqrt{(a+b)(a+c)}}\right)}{2a+b+c+2\sqrt{(a+b)(a+c)}} -$$

$$\left.\left.\frac{(2a+b+c)\,{}_2F_1\left(\frac{d+2e-ip}{2e}, 1; \frac{d+4e-ip}{2e}; \frac{(b-c)e^{2iez}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right) -$$

$$\frac{1}{-i d + 2 i e + p}\left(e^{(-i d + 2 i e + p) z}\left(2\sqrt{(a+b)(a+c)}\left(\frac{{}_2F_1\left(1-\frac{d+ip}{2e}, 2; 2-\frac{d+ip}{2e}; \frac{(b-c)e^{2iez}}{2a+b+c+2\sqrt{(a+b)(a+c)}}\right)}{2a+b+c+2\sqrt{(a+b)(a+c)}} + \right.\right.\right.$$

$$\left.\frac{{}_2F_1\left(1-\frac{d+ip}{2e}, 2; 2-\frac{d+ip}{2e}; \frac{(b-c)e^{2iez}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right) +$$

$$\frac{(2a+b+c)\,{}_2F_1\left(1-\frac{d+ip}{2e}, 1; 2-\frac{d+ip}{2e}; \frac{(b-c)e^{2iez}}{2a+b+c+2\sqrt{(a+b)(a+c)}}\right)}{2a+b+c+2\sqrt{(a+b)(a+c)}} -$$

$$\left.\left.\left.\left.\frac{(2a+b+c)\,{}_2F_1\left(1-\frac{d+ip}{2e}, 1; 2-\frac{d+ip}{2e}; \frac{(b-c)e^{2iez}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)\right)\right)$$

Involving $e^{p z}\left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^{-n}$

01.07.21.2686.01

$$\int \frac{e^{p z}}{a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)} \, dz = \left((-a - 2 i b + c) \, e^{(2 i e + p) z} \left(\left(-a - c + 2 \sqrt{a c - b^2} \right) {}_2F_1\left(1 - \frac{i p}{2 e}, 1; 2 - \frac{i p}{2 e}; \frac{(a - c + 2 i b) \, e^{2 i e z}}{a + c + 2 \sqrt{a c - b^2}}\right) + \left(a + c + 2 \sqrt{a c - b^2} \right) {}_2F_1\left(1 - \frac{i p}{2 e}, 1; 2 - \frac{i p}{2 e}; -\frac{(-a - 2 i b + c) \, e^{2 i e z}}{a + c - 2 \sqrt{a c - b^2}}\right) \right) \right) \Big/ \left(\sqrt{a c - b^2} \left(a + c - 2 \sqrt{a c - b^2} \right) \left(a + c + 2 \sqrt{a c - b^2} \right) (2 i e + p) \right)$$

01.07.21.2687.01

$$\int \frac{e^{p z}}{\left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^2} \, dz = \left((2 b - i a + i c) \, e^{(2 i e + p) z} \left(-(a + c) \left(-a - c + 2 \sqrt{a c - b^2} \right) {}_2F_1\left(1 - \frac{i p}{2 e}, 1; 2 - \frac{i p}{2 e}; \frac{(a - c + 2 i b) \, e^{2 i e z}}{a + c + 2 \sqrt{a c - b^2}}\right) - (a + c) \left(a + c + 2 \sqrt{a c - b^2} \right) {}_2F_1\left(1 - \frac{i p}{2 e}, 1; 2 - \frac{i p}{2 e}; -\frac{(-a - 2 i b + c) \, e^{2 i e z}}{a + c - 2 \sqrt{a c - b^2}}\right) + 2 \left(\left(2 b^2 + a \left(\sqrt{a c - b^2} - 2 c \right) + c \sqrt{a c - b^2} \right) {}_2F_1\left(1 - \frac{i p}{2 e}, 2; 2 - \frac{i p}{2 e}; \frac{(a - c + 2 i b) \, e^{2 i e z}}{a + c + 2 \sqrt{a c - b^2}}\right) + \left(-2 b^2 + a \left(2 c + \sqrt{a c - b^2} \right) + c \sqrt{a c - b^2} \right) {}_2F_1\left(1 - \frac{i p}{2 e}, 2; 2 - \frac{i p}{2 e}; -\frac{(-a - 2 i b + c) \, e^{2 i e z}}{a + c - 2 \sqrt{a c - b^2}}\right) \right) \right) \right) \Big/ \left(2 \left(a c - b^2 \right)^{3/2} \left(a + c - 2 \sqrt{a c - b^2} \right) \left(a + c + 2 \sqrt{a c - b^2} \right) (2 e - i p) \right)$$

Involving $e^{p z} \sin(d z) \left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^{-n}$

01.07.21.2688.01

$$\int \frac{e^{p z} \sin(d z)}{a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)}\, dz = \Bigg(i\,(-a - 2 i b + c) \Bigg(\frac{1}{-i d + 2 i e + p} \Bigg(e^{(-i d + 2 i e + p) z} \Bigg(\left(-a - c + 2\sqrt{a c - b^2}\right) {}_2F_1\!\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(a - c + 2 i b)\, e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}\right) + \left(a + c + 2\sqrt{a c - b^2}\right) {}_2F_1\!\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; -\frac{(-a - 2 i b + c)\, e^{2 i e z}}{a + c - 2\sqrt{a c - b^2}}\right)\Bigg)\Bigg) - \frac{1}{i d + 2 i e + p} \Bigg(e^{(i d + 2 i e + p) z} \Bigg(\left(-a - c + 2\sqrt{a c - b^2}\right) {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(a - c + 2 i b)\, e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}\right) + \left(a + c + 2\sqrt{a c - b^2}\right) {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; -\frac{(-a - 2 i b + c)\, e^{2 i e z}}{a + c - 2\sqrt{a c - b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg) \Big/ \left(2\sqrt{a c - b^2}\,\left(a^2 - 2 c a + 4 b^2 + c^2\right)\right)$$

01.07.21.2689.01

$$\int \frac{e^{p z} \sin(d z)}{\left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^2}\, dz =$$

$$-\Bigg((-a - 2 i b + c) \Bigg(\frac{1}{d + 2 e - i p} \Bigg(e^{(i d + 2 i e + p) z} \Bigg(-4\, {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; \frac{(a - c + 2 i b)\, e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}\right) b^2 + 4\, {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; -\frac{(-a - 2 i b + c)\, e^{2 i e z}}{a + c - 2\sqrt{a c - b^2}}\right) b^2 + (a + c)\left(-a - c + 2\sqrt{a c - b^2}\right) {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(a - c + 2 i b)\, e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}\right) + (a + c)\left(a + c + 2\sqrt{a c - b^2}\right) {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; -\frac{(-a - 2 i b + c)\, e^{2 i e z}}{a + c - 2\sqrt{a c - b^2}}\right) + 4 a c\, {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; \frac{(a - c + 2 i b)\, e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}\right) - 2 a \sqrt{a c - b^2}\; {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; \frac{(a - c + 2 i b)\, e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}\right) -$$

$$2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(\frac{d+2\,e-i\,p}{2\,e},\,2;\,\frac{d+4\,e-i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$4\,a\,c\,{}_2F_1\!\left(\frac{d+2\,e-i\,p}{2\,e},\,2;\,\frac{d+4\,e-i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)-$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(\frac{d+2\,e-i\,p}{2\,e},\,2;\,\frac{d+4\,e-i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)-$$

$$2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(\frac{d+2\,e-i\,p}{2\,e},\,2;\,\frac{d+4\,e-i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{d-2\,e+i\,p}\Bigg(e^{(-i\,d+2\,i\,e+p)\,z}\Bigg(-4\,{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)b^2+$$

$$4\,{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)b^2+$$

$$(a+c)\left(-a-c+2\,\sqrt{a\,c-b^2}\right){}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,1;\,2-\frac{d+i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)+$$

$$(a+c)\left(a+c+2\,\sqrt{a\,c-b^2}\right){}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,1;\,2-\frac{d+i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)+$$

$$4\,a\,c\,{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$4\,a\,c\,{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)-$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)-2\,c\,\sqrt{a\,c-b^2}$$

$${}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/\left(4\left(a\,c-b^2\right)^{3/2}\left(a^2-2\,c\,a+4\,b^2+c^2\right)\right)$$

Involving $e^{p z} \cos(d z) \left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^{-n}$

01.07.21.2690.01

$$\int \frac{e^{p z} \cos(d z)}{a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)} \, dz = -\Bigg((-a - 2 i b + c) \Bigg(-\frac{1}{i d + 2 i e + p} \Bigg(e^{(i d + 2 i e + p) z} \Bigg(\left(-a - c + 2 \sqrt{a c - b^2}\right) {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2 \sqrt{a c - b^2}}\right) + \left(a + c + 2 \sqrt{a c - b^2}\right) {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2 \sqrt{a c - b^2}}\right)\Bigg)\Bigg) - \frac{1}{-i d + 2 i e + p} \Bigg(e^{(-i d + 2 i e + p) z} \Bigg(\left(-a - c + 2 \sqrt{a c - b^2}\right) {}_2F_1\!\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2 \sqrt{a c - b^2}}\right) + \left(a + c + 2 \sqrt{a c - b^2}\right) {}_2F_1\!\left(1 - \frac{d + i p}{2 e}, 1; 2 - \frac{d + i p}{2 e}; -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2 \sqrt{a c - b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg) \Big/ \left(2 \sqrt{a c - b^2} \left(a^2 - 2 c a + 4 b^2 + c^2\right)\right)$$

01.07.21.2691.01

$$\int \frac{e^{p z} \cos(d z)}{\left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^2} \, dz = -\Bigg((-a - 2 i b + c) \Bigg(\frac{1}{d + 2 e - i p} \Bigg(i e^{(i d + 2 i e + p) z} \Bigg(-4 \, {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2 \sqrt{a c - b^2}}\right) b^2 + 4 \, {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2 \sqrt{a c - b^2}}\right) b^2 + (a + c) \left(-a - c + 2 \sqrt{a c - b^2}\right) {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2 \sqrt{a c - b^2}}\right) + (a + c) \left(a + c + 2 \sqrt{a c - b^2}\right) {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 1; \frac{d + 4 e - i p}{2 e}; -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2 \sqrt{a c - b^2}}\right) + 4 a c \, {}_2F_1\!\left(\frac{d + 2 e - i p}{2 e}, 2; \frac{d + 4 e - i p}{2 e}; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2 \sqrt{a c - b^2}}\right) -$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(\frac{d+2\,e-i\,p}{2\,e},\,2;\,\frac{d+4\,e-i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(\frac{d+2\,e-i\,p}{2\,e},\,2;\,\frac{d+4\,e-i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$4\,a\,c\,{}_2F_1\!\left(\frac{d+2\,e-i\,p}{2\,e},\,2;\,\frac{d+4\,e-i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)-$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(\frac{d+2\,e-i\,p}{2\,e},\,2;\,\frac{d+4\,e-i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)-$$

$$\left.\left.\left.2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(\frac{d+2\,e-i\,p}{2\,e},\,2;\,\frac{d+4\,e-i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)\right)\right)\right)-$$

$$\frac{1}{d-2\,e+i\,p}\left(i\,e^{(-i\,d+2\,i\,e+p)\,z}\left(-4\,{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)b^2+\right.\right.$$

$$4\,{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)b^2+$$

$$(a+c)\left(-a-c+2\,\sqrt{a\,c-b^2}\right){}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,1;\,2-\frac{d+i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)+$$

$$(a+c)\left(a+c+2\,\sqrt{a\,c-b^2}\right){}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,1;\,2-\frac{d+i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\,\sqrt{a\,c-b^2}}\right)+$$

$$4\,a\,c\,{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,\frac{(a-c+2\,i\,b)\,e^{2\,i\,e\,z}}{a+c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$4\,a\,c\,{}_2F_1\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)-$$

$$2\,a\sqrt{a\,c-b^2}\;{}_2F_1\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)-2\,c\sqrt{a\,c-b^2}$$

$${}_2F_1\left(1-\frac{d+i\,p}{2\,e},\,2;\,2-\frac{d+i\,p}{2\,e};\,-\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{a+c-2\sqrt{a\,c-b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/\left(4\left(a\,c-b^2\right)^{3/2}\left(a^2-2\,c\,a+4\,b^2+c^2\right)\right)$$

Involving algebraic functions of the direct function, trigonometric and exponential functions

Involving sin and exp

Involving $e^{p\,z}\sin(d\,z)\,(a+b\cos(c\,z))^{\beta}$

01.07.21.2692.01

$$\int e^{p\,z}\sin(d\,z)\,(a+b\cos(c\,z))^{\beta}\,dz =$$

$$\frac{1}{2\,(d-i\,p-c\,\beta)\,(d+i\,p+c\,\beta)}\left(i\left(\frac{e^{i\,c\,z}\,b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(\frac{e^{i\,c\,z}\,b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2}\,b\,e^{-i\,c\,z}\left(1+e^{2\,i\,c\,z}\right)\right)^{\beta}\right.$$

$$\left(e^{(i\,d+p)\,z}\,i\,(d+i\,p+c\,\beta)\,F_1\left(\frac{d-i\,p-c\,\beta}{c};\,-\beta,\,-\beta;\,\frac{-\beta\,c+c+d-i\,p}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.$$

$$\left.\left.e^{(-i\,d+p)\,z}\,(i\,d+p-i\,c\,\beta)\,F_1\left(-\frac{d+i\,p+c\,\beta}{c};\,-\beta,\,-\beta;\,-\frac{d+i\,p+c\,(\beta-1)}{c};\,-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}},\,\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)\right)\right)$$

Involving $e^{p\,z}\sin(d\,z)\left(a+b\cos^2(c\,z)\right)^{\beta}$

01.07.21.2693.01

$$\int e^{p z} \sin(d z) \left(a + b \cos^2(c z)\right)^{\beta} d z == \frac{1}{2\left(d^2 + (p - 2 i c \beta)^2\right)} \left(i \left(\frac{e^{2 i c z} b}{2 a + b - 2 \sqrt{a (a + b)}} + 1 \right)^{-\beta} \left(\frac{e^{2 i c z} b}{2 a + b + 2 \sqrt{a (a + b)}} + 1 \right)^{-\beta} \left(\frac{1}{4} b e^{-2 i c z} \left(1 + e^{2 i c z}\right)^2 + a \right)^{\beta} \left(e^{(i d + p) z} i (d + i p + 2 c \beta) F_1\left(\frac{d - i p - 2 c \beta}{2 c}; -\beta, -\beta; \frac{-2 \beta c + 2 c + d - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, -\frac{b e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}} \right) + e^{(-i d + p) z} (i d + p - 2 i c \beta) F_1\left(-\frac{d + i p + 2 c \beta}{2 c}; -\beta, -\beta; -\frac{d + i p + 2 c (\beta - 1)}{2 c}; -\frac{b e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, -\frac{b e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}} \right) \right) \right)$$

Involving $e^{p z} \sin(d z) \cos(e z) (a + b \cos(c z))^{\beta}$

01.07.21.2694.01

$$\int e^{p z} \sin(d z) \cos(e z) (a + b \cos(c z))^{\beta} d z == -\frac{1}{4} \left(\frac{e^{i c z} b}{a - \sqrt{a^2 - b^2}} + 1 \right)^{-\beta} \left(\frac{e^{i c z} b}{a + \sqrt{a^2 - b^2}} + 1 \right)^{-\beta} \left(a + \frac{1}{2} b e^{-i c z} \left(1 + e^{2 i c z}\right) \right)^{\beta} \left(\frac{e^{(i d + i e + p) z}}{d + e - i p - c \beta} F_1\left(\frac{d + e - i p - c \beta}{c}; -\beta, -\beta; \frac{-\beta c + c + d + e - i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \frac{e^{(-i d + i e + p) z}}{d - e + i p + c \beta} F_1\left(-\frac{d - e + i p + c \beta}{c}; -\beta, -\beta; \frac{-\beta c + c - d + e - i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \frac{e^{(i d - i e + p) z}}{d - e - i p - c \beta} F_1\left(-\frac{-d + e + i p + c \beta}{c}; -\beta, -\beta; \frac{-\beta c + c + d - e - i p}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \frac{e^{-i (d + e + i p) z}}{d + e + i p + c \beta} F_1\left(-\frac{d + e + i p + c \beta}{c}; -\beta, -\beta; -\frac{d + e + i p + c (\beta - 1)}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) \right)$$

Involving $e^{p z} \sin(d z) \cos(e z) \left(a + b \cos^2(c z)\right)^{\beta}$

01.07.21.2695.01

$$\int e^{p z} \sin(d z) \cos(e z) \left(a + b \cos^2(c z)\right)^\beta \, dz = -\frac{1}{4} \left(\frac{e^{2 i c z} b}{2 a + b - 2 \sqrt{a (a + b)}} + 1\right)^{-\beta} \left(\frac{e^{2 i c z} b}{2 a + b + 2 \sqrt{a (a + b)}} + 1\right)^{-\beta} \left(\frac{1}{4} b e^{-2 i c z} \left(1 + e^{2 i c z}\right)^2 + a\right)^\beta \left(\frac{e^{(i d + i e + p) z}}{d + e - i p - 2 c \beta} F_1\left(\frac{d + e - i p - 2 c \beta}{2 c}; -\beta, -\beta; \frac{-2 \beta c + 2 c + d + e - i p}{2 c}; -\frac{b e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, -\frac{b e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}}\right) + \frac{e^{(-i d + i e + p) z}}{d - e + i p + 2 c \beta} F_1\left(-\frac{d - e + i p + 2 c \beta}{2 c}; -\beta, -\beta; -\frac{d - e + i p + 2 c (\beta - 1)}{2 c}; -\frac{b e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, -\frac{b e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}}\right) + \frac{e^{(i d - i e + p) z}}{d - e - i p - 2 c \beta} F_1\left(-\frac{-d + e + i p + 2 c \beta}{2 c}; -\beta, -\beta; -\frac{-d + e + i p + 2 c (\beta - 1)}{2 c}; -\frac{b e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, -\frac{b e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}}\right) + \frac{e^{-i (d + e + i p) z}}{d + e + i p + 2 c \beta} F_1\left(-\frac{d + e + i p + 2 c \beta}{2 c}; -\beta, -\beta; -\frac{d + e + i p + 2 c (\beta - 1)}{2 c}; -\frac{b e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, -\frac{b e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}}\right)\right)$$

Involving algebraic functions of sin and exp

Involving $e^{p z} (a \sin(e z) + b \cos(e z))^\beta$

01.07.21.2696.01

$$\int e^{p z} (a \sin(e z) + b \cos(e z))^\beta \, dz = \frac{1}{p - i e \beta} \left(2^{-\beta} e^{p z} \left(\frac{e^{2 i e z} (b - i a)}{b + i a} + 1\right)^{-\beta} \left(e^{-i e z} \left(b \left(1 + e^{2 i e z}\right) - i a \left(-1 + e^{2 i e z}\right)\right)\right)^\beta {}_2F_1\left(-\frac{i p + e \beta}{2 e}, -\beta; \frac{1}{2} \left(-\frac{i p}{e} - \beta + 2\right); \frac{(a + i b) e^{2 i e z}}{a - i b}\right)\right)$$

Involving $e^{p z} \sin(d z) (a \sin(e z) + b \cos(e z))^\beta$

01.07.21.2697.01

$$\int e^{p z} \sin(d z) (a \sin(e z) + b \cos(e z))^\beta \, dz = -\left(2^{-\beta - 1} \left(\frac{e^{2 i e z} (b - i a)}{b + i a} + 1\right)^{-\beta} \left(e^{-i e z} \left(b \left(1 + e^{2 i e z}\right) - i a \left(-1 + e^{2 i e z}\right)\right)\right)^\beta \left(e^{(i d + p) z} (d + i p + e \beta) \, {}_2F_1\left(\frac{d - i p - e \beta}{2 e}, -\beta; \frac{d + 2 e - i p - e \beta}{2 e}; \frac{(a + i b) e^{2 i e z}}{a - i b}\right) + e^{(-i d + p) z} (d - i p - e \beta) \, {}_2F_1\left(-\frac{d + i p + e \beta}{2 e}, -\beta; -\frac{d + i p + e (\beta - 2)}{2 e}; \frac{(a + i b) e^{2 i e z}}{a - i b}\right)\right)\right) \Big/ ((d - i p - e \beta) (d + i p + e \beta))$$

Involving $e^{p z} \cos(d z) (a \sin(e z) + b \cos(e z))^\beta$

01.07.21.2698.01

$$\int e^{p z} \cos(d z)\,(a \sin(e z) + b \cos(e z))^{\beta}\, dz = -\left(i\, 2^{-\beta-1} \left(\frac{e^{2 i e z}(b - i a)}{b + i a} + 1\right)^{-\beta} \left(e^{-i e z}\left(b\left(1 + e^{2 i e z}\right) - i a\left(-1 + e^{2 i e z}\right)\right)\right)^{\beta} \left(e^{(-i d + p) z}(d - i p - e \beta)\, {}_2F_1\left(-\frac{d + i p + e \beta}{2 e}, -\beta; -\frac{d + i p + e(\beta - 2)}{2 e}; \frac{(a + i b)\, e^{2 i e z}}{a - i b}\right) - e^{(i d + p) z}(d + i p + e \beta)\, {}_2F_1\left(\frac{d - i p - e \beta}{2 e}, -\beta; \frac{d + 2 e - i p - e \beta}{2 e}; \frac{(a + i b)\, e^{2 i e z}}{a - i b}\right)\right)\right) \Big/ ((-d + i p + e \beta)(d + i p + e \beta))$$

Involving $e^{p z}(a + b \sin(e z) + c \cos(e z))^{\beta}$

01.07.21.2699.01

$$\int e^{p z}(a + b \sin(e z) + c \cos(e z))^{\beta}\, dz = \frac{1}{p - i e \beta}\left(2^{-\beta} e^{p z}\left(1 + \frac{i(b + i c)\, e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right)^{-\beta}\left(\frac{e^{i e z}(c - i b)}{a + \sqrt{a^2 - b^2 - c^2}} + 1\right)^{-\beta}\left(e^{-i e z}\left(2 e^{i e z} a + c\, e^{2 i e z} + c - i b\left(-1 + e^{2 i e z}\right)\right)\right)^{\beta} F_1\left(-\frac{i p}{e} - \beta; -\beta, -\beta; -\frac{i p}{e} - \beta + 1; \frac{i(b + i c)\, e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}, \frac{(c - i b)\, e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right)\right)$$

Involving $e^{p z} \sin(d z)\,(a + b \sin(e z) + c \cos(e z))^{\beta}$

01.07.21.2700.01

$$\int e^{p z} \sin(d z)\,(a + b \sin(e z) + c \cos(e z))^{\beta}\, dz = -\left(2^{-\beta-1}\left(1 + \frac{i(b + i c)\, e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right)^{-\beta}\left(\frac{e^{i e z}(c - i b)}{a + \sqrt{a^2 - b^2 - c^2}} + 1\right)^{-\beta}\left(e^{-i e z}\left(2 e^{i e z} a + c\, e^{2 i e z} + c - i b\left(-1 + e^{2 i e z}\right)\right)\right)^{\beta}\left(e^{(i d + p) z}(d + i p + e \beta)\, F_1\left(\frac{d - i p - e \beta}{e}; -\beta, -\beta; \frac{d + e - i p - e \beta}{e}; \frac{i(b + i c)\, e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}, \frac{(c - i b)\, e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) + e^{(-i d + p) z}(d - i p - e \beta)\, F_1\left(-\frac{d + i p + e \beta}{e}; -\beta, -\beta; -\frac{d + i p + e(\beta - 1)}{e}; \frac{i(b + i c)\, e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}, \frac{(c - i b)\, e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right)\right)\right) \Big/ ((d - i p - e \beta)(d + i p + e \beta))$$

Involving $e^{p z} \cos(d z)\,(a + b \sin(e z) + c \cos(e z))^{\beta}$

01.07.21.2701.01

$$\int e^{p z} \cos(d z) (a + b \sin(e z) + c \cos(e z))^{\beta} \, dz = -\left(i\, 2^{-\beta-1} \left(1 + \frac{i (b + i c) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right)^{-\beta} \left(\frac{e^{i e z} (c - i b)}{a + \sqrt{a^2 - b^2 - c^2}} + 1\right)^{-\beta} \left(e^{-i e z} \left(2 e^{i e z} a + c e^{2 i e z} + c - i b \left(-1 + e^{2 i e z}\right)\right)\right)^{\beta} \left(e^{(-i d + p) z} (d - i p - e \beta) F_1\left(-\frac{d + i p + e \beta}{e}; -\beta, -\beta; -\frac{d + i p + e (\beta - 1)}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}, \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right) - e^{(i d + p) z} (d + i p + e \beta) F_1\left(\frac{d - i p - e \beta}{e}; -\beta, -\beta; \frac{d + e - i p - e \beta}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}}, \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a}\right)\right)\right) \Big/ ((-d + i p + e \beta) (d + i p + e \beta))$$

Involving $e^{p z} \left(a \sin^2(e z) + b \cos^2(e z)\right)^{\beta}$

01.07.21.2702.01

$$\int e^{p z} \left(a \sin^2(e z) + b \cos^2(e z)\right)^{\beta} dz = \frac{1}{p - 2 i e \beta} \left(4^{-\beta} e^{p z} \left(\frac{e^{2 i e z} (b - a)}{a + b - 2 \sqrt{a b}} + 1\right)^{-\beta} \left(\frac{e^{2 i e z} (b - a)}{a + b + 2 \sqrt{a b}} + 1\right)^{-\beta} \left(e^{-2 i e z} \left(b \left(1 + e^{2 i e z}\right)^2 - a \left(-1 + e^{2 i e z}\right)^2\right)\right)^{\beta} F_1\left(-\frac{i p}{2 e} - \beta; -\beta, -\beta; -\frac{i p}{2 e} - \beta + 1; \frac{(a - b) e^{2 i e z}}{a + b + 2 \sqrt{a b}}, \frac{(a - b) e^{2 i e z}}{a + b - 2 \sqrt{a b}}\right)\right)$$

Involving $e^{p z} \sin(d z) \left(a \sin^2(e z) + b \cos^2(e z)\right)^{\beta}$

01.07.21.2703.01

$$\int e^{p z} \sin(d z) \left(a \sin^2(e z) + b \cos^2(e z)\right)^{\beta} dz = -\frac{1}{d^2 + (p - 2 i e \beta)^2} \left(2^{-2\beta-1} \left(\frac{e^{2 i e z} (b - a)}{a + b - 2 \sqrt{a b}} + 1\right)^{-\beta} \left(\frac{e^{2 i e z} (b - a)}{a + b + 2 \sqrt{a b}} + 1\right)^{-\beta} \left(e^{-2 i e z} \left(b \left(1 + e^{2 i e z}\right)^2 - a \left(-1 + e^{2 i e z}\right)^2\right)\right)^{\beta} \left(e^{(i d + p) z} (d + i p + 2 e \beta) F_1\left(\frac{d - i p - 2 e \beta}{2 e}; -\beta, -\beta; \frac{d + 2 e - i p - 2 e \beta}{2 e}; \frac{(a - b) e^{2 i e z}}{a + b + 2 \sqrt{a b}}, \frac{(a - b) e^{2 i e z}}{a + b - 2 \sqrt{a b}}\right) + e^{(-i d + p) z} (d - i p - 2 e \beta) F_1\left(-\frac{d + i p + 2 e \beta}{2 e}; -\beta, -\beta; -\frac{d + i p + 2 e (\beta - 1)}{2 e}; \frac{(a - b) e^{2 i e z}}{a + b + 2 \sqrt{a b}}, \frac{(a - b) e^{2 i e z}}{a + b - 2 \sqrt{a b}}\right)\right)\right)$$

Involving $e^{p z} \cos(d z) \left(a \sin^2(e z) + b \cos^2(e z)\right)^{\beta}$

01.07.21.2704.01

$$\int e^{p z} \cos(d z) \left(a \sin^2(e z) + b \cos^2(e z)\right)^{\beta} \, dz = -\left(i \, 2^{-2\beta-1} \left(\frac{e^{2 i e z} (b-a)}{a+b-2\sqrt{a b}} + 1\right)^{-\beta} \left(\frac{e^{2 i e z} (b-a)}{a+b+2\sqrt{a b}} + 1\right)^{-\beta} \left(e^{-2 i e z} \left(b \left(1+e^{2 i e z}\right)^2 - a \left(-1+e^{2 i e z}\right)^2\right)\right)^{\beta} \left(e^{(-i d+p) z} (d - i p - 2 e \beta) F_1\left(-\frac{d + i p + 2 e \beta}{2 e}; -\beta, -\beta; -\frac{d + i p + 2 e (\beta-1)}{2 e}; \frac{(a-b) e^{2 i e z}}{a+b+2\sqrt{a b}}, \frac{(a-b) e^{2 i e z}}{a+b-2\sqrt{a b}}\right) - e^{(i d+p) z} (d + i p + 2 e \beta) F_1\left(\frac{d - i p - 2 e \beta}{2 e}; -\beta, -\beta; \frac{d + 2 e - i p - 2 e \beta}{2 e}; \frac{(a-b) e^{2 i e z}}{a+b+2\sqrt{a b}}, \frac{(a-b) e^{2 i e z}}{a+b-2\sqrt{a b}}\right)\right)\right) \Big/ ((-d + i p + 2 e \beta)(d + i p + 2 e \beta))$$

Involving $e^{p z}\left(a + b \sin^2(e z) + c \cos^2(e z)\right)^{\beta}$

01.07.21.2705.01

$$\int e^{p z} \left(a + b \sin^2(e z) + c \cos^2(e z)\right)^{\beta} \, dz = \frac{1}{p - 2 i e \beta} \left(4^{-\beta} e^{p z} \left(\frac{e^{2 i e z} (c-b)}{2 a + b + c - 2\sqrt{(a+b)(a+c)}} + 1\right)^{-\beta} \left(\frac{e^{2 i e z} (c-b)}{2 a + b + c + 2\sqrt{(a+b)(a+c)}} + 1\right)^{-\beta} \left(e^{-2 i e z} \left(-b \left(-1 + e^{2 i e z}\right)^2 + 4 a e^{2 i e z} + c \left(1 + e^{2 i e z}\right)^2\right)\right)^{\beta} F_1\left(-\frac{i p}{2 e} - \beta; -\beta, -\beta; -\frac{i p}{2 e} - \beta + 1; \frac{(b-c) e^{2 i e z}}{2 a + b + c + 2\sqrt{(a+b)(a+c)}}, \frac{(b-c) e^{2 i e z}}{2 a + b + c - 2\sqrt{(a+b)(a+c)}}\right)\right)$$

Involving $e^{p z} \sin(d z)\left(a + b \sin^2(e z) + c \cos^2(e z)\right)^{\beta}$

01.07.21.2706.01

$$\int e^{p z} \sin(d z) \left(a + b \sin^2(e z) + c \cos^2(e z)\right)^{\beta} \, dz = -\frac{1}{d^2 + (p - 2 i e \beta)^2} \left(2^{-2\beta-1} \left(\frac{e^{2 i e z} (c-b)}{2 a + b + c - 2\sqrt{(a+b)(a+c)}} + 1\right)^{-\beta} \left(\frac{e^{2 i e z} (c-b)}{2 a + b + c + 2\sqrt{(a+b)(a+c)}} + 1\right)^{-\beta} \left(e^{-2 i e z} \left(-b \left(-1 + e^{2 i e z}\right)^2 + 4 a e^{2 i e z} + c \left(1 + e^{2 i e z}\right)^2\right)\right)^{\beta} \left(e^{(i d+p) z} (d + i p + 2 e \beta) F_1\left(\frac{d - i p - 2 e \beta}{2 e}; -\beta, -\beta; \frac{d + 2 e - i p - 2 e \beta}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c + 2\sqrt{(a+b)(a+c)}}, \frac{(b-c) e^{2 i e z}}{2 a + b + c - 2\sqrt{(a+b)(a+c)}}\right) + e^{(-i d+p) z} (d - i p - 2 e \beta) F_1\left(-\frac{d + i p + 2 e \beta}{2 e}; -\beta, -\beta; -\frac{d + i p + 2 e (\beta-1)}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c + 2\sqrt{(a+b)(a+c)}}, \frac{(b-c) e^{2 i e z}}{2 a + b + c - 2\sqrt{(a+b)(a+c)}}\right)\right)\right)$$

Involving $e^{p z} \cos(d z) \left(a + b \sin^2(e z) + c \cos^2(e z)\right)^\beta$

01.07.21.2707.01

$$\int e^{p z} \cos(d z) \left(a + b \sin^2(e z) + c \cos^2(e z)\right)^\beta dz = -\left(i\, 2^{-2\beta-1} \left(\frac{e^{2 i e z} (c-b)}{2a+b+c-2\sqrt{(a+b)(a+c)}} + 1\right)^{-\beta} \left(\frac{e^{2 i e z} (c-b)}{2a+b+c+2\sqrt{(a+b)(a+c)}} + 1\right)^{-\beta} \left(e^{-2 i e z} \left(-b\left(-1 + e^{2 i e z}\right)^2 + 4 a e^{2 i e z} + c\left(1 + e^{2 i e z}\right)^2\right)\right)^\beta \left(e^{(-i d + p) z} (d - i p - 2 e \beta) F_1\left(-\frac{d + i p + 2 e \beta}{2 e}; -\beta, -\beta; -\frac{d + i p + 2 e (\beta - 1)}{2 e}; \frac{(b-c) e^{2 i e z}}{2a+b+c+2\sqrt{(a+b)(a+c)}}, \frac{(b-c) e^{2 i e z}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right) - e^{(i d + p) z} (d + i p + 2 e \beta) F_1\left(\frac{d - i p - 2 e \beta}{2 e}; -\beta, -\beta; \frac{d + 2 e - i p - 2 e \beta}{2 e}; \frac{(b-c) e^{2 i e z}}{2a+b+c+2\sqrt{(a+b)(a+c)}}, \frac{(b-c) e^{2 i e z}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)\right) \Big/ ((-d + i p + 2 e \beta)(d + i p + 2 e \beta))$$

Involving $e^{p z} \left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^\beta$

01.07.21.2708.01

$$\int e^{p z} \left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^\beta dz = \frac{1}{p - 2 i e \beta} \left(4^{-\beta} e^{p z} \left(\frac{e^{2 i e z} (-a - 2 i b + c)}{a + c - 2\sqrt{a c - b^2}} + 1\right)^{-\beta} \left(\frac{e^{2 i e z} (-a - 2 i b + c)}{a + c + 2\sqrt{a c - b^2}} + 1\right)^{-\beta} \left(e^{-2 i e z} \left(\left(1 + e^{2 i e z}\right)\left(c\left(1 + e^{2 i e z}\right) - 2 i b\left(-1 + e^{2 i e z}\right)\right) - a\left(-1 + e^{2 i e z}\right)^2\right)\right)^\beta F_1\left(-\frac{i p}{2 e} - \beta; -\beta, -\beta; -\frac{i p}{2 e} - \beta + 1; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}, -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2\sqrt{a c - b^2}}\right)\right)$$

Involving $e^{p z} \sin(d z) \left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^\beta$

01.07.21.2709.01

$$\int e^{p z} \sin(d z) \left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^\beta \, dz = -\frac{1}{d^2 + (p - 2 i e \beta)^2} \left(2^{-2\beta-1} \left(\frac{e^{2 i e z}(-a - 2 i b + c)}{a + c - 2\sqrt{a c - b^2}} + 1\right)^{-\beta} \left(\frac{e^{2 i e z}(-a - 2 i b + c)}{a + c + 2\sqrt{a c - b^2}} + 1\right)^{-\beta} \left(e^{-2 i e z}\left(\left(1 + e^{2 i e z}\right)\left(c\left(1 + e^{2 i e z}\right) - 2 i b\left(-1 + e^{2 i e z}\right)\right) - a\left(-1 + e^{2 i e z}\right)^2\right)\right)^\beta \left(e^{(i d + p) z}(d + i p + 2 e \beta) F_1\left(\frac{d - i p - 2 e \beta}{2 e}; -\beta, -\beta; \frac{d + 2 e - i p - 2 e \beta}{2 e}; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}, -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2\sqrt{a c - b^2}}\right) + e^{(-i d + p) z}(d - i p - 2 e \beta) F_1\left(-\frac{d + i p + 2 e \beta}{2 e}; -\beta, -\beta; -\frac{d + i p + 2 e (\beta - 1)}{2 e}; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}, -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2\sqrt{a c - b^2}}\right)\right)\right)$$

Involving $e^{p z} \cos(d z) \left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^\beta$

01.07.21.2710.01

$$\int e^{p z} \cos(d z) \left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^\beta \, dz = -\left(i\, 2^{-2\beta-1} \left(\frac{e^{2 i e z}(-a - 2 i b + c)}{a + c - 2\sqrt{a c - b^2}} + 1\right)^{-\beta} \left(\frac{e^{2 i e z}(-a - 2 i b + c)}{a + c + 2\sqrt{a c - b^2}} + 1\right)^{-\beta} \left(e^{-2 i e z}\left(\left(1 + e^{2 i e z}\right)\left(c\left(1 + e^{2 i e z}\right) - 2 i b\left(-1 + e^{2 i e z}\right)\right) - a\left(-1 + e^{2 i e z}\right)^2\right)\right)^\beta \left(e^{(-i d + p) z}(d - i p - 2 e \beta) F_1\left(-\frac{d + i p + 2 e \beta}{2 e}; -\beta, -\beta; -\frac{d + i p + 2 e (\beta - 1)}{2 e}; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}, -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2\sqrt{a c - b^2}}\right) - e^{(i d + p) z}(d + i p + 2 e \beta) F_1\left(\frac{d - i p - 2 e \beta}{2 e}; -\beta, -\beta; \frac{d + 2 e - i p - 2 e \beta}{2 e}; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}, -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2\sqrt{a c - b^2}}\right)\right)\right) \Big/ ((-d + i p + 2 e \beta)(d + i p + 2 e \beta))$$

Involving functions of the direct function, trigonometric, exponential and a power functions

Involving powers of the direct function, trigonometric, exponential and a power functions

Involving sin, exp and power

Involving $z^{\alpha-1}\, e^{p z} \sin(c z) \cos^{\nu}(a z)$

01.07.21.2711.01

$$\int z^{\alpha-1} e^{p z} \sin(c z) \cos^{\nu}(a z)\, dz = -i\, 2^{-\nu-1} z^{\alpha} \left(\binom{\nu}{\frac{\nu}{2}} (E_{1-\alpha}(-(p+i c) z) - E_{1-\alpha}(i c z - p z)) (\nu \bmod 2 - 1) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} (E_{1-\alpha}(-(p+i(c-2 a s+a \nu)) z) - E_{1-\alpha}(-(p-i(c-2 a s+a \nu)) z) + E_{1-\alpha}(-(p+i(c+2 a s-a \nu)) z) - E_{1-\alpha}(-(p-i(c+2 a s-a \nu)) z)) \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2712.01

$$\int z^{n} e^{p z} \sin(c z) \cos^{\nu}(a z)\, dz = \frac{i\, n!}{2} e^{p z} \cos^{\nu}(a z) \left(1 + e^{2 i a z}\right)^{-\nu} \left(-e^{i c z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (p + i c - i a \nu)^{j+1}} {}_{j+2}F_{j+1}\left(\frac{-i p + c - a \nu}{2 a}, \ldots, \frac{-i p + c - a \nu}{2 a}, -\nu; 1 + \frac{-i p + c - a \nu}{2 a}, \ldots, 1 + \frac{-i p + c - a \nu}{2 a}; -e^{2 i a z} \right) + e^{-i c z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (p - i c - i a \nu)^{j+1}} {}_{j+2}F_{j+1}\left(-\frac{i p + c + a \nu}{2 a}, \ldots, -\frac{i p + c + a \nu}{2 a}, -\nu; 1 - \frac{i p + c + a \nu}{2 a}, \ldots, 1 - \frac{i p + c + a \nu}{2 a}; -e^{2 i a z} \right) \right) /;\ n \in \mathbb{N}$$

Involving $z^{\alpha-1}\, e^{p z} \sin(c z + d) \cos^{\nu}(a z)$

01.07.21.2713.01

$$\int z^{\alpha-1} e^{p z} \sin(d + c z) \cos^{\nu}(a z)\, dz = 2^{-\nu-1} z^{\alpha}\, i \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i d} \binom{\nu}{s} \left(e^{2 i d} E_{1-\alpha}(i(-c + i p - 2 a s + a \nu) z) - E_{1-\alpha}(-i(-c - i p - 2 a s + a \nu) z) + e^{2 i d} E_{1-\alpha}(i(-c + i p + 2 a s - a \nu) z) - E_{1-\alpha}(-i(-c - i p + 2 a s - a \nu) z) \right) - e^{-i d} \binom{\nu}{\frac{\nu}{2}} \left(e^{2 i d} E_{1-\alpha}(i(i p - c) z) - E_{1-\alpha}((i c - p) z) \right) (\nu \bmod 2 - 1) \right) /;\ \nu \in \mathbb{N}^+$$

01.07.21.2714.01

$$\int z^n e^{p z} \sin(c z + d) \cos^\nu(a z)\, dz = \frac{i\, n!}{2} \cos^\nu(a z) \left(1 + e^{2 i a z}\right)^{-\nu} \left(-e^{i d + (p + i c) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (p + i c - i a \nu)^{j+1}}\, {}_{j+2}F_{j+1}\left(\frac{-i p + c - a \nu}{2 a}, \ldots, \frac{-i p + c - a \nu}{2 a}, -\nu; 1 + \frac{-i p + c - a \nu}{2 a}, \ldots, 1 + \frac{-i p + c - a \nu}{2 a}; -e^{2 i a z}\right) + e^{-i d + (p - i c) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (p - i c - i a \nu)^{j+1}}\, {}_{j+2}F_{j+1}\left(-\frac{i p + c + a \nu}{2 a}, \ldots, -\frac{i p + c + a \nu}{2 a}, -\nu; 1 - \frac{i p + c + a \nu}{2 a}, \ldots, 1 - \frac{i p + c + a \nu}{2 a}; -e^{2 i a z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sin(c z) \cos^\nu(a z + b)$

01.07.21.2715.01

$$\int z^{\alpha-1} e^{p z} \sin(c z) \cos^\nu(a z + b)\, dz = -i\, 2^{-\nu-1} z^\alpha \left(\binom{\nu}{\frac{\nu}{2}} \left(E_{1-\alpha}(-i c z - p z) - E_{1-\alpha}(i c z - p z)\right) (\nu \bmod 2 - 1) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i b (2 s + \nu)} \binom{\nu}{s} \left(-e^{4 i b s} E_{1-\alpha}(i (c + i p - 2 a s + a \nu) z) + e^{2 i b \nu} E_{1-\alpha}(-i (c - i p - 2 a s + a \nu) z) - e^{2 i b \nu} E_{1-\alpha}(i (c + i p + 2 a s - a \nu) z) + e^{4 i b s} E_{1-\alpha}(-i (c - i p + 2 a s - a \nu) z)\right)\right) /; \nu \in \mathbb{N}^+$$

01.07.21.2716.01

$$\int z^n e^{p z} \sin(c z) \cos^\nu(b + a z)\, dz = \frac{1}{2} i \left(1 + e^{2 i (b + a z)}\right)^{-\nu} \cos^\nu(b + a z)\, n! \left(e^{(-i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c + p - i a \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{c + i p + a \nu}{2 a}, \ldots, -\frac{c + i p + a \nu}{2 a}, -\nu; 1 - \frac{c + i p + a \nu}{2 a}, \ldots, 1 - \frac{c + i p + a \nu}{2 a}; -e^{2 i (b + a z)}\right) - e^{(i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i c + p - i a \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{-c + i p + a \nu}{2 a}, \ldots, -\frac{-c + i p + a \nu}{2 a}, -\nu; 1 - \frac{-c + i p + a \nu}{2 a}, \ldots, 1 - \frac{-c + i p + a \nu}{2 a}; -e^{2 i (b + a z)}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sin(c z + d) \cos^\nu(a z + b)$

01.07.21.2717.01

$$\int z^{\alpha-1} e^{p z} \sin(c z + d) \cos^{\nu}(a z + b) \, dz = -i \, 2^{-\nu-1} z^{\alpha} \left(e^{-i d} \binom{\nu}{\frac{\nu}{2}} \left(e^{2 i d} E_{1-\alpha}(-i c z - p z) - E_{1-\alpha}(i c z - p z) \right) (\nu \bmod 2 - 1) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i (d + b (2 s + \nu))} \binom{\nu}{s} \left(-e^{4 i b s} E_{1-\alpha}(i (c + i p - 2 a s + a \nu) z) + e^{2 i (d + b \nu)} E_{1-\alpha}(-i (c - i p - 2 a s + a \nu) z) - e^{2 i b \nu} E_{1-\alpha}(i (c + i p + 2 a s - a \nu) z) + e^{2 i (d + 2 b s)} E_{1-\alpha}(-i (c - i p + 2 a s - a \nu) z) \right) \right) /; \nu \in \mathbb{N}^+$$

01.07.21.2718.01

$$\int z^n e^{p z} \sin(d + c z) \cos^{\nu}(b + a z) \, dz = \frac{1}{2} i \left(1 + e^{2 i (b + a z)}\right)^{-\nu} \cos^{\nu}(b + a z) \, n! \left(e^{-i d + (-i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c + p - i a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{c + i p + a \nu}{2 a}, \ldots, -\frac{c + i p + a \nu}{2 a}, -\nu; 1 - \frac{c + i p + a \nu}{2 a}, \ldots, 1 - \frac{c + i p + a \nu}{2 a}; -e^{2 i (b + a z)} \right) - e^{i d + (i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i c + p - i a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-c + i p + a \nu}{2 a}, \ldots, -\frac{-c + i p + a \nu}{2 a}, -\nu; 1 - \frac{-c + i p + a \nu}{2 a}, \ldots, 1 - \frac{-c + i p + a \nu}{2 a}; -e^{2 i (b + a z)} \right) \right) /; n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \sin(b z^r) \cos^{\nu}(c z)$

01.07.21.2719.01

$$\int z^n e^{p z^2} \sin(b z^2) \cos^\nu(c z)\, dz = i\, 2^{-\nu-2} \left(z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(\left((-i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i b - p) z^2\right) - \left(i (b + i p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i (b + i p) z^2\right)\right) (1 - \nu \bmod 2) - \frac{1}{\sqrt{-i b + p}\, \sqrt{i b + p}} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(-e^{\frac{c^2 (\nu-2 s)^2}{4 (i b+p)}} \sqrt{-i b + p} \sum_{q=0}^{n} (i b + p)^{-n-\frac{1}{2}} \left(i c \left(s - \frac{\nu}{2}\right)\right)^{n-q} (c\, i (\nu - 2 s) + 2 (i b + p) z)^{q+1} \left(-\frac{(c\, i (\nu - 2 s) + 2 (i b + p) z)^2}{i b + p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c\, i (\nu - 2 s) + 2 (i b + p) z)^2}{4 (i b + p)}\right) + e^{\frac{c^2 (\nu-2 s)^2}{4 (-i b+p)}} \sqrt{i b + p} \sum_{q=0}^{n} (-i b + p)^{-n-\frac{1}{2}} \left(i c \left(s - \frac{\nu}{2}\right)\right)^{n-q} \left(\frac{i (2 c s - c \nu + 2 b z + 2 i p z)^2}{b + i p}\right)^{\frac{1}{2}(-q-1)} (-2 c\, i s + i c \nu - 2 i b z + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (2 c s - c \nu + 2 b z + 2 i p z)^2}{4 (b + i p)}\right) + e^{\frac{c^2 (\nu-2 s)^2}{4 (-i b+p)}} \sqrt{i b + p} \sum_{q=0}^{n} 2^{q-n} (-i b + p)^{-n-\frac{1}{2}} (i c (\nu - 2 s))^{n-q} (-i (c (\nu - 2 s) + 2 (b + i p) z))^{q+1} \left(\frac{i (c (\nu - 2 s) + 2 (b + i p) z)^2}{b + i p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c (\nu - 2 s) + 2 (b + i p) z)^2}{4 (b + i p)}\right) - e^{\frac{c^2 (\nu-2 s)^2}{4 (i b+p)}} \sqrt{-i b + p} \sum_{q=0}^{n} 2^{q-n} (i b + p)^{-n-\frac{1}{2}} (i c (\nu - 2 s))^{n-q} \left(-\frac{i (-2 c s + c \nu - 2 b z + 2 i p z)^2}{b - i p}\right)^{\frac{1}{2}(-q-1)} (2 i c s - i c \nu + 2 i b z + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-2 c s + c \nu - 2 b z + 2 i p z)^2}{4 (b - i p)}\right) \right) \right) \right) /; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.07.21.2720.01

$$\int z^n e^{p \sqrt{z}} \sin(b \sqrt{z}) \cos^\nu(c z)\, dz = 2^{-\nu}\, i \binom{\nu}{\frac{\nu}{2}} \left(\left((-i b - p) \sqrt{z}\right)^{-2 (n+1)} \Gamma\left(2 (n + 1), (-i b - p) \sqrt{z}\right) - \left(i (b + i p) \sqrt{z}\right)^{-2 (n+1)} \Gamma\left(2 (n + 1), i (b + i p) \sqrt{z}\right)\right) (1 - \nu \bmod 2)\, z^{n+1} + \frac{i\, 2^{-2 n-\nu-2}}{c^2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(\nu - 2 s)^2} \left(\binom{\nu}{s} \left(e^{-\frac{(i b+p)^2}{8 i c s - 4 i c \nu}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (i b + p)^{-h-k+2 n} \right.\right.\right.$$

$$\left(i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)^{h+k}\left(\frac{i\left(i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((i\,b+p)\left(i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+2\,c\,i\,(2\,s-\right.$$

$$\left.\left.v)\sqrt{\frac{i\left(i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\right)\right)$$

$$(i\,c\,(2\,s-v))^{-2\,n}-e^{-\frac{i\,(b+i\,p)^2}{4\,(2\,c\,s-c\,v)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+p)^{-h-k+2\,n}\left(-i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+i\,p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((-i\,b+p)\left(-i\,b+p+2\,i\,c\,(2\,s-v)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+i\,p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+2\,c\,i\,(2\,s-v)$$

$$\left.\left.\sqrt{-\frac{i\left(b+i\,p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+i\,p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\right)\right)$$

$$(i\,c\,(2\,s-v))^{-2\,n}+e^{\frac{i\,(b+i\,p)^2}{4\,(2\,c\,s-c\,v)}}\,(i\,c\,(v-2\,s))^{-2\,n}\left(e^{\frac{b\,p}{2\,c\,s-c\,v}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b+p)^{-h-k+2\,n}\right.$$

$$\left(i\,b+p+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+k}\left(\frac{i\left(i\,b+p+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((i\,b+p)\left(i\,b+p+2\,i\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b-i\,p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+\right.$$

$$2\,c\,i\,(v-2\,s)\sqrt{\frac{i\left(i\,b+p+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.\frac{i\left(b-i\,p+2\,c\,(v-2\,s)\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\right)-\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b+p)^{-h-k+2\,n}$$

$$\left(-i\,b+p+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^{h+k}\left(\frac{i\left(-i\,b+p+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(\left(-i\,b+p\right)\left(-i\,b+p+2\,i\,c\,(v-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+i\,p+2\,c\,(2\,s-v)\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+\right.$$

$$2\,c\,i\,(v-2\,s)\sqrt{\frac{i\left(-i\,b+p+2\,i\,c\,(v-2\,s)\sqrt{z}\right)^2}{c\,(v-2\,s)}}$$

$$\left.\left.\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+i\,p+2\,c\,(2\,s-v)\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\right)\right)\right)\right)\; /;\; v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\, e^{p\, z^r}\, \sin(b\, z)\cos^v(c\, z)$

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$$\int z^n e^{p z^2} \sin(b z) \cos^\nu(c z)\, dz = -i\, 2^{-\nu-2} p^{-n-1} \Bigg(\Bigg(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} e^{\frac{b^2+c^2(\nu-2s)^2}{2p}} \binom{\nu}{s} \Bigg(e^{-\frac{(b+2cs-c\nu)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} p^{-n-\frac{1}{2}} (i(b-2cs+c\nu))^{n-q} (-i(b-2cs+c\nu+2ipz))^{q+1} \left(\frac{(b-2cs+c\nu+2ipz)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b-2cs+c\nu+2ipz)^2}{4p}\right) + e^{-\frac{(b-2cs+c\nu)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} p^{-n-\frac{1}{2}} (i(b+2cs-c\nu))^{n-q} (-i(b+2cs-c\nu+2ipz))^{q+1} \left(\frac{(b+2cs-c\nu+2ipz)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b+2cs-c\nu+2ipz)^2}{4p}\right) - e^{-\frac{(b+2cs-c\nu)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} p^{-n-\frac{1}{2}} (-i(b-2cs+c\nu))^{n-q} (i(b-2cs+c\nu-2ipz))^{q+1} \left(\frac{(b-2cs+c\nu-2ipz)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b-2cs+c\nu-2ipz)^2}{4p}\right) - e^{-\frac{(b-2cs+c\nu)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} p^{-n-\frac{1}{2}} (-i(b+2cs-c\nu))^{n-q} (i(b+2cs-c\nu-2ipz))^{q+1} \left(\frac{(b+2cs-c\nu-2ipz)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b+2cs-c\nu-2ipz)^2}{4p}\right)\Bigg)\Bigg) p^{n+\frac{1}{2}} - e^{\frac{b^2}{4p}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (ib)^{n-q} \left(\frac{(b+2ipz)^2}{p}\right)^{\frac{1}{2}(-q-1)} (-ib+2pz)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b+2ipz)^2}{4p}\right) + e^{\frac{b^2}{4p}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-ib)^{n-q} \left(\frac{(b-2ipz)^2}{p}\right)^{\frac{1}{2}(-q-1)} (ib+2pz)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b-2ipz)^2}{4p}\right)\Bigg) /;\ \nu \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

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$$\int z^n e^{p\sqrt{z}} \sin(b z) \cos^\nu(c z)\, dz =$$

$$i\, 2^{-2n-\nu-2} (ib)^{-2(n+1)} e^{-\frac{ip^2}{4b}} \Bigg(b^2 e^{\frac{ip^2}{4b}} \Bigg(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \binom{\nu}{s} \Bigg(e^{-\frac{ip^2}{4(b-2cs+c\nu)}} \left((b-2cs+c\nu)^2\right)^{-2n-1} \Bigg((i(b-2cs+c\nu))^{2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}\left(p-2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(i\,p+2\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{b-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(p\left(p-2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}(h+k+1),\,\frac{i\left(i\,p+2\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{4\,(b-2\,c\,s+c\,v)}\right)-2\,i\,(b-2\,c\,s+c\,v)$$

$$\left.\sqrt{\frac{i\left(i\,p+2\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{b-2\,c\,s+c\,v}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),\,\frac{i\left(i\,p+2\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{4\,(b-2\,c\,s+c\,v)}\right)\right)-$$

$$e^{\frac{i\,p^2}{2\,(b-2\,c\,s+c\,v)}}\,(-i\,(b-2\,c\,s+c\,v))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{b-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(p\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+\right.\right.$$

$$\left.k+1),\,\frac{i\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{4\,(b-2\,c\,s+c\,v)}\right)+2\,i\sqrt{\frac{i\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{b-2\,c\,s+c\,v}}$$

$$\left.\left.(b-2\,c\,s+c\,v)\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,\frac{i\left(p+2\,i\,(b-2\,c\,s+c\,v)\sqrt{z}\right)^2}{4\,(b-2\,c\,s+c\,v)}\right)\right)\right)+$$

$$\frac{1}{(b+2\,c\,s-c\,v)^2}\left(e^{\frac{i\,p^2}{-4\,b-8\,c\,s+4\,c\,v}}\,(-i\,(b+2\,c\,s-c\,v))^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}\right.$$

$$\left(p-2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^{h+k}\left(\frac{i\left(i\,p+2\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{b+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(p\left(p-2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\,\frac{i\left(i\,p+2\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(b+2\,c\,s-c\,v)}\right)-\right.$$

$$2\,i\,(b+2\,c\,s-c\,v)\sqrt{\frac{i\left(i\,p+2\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{b+2\,c\,s-c\,v}}$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(i\,p+2\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(b+2\,c\,s-c\,v)}\right)\Bigg)\Bigg)\Bigg)-\frac{1}{(b+2\,c\,s-c\,v)^2}$$

$$\Bigg(e^{\frac{i\,p^2}{4\,b+8\,c\,s-4\,c\,v}}\,(i\,(b+2\,c\,s-c\,v))^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{b+2\,c\,s-c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(b+2\,c\,s-c\,v)}\right)+2\,i\sqrt{\frac{i\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{b+2\,c\,s-c\,v}}$$

$$(b+2\,c\,s-c\,v)\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(p+2\,i\,(b+2\,c\,s-c\,v)\sqrt{z}\right)^2}{4\,(b+2\,c\,s-c\,v)}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)(i\,b)^{2\,n}-$$

$$\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p-2\,i\,b\sqrt{z}\right)^{h+k}\left(\frac{i\left(2\sqrt{z}\,b+i\,p\right)^2}{b}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(p\left(p-2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\sqrt{z}\,b+i\,p\right)^2}{4\,b}\right)-$$

$$2\,i\,b\sqrt{\frac{i\left(2\sqrt{z}\,b+i\,p\right)^2}{b}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\sqrt{z}\,b+i\,p\right)^2}{4\,b}\right)\Bigg)+$$

$$e^{\frac{i p^2}{2 b}} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(p + 2 i b \sqrt{z}\right)^{h+k} \left(\frac{i \left(p + 2 i b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(p \left(p + 2 i b \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i \left(p + 2 i b \sqrt{z}\right)^2}{4 b}\right) + \right.$$

$$\left. 2 \sqrt{\frac{i \left(p + 2 i b \sqrt{z}\right)^2}{b}} \, b \, i \, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i \left(p + 2 i b \sqrt{z}\right)^2}{4 b}\right)\right)\Bigg) /; v \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

Involving $z^n e^{p z} \sin\left(b z^r\right) \cos^v(c z)$

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$$\int z^n e^{pz}\sin\left(b z^2\right)\cos^\nu(c z)\,dz = \frac{2^{-\nu-2}(i b)^{-n}}{b} e^{-\frac{i p^2}{4b}}$$

$$\left(-(-1)^n \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (p - 2 i b z)^{q+1} \left(\frac{i (i p + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (i p + 2 b z)^2}{4b}\right) - \right.$$

$$e^{\frac{i p^2}{2b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (p + 2 i b z)^{q+1} \left(\frac{i (p + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (p + 2 i b z)^2}{4b}\right) +$$

$$e^{\frac{i p^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{\frac{i (p + c i (\nu - 2 s))^2}{4b}} \binom{\nu}{s} \left((-1)^n e^{-\frac{i \left(p^2 - c^2 (\nu - 2 s)^2\right)}{2b}} \sum_{q=0}^{n} 2^{q-n} (i c (\nu - 2 s) - p)^{n-q} \left(\frac{i (i p - 2 c s + c \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)}\right.$$

$$(p - i(-2 c s + c \nu + 2 b z))^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (i p - 2 c s + c \nu + 2 b z)^2}{4b}\right) +$$

$$(-1)^n e^{-\frac{i (p + c i (\nu - 2 s))^2}{2b}} \sum_{q=0}^{n} 2^{q-n} (-p + 2 i c s - i c \nu)^{n-q} \left(\frac{i (i p + 2 c s - c \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)}$$

$$(p - i (2 c s - c \nu + 2 b z))^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (i p + 2 c s - c \nu + 2 b z)^2}{4b}\right) +$$

$$e^{\frac{c p (\nu - 2 s)}{b}} \sum_{q=0}^{n} 2^{q-n} (-p - 2 i c s + i c \nu)^{n-q} (p + i (2 c s - c \nu + 2 b z))^{q+1}$$

$$\left(\frac{i (p + i (2 c s - c \nu + 2 b z))^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (p + i (2 c s - c \nu + 2 b z))^2}{4b}\right) +$$

$$\sum_{q=0}^{n} 2^{q-n} (-p + 2 i c s - i c \nu)^{n-q} \left(-\frac{i (-i p - 2 c s + c \nu + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} (p + i(-2 c s + c \nu + 2 b z))^{q+1}$$

$$\left.\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-i p - 2 c s + c \nu + 2 b z)^2}{4b}\right)\right)\right) /; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{pz} \sin\left(b \sqrt{z}\right) \cos^\nu(c z)\,dz =$$

$$-i\, 2^{-2n-\nu-2} p^{-2(n+1)} \left(\left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{\frac{b^2}{4p - 8 i c s + 4 i c \nu}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b)^{-h-k+2n} \left(i b + 2 (p - 2 i c s + i c \nu) \sqrt{z}\right)^{h+k}\right.\right.\right.\right.$$

$$\left(\frac{\left(b+2\left(-i\,p-2\,c\,s+c\,v\right)\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(b\,i\left(i\,b+2\left(p-2\,i\,c\,s+i\,c\,v\right)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{\left(b+2\left(-i\,p-2\,c\,s+c\,v\right)\sqrt{z}\right)^2}{4\left(p-2\,i\,c\,s+i\,c\,v\right)}\right)+2\sqrt{\frac{\left(b+2\left(-i\,p-2\,c\,s+c\,v\right)\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}}$$

$$\left.\left.\left(p-2\,i\,c\,s+i\,c\,v\right)\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{\left(b+2\left(-i\,p-2\,c\,s+c\,v\right)\sqrt{z}\right)^2}{4\left(p-2\,i\,c\,s+i\,c\,v\right)}\right)\right)\right)-\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(-i\,b)^{-h-k+2\,n}\left(\frac{\left(b+2\left(i\,p+2\,c\,s-c\,v\right)\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}\right)^{\frac{1}{2}(-h-k-1)}\left(-i\,b+2\left(p-2\,i\,c\,s+i\,c\,v\right)\sqrt{z}\right)^{h+k}$$

$$\binom{k}{h}\binom{n}{k}\left(2\left(p-2\,i\,c\,s+i\,c\,v\right)\sqrt{\frac{\left(b+2\left(i\,p+2\,c\,s-c\,v\right)\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{\left(b+2\left(i\,p+2\,c\,s-c\,v\right)\sqrt{z}\right)^2}{4\left(p-2\,i\,c\,s+i\,c\,v\right)}\right)-b\left(b+2\left(i\,p+2\,c\,s-c\,v\right)\sqrt{z}\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{\left(b+2\left(i\,p+2\,c\,s-c\,v\right)\sqrt{z}\right)^2}{4\left(p-2\,i\,c\,s+i\,c\,v\right)}\right)\right)\right)\left(p-2\,i\,c\,s+i\,c\,v\right)^{-2(n+1)}-$$

$$e^{\frac{b^2}{4\,p+8\,i\,c\,s-4\,i\,c\,v}}\left(p+2\,i\,c\,s-i\,c\,v\right)^{-2(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b)^{-h-k+2\,n}\left(-i\,b+2\left(p+2\,i\,c\,s-i\,c\,v\right)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{\left(b+2\left(i\,p-2\,c\,s+c\,v\right)\sqrt{z}\right)^2}{p+2\,i\,c\,s-i\,c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2\left(p+2\,i\,c\,s-i\,c\,v\right)\right.$$

$$\sqrt{\frac{\left(b+2\left(i\,p-2\,c\,s+c\,v\right)\sqrt{z}\right)^2}{p+2\,i\,c\,s-i\,c\,v}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{\left(b+2\left(i\,p-2\,c\,s+c\,v\right)\sqrt{z}\right)^2}{4\left(p+2\,i\,c\,s-i\,c\,v\right)}\right)-$$

$$b\left(b+2\left(i\,p-2\,c\,s+c\,v\right)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\left(h+k+1\right),\,\frac{\left(b+2\left(i\,p-2\,c\,s+c\,v\right)\sqrt{z}\right)^{2}}{4\left(p+2\,i\,c\,s-i\,c\,v\right)}\right)\Bigg)+e^{\frac{b^{2}}{4\,p+8\,i\,c\,s-4\,i\,c\,v}}$$

$$\left(p+2\,i\,c\,s-i\,c\,v\right)^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^{k}\,(i\,b)^{-h-k+2\,n}\left(\frac{\left(b+2\left(-i\,p+2\,c\,s-c\,v\right)\sqrt{z}\right)^{2}}{p+2\,i\,c\,s-i\,c\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\left(i\,b+2\left(p+2\,i\,c\,s-i\,c\,v\right)\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}\Bigg(b\,i\left(i\,b+2\left(p+2\,i\,c\,s-i\,c\,v\right)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\left(h+k+1\right),\,\frac{\left(b+2\left(-i\,p+2\,c\,s-c\,v\right)\sqrt{z}\right)^{2}}{4\left(p+2\,i\,c\,s-i\,c\,v\right)}\right)+2\sqrt{\frac{\left(b+2\left(-i\,p+2\,c\,s-c\,v\right)\sqrt{z}\right)^{2}}{p+2\,i\,c\,s-i\,c\,v}}$$

$$\left(p+2\,i\,c\,s-i\,c\,v\right)\Gamma\left(\frac{1}{2}\left(h+k+2\right),\,\frac{\left(b+2\left(-i\,p+2\,c\,s-c\,v\right)\sqrt{z}\right)^{2}}{4\left(p+2\,i\,c\,s-i\,c\,v\right)}\right)\Bigg)\Bigg)\Bigg)\Bigg)\,p^{2\,(n+1)}+$$

$$e^{\frac{b^{2}}{4\,p}}\binom{v}{\frac{v}{2}}\left(v \bmod 2-1\right)\sum_{k=0}^{n}\sum_{h=0}^{k}-(-1)^{k-h}\,4^{k}\,(-i\,b)^{-h-k+2\,n}\left(\frac{\left(b+2\,i\,p\sqrt{z}\right)^{2}}{p}\right)^{\frac{1}{2}(-h-k-1)}\left(-i\,b+2\,p\sqrt{z}\right)^{h+k}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2\,i\,p\sqrt{z}\right)\Gamma\left(\frac{1}{2}\left(h+k+1\right),\,\frac{\left(b+2\,i\,p\sqrt{z}\right)^{2}}{4\,p}\right)-$$

$$2\,p\sqrt{\frac{\left(b+2\,i\,p\sqrt{z}\right)^{2}}{p}}\;\Gamma\left(\frac{1}{2}\left(h+k+2\right),\,\frac{\left(b+2\,i\,p\sqrt{z}\right)^{2}}{4\,p}\right)\Bigg)-$$

$$e^{\frac{b^{2}}{4\,p}}\binom{v}{\frac{v}{2}}\left(v \bmod 2-1\right)\sum_{k=0}^{n}\sum_{h=0}^{k}-(-1)^{k-h}\,4^{k}\,(i\,b)^{-h-k+2\,n}\left(\frac{\left(b-2\,i\,p\sqrt{z}\right)^{2}}{p}\right)^{\frac{1}{2}(-h-k-1)}\left(i\,b+2\,p\sqrt{z}\right)^{h+k}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b\left(b-2\,i\,p\sqrt{z}\right)\Gamma\left(\frac{1}{2}\left(h+k+1\right),\,\frac{\left(b-2\,i\,p\sqrt{z}\right)^{2}}{4\,p}\right)-$$

$$\sqrt{\frac{\left(b-2\,i\,p\sqrt{z}\right)^{2}}{p}}\;\Gamma\left(\frac{1}{2}\ldots,\,\frac{\left(b-2\,i\,p\sqrt{z}\right)^{2}}{\ldots}\right)\Bigg)\Bigg)$$

Involving $z^n e^{p z} \sin(b z) \cos^\nu(c z^r)$

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$$\int z^n e^{p z} \sin(b z) \cos^\nu(c z^2)\, dz = -i\, 2^{-\nu-2} \Bigg(2 z^{n+1} \binom{\nu}{\frac{\nu}{2}} (E_{-n}(-i b z - p z) - E_{-n}(i b z - p z)) (\nu \bmod 2 - 1) - \sum_{s=0}^{\lfloor \frac{\nu-1}{2} \rfloor} \binom{\nu}{s} \Bigg(-\frac{1}{\sqrt{i c (2 s - \nu)}} \Bigg(e^{-\frac{i (b + i p)^2}{c (8 s - 4 \nu)}} \sum_{q=0}^{n} 2^{q-n} (i b - p)^{n-q} (i c (2 s - \nu))^{-n-\frac{1}{2}} (-i b + p + 2 i c (2 s - \nu) z)^{q+1} \left(-\frac{i (b + i p + 2 c (\nu - 2 s) z)^2}{c (2 s - \nu)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (b + i p + 2 c (\nu - 2 s) z)^2}{c (8 s - 4 \nu)} \right) \Bigg) + \frac{1}{\sqrt{i c (\nu - 2 s)}} \Bigg(e^{\frac{i (i b + p)^2}{4 c (\nu - 2 s)}} \sum_{q=0}^{n} \left(-\frac{1}{2} (i b) - \frac{p}{2} \right)^{n-q} (i c (\nu - 2 s))^{-n-\frac{1}{2}} (i b + p + 2 i c (\nu - 2 s) z)^{q+1} \left(\frac{i (i b + p + 2 i c (\nu - 2 s) z)^2}{c (\nu - 2 s)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (i b + p + 2 i c (\nu - 2 s) z)^2}{c (8 s - 4 \nu)} \right) \Bigg) + \frac{1}{\sqrt{i c (2 s - \nu)}} \Bigg(e^{-\frac{i (i b + p)^2}{4 c (\nu - 2 s)}} \sum_{q=0}^{n} 2^{q-n} (-i b - p)^{n-q} (i c (2 s - \nu))^{-n-\frac{1}{2}} (i b + p + 2 i c (2 s - \nu) z)^{q+1} \left(-\frac{i (b - i p + 4 c s z - 2 c \nu z)^2}{2 c s - c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (b - i p + 4 c s z - 2 c \nu z)^2}{4 (2 c s - c \nu)} \right) \Bigg) - \frac{1}{\sqrt{i c (\nu - 2 s)}} \Bigg(e^{\frac{i (b + i p)^2}{c (8 s - 4 \nu)}} \sum_{q=0}^{n} 2^{q-n} (i b - p)^{n-q} (i c (\nu - 2 s))^{-n-\frac{1}{2}} \left(\frac{i (b + i p + 4 c s z - 2 c \nu z)^2}{c (2 s - \nu)} \right)^{\frac{1}{2}(-q-1)} (-i b + p + 2 i c (\nu - 2 s) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (b + i p + 4 c s z - 2 c \nu z)^2}{c (8 s - 4 \nu)} \right) \Bigg) \Bigg) \Bigg) /; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{p z} \sin(b z) \cos^\nu(c \sqrt{z})\, dz = 2^{-\nu-1} i \binom{\nu}{\frac{\nu}{2}} \left((-i b - p)^{-n-1} \Gamma(n + 1, (-i b - p) z) - (i b - p)^{-n-1} \Gamma(n + 1, (i b - p) z) \right) (1 - \nu \bmod 2) + 2^{-2 n - \nu - 1 - 1} i \sum_{s=0}^{\lfloor \frac{\nu-1}{2} \rfloor} \binom{\nu}{s} \Bigg(e^{\frac{c^2 (\nu - 2 s)^2}{4 (-i b + p)}} \Bigg(\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-i c (\nu - 2 s))^{-h-i+2 n} \left(2 (-i b + p) \sqrt{z} - i c (\nu - 2 s) \right)^{h+i}$$

$$\left(-\frac{\left(2\,(-i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{-i\,b+p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}\binom{n}{i}\Bigg(2\,(-i\,b+p)$$

$$\sqrt{-\frac{\left(2\,(-i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{-i\,b+p}}\;\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(2\,(-i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{4\,(-i\,b+p)}\right)-i\,c$$

$$(v-2\,s)\left(2\,(-i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(2\,(-i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{4\,(-i\,b+p)}\right)\Bigg)\Bigg)\Bigg)$$

$$(-i\,b+p)^{-2\,(n+1)}+e^{\frac{c^2\,(v-2\,s)^2}{4\,(-i\,b+p)}}\Bigg(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,c\,(v-2\,s))^{-h-i+2\,n}\left(2\,\sqrt{z}\,(-i\,b+p)+c\,i\,(v-2\,s)\right)^{h+i}$$

$$\left(-\frac{\left(2\,\sqrt{z}\,(-i\,b+p)+c\,i\,(v-2\,s)\right)^2}{-i\,b+p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}\binom{n}{i}\Bigg(c\,i\,(v-2\,s)\left(2\,\sqrt{z}\,(-i\,b+p)+c\,i\,(v-2\,s)\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(2\,\sqrt{z}\,(-i\,b+p)+c\,i\,(v-2\,s)\right)^2}{4\,(-i\,b+p)}\right)+2\,\sqrt{-\frac{\left(2\,\sqrt{z}\,(-i\,b+p)+c\,i\,(v-2\,s)\right)^2}{-i\,b+p}}$$

$$(-i\,b+p)\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(2\,\sqrt{z}\,(-i\,b+p)+c\,i\,(v-2\,s)\right)^2}{4\,(-i\,b+p)}\right)\Bigg)\Bigg)\Bigg)(-i\,b+p)^{-2\,(n+1)}-$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,(i\,b+p)}}\,(i\,b+p)^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,c\,(v-2\,s))^{-h-i+2\,n}\left(2\,(i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^{h+i}$$

$$\left(-\frac{\left(2\,(i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{i\,b+p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}\binom{n}{i}$$

$$\Bigg(2\,(i\,b+p)\,\sqrt{-\frac{\left(2\,(i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{i\,b+p}}\;\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(2\,(i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{4\,(i\,b+p)}\right)-$$

$$i\, c\,(v-2\,s)\left(2\,(i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(2\,(i\,b+p)\,\sqrt{z}\,-i\,c\,(v-2\,s)\right)^2}{4\,(i\,b+p)}\right)\Bigg)-$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,(i\,b+p)}}\,(i\,b+p)^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,c\,(v-2\,s))^{-h-i+2\,n}\left(2\,\sqrt{z}\,(i\,b+p)+c\,i\,(v-2\,s)\right)^{h+i}$$

$$\left(-\frac{\left(2\,\sqrt{z}\,(i\,b+p)+c\,i\,(v-2\,s)\right)^2}{i\,b+p}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg(c\,i\,(v-2\,s)\left(2\,\sqrt{z}\,(i\,b+p)+c\,i\,(v-2\,s)\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+i+1),\,-\frac{\left(2\,\sqrt{z}\,(i\,b+p)+c\,i\,(v-2\,s)\right)^2}{4\,(i\,b+p)}\Bigg)+2\,\sqrt{-\frac{\left(2\,\sqrt{z}\,(i\,b+p)+c\,i\,(v-2\,s)\right)^2}{i\,b+p}}$$

$$(i\,b+p)\,\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(2\,\sqrt{z}\,(i\,b+p)+c\,i\,(v-2\,s)\right)^2}{4\,(i\,b+p)}\right)\Bigg)\Bigg)\Bigg)\;/;\;v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z^r}\,\sin(b\,z)\cos^v\left(c\,z^r\right)$

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$$\int z^n\,e^{p\,z^2}\,\sin(b\,z)\cos^v\left(c\,z^2\right)dz=-i\,2^{-v-2}\,p^{-n-1}$$

$$\Bigg(\Bigg(\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(\frac{1}{\sqrt{p-2\,i\,c\,s+i\,c\,v}}\Bigg(e^{\frac{b^2}{4\,p-8\,i\,c\,s+4\,i\,c\,v}}\sum_{q=0}^{n}2^{q-n}\,(i\,b)^{n-q}\,(p-2\,i\,c\,s+i\,c\,v)^{-n-\frac{1}{2}}\,(-i\,(b+2\,i\,p\,z+4\,c\,s\,z-2\,c\,v\,z))^{q+1}$$

$$\left(\frac{(b+2\,i\,p\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{p-2\,i\,c\,s+i\,c\,v}\right)^{\frac{1}{2}\,(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{(b+2\,i\,p\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{4\,(p-2\,i\,c\,s+i\,c\,v)}\right)\Bigg)+$$

$$\frac{1}{\sqrt{p+2\,i\,c\,s-i\,c\,v}}\Bigg(e^{\frac{b^2}{4\,p+8\,i\,c\,s-4\,i\,c\,v}}\sum_{q=0}^{n}2^{q-n}\,(i\,b)^{n-q}\,(p+2\,i\,c\,s-i\,c\,v)^{-n-\frac{1}{2}}$$

$$(-i\,(b+2\,i\,p\,z-4\,c\,s\,z+2\,c\,v\,z))^{q+1}\left(\frac{(b+2\,i\,p\,z-4\,c\,s\,z+2\,c\,v\,z)^2}{p+2\,i\,c\,s-i\,c\,v}\right)^{\frac{1}{2}\,(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2},\,\frac{(b+2\,i\,p\,z-4\,c\,s\,z+2\,c\,v\,z)^2}{4\,(p+2\,i\,c\,s-i\,c\,v)}\right)\Bigg)-\frac{1}{\sqrt{p+2\,i\,c\,s-i\,c\,v}}\Bigg(e^{\frac{b^2}{4\,p+8\,i\,c\,s-4\,i\,c\,v}}\sum_{q=0}^{n}2^{q-n}\,(-i\,b)^{n-q}$$

$$(p+2\,i\,c\,s-i\,c\,v)^{-n-\frac{1}{2}}\left(\frac{(b-2\,i\,p\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{p+2\,i\,c\,s-i\,c\,v}\right)^{\frac{1}{2}(-q-1)}(i\,b+2\,(p+2\,i\,c\,s-i\,c\,v)\,z)^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(b-2\,i\,p\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{4\,(p+2\,i\,c\,s-i\,c\,v)}\right)\Bigg)-\frac{1}{\sqrt{p-2\,i\,c\,s+i\,c\,v}}$$

$$\left(e^{\frac{b^2}{4\,p-8\,i\,c\,s+4\,i\,c\,v}}\sum_{q=0}^{n}2^{q-n}\,(-i\,b)^{n-q}\,(p-2\,i\,c\,s+i\,c\,v)^{-n-\frac{1}{2}}\left(\frac{(b-2\,i\,p\,z-4\,c\,s\,z+2\,c\,v\,z)^2}{p-2\,i\,c\,s+i\,c\,v}\right)^{\frac{1}{2}(-q-1)}\right.$$

$$\left.(i\,b+2\,(p-2\,i\,c\,s+i\,c\,v)\,z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(b-2\,i\,p\,z-4\,c\,s\,z+2\,c\,v\,z)^2}{4\,(p-2\,i\,c\,s+i\,c\,v)}\right)\right)\Bigg)\Bigg)p^{n+1}-$$

$$e^{\frac{b^2}{4\,p}}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{q=0}^{n}2^{q-n}\,(i\,b)^{n-q}\left(\frac{(b+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(-i\,b+2\,p\,z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(b+2\,i\,p\,z)^2}{4\,p}\right)+$$

$$e^{\frac{b^2}{4\,p}}$$

$$\binom{v}{\frac{v}{2}}$$

$$(v\bmod 2-1)$$

$$\sum_{q=0}^{n}2^{q-n}\,(-i\,b)^{n-q}\left(\frac{(b-2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(i\,b+2\,p\,z)^{q+1}$$

$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(b-2\,i\,p\,z)^2}{4\,p}\right)\right)\Bigg)\;/;\;v\in\mathbb{N}^+\wedge n\in\mathbb{N}$$

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$$\int z^n\,e^{p\sqrt{z}}\,\sin(b\,z)\cos^v\!\left(c\sqrt{z}\right)dz=$$

$$2^{-2\,n-v-2}\,i\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(e^{-\frac{i\,p^2}{4\,b}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,p^{-h-i+2\,n}\left(p-2\,i\,b\sqrt{z}\right)^{h+i}\left(-\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-i-1)}\right.$$

$$\binom{i}{h}\binom{n}{i}\left(p\left(p-2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),-\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)-\right.$$

$$\left.2\,i\,b\sqrt{-\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+i+2),-\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\right)-$$

$$e^{\frac{i p^2}{4 b}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i p^{-h-i+2n} \left(p + 2 i b \sqrt{z}\right)^{h+i} \left(\frac{i \left(p + 2 i b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i} \left(p \left(p + 2 i b \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), \frac{i \left(p + 2 i b \sqrt{z}\right)^2}{4 b}\right) + 2 \sqrt{\frac{i \left(p + 2 i b \sqrt{z}\right)^2}{b}} \, b \, i \, \Gamma\left(\frac{1}{2}(h+i+2), \frac{i \left(p + 2 i b \sqrt{z}\right)^2}{4 b}\right)\right)\right)$$

$$(i b)^{-2(n+1)} + 2^{-2n-v-2} \, i \left(\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(-e^{\frac{i (p + c i (v - 2 s))^2}{4 b}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (p + c i (v - 2 s))^{-h-i+2n} \right.\right.$$

$$\left(p + i c (v - 2 s) + 2 i b \sqrt{z}\right)^{h+i} \left(\frac{i \left(p + i c (v - 2 s) + 2 i b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i}$$

$$\left((p + c i (v - 2 s)) \left(p + i c (v - 2 s) + 2 i b \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), \frac{i \left(p + i c (v - 2 s) + 2 i b \sqrt{z}\right)^2}{4 b}\right) + 2 \right.$$

$$\left. \sqrt{\frac{i \left(p + i c (v - 2 s) + 2 i b \sqrt{z}\right)^2}{b}} \, b \, i \, \Gamma\left(\frac{1}{2}(h+i+2), \frac{i \left(p + i c (v - 2 s) + 2 i b \sqrt{z}\right)^2}{4 b}\right)\right) -$$

$$e^{\frac{i (p - i c (v - 2 s))^2}{4 b}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (p - i c (v - 2 s))^{-h-i+2n} \left(p - i c (v - 2 s) + 2 i b \sqrt{z}\right)^{h+i}$$

$$\left(\frac{i \left(p - i c (v - 2 s) + 2 i b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i}$$

$$\left((p - i c (v - 2 s)) \left(p - i c (v - 2 s) + 2 i b \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), \frac{i \left(p - i c (v - 2 s) + 2 i b \sqrt{z}\right)^2}{4 b}\right) + 2 \right.$$

$$\left. \sqrt{\frac{i \left(p - i c (v - 2 s) + 2 i b \sqrt{z}\right)^2}{b}} \, b \, i \, \Gamma\left(\frac{1}{2}(h+i+2), \frac{i \left(p - i c (v - 2 s) + 2 i b \sqrt{z}\right)^2}{4 b}\right)\right) +$$

$$e^{-\frac{i (p + c i (v - 2 s))^2}{4 b}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (p + c i (v - 2 s))^{-h-i+2n} \left(p + i c (v - 2 s) - 2 i b \sqrt{z}\right)^{h+i}$$

$$\left(-\frac{i\left(p+i\,c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((p+c\,i\,(v-2\,s))\left(p+i\,c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{i\left(p+i\,c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)-2\right.$$

$$\left.i\,b\,\sqrt{-\frac{i\left(p+i\,c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{i\left(p+i\,c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)\right)+$$

$$e^{-\frac{i(p-i\,c\,(v-2\,s))^2}{4\,b}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(p-i\,c\,(v-2\,s))^{-h-i+2\,n}\left(p-i\,c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{i\left(p-i\,c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\left((p-i\,c\,(v-2\,s))\left(p-i\,c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{i\left(p-i\,c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)-2\,i\,b\,\sqrt{-\frac{i\left(p-i\,c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{b}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{i\left(p-i\,c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)\right)\right)\right)(i\,b)^{-2(n+1)}\;/;\;v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\, e^{p\,z}\,\sin(b\,z^r)\cos^v(c\,z^r)$

01.07.21.2729.01

$$\int z^n\,e^{p\,z}\sin(b\,z^2)\cos^v(c\,z^2)\,dz = $$

$$-\frac{i\,2^{-v-2}}{\sqrt{b^2}}\,e^{-\frac{i\,p^2}{4\,b}}\left(\sqrt{b^2}\;e^{\frac{i\,p^2}{4\,b}}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left(e^{\frac{i\,b\,p^2}{2(b+2\,c\,s-c\,v)(b-2\,c\,s+c\,v)}}\binom{v}{s}\left(e^{-\frac{i\,p^2(3\,b+2\,c\,s-c\,v)}{4(b+2\,c\,s-c\,v)(b-2\,c\,s+c\,v)}}\sqrt{(b+2\,c\,s-c\,v)^2}\left(\sqrt{i\,(b-2\,c\,s+c\,v)}\right.\right.\right.\right.$$

$$\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(-i\,(b-2\,c\,s+c\,v))^{-n-\frac{1}{2}}\,(p-2\,i\,(b-2\,c\,s+c\,v)\,z)^{q+1}$$

$$\left(\frac{i\,(i\,p+2\,(b-2\,c\,s+c\,v)\,z)^2}{b-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(i\,p+2\,(b-2\,c\,s+c\,v)\,z)^2}{4\,(b-2\,c\,s+c\,v)}\right)-e^{\frac{i\,p^2}{2(b-2\,c\,s+c\,v)}}$$

$$\sqrt{-i(b-2cs+cv)}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(i(b-2cs+cv))^{-n-\frac{1}{2}}(p+2i(b-2cs+cv)z)^{q+1}$$

$$\left(\frac{i(p+2i(b-2cs+cv)z)^2}{b-2cs+cv}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(p+2i(b-2cs+cv)z)^2}{4(b-2cs+cv)}\right)\Bigg)+$$

$$e^{-\frac{ip^2(3b-2cs+cv)}{4(b+2cs-cv)(b-2cs+cv)}}\sqrt{(b-2cs+cv)^2}\sqrt{i(b+2cs-cv)}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}$$

$$(-i(b+2cs-cv))^{-n-\frac{1}{2}}(p-2i(b+2cs-cv)z)^{q+1}\left(\frac{i(ip+2(b+2cs-cv)z)^2}{b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(ip+2(b+2cs-cv)z)^2}{4(b+2cs-cv)}\right)-e^{-\frac{ip^2}{4(b-2cs+cv)}}\sqrt{(b-2cs+cv)^2}$$

$$\sqrt{-i(b+2cs-cv)}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(i(b+2cs-cv))^{-n-\frac{1}{2}}(p+2i(b+2cs-cv)z)^{q+1}$$

$$\left(\frac{i(p+2i(b+2cs-cv)z)^2}{b+2cs-cv}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(p+2i(b+2cs-cv)z)^2}{4(b+2cs-cv)}\right)\Bigg)\Bigg)\Bigg/$$

$$\left(\sqrt{(b+2cs-cv)^2}\sqrt{(b-2cs+cv)^2}\right)-\sqrt{ib}\binom{v}{\frac{v}{2}}(v\bmod 2-1)$$

$$\sum_{q=0}^{n}2^{q-n}(-ib)^{-n-\frac{1}{2}}(-p)^{n-q}(p-2ibz)^{q+1}\left(\frac{i(ip+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2},\frac{i(ip+2bz)^2}{4b}\right)+$$

$$\sqrt{-ib}\;e^{\frac{ip^2}{2b}}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{q=0}^{n}2^{q-n}(ib)^{-n-\frac{1}{2}}(-p)^{n-q}(p+2ibz)^{q+1}\left(\frac{i(p+2ibz)^2}{b}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(p+2ibz)^2}{4b}\right)\Bigg)\Bigg)/;\ v\in\mathbb{N}^+\land n\in\mathbb{N}$$

01.07.21.2730.01

$$\int z^n e^{pz}\sin\left(b\sqrt{z}\right)\cos^v\left(c\sqrt{z}\right)dz=2^{-2n-v-2}\,i\,p^{-2(n+1)}\,e^{\frac{b^2}{4p}}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}4^i(-ib)^{-h-i+2n}\left(-ib+2p\sqrt{z}\right)^{h+i}\left(-\frac{\left(-ib+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\left(2p\sqrt{-\frac{\left(-ib+2p\sqrt{z}\right)^2}{p}}\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(-i\, b+2\, p\,\sqrt{z}\right)^2}{4\, p}\right) - i\, b\left(-i\, b+2\, p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(-i\, b+2\, p\,\sqrt{z}\right)^2}{4\, p}\right)\Bigg) -$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\, 4^i\,(i\, b)^{-h-i+2\, n}\left(i\, b+2\, p\,\sqrt{z}\right)^{h+i}\left(-\frac{\left(i\, b+2\, p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg(b\, i\left(i\, b+2\, p\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(i\, b+2\, p\,\sqrt{z}\right)^2}{4\, p}\right) + 2\sqrt{-\frac{\left(i\, b+2\, p\,\sqrt{z}\right)^2}{p}}\; p\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(i\, b+2\, p\,\sqrt{z}\right)^2}{4\, p}\right)\Bigg)\Bigg) -$$

$$i\, 2^{-2\, n-v-2}\, p^{-2(n+1)}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Bigg(-e^{-\frac{(-i\, b+i\, c\,(v-2\, s))^2}{4\, p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\, 4^i\,(-i\, b+i\, c\,(v-2\, s))^{-h-i+2\, n}$$

$$\left(-i\, b+i\, c\,(v-2\, s)+2\, p\,\sqrt{z}\right)^{h+i}\left(-\frac{\left(-i\, b+i\, c\,(v-2\, s)+2\, p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((-i\, b+i\, c\,(v-2\, s))\left(-i\, b+i\, c\,(v-2\, s)+2\, p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(-i\, b+i\, c\,(v-2\, s)+2\, p\,\sqrt{z}\right)^2}{4\, p}\right) +$$

$$2\sqrt{-\frac{\left(-i\, b+i\, c\,(v-2\, s)+2\, p\,\sqrt{z}\right)^2}{p}}\; p\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(-i\, b+i\, c\,(v-2\, s)+2\, p\,\sqrt{z}\right)^2}{4\, p}\right)\Bigg) +$$

$$e^{-\frac{(i\, b+i\, c\,(v-2\, s))^2}{4\, p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\, 4^i\,(i\, b+i\, c\,(v-2\, s))^{-h-i+2\, n}\left(i\, b+i\, c\,(v-2\, s)+2\, p\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(i\, b+i\, c\,(v-2\, s)+2\, p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((i\, b+i\, c\,(v-2\, s))\left(i\, b+i\, c\,(v-2\, s)+2\, p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(i\, b+i\, c\,(v-2\, s)+2\, p\,\sqrt{z}\right)^2}{4\, p}\right) +$$

$$2\sqrt{-\frac{\left(\mathrm{i}\,b+\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}(h+i+2),\,-\frac{\left(\mathrm{i}\,b+\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)-$$

$$e^{-\frac{(-\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s))^2}{4p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s))^{-h-i+2n}\left(-\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(-\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((-\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s))\left(-\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+i+1),\,-\frac{\left(-\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^2}{4p}\right)+$$

$$2\sqrt{-\frac{\left(-\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}(h+i+2),\,-\frac{\left(-\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)+$$

$$e^{-\frac{(\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s))^2}{4p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s))^{-h-i+2n}\left(\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s))\left(\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+i+1),\,-\frac{\left(\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^2}{4p}\Bigg)+2\sqrt{-\frac{\left(\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\Bigg($$

$$\frac{1}{2}(h+i+2),\,-\frac{\left(\mathrm{i}\,b-\mathrm{i}\,c\,(v-2s)+2p\sqrt{z}\right)^2}{4p}\Bigg)\Bigg)\Bigg)\;/;\;v\in\mathbb{N}^+\land n\in\mathbb{N}$$

Involving $z^{\alpha-1}\,e^{p\,z^r}\,\sin(b\,z^r)\cos^v(c\,z^r)$

01.07.21.2731.01

$$\int z^{\alpha-1} e^{p z^r} \sin(b z^r) \cos^v(c z^r)\, dz = -\frac{i\, 2^{-v-1} z^\alpha}{r} \left(\binom{v}{\frac{v}{2}} \left(((-i\, b - p) z^r)^{-\frac{\alpha}{r}} \Gamma\!\left(\frac{\alpha}{r}, (-i\, b - p) z^r\right) - (i\,(b + i\, p) z^r)^{-\frac{\alpha}{r}} \Gamma\!\left(\frac{\alpha}{r}, i\,(b + i\, p) z^r\right) \right) (v \bmod 2 - 1) + \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\Gamma\!\left(\frac{\alpha}{r}, i\,(b + i\, p - 2 c s + c v) z^r\right) (i\,(b + i\, p - 2 c s + c v) z^r)^{-\frac{\alpha}{r}} - (-i\,(b - i\, p - 2 c s + c v) z^r)^{-\frac{\alpha}{r}} \Gamma\!\left(\frac{\alpha}{r}, -i\,(b - i\, p - 2 c s + c v) z^r\right) + (i\,(b + i\, p + 2 c s - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\!\left(\frac{\alpha}{r}, i\,(b + i\, p + 2 c s - c v) z^r\right) - (-i\,(b - i\, p + 2 c s - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\!\left(\frac{\alpha}{r}, -i\,(b - i\, p + 2 c s - c v) z^r\right) \right) \right) /;\ v \in \mathbb{N}^+$$

01.07.21.2732.01

$$\int z^n e^{p z^2} \sin(b z^2) \cos^v(c z^2)\, dz = -2^{-v-2}\, i \binom{v}{\frac{v}{2}} \left(((i\, b - p) z^2)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (i\, b - p) z^2\right) - ((-i\, b - p) z^2)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (-i\, b - p) z^2\right) \right) (1 - v \bmod 2)\, z^{n+1} - 2^{-v-2}\, i\, z^{n+1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(-\Gamma\!\left(\frac{n+1}{2}, (-i\, b - p + i\, c\,(v - 2 s)) z^2\right) ((-i\, b - p + i\, c\,(v - 2 s)) z^2)^{\frac{1}{2}(-n-1)} + ((i\, b - p + i\, c\,(v - 2 s)) z^2)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (i\, b - p + i\, c\,(v - 2 s)) z^2\right) - ((-i\, b - p - i\, c\,(v - 2 s)) z^2)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (-i\, b - p - i\, c\,(v - 2 s)) z^2\right) + ((i\, b - p - i\, c\,(v - 2 s)) z^2)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (i\, b - p - i\, c\,(v - 2 s)) z^2\right) \right) /;\ v \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

01.07.21.2733.01

$$\int z^n e^{p \sqrt{z}} \sin\!\left(b \sqrt{z}\right) \cos^v\!\left(c \sqrt{z}\right) dz = -2^{-v} \binom{v}{\frac{v}{2}} \left(i\,(i\, b - p)^{-2(n+1)} \Gamma\!\left(2(n+1), (i\, b - p) \sqrt{z}\right) - i\,(-i\, b - p)^{-2(n+1)} \Gamma\!\left(2(n+1), (-i\, b - p) \sqrt{z}\right) \right) (1 - v \bmod 2) - 2^{-v} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(-i\, \Gamma\!\left(2(n+1), (-i\, b - p + i\, c\,(v - 2 s)) \sqrt{z}\right) (-i\, b - p + i\, c\,(v - 2 s))^{-2(n+1)} + i\,(i\, b - p + i\, c\,(v - 2 s))^{-2(n+1)} \Gamma\!\left(2(n+1), (i\, b - p + i\, c\,(v - 2 s)) \sqrt{z}\right) - i\,(-i\, b - p - i\, c\,(v - 2 s))^{-2(n+1)} \Gamma\!\left(2(n+1), (-i\, b - p - i\, c\,(v - 2 s)) \sqrt{z}\right) + i\,(i\, b - p - i\, c\,(v - 2 s))^{-2(n+1)} \Gamma\!\left(2(n+1), (i\, b - p - i\, c\,(v - 2 s)) \sqrt{z}\right) \right) /;\ v \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \sin(a z^r + q) \cos^v(c z^r + g)$

01.07.21.2734.01

$$\int z^{\alpha-1} e^{b z^r+e} \sin(a z^r+q) \cos^\nu(c z^r+g)\, dz = -\frac{2^{-\nu-1} z^\alpha}{r}\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} -i e^{e-i(q+g(2s+\nu))}\binom{\nu}{s}\left(-e^{4igs}\Gamma\left(\frac{\alpha}{r}, i(a+ib-2cs+c\nu)z^r\right)(i(a+ib-2cs+c\nu)z^r)^{-\frac{\alpha}{r}} + e^{2i(q+g\nu)}(-i(a-ib-2cs+c\nu)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, -i(a-ib-2cs+c\nu)z^r\right) - e^{2ig\nu}(i(a+ib+2cs-c\nu)z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, i(a+ib+2cs-c\nu)z^r\right) + e^{2i(q+2gs)}(-i(a-ib+2cs-c\nu)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, -i(a-ib+2cs-c\nu)z^r\right)\right) - i e^{e-iq}\binom{\nu}{\frac{\nu}{2}}\left(e^{2iq}((-b-ia)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (-b-ia)z^r\right) - (i(a+ib)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, i(a+ib)z^r\right)\right)(1-\nu \bmod 2)\right) /; \nu\in\mathbb{N}^+$$

01.07.21.2735.01

$$\int z^n e^{b z^2+e}\sin\left(a z^2+q\right)\cos^\nu\left(c z^2+g\right) dz = -2^{-\nu-2}\binom{\nu}{\frac{\nu}{2}} \left(e^{e+iq-\frac{i\pi}{2}}\Gamma\left(\frac{n+1}{2}, (-b-ia)z^2\right)\left((-b-ia)z^2\right)^{\frac{1}{2}(-n-1)} + e^{e-iq+\frac{i\pi}{2}}\left((ia-b)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (ia-b)z^2\right)\right)(1-\nu \bmod 2)\, z^{n+1} - 2^{-\nu-2} z^{n+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{e+iq-ig(\nu-2s)-\frac{i\pi}{2}}\Gamma\left(\frac{n+1}{2}, (-b-ia+ci(\nu-2s))z^2\right)\left((-b-ia+ci(\nu-2s))z^2\right)^{\frac{1}{2}(-n-1)} + e^{e-iq-ig(\nu-2s)+\frac{i\pi}{2}}\left((-b+ia+ci(\nu-2s))z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (-b+ia+ci(\nu-2s))z^2\right) + e^{e+iq+gi(\nu-2s)-\frac{i\pi}{2}}\left((-b-ia-ic(\nu-2s))z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (-b-ia-ic(\nu-2s))z^2\right) + e^{e-iq+gi(\nu-2s)+\frac{i\pi}{2}}\left((-b+ia-ic(\nu-2s))z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (-b+ia-ic(\nu-2s))z^2\right)\right) /; \nu\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

01.07.21.2736.01

$$\int z^n e^{\sqrt{z}\, b+e}\sin\left(\sqrt{z}\, a+q\right)\cos^\nu\left(\sqrt{z}\, c+g\right) dz = -2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\left(e^{e+iq-\frac{i\pi}{2}}\Gamma\left(2(n+1), (-b-ia)\sqrt{z}\right)(-b-ia)^{-2(n+1)} + (ia-b)^{-2(n+1)} e^{e-iq+\frac{i\pi}{2}}\Gamma\left(2(n+1), (ia-b)\sqrt{z}\right)\right)(1-\nu \bmod 2) - 2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{e+iq-ig(\nu-2s)-\frac{i\pi}{2}}\Gamma\left(2(n+1), (-b-ia+ci(\nu-2s))\sqrt{z}\right)(-b-ia+ci(\nu-2s))^{-2(n+1)} + e^{e-iq-ig(\nu-2s)+\frac{i\pi}{2}}(-b+ia+ci(\nu-2s))^{-2(n+1)}\Gamma\left(2(n+1), (-b+ia+ci(\nu-2s))\sqrt{z}\right) + e^{e+iq+gi(\nu-2s)-\frac{i\pi}{2}}(-b-ia-ic(\nu-2s))^{-2(n+1)}\Gamma\left(2(n+1), (-b-ia-ic(\nu-2s))\sqrt{z}\right) + e^{e-iq+gi(\nu-2s)+\frac{i\pi}{2}}(-b+ia-ic(\nu-2s))^{-2(n+1)}\Gamma\left(2(n+1), (-b+ia-ic(\nu-2s))\sqrt{z}\right)\right) /; \nu\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n e^{b z^r+d z+e}\sin\left(a z^r+p z+q\right)\cos^\nu\left(c z^r+f z+g\right)$

01.07.21.2737.01

$$\int z^n e^{b z^2+d z+e} \sin\left(a z^2 + p z + q\right) \cos^v\left(c z^2 + f z + g\right) dz =$$

$$2^{-v-2} \Bigg(-\binom{v}{\frac{v}{2}} (1 - v \bmod 2) \Bigg(i\, (b - i\, a)^{-n-1}\, e^{-\frac{(d-i\,p)^2}{4(b-i\,a)}+e-i\,q} \sum_{j=0}^{n} 2^{j-n}\, (i\, p - d)^{n-j} \left(\frac{i\,(i\, d + p + 2\, a\, z + 2\, i\, b\, z)^2}{a + i\, b} \right)^{\frac{1}{2}(-j-1)}$$

$$(d - i\,(p + 2\, a\, z + 2\, i\, b\, z))^{j+1} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i\,(i\, d + p + 2\, a\, z + 2\, i\, b\, z)^2}{4\,(a + i\, b)} \right) -$$

$$i\,(b + i\, a)^{-n-1}\, e^{-\frac{(d+i\,p)^2}{4(b+i\,a)}+e+i\,q} \sum_{j=0}^{n} 2^{j-n}\, (-d - i\, p)^{n-j}\, (d + i\, p + 2\, b\, z + 2\, i\, a\, z)^{j+1}$$

$$\left(-\frac{(d + i\, p + 2\, b\, z + 2\, i\, a\, z)^2}{b + i\, a} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + i\, p + 2\, b\, z + 2\, i\, a\, z)^2}{4\,(b + i\, a)} \right) \Bigg) -$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} i\, e^{e-i\,(q+2\,g\,s-g\,v)} \binom{v}{s} \Bigg(e^{\frac{1}{4} i \left(\frac{(i\,d+p-2\,f\,s+f\,v)^2}{a+i\,b-2\,c\,s+c\,v} + 8\,g\,(2\,s-v) \right)} \Bigg(\sum_{j=0}^{n} -i\, 2^{j-n}\, (i\,(p - 2\, f\, s + f\, v) - d)^{n-j}\, (i\, d + p - 2\, f\, s + f\, v +$$

$$2\, a\, z + 2\, i\, b\, z - 4\, c\, s\, z + 2\, c\, v\, z) \left(\frac{i\,(i\, d + p - 2\, f\, s + f\, v + 2\, a\, z + 2\, i\, b\, z - 4\, c\, s\, z + 2\, c\, v\, z)^2}{a + i\, b - 2\, c\, s + c\, v} \right)^{\frac{1}{2}(-j-1)}$$

$$(d - i\,(p + f\,(v - 2\, s) + 2\,(a + i\, b - 2\, c\, s + c\, v)\, z))^{j} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, \frac{i\,(i\, d + p - 2\, f\, s + f\, v + 2\, a\, z + 2\, i\, b\, z - 4\, c\, s\, z + 2\, c\, v\, z)^2}{4\,(a + i\, b - 2\, c\, s + c\, v)} \right) \Bigg)$$

$$(-i\,(a + i\, b - 2\, c\, s + c\, v))^{-n-1} - e^{\frac{1}{4} i \left(\frac{(d+i\,(p-2\,f\,s+f\,v))^2}{a-i\,b-2\,c\,s+c\,v} + 8\,q \right)}\, (b + i\, a + c\, i\,(v - 2\, s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\, (-d - i\,(p - 2\, f\, s + f\, v))^{n-j} \left(-\frac{i\,(-i\, d + p - 2\, f\, s + f\, v + 2\, a\, z - 2\, i\, b\, z - 4\, c\, s\, z + 2\, c\, v\, z)^2}{a - i\, b - 2\, c\, s + c\, v} \right)^{\frac{1}{2}(-j-1)}$$

$$(d + i\,(p + f\,(v - 2\, s) + 2\,(a - i\, b - 2\, c\, s + c\, v)\, z))^{j+1} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{i\,(-i\, d + p - 2\, f\, s + f\, v + 2\, a\, z - 2\, i\, b\, z - 4\, c\, s\, z + 2\, c\, v\, z)^2}{4\,(a - i\, b - 2\, c\, s + c\, v)} \right) +$$

$$\frac{1}{a + i\, b + 2\, c\, s - c\, v} \Bigg(i\, e^{\frac{i\,(i\,d+p+2\,f\,s-f\,v)^2}{4\,(a+i\,b+2\,c\,s-c\,v)}}\, (b - i\, a + c\, i\,(v - 2\, s))^{-n}$$

$$\sum_{j=0}^{n} 2^{j-n}\, (i\,(p + 2\, f\, s - f\, v) - d)^{n-j} \left(\frac{i\,(i\, d + p + 2\, f\, s - f\, v + 2\, a\, z + 2\, i\, b\, z + 4\, c\, s\, z - 2\, c\, v\, z)^2}{a + i\, b + 2\, c\, s - c\, v} \right)^{\frac{1}{2}(-j-1)}$$

$$(d - i\,(p + f\,(2\, s - v) + 2\,(a + i\, b + 2\, c\, s - c\, v)\, z))^{j+1} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, \frac{i\,(i\,d+p+2\,f\,s-f\,v+2\,a\,z+2\,i\,b\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{4\,(a+i\,b+2\,c\,s-c\,v)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{a-i\,b+2\,c\,s-c\,v}\left(i\,e^{\frac{1}{4}\,i\left(\frac{(d+i\,(p+2\,f\,s-f\,v))^2}{a-i\,b+2\,c\,s-c\,v}+8\,q+8\,g\,(2\,s-v)\right)}\,(b+i\,a+2\,i\,c\,s-i\,c\,v)^{-n}\right.$$

$$\sum_{j=0}^{n} 2^{j-n}\,(-d-i\,(p+2\,f\,s-f\,v))^{n-j}\left(-\frac{i\,(-i\,d+p+2\,f\,s-f\,v+2\,a\,z-2\,i\,b\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{a-i\,b+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-j-1)}$$

$$(d+i\,(p+f\,(2\,s-v)+2\,(a-i\,b+2\,c\,s-c\,v)\,z))^{j+1}\binom{n}{j}$$

$$\left.\Gamma\left(\frac{j+1}{2}, -\frac{i\,(-i\,d+p+2\,f\,s-f\,v+2\,a\,z-2\,i\,b\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{4\,(a-i\,b+2\,c\,s-c\,v)}\right)\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

01.07.21.2738.01

$$\int z^n\,e^{\sqrt{z}\,b+d\,z+e}\,\sin\left(\sqrt{z}\,a+p\,z+q\right)\cos^v\left(\sqrt{z}\,c+f\,z+g\right)dz=$$

$$2^{-2\,n-v-2}\left(\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(i\,e^{\frac{(a+i\,b)^2}{4\,(d-i\,p)}+e-i\,q}\,(d-i\,p)^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-i\,a)^{-h-i+2\,n}\right.\right.$$

$$\left(b-i\,a+2\,(d-i\,p)\sqrt{z}\right)^{h+i}\left(\frac{\left(a+i\,b+2\,(i\,d+p)\sqrt{z}\right)^2}{d-i\,p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b-i\,a)\left(b-i\,a+2\,(d-i\,p)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1), \frac{\left(a+i\,b+2\,(i\,d+p)\sqrt{z}\right)^2}{4\,(d-i\,p)}\right)+\right.$$

$$\left.2\sqrt{\frac{\left(a+i\,b+2\,(i\,d+p)\sqrt{z}\right)^2}{d-i\,p}}\,(d-i\,p)\,\Gamma\left(\frac{1}{2}(h+i+2), \frac{\left(a+i\,b+2\,(i\,d+p)\sqrt{z}\right)^2}{4\,(d-i\,p)}\right)\right)-$$

$$i\,e^{\frac{(a-i\,b)^2}{4\,(d+i\,p)}+e+i\,q}\,(d+i\,p)^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+i\,a)^{-h-i+2\,n}\left(b+i\,a+2\,(d+i\,p)\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+i\,a+2\,(d+i\,p)\sqrt{z}\right)^2}{d+i\,p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b+i\,a)\left(b+i\,a+2\,(d+i\,p)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(b+i\,a+2\,(d+i\,p)\,\sqrt{z}\right)^2}{4\,(d+i\,p)}\right)+\right.$$

$$\left.\left.2\,\sqrt{-\frac{\left(b+i\,a+2\,(d+i\,p)\,\sqrt{z}\right)^2}{d+i\,p}}\,(d+i\,p)\,\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+i\,a+2\,(d+i\,p)\,\sqrt{z}\right)^2}{4\,(d+i\,p)}\right)\right)\right)+$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} i\,e^{e-i\,(q+2\,g\,s-g\,v)}\binom{v}{s}\left(-e^{i\left(\frac{(a-i\,b-2\,c\,s+c\,v)^2}{4\,i\,d-4\,(p-2\,f\,s+f\,v)}+2\,q\right)}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+i\,a+c\,i\,(v-2\,s))^{-h-i+2\,n}\right.\right.$$

$$\left(b+i\,a+c\,i\,(v-2\,s)+2\,(d+i\,(p-2\,f\,s+f\,v))\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+i\,a+c\,i\,(v-2\,s)+2\,(d+i\,(p-2\,f\,s+f\,v))\,\sqrt{z}\right)^2}{d+i\,(p-2\,f\,s+f\,v)}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b+i\,a+c\,i\,(v-2\,s))\left(b+i\,a+c\,i\,(v-2\,s)+2\,(d+i\,(p-2\,f\,s+f\,v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\right.\right.$$

$$\left.-\frac{\left(b+i\,a+c\,i\,(v-2\,s)+2\,(d+i\,(p-2\,f\,s+f\,v))\,\sqrt{z}\right)^2}{4\,(d+i\,(p-2\,f\,s+f\,v))}\right)+2\,(d+i\,(p-2\,f\,s+f\,v))$$

$$\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+i\,a+c\,i\,(v-2\,s)+2\,(d+i\,(p-2\,f\,s+f\,v))\,\sqrt{z}\right)^2}{4\,(d+i\,(p-2\,f\,s+f\,v))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b+i\,a+c\,i\,(v-2\,s)+2\,(d+i\,(p-2\,f\,s+f\,v))\,\sqrt{z}\right)^2}{d+i\,(p-2\,f\,s+f\,v)}}\right)\right)(d+i\,(p-2\,f\,s+f\,v))^{-2\,(n+1)}+$$

$$e^{2\,i\,g\,(2\,s-v)-\frac{i\,(a+i\,b-2\,c\,s+c\,v)^2}{-4\,i\,d-4\,(p-2\,f\,s+f\,v)}}\,(d-i\,(p-2\,f\,s+f\,v))^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,(a+i\,b-2\,c\,s+c\,v))^{-h-i+2\,n}$$

$$\left(\frac{\left(a+i\,b-2\,c\,s+c\,v+2\,i\,d\,\sqrt{z}+2\,p\,\sqrt{z}-4\,f\,s\,\sqrt{z}+2\,f\,v\,\sqrt{z}\right)^2}{d-i\,(p-2\,f\,s+f\,v)}\right)^{\frac{1}{2}\,(-h-i-1)}$$

$$\left(b-i\,a+c\,i\,(2\,s-v)+2\,(d-i\,(p-2\,f\,s+f\,v))\,\sqrt{z}\right)^{h+i}\binom{i}{h}\binom{n}{i}\left(2\,(d-i\,(p-2\,f\,s+f\,v))\right.$$

$$\sqrt{\left(\left(a+i\,b-2\,c\,s+c\,v+2\,i\,d\,\sqrt{z}+2\,p\,\sqrt{z}-4\,f\,s\,\sqrt{z}+2\,f\,v\,\sqrt{z}\right)^2\Big/(d-i\,(p-2\,f\,s+f\,v))\right)}$$
$$\Gamma\left(\frac{1}{2}\,(h+i+2),\,\left(a+i\,b-2\,c\,s+c\,v+2\,i\,d\,\sqrt{z}+2\,p\,\sqrt{z}-4\,f\,s\,\sqrt{z}+2\,f\,v\,\sqrt{z}\right)^2\Big/\right.$$
$$\left.(4\,(d-i\,(p-2\,f\,s+f\,v)))\right)-(a+i\,b-2\,c\,s+c\,v)\left(a+i\,b-2\,c\,s+c\,v+2\,i\,d\,\sqrt{z}+\right.$$
$$\left.2\,p\,\sqrt{z}-4\,f\,s\,\sqrt{z}+2\,f\,v\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\,\left(a+i\,b-2\,c\,s+c\,v+2\,i\,d\,\sqrt{z}+\right.\right.$$
$$\left.\left.2\,p\,\sqrt{z}-4\,f\,s\,\sqrt{z}+2\,f\,v\,\sqrt{z}\right)^2\Big/(4\,(d-i\,(p-2\,f\,s+f\,v)))\right)\Bigg)-$$
$$e^{\frac{1}{4}\,i\left(-\frac{(a-i\,b+2\,c\,s-c\,v)^2}{-i\,d+p+2\,f\,s-f\,v}+8\,q+8\,g\,(2\,s-v)\right)}\,(d+i\,(p+2\,f\,s-f\,v))^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+i\,a+2\,i\,c\,s-i\,c\,v)^{-h-i+2\,n}$$
$$\left(b+i\,a+c\,i\,(2\,s-v)+2\,(d+i\,(p+2\,f\,s-f\,v))\,\sqrt{z}\right)^{h+i}$$
$$\left(-\frac{\left(b+i\,a+c\,i\,(2\,s-v)+2\,(d+i\,(p+2\,f\,s-f\,v))\,\sqrt{z}\right)^2}{d+i\,(p+2\,f\,s-f\,v)}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$
$$\Bigg((b+i\,a+2\,i\,c\,s-i\,c\,v)\left(b+i\,a+c\,i\,(2\,s-v)+2\,(d+i\,(p+2\,f\,s-f\,v))\,\sqrt{z}\right)$$
$$\Gamma\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(b+i\,a+c\,i\,(2\,s-v)+2\,(d+i\,(p+2\,f\,s-f\,v))\,\sqrt{z}\right)^2}{4\,(d+i\,(p+2\,f\,s-f\,v))}\right)+2$$
$$(d+i\,(p+2\,f\,s-f\,v))\,\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+i\,a+c\,i\,(2\,s-v)+2\,(d+i\,(p+2\,f\,s-f\,v))\,\sqrt{z}\right)^2}{4\,(d+i\,(p+2\,f\,s-f\,v))}\right)$$
$$\left.\sqrt{-\frac{\left(b+i\,a+c\,i\,(2\,s-v)+2\,(d+i\,(p+2\,f\,s-f\,v))\,\sqrt{z}\right)^2}{d+i\,(p+2\,f\,s-f\,v)}}\right)+$$
$$e^{\frac{i\,(a+i\,b+2\,c\,s-c\,v)^2}{4\,(i\,d+p+2\,f\,s-f\,v)}}\,(d-i\,(p+2\,f\,s-f\,v))^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-i\,a+c\,i\,(v-2\,s))^{-h-i+2\,n}$$
$$\left(b-i\,a+c\,i\,(v-2\,s)+2\,(d-i\,(p+2\,f\,s-f\,v))\,\sqrt{z}\right)^{h+i}$$
$$\left(-\frac{\left(b-i\,a+c\,i\,(v-2\,s)+2\,(d-i\,(p+2\,f\,s-f\,v))\,\sqrt{z}\right)^2}{d-i\,(p+2\,f\,s-f\,v)}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b - i a + c i (v - 2 s)) \left(b - i a + c i (v - 2 s) + 2 (d - i (p + 2 f s - f v)) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2} (h + i + 1), -\frac{\left(b - i a + c i (v - 2 s) + 2 (d - i (p + 2 f s - f v)) \sqrt{z}\right)^2}{4 (d - i (p + 2 f s - f v))}\right) + 2$$

$$(d - i (p + 2 f s - f v)) \Gamma\left(\frac{1}{2} (h + i + 2), -\frac{\left(b - i a + c i (v - 2 s) + 2 (d - i (p + 2 f s - f v)) \sqrt{z}\right)^2}{4 (d - i (p + 2 f s - f v))}\right)$$

$$\left.\left.\left.\sqrt{-\frac{\left(b - i a + c i (v - 2 s) + 2 (d - i (p + 2 f s - f v)) \sqrt{z}\right)^2}{d - i (p + 2 f s - f v)}}\right)\right)\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving powers of sin, exp and power

Involving $z^{\alpha-1} e^{p z} \sin^{\mu}(c z) \cos^{\nu}(a z)$

01.07.21.2739.01

$$\int z^{\alpha-1} e^{p z} \sin^m(c z) \cos^v(a z)\, dz = 2^{-m-v} z^{\alpha} \left(-(-p z)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma(\alpha, -p z) (m \bmod 2 - 1) (v \bmod 2 - 1) + \right.$$

$$i^{-m} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{i m \pi} E_{1-\alpha}(-(p + c i (2 k - m)) z) + E_{1-\alpha}(-(p - 2 i c k + i c m) z)\right) +$$

$$\binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} (E_{1-\alpha}(-(p + a i (2 s - v)) z) + E_{1-\alpha}(-(p - 2 i a s + i a v) z)) - i^{-m} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\left(e^{i m \pi} (E_{1-\alpha}(-(p + i (2 c k - c m - 2 a s + a v)) z) + E_{1-\alpha}((-p - i (2 c k - c m + 2 a s - a v)) z)) + E_{1-\alpha}(\right.$$

$$\left.\left. -(p + i (-2 c k + c m + 2 a s - a v)) z) + E_{1-\alpha}(-(p - i (2 c k - c m + 2 a s - a v)) z)\right)\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.07.21.2740.01

$$\int z^n e^{p z} \sin^\mu(c z) \cos^\nu(a z)\, dz = 2^{-\nu} e^{p z} \binom{\nu}{\frac{\nu}{2}} n!\, (1 - \nu \bmod 2) \sin^\mu(c z) \left(1 - e^{2 i c z}\right)^{-\mu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (p - i c \mu)^{j+1}} {}_{j+2}F_{j+1}\left(-\frac{i p + c \mu}{2 c}, \ldots, -\frac{i p + c \mu}{2 c}, -\mu; 1 - \frac{i p + c \mu}{2 c}, \ldots, 1 - \frac{i p + c \mu}{2 c}; e^{2 i c z}\right) + 2^{-\nu} n!\, \sin^\mu(c z) \left(1 - e^{2 i c z}\right)^{-\mu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{(p + i a (\nu - 2 s)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (p + i a\, (\nu - 2 s) - i c \mu)^{j+1}} {}_{j+2}F_{j+1}\left(-\frac{i p + 2 a s - a \nu + c \mu}{2 c}, \ldots, -\frac{i p + 2 a s - a \nu + c \mu}{2 c}, -\mu; 1 - \frac{i p + 2 a s - a \nu + c \mu}{2 c}, \ldots, 1 - \frac{i p + 2 a s - a \nu + c \mu}{2 c}; e^{2 i c z}\right) + e^{(p - i a\, (\nu - 2 s)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (p - i a\, (\nu - 2 s) - i c \mu)^{j+1}} {}_{j+2}F_{j+1}\left(-\frac{i p - 2 a s + a \nu + c \mu}{2 c}, \ldots, -\frac{i p - 2 a s + a \nu + c \mu}{2 c}, -\mu; 1 - \frac{i p - 2 a s + a \nu + c \mu}{2 c}, \ldots, 1 - \frac{i p - 2 a s + a \nu + c \mu}{2 c}; e^{2 i c z}\right)\right) /; \nu \in \mathbb{N} \land n \in \mathbb{N}$$

01.07.21.2741.01

$$\int z^n e^{p z} \sin^m(c z) \cos^\nu(a z)\, dz = 2^{-m} n! \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, e^{p z} \cos^\nu(a z) \left(1 + e^{2 i a z}\right)^{-\nu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (p - i a \nu)^{j+1}} {}_{j+2}F_{j+1}\left(-\frac{i p + a \nu}{2 a}, \ldots, -\frac{i p + a \nu}{2 a}, -\nu; 1 - \frac{i p + a \nu}{2 a}, \ldots, 1 - \frac{i p + a \nu}{2 a}; -e^{2 i a z}\right) + 2^{-m} n! \cos^\nu(a z) \left(1 + e^{2 i a z}\right)^{-\nu} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{m+s} \binom{m}{s} \left(e^{i \frac{m \pi}{2} + (p + i c (m - 2 s)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (p + i c (m - 2 s) - i a \nu)^{j+1}} {}_{j+2}F_{j+1}\left(-\frac{i p - c m + 2 c s + a \nu}{2 a}, \ldots, -\frac{i p - c m + 2 c s + a \nu}{2 a}, -\nu; 1 - \frac{i p - c m + 2 c s + a \nu}{2 a}, \ldots, 1 - \frac{i p - c m + 2 c s + a \nu}{2 a}; -e^{2 i a z}\right) + e^{-i \frac{m \pi}{2} + (p - i c (m - 2 s)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (p - i c (m - 2 s) - i a \nu)^{j+1}} {}_{j+2}F_{j+1}\left(-\frac{i p + c m - 2 c s + a \nu}{2 a}, \ldots, -\frac{i p + c m - 2 c s + a \nu}{2 a}, -\nu; 1 - \frac{i p + c m - 2 c s + a \nu}{2 a}, \ldots, 1 - \frac{i p + c m - 2 c s + a \nu}{2 a}; -e^{2 i a z}\right)\right) /; m \in \mathbb{N} \land n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sin^\mu(c z + d) \cos^\nu(a z)$

01.07.21.2742.01

$$\int z^{\alpha-1} e^{p z} \sin^m(d+c z) \cos^\nu(a z)\, dz = 2^{-m-\nu} z^\alpha \left(-(-p z)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(\alpha, -p z)(m \bmod 2 - 1)(\nu \bmod 2 - 1) + i^{-m} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-i d (2k+m)} \binom{m}{k} \left(e^{i(4 d k + m\pi)} E_{1-\alpha}((-2 c i k + i c m - p) z) + e^{2 i d m} E_{1-\alpha}(i (2 c k - c m + i p) z)\right) + \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} (E_{1-\alpha}((-p - i a (2 s - \nu)) z) + E_{1-\alpha}((-p + 2 i a s - i a \nu) z)) - i^{-m} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-i d (2k+m)} \binom{m}{k} \left(e^{2 i d m} E_{1-\alpha}(i (2 c k - c m + i p - 2 a s + a \nu) z) + e^{i(4 d k + m\pi)} E_{1-\alpha}(-i (2 c k - c m - i p - 2 a s + a \nu) z) + e^{2 i d m} E_{1-\alpha}(i (2 c k - c m + i p + 2 a s - a \nu) z) + e^{i(4 d k + m\pi)} E_{1-\alpha}(-i (2 c k - c m - i p + 2 a s - a \nu) z)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2743.01

$$\int z^n e^{p z} \sin^\mu(d+c z) \cos^\nu(a z)\, dz = 2^{-\nu} e^{p z} \binom{\nu}{\frac{\nu}{2}} n!\, (1 - \nu \bmod 2) \sin^\mu(d + c z) \left(1 - e^{2 i (d + c z)}\right)^{-\mu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p + c \mu}{2 c}, \ldots, -\frac{i p + c \mu}{2 c}, -\mu; 1 - \frac{i p + c \mu}{2 c}, \ldots, 1 - \frac{i p + c \mu}{2 c}; e^{2 i (d + c z)}\right) + 2^{-\nu} n!\, \sin^\mu(d + c z) \left(1 - e^{2 i (d + c z)}\right)^{-\mu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{(p + a i (\nu - 2 s)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a i (\nu - 2 s) - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p + 2 a s - a \nu + c \mu}{2 c}, \ldots, -\frac{i p + 2 a s - a \nu + c \mu}{2 c}, -\mu; 1 - \frac{i p + 2 a s - a \nu + c \mu}{2 c}, \ldots, 1 - \frac{i p + 2 a s - a \nu + c \mu}{2 c}; e^{2 i (d + c z)}\right) + e^{(p - i a (\nu - 2 s)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i a (\nu - 2 s) - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p - 2 a s + a \nu + c \mu}{2 c}, \ldots, -\frac{i p - 2 a s + a \nu + c \mu}{2 c}, -\mu; 1 - \frac{i p - 2 a s + a \nu + c \mu}{2 c}, \ldots, 1 - \frac{i p - 2 a s + a \nu + c \mu}{2 c}; e^{2 i (d + c z)}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2744.01

$$\int z^n e^{p z} \sin^m(d + c z) \cos^\nu(a z) \, dz = 2^{-m} e^{p z} \binom{m}{\frac{m}{2}} \cos^\nu(a z) \, n! \, (1 - m \bmod 2) \left(1 + e^{2 i a z}\right)^{-\nu}$$
$$\sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(-\frac{i p + a \nu}{2 a}, \ldots, -\frac{i p + a \nu}{2 a}, -\nu; 1 - \frac{i p + a \nu}{2 a}, \ldots, 1 - \frac{i p + a \nu}{2 a}; -e^{2 i a z}\right) +$$
$$2^{-m} \cos^\nu(a z) \, n! \left(1 + e^{2 i a z}\right)^{-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Bigg(e^{-\frac{1}{2} i \pi m + d i (m - 2k) + (c i (m - 2k) + p) z}$$
$$\sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c i (m - 2k) + p - i a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(-\frac{2 c k - c m + i p + a \nu}{2 a}, \ldots, -\frac{2 c k - c m + i p + a \nu}{2 a}, -\nu;\right.$$
$$\left. 1 - \frac{2 c k - c m + i p + a \nu}{2 a}, \ldots, 1 - \frac{2 c k - c m + i p + a \nu}{2 a}; -e^{2 i a z}\right) + e^{\frac{i \pi m}{2} - i d (m - 2k) + (p - i c (m - 2k)) z}$$
$$\sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c (m - 2k) + p - i a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(-\frac{c (m - 2k) + i p + a \nu}{2 a}, \ldots, -\frac{c (m - 2k) + i p + a \nu}{2 a},\right.$$
$$\left.\left. -\nu; 1 - \frac{c (m - 2k) + i p + a \nu}{2 a}, \ldots, 1 - \frac{c (m - 2k) + i p + a \nu}{2 a}; -e^{2 i a z}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{p z} \sin^\mu(c z) \cos^\nu(a z + b)$

01.07.21.2745.01

$$\int z^{\alpha-1} e^{p z} \sin^m(c z) \cos^\nu(b + a z) \, dz = 2^{-m-\nu} z^\alpha \Bigg(-(-p z)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(\alpha, -p z) (m \bmod 2 - 1) (\nu \bmod 2 - 1) +$$
$$i^{-m} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m E_{1-\alpha}((-2 c i k + i c m - p) z) + E_{1-\alpha}(i (2 c k - c m + i p) z)\right) +$$
$$\binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i b (2 s + \nu)} \binom{\nu}{s} \left(e^{4 i b s} E_{1-\alpha}(-(p + a i (2 s - \nu)) z) + e^{2 i b \nu} E_{1-\alpha}(-(p - 2 i a s + i a \nu) z)\right) -$$
$$i^{-m} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-i b (2 s + \nu)} \binom{m}{k} \Big(e^{4 i b s} E_{1-\alpha}(i (2 c k - c m + i p - 2 a s + a \nu) z) +$$
$$e^{i (\pi m + 2 b \nu)} E_{1-\alpha}(-i (2 c k - c m - i p - 2 a s + a \nu) z) + e^{2 i b \nu} E_{1-\alpha}(i (2 c k - c m + i p + 2 a s - a \nu) z) +$$
$$e^{i (\pi m + 4 b s)} E_{1-\alpha}(-i (2 c k - c m - i p + 2 a s - a \nu) z)\Big)\Bigg) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.07.21.2746.01

$$\int z^n e^{p z} \sin^\mu(c z) \cos^\nu(b + a z)\, dz = 2^{-\nu} e^{p z} \binom{\nu}{\frac{\nu}{2}} n!\, (1 - \nu \bmod 2) \sin^\mu(c z) \left(1 - e^{2 i c z}\right)^{-\mu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i c \mu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{i p + c \mu}{2 c}, \ldots, -\frac{i p + c \mu}{2 c}, -\mu; 1 - \frac{i p + c \mu}{2 c}, \ldots, 1 - \frac{i p + c \mu}{2 c}; e^{2 i c z}\right) + 2^{-\nu} n!\, \sin^\mu(c z) \left(1 - e^{2 i c z}\right)^{-\mu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{b i (\nu - 2 s) + (p + a i (\nu - 2 s)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a i (\nu - 2 s) - i c \mu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{i p + 2 a s - a \nu + c \mu}{2 c}, \ldots, -\frac{i p + 2 a s - a \nu + c \mu}{2 c}, -\mu; 1 - \frac{i p + 2 a s - a \nu + c \mu}{2 c}, \ldots, 1 - \frac{i p + 2 a s - a \nu + c \mu}{2 c}; e^{2 i c z}\right) + e^{(p - i a (\nu - 2 s)) z - i b (\nu - 2 s)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i a (\nu - 2 s) - i c \mu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{i p - 2 a s + a \nu + c \mu}{2 c}, \ldots, -\frac{i p - 2 a s + a \nu + c \mu}{2 c}, -\mu; 1 - \frac{i p - 2 a s + a \nu + c \mu}{2 c}, \ldots, 1 - \frac{i p - 2 a s + a \nu + c \mu}{2 c}; e^{2 i c z}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.07.21.2747.01

$$\int z^n e^{p z} \sin^m(c z) \cos^\nu(b + a z)\, dz = 2^{-m} e^{p z} \binom{m}{\frac{m}{2}} \cos^\nu(b + a z)\, n!\, (1 - m \bmod 2) \left(1 + e^{2 i (b + a z)}\right)^{-\nu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{i p + a \nu}{2 a}, \ldots, -\frac{i p + a \nu}{2 a}, -\nu; 1 - \frac{i p + a \nu}{2 a}, \ldots, 1 - \frac{i p + a \nu}{2 a}; -e^{2 i (b + a z)}\right) + 2^{-m} \cos^\nu(b + a z)\, n!\, \left(1 + e^{2 i (b + a z)}\right)^{-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{1}{2} i \pi m + (c i (m - 2 k) + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c i (m - 2 k) + p - i a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{2 c k - c m + i p + a \nu}{2 a}, \ldots, -\frac{2 c k - c m + i p + a \nu}{2 a}, -\nu; 1 - \frac{2 c k - c m + i p + a \nu}{2 a}, \ldots, 1 - \frac{2 c k - c m + i p + a \nu}{2 a}; -e^{2 i (b + a z)}\right) + e^{\frac{i \pi m}{2} + (p - i c (m - 2 k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c (m - 2 k) + p - i a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{c (m - 2 k) + i p + a \nu}{2 a}, \ldots, -\frac{c (m - 2 k) + i p + a \nu}{2 a}, -\nu; 1 - \frac{c (m - 2 k) + i p + a \nu}{2 a}, \ldots, 1 - \frac{c (m - 2 k) + i p + a \nu}{2 a}; -e^{2 i (b + a z)}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{p z} \sin^\mu(c z + d) \cos^\nu(a z + b)$

01.07.21.2748.01

$$\int z^{\alpha-1} e^{p z} \sin^m(c z+d) \cos^\nu(a z+b)\, dz = 2^{-m-\nu} z^\alpha \Bigg(-(-p z)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(\alpha, -p z)\,(m \bmod 2-1)\,(\nu \bmod 2-1) + i^{-m} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2-1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-i d (2 k+m)} \binom{m}{k} \left(e^{i (4 d k+m \pi)} E_{1-\alpha}((-2 c i k+i c m-p) z)+e^{2 i d m} E_{1-\alpha}(i (2 c k-c m+i p) z)\right) + \binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{-i b (2 s+\nu)} \binom{\nu}{s} \left(e^{4 i b s} E_{1-\alpha}(-(p+a i (2 s-\nu)) z)+e^{2 i b \nu} E_{1-\alpha}(-(p-2 i a s+i a \nu) z)\right) - i^{-m} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-i (d (2 k+m)+b (2 s+\nu))} \binom{m}{k} \left(e^{2 i (d m+2 b s)} E_{1-\alpha}(i (2 c k-c m+i p-2 a s+a \nu) z)+e^{i (4 d k+2 b \nu+m \pi)} E_{1-\alpha}(-i (2 c k-c m-i p-2 a s+a \nu) z)+e^{2 i (d m+b \nu)} E_{1-\alpha}(i (2 c k-c m+i p+2 a s-a \nu) z)+e^{i (4 d k+4 b s+m \pi)} E_{1-\alpha}(-i (2 c k-c m-i p+2 a s-a \nu) z)\right)\Bigg) /;\, m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.2749.01

$$\int z^n e^{p z} \sin^\mu(d+c z) \cos^\nu(b+a z)\, dz = 2^{-\nu} e^{p z} \binom{\nu}{\frac{\nu}{2}} n!\, (1-\nu \bmod 2) \sin^\mu(d+c z) \left(1-e^{2 i (d+c z)}\right)^{-\mu} \sum_{j=0}^n \frac{(-1)^j z^{n-j} (p-i c \mu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{i p+c \mu}{2 c}, \ldots, -\frac{i p+c \mu}{2 c}, -\mu; 1-\frac{i p+c \mu}{2 c}, \ldots, 1-\frac{i p+c \mu}{2 c}; e^{2 i (d+c z)}\right) + 2^{-\nu} n!\, \sin^\mu(d+c z) \left(1-e^{2 i (d+c z)}\right)^{-\mu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \Bigg(e^{b i (\nu-2 s)+(p+a i (\nu-2 s)) z} \sum_{j=0}^n \frac{(-1)^j z^{n-j} (p+a i (\nu-2 s)-i c \mu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{i p+2 a s-a \nu+c \mu}{2 c}, \ldots, -\frac{i p+2 a s-a \nu+c \mu}{2 c}, -\mu; 1-\frac{i p+2 a s-a \nu+c \mu}{2 c}, \ldots, 1-\frac{i p+2 a s-a \nu+c \mu}{2 c}; e^{2 i (d+c z)}\right) + e^{(p-i a (\nu-2 s)) z-i b (\nu-2 s)} \sum_{j=0}^n \frac{(-1)^j z^{n-j} (p-i a (\nu-2 s)-i c \mu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{i p-2 a s+a \nu+c \mu}{2 c}, \ldots, -\frac{i p-2 a s+a \nu+c \mu}{2 c}, -\mu; 1-\frac{i p-2 a s+a \nu+c \mu}{2 c}, \ldots, 1-\frac{i p-2 a s+a \nu+c \mu}{2 c}; e^{2 i (d+c z)}\right)\Bigg) /;\, n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.07.21.2750.01

$$\int z^n e^{p z} \sin^m(d+c z) \cos^\nu(b+a z)\, dz = 2^{-m} e^{p z} \binom{m}{\frac{m}{2}} \cos^\nu(b+a z)\, n!\, (1 - m \bmod 2) \left(1+e^{2 i (b+a z)}\right)^{-\nu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{i p + a \nu}{2 a}, \ldots, -\frac{i p + a\nu}{2 a}, -\nu; 1 - \frac{i p + a \nu}{2 a}, \ldots, 1 - \frac{i p + a \nu}{2 a}; -e^{2 i (b+a z)}\right) + 2^{-m} \cos^\nu(b + a z)\, n!\, \left(1 + e^{2 i (b+a z)}\right)^{-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{1}{2} i \pi m + d i (m-2k) + (c i (m-2k)+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c i (m-2k) + p - i a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{2 c k - c m + i p + a \nu}{2 a}, \ldots, -\frac{2 c k - c m + i p + a\nu}{2 a}, -\nu; 1 - \frac{2 c k - c m + i p + a \nu}{2 a}, \ldots, 1 - \frac{2 c k - c m + i p + a \nu}{2 a}; -e^{2 i (b+a z)}\right) + e^{\frac{i \pi m}{2} - i d (m-2k) + (p - i c (m-2k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c (m-2k) + p - i a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{c (m-2k) + i p + a \nu}{2 a}, \ldots, -\frac{c (m-2k) + i p + a\nu}{2 a}, -\nu; 1 - \frac{c (m-2k) + i p + a \nu}{2 a}, \ldots, 1 - \frac{c (m-2k) + i p + a \nu}{2 a}; -e^{2 i (b+a z)}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n e^{p z^r} \sin^m\left(b z^r\right) \cos^\nu(c z)$

01.07.21.2751.01

$$\int z^n e^{p z^2} \sin^m\left(b z^2\right) \cos^\nu(c z)\, dz = 2^{-m-\nu-1} \left(-z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} E_{\frac{1}{2}-\frac{n}{2}}\left(-p z^2\right) (m \bmod 2 - 1) (\nu \bmod 2 - 1) + i^{-m} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m - p) z^2\right) \left((-2 b i k + i b m - p) z^2\right)^{\frac{1}{2}(-n-1)} + \left((-i b (m-2k) - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i b (m-2k) - p) z^2\right)\right) + \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} e^{\frac{c^2 (\nu - 2 s)^2}{4 p}} p^{-n-1} \binom{\nu}{s} \left(\sum_{q=0}^{n} 2^{q-n} (i c (2 s - \nu))^{n-q} \left(\frac{(2 c s - c \nu + 2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} (c i (\nu - 2 s) + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(2 c s - c \nu + 2 i p z)^2}{4 p}\right) + \sum_{q=0}^{n} 2^{q-n} (i c (\nu - 2 s))^{n-q} \left(\frac{(c (\nu - 2 s) + 2 i p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} (c i (2 s - \nu) + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(c (\nu - 2 s) + 2 i p z)^2}{4 p}\right)\right) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^k e^{-\frac{1}{2} i m \pi} \binom{m}{k} \binom{\nu}{s} \left(e^{\frac{c^2 (\nu - 2 s)^2}{4 (b i (m-2k) + p)}} \sqrt{2 i b k - i b m + p} \sum_{q=0}^{n} 2^{q-n} (-2 b i k + i b m + p)^{-n-\frac{1}{2}} (i c (\nu - 2 s))^{n-q}\right.\right.$$

$$\left(\frac{i(-2cs+cv+4bkz-2bmz+2ipz)^2}{2bk-bm+ip}\right)^{\frac{1}{2}(-q-1)} (c\,i(2s-v)+2(-2b\,i\,k+i\,b\,m+p)z)^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(-2cs+cv+4bkz-2bmz+2ipz)^2}{8bk-4bm+4ip}\right)+$$

$$e^{\frac{c^2(v-2s)^2}{4(b\,i(m-2k)+p)}}\sqrt{2\,i\,b\,k-i\,b\,m+p}\sum_{q=0}^{n}(-2b\,i\,k+i\,b\,m+p)^{-n-\frac{1}{2}}\left(i\,c\left(s-\frac{v}{2}\right)\right)^{n-q}$$

$$\left(\frac{i(2cs-cv+4bkz-2bmz+2ipz)^2}{2bk-bm+ip}\right)^{\frac{1}{2}(-q-1)} (c\,i(v-2s)+2(-2b\,i\,k+i\,b\,m+p)z)^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(2cs-cv+4bkz-2bmz+2ipz)^2}{8bk-4bm+4ip}\right)+$$

$$e^{\frac{c^2(v-2s)^2}{4(2\,i\,b\,k-i\,b\,m+p)}+i\,m\,\pi}\sqrt{-2b\,i\,k+i\,b\,m+p}\sum_{q=0}^{n}(2\,i\,b\,k-i\,b\,m+p)^{-n-\frac{1}{2}}\left(i\,c\left(s-\frac{v}{2}\right)\right)^{n-q}$$

$$\left(-\frac{i(2cs-cv-4bkz+2bmz+2ipz)^2}{2bk-bm-ip}\right)^{\frac{1}{2}(-q-1)} (c\,i(v-2s)+2(2\,i\,b\,k-i\,b\,m+p)z)^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(2cs-cv-4bkz+2bmz+2ipz)^2}{8bk-4bm-4ip}\right)+$$

$$e^{\frac{c^2(v-2s)^2}{4(b\,i(2k-m)+p)}+i\,m\,\pi}\sqrt{b\,i(m-2k)+p}\sum_{q=0}^{n}2^{q-n}(b\,i(2k-m)+p)^{-n-\frac{1}{2}}(i\,c(v-2s))^{n-q}$$

$$\left(-\frac{i(c(v-2s)+2(-2bk+bm+ip)z)^2}{2bk-bm-ip}\right)^{\frac{1}{2}(-q-1)} (c\,i(2s-v)+2(2\,i\,b\,k-i\,b\,m+p)z)^{q+1}$$

$$\left.\left.\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(c(v-2s)+2(-2bk+bm+ip)z)^2}{8bk-4bm-4ip}\right)\right)\right)\right)\Big/$$

$$\left(\sqrt{b\,i(2k-m)+p}\,\sqrt{b\,i(m-2k)+p}\right)\Big)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

01.07.21.2752.01

$$\int z^n e^{p\sqrt{z}}\sin^m\left(b\sqrt{z}\right)\cos^v(c\,z)\,dz = $$

$$2^{-m-v-1}\left(-4p^{-2(n+1)}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\left(2(n+1), -p\sqrt{z}\right)(m\bmod 2-1)(v\bmod 2-1)+4\,i^{-m}z^{n+1}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\right.$$

$$\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\Big(\Gamma\big(2(n+1),\,-(p+b\,i\,(m-2u))\sqrt{z}\big)\big(-(p+b\,i\,(m-2u))\sqrt{z}\big)^{-2(n+1)}+(-1)^m$$

$$\big(-(p-i\,b\,(m-2u))\sqrt{z}\big)^{-2(n+1)}\,\Gamma\big(2(n+1),\,-(p-i\,b\,(m-2u))\sqrt{z}\big)\Big)-$$

$$4\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}-2^{-2(n+1)}\,e^{\frac{i\,p^2}{4cv-8cs}}\left(c^2\,(v-2s)^2\right)^{-2n-1}\binom{v}{s}$$

$$\Bigg(\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)^{h+k}\left(\frac{i\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(p\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)+$$

$$2\,c\,i\sqrt{-\frac{i\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(2s-v)}}\;(v-2s)\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)\Bigg)\Bigg)$$

$$(i\,c\,(2s-v))^{2n}+e^{\frac{i\,p^2}{4cs-2cv}}\,(i\,c\,(v-2s))^{2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}\left(p+2\,c\,i\,(2s-v)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p+2\,c\,i\,(2s-v)\sqrt{z}\right)^2}{c\,(2s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(p\left(p+2\,c\,i\,(2s-v)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{i\left(p+2\,c\,i\,(2s-v)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)+2\,c\,i\,(2s-v)$$

$$\sqrt{\frac{i\left(p+2\,c\,i\,(2s-v)\sqrt{z}\right)^2}{c\,(2s-v)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{i\left(p+2\,c\,i\,(2s-v)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)\Bigg)\Bigg)-\frac{1}{c^2}\Bigg(i^{-m}\,4^{-n}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(v-2s)^2}\Bigg(\binom{v}{s}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\Bigg(e^{\frac{i\,(p+b\,i\,(m-2u))^2}{c\,(8s-4v)}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p+b\,i\,(m-2u))^{-h-k+2n}\left(p+b\,i\,(m-2u)+\right.$$

$$2\, c\, i\, (2\, s - v)\, \sqrt{z}\Big)^{h+k} \left(\frac{i\left(p + b\, i\, (m - 2\, u) + 2\, c\, i\, (2\, s - v)\, \sqrt{z}\right)^2}{c\, (2\, s - v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((p + b\, i\, (m - 2\, u))\left(p + b\, i\, (m - 2\, u) + 2\, c\, i\, (2\, s - v)\, \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h + k + 1),\ \frac{i\left(p + b\, i\, (m - 2\, u) + 2\, c\, i\, (2\, s - v)\, \sqrt{z}\right)^2}{c\, (8\, s - 4\, v)}\right) +$$

$$2\, c\, i\, (2\, s - v)\, \sqrt{\frac{i\left(p + b\, i\, (m - 2\, u) + 2\, c\, i\, (2\, s - v)\, \sqrt{z}\right)^2}{c\, (2\, s - v)}}$$

$$\Gamma\left(\frac{1}{2}(h + k + 2),\ \frac{i\left(p + b\, i\, (m - 2\, u) + 2\, c\, i\, (2\, s - v)\, \sqrt{z}\right)^2}{c\, (8\, s - 4\, v)}\right)\Bigg)\Bigg)(i\, c\, (2\, s - v))^{-2\, n} +$$

$$e^{i\left(\frac{(p - i\, b\, (m - 2\, u))^2}{c\, (8\, s - 4\, v)} + m\, \pi\right)} \Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (p - i\, b\, (m - 2\, u))^{-h-k+2\, n} \Big(p - i\, b\, (m - 2\, u) +$$

$$2\, c\, i\, (2\, s - v)\, \sqrt{z}\Big)^{h+k} \left(-\frac{i\left(i\, p + b\, (m - 2\, u) + 2\, c\, (v - 2\, s)\, \sqrt{z}\right)^2}{c\, (2\, s - v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((p - i\, b\, (m - 2\, u))\left(p - i\, b\, (m - 2\, u) + 2\, c\, i\, (2\, s - v)\, \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h + k + 1),\ -\frac{i\left(i\, p + b\, (m - 2\, u) + 2\, c\, (v - 2\, s)\, \sqrt{z}\right)^2}{c\, (8\, s - 4\, v)}\right) +$$

$$2\, c\, i\, (2\, s - v)\, \sqrt{-\frac{i\left(i\, p + b\, (m - 2\, u) + 2\, c\, (v - 2\, s)\, \sqrt{z}\right)^2}{c\, (2\, s - v)}}\ \Gamma\Bigg(\frac{1}{2}(h + k + 2),$$

$$\left.\left.\left.-\frac{i\left(i\,p+b\,(m-2\,u)+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(8\,s-4\,v)}\right)\right)\right)(i\,c\,(2\,s-v))^{-2\,n}+(i\,c\,(v-2\,s))^{-2\,n}$$

$$\left(e^{\frac{1}{4}\,i\left(\frac{(b\,m+i\,p-2\,b\,u)^2}{2\,c\,s-c\,v}+4\,m\,\pi\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p-i\,b\,(m-2\,u))^{-h-k+2\,n}\,\left(p-i\,b\,(m-2\,u)+\right.\right.$$

$$\left.2\,c\,i\,(v-2\,s)\,\sqrt{z}\,\right)^{h+k}\left(\frac{i\left(p-i\,b\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((p-i\,b\,(m-2\,u))\left(p-i\,b\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\,\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(i\,p+b\,(m-2\,u)+2\,c\,(2\,s-v)\,\sqrt{z}\,\right)^2}{c\,(8\,s-4\,v)}\right)+$$

$$2\,c\,i\,(v-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(i\,p+b\,(m-2\,u)+2\,c\,(2\,s-v)\,\sqrt{z}\,\right)^2}{c\,(8\,s-4\,v)}\right)$$

$$\left.\sqrt{\frac{i\left(p-i\,b\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}}\,\right)+e^{\frac{(i\,b\,m+p-2\,i\,b\,u)^2}{8\,i\,c\,s-4\,i\,c\,v}}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p+b\,i\,(m-2\,u))^{-h-k+2\,n}\,\left(p+b\,i\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\,\right)^{h+k}$$

$$\left(\frac{i\left(p+b\,i\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((p+b\,i\,(m-2\,u))\left(p+b\,i\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\,\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(-i\,p+b\,(m-2\,u)+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(8\,s-4\,v)}\right)+$$

$$2\,c\,i\,(v-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(-i\,p+b\,(m-2\,u)+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)$$

$$\left.\left.\left.\left.\left.\left.\left.\sqrt{\frac{i\left(p+b\,i\,(m-2\,u)+2\,c\,i\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\right)\right)\right)\right)\right)\right)\right)\,/;\,m\in$$

$\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$

Involving $z^n\,e^{p\,z^r}\sin^m(b\,z)\cos^v(c\,z)$

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$$\int z^n\,e^{p\,z^2}\sin^m(b\,z)\cos^v(c\,z)\,dz ==$$

$$2^{-m-v-1}\left(-z^{n+1}\left(-p\,z^2\right)^{\frac{1}{2}(-n-1)}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\left(\frac{n+1}{2},\,-p\,z^2\right)(m\bmod 2-1)\,(v\bmod 2-1)+i^{-m}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\right.$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{\frac{b^2\,(m-2\,k)^2}{4\,p}}\,p^{-n-1}\binom{m}{k}\left(\sum_{q=0}^{n}\left(i\,b\left(k-\frac{m}{2}\right)\right)^{n-q}\left(\frac{(2\,b\,k-b\,m+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(b\,i\,(m-2\,k)+2\,p\,z)^{q+1}\right.$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{(2\,b\,k-b\,m+2\,i\,p\,z)^2}{4\,p}\right)+(-1)^m\sum_{q=0}^{n}2^{q-n}\,(i\,b\,(m-2\,k))^{n-q}$$

$$\left.\left(\frac{(b\,(m-2\,k)+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(b\,i\,(2\,k-m)+2\,p\,z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{(b\,(m-2\,k)+2\,i\,p\,z)^2}{4\,p}\right)\right)+$$

$$p^{-n-1}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{\frac{c^2\,(v-2\,s)^2}{4\,p}}\binom{v}{s}\left(\sum_{q=0}^{n}\left(i\,c\left(s-\frac{v}{2}\right)\right)^{n-q}\left(\frac{(2\,c\,s-c\,v+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}\right.$$

$$(c\,i\,(v-2\,s)+2\,p\,z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{(2\,c\,s-c\,v+2\,i\,p\,z)^2}{4\,p}\right)+\sum_{q=0}^{n}2^{q-n}\,(i\,c\,(v-2\,s))^{n-q}$$

$$\left.\left(\frac{(c\,(v-2\,s)+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(c\,i\,(2\,s-v)+2\,p\,z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{(c\,(v-2\,s)+2\,i\,p\,z)^2}{4\,p}\right)\right)-\frac{1}{\sqrt{p}}$$

$$\left(\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{\frac{b^2\,(m-2\,k)^2+c^2\,(v-2\,s)^2-i\,m\,p\,\pi}{2\,p}}\binom{m}{k}\left(e^{i\,m\,\pi-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,p}}\sum_{q=0}^{n}2^{q-n}\,p^{-n-\frac{1}{2}}\,(i\,(-2\,b\,k+b\,m-2\,c\,s+c\,v))^{n-q}\right.\right.$$

$$(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v-2\,i\,p\,z))^{q+1}\left(\frac{(-2\,b\,k+b\,m-2\,c\,s+c\,v+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{(-2\,b\,k+b\,m-2\,c\,s+c\,v+2\,i\,p\,z)^2}{4\,p}\right)+e^{-\frac{(-2\,b\,k+b\,m-2\,c\,s+c\,v)^2}{4\,p}}$$

$$\sum_{q=0}^{n} 2^{q-n}\,p^{-n-\frac{1}{2}}\,(i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{n-q}\,(-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v+2\,i\,p\,z))^{q+1}$$

$$\left(\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{(2\,b\,k-b\,m-2\,c\,s+c\,v+2\,i\,p\,z)^2}{4\,p}\right)+$$

$$e^{i\,m\,\pi-\frac{(-2\,b\,k+b\,m-2\,c\,s+c\,v)^2}{4\,p}}\sum_{q=0}^{n} 2^{q-n}\,p^{-n-\frac{1}{2}}\,(-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{n-q}$$

$$(i\,(2\,b\,k-b\,m-2\,c\,s+c\,v-2\,i\,p\,z))^{q+1}\left(\frac{(-2\,b\,k+b\,m+2\,c\,s-c\,v+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{(-2\,b\,k+b\,m+2\,c\,s-c\,v+2\,i\,p\,z)^2}{4\,p}\right)+$$

$$e^{-\frac{(2\,b\,k-b\,m-2\,c\,s+c\,v)^2}{4\,p}}\sum_{q=0}^{n} 2^{q-n}\,p^{-n-\frac{1}{2}}\,(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{n-q}$$

$$\left(\frac{(b\,(m-2\,k)-2\,c\,s+c\,v-2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(-i\,(2\,b\,k-b\,m+2\,c\,s-c\,v+2\,i\,p\,z))^{q+1}$$

$$\left.\left.\left.\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{(b\,(m-2\,k)-2\,c\,s+c\,v-2\,i\,p\,z)^2}{4\,p}\right)\right)\right)\right)\right)\, /;\, m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

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$$\int z^n\,e^{p\sqrt{z}}\,\sin^m(b\,z)\cos^v(c\,z)\,dz ==$$

$$2^{-m-v-1}\left(-4\,p^{-2\,(n+1)}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\left(2\,(n+1), -p\sqrt{z}\right)(m \bmod 2-1)\,(v \bmod 2-1)+i^{-m}\,4^{-n}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\right.$$

$$\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\,e^{\frac{i\,p^2}{8\,b\,u-4\,b\,m}}\left(b^2\,(m-2\,u)^2\right)^{-2\,n-1}\binom{m}{u}\left(e^{\frac{i\,p^2}{2\,b\,m-4\,b\,u}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,b\,i\,(m-2\,u)\sqrt{z}\right)^{h+k}\right.\right.$$

$$\left(\frac{i\left(p+2\,b\,i\,(m-2\,u)\sqrt{z}\right)^2}{b\,(m-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(p\left(p+2\,b\,i\,(m-2\,u)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(p+2\,b\,i\,(m-2u)\sqrt{z}\right)^2}{4\,b\,(m-2u)}\right)+2\,b\,i\,(m-2u)\sqrt{\frac{i\left(p+2\,b\,i\,(m-2u)\sqrt{z}\right)^2}{b\,(m-2u)}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(p+2\,b\,i\,(m-2u)\sqrt{z}\right)^2}{4\,b\,(m-2u)}\right)\Bigg)\Bigg)\left(-i\,b\,(m-2u)\right)^{2n}+(-1)^m\left(i\,b\,(m-2u)\right)^{2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}\left(p-2\,i\,b\,(m-2u)\sqrt{z}\right)^{h+k}\left(-\frac{i\left(p-2\,i\,b\,(m-2u)\sqrt{z}\right)^2}{b\,(m-2u)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(p\left(p-2\,i\,b\,(m-2u)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(p-2\,i\,b\,(m-2u)\sqrt{z}\right)^2}{4\,b\,(m-2u)}\right)-$$

$$2\,i\,b\,(m-2u)\sqrt{-\frac{i\left(p-2\,i\,b\,(m-2u)\sqrt{z}\right)^2}{b\,(m-2u)}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(p-2\,i\,b\,(m-2u)\sqrt{z}\right)^2}{4\,b\,(m-2u)}\right)\Bigg)\Bigg)\Bigg)-$$

$$4^{-n}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}-e^{\frac{i\,p^2}{4\,c\,v-8\,c\,s}}\left(c^2\,(v-2s)^2\right)^{-2n-1}\binom{v}{s}\Bigg(\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}$$

$$\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)^{h+k}\left(\frac{i\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)+2\,c\,i\sqrt{-\frac{i\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(2s-v)}}\;(v-2s)$$

$$\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(p+2\,c\,i\,(v-2s)\sqrt{z}\right)^2}{c\,(8s-4v)}\right)\Bigg)\Bigg)\left(i\,c\,(2s-v)\right)^{2n}+e^{\frac{i\,p^2}{4\,c\,s-2\,c\,v}}\left(i\,c\,(v-2s)\right)^{2n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}\left(p+2\,c\,i\,(2s-v)\sqrt{z}\right)^{h+k}\left(\frac{i\left(p+2\,c\,i\,(2s-v)\sqrt{z}\right)^2}{c\,(2s-v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(p\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)+\right.$$

$$\left.\left.2\,c\,i\,(2\,s-v)\,\sqrt{\frac{i\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(2\,s-v)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(p+2\,c\,i\,(2\,s-v)\,\sqrt{z}\right)^2}{c\,(8\,s-4\,v)}\right)\right)\right)+$$

$$i^{-m}\,4^{-n}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\sum_{u=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^u\binom{m}{u}\left(-\frac{1}{(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}\left((-1)^m\,e^{\frac{i\,p^2}{-4\,b\,m-8\,c\,s+8\,b\,u+4\,c\,v}}\,(-i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-2\,n}\right.\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p-2\,i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(i\,p+2\,(b\,m+2\,c\,s-2\,b\,u-c\,v)\,\sqrt{z}\right)^2}{b\,m+2\,c\,s-2\,b\,u-c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(p\left(p-2\,i\,(b\,m+2\,c\,s-2\,b\right.\right.$$

$$\left.u-c\,v)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(i\,p+2\,(b\,m+2\,c\,s-2\,b\,u-c\,v)\,\sqrt{z}\right)^2}{8\,c\,s+4\,b\,(m-2\,u)-4\,c\,v}\right)-$$

$$2\,i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)\,\sqrt{\frac{i\left(i\,p+2\,(b\,m+2\,c\,s-2\,b\,u-c\,v)\,\sqrt{z}\right)^2}{b\,m+2\,c\,s-2\,b\,u-c\,v}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(i\,p+2\,(b\,m+2\,c\,s-2\,b\,u-c\,v)\,\sqrt{z}\right)^2}{8\,c\,s+4\,b\,(m-2\,u)-4\,c\,v}\right)\right)\right)\right)-$$

$$\frac{1}{(b\,m-2\,c\,s-2\,b\,u+c\,v)^2}\left((-1)^m\,e^{\frac{i\,p^2}{-4\,b\,m+8\,c\,s+8\,b\,u-4\,c\,v}}\,(-i\,(b\,m-2\,c\,s-2\,b\,u+c\,v))^{-2\,n}\right.$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p-2\,i\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(i\,p+2\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{z}\right)^2}{b\,m-2\,c\,s-2\,b\,u+c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(p\left(p-2\,i\,(b\,m-2\,c\,s-2\,b\,u+\right.\right.$$

$$c\,v)\,\sqrt{z}\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\,\big(i\,p+2\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{z}\,\big)^2}{4\,(b\,m-2\,c\,s-2\,b\,u+c\,v)}\right)-$$

$$2\,i\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{\frac{i\,\big(i\,p+2\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{z}\,\big)^2}{b\,m-2\,c\,s-2\,b\,u+c\,v}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\,\big(i\,p+2\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{z}\,\big)^2}{4\,(b\,m-2\,c\,s-2\,b\,u+c\,v)}\right)\Bigg)\Bigg)\Bigg)-$$

$$\frac{1}{(b\,m-2\,c\,s-2\,b\,u+c\,v)^2}\Bigg(e^{\frac{i\,p^2}{4\,b\,m-8\,c\,s-8\,b\,u+4\,c\,v}}\,(i\,(b\,m-2\,c\,s-2\,b\,u+c\,v))^{-2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(-\frac{i\,\big(i\,p-2\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{z}\,\big)^2}{b\,m-2\,c\,s-2\,b\,u+c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\big(p+2\,i\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{z}\,\big)^{h+k}\binom{k}{h}\binom{n}{k}\Bigg(p\,\big(p+2\,i\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{z}\,\big)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\,\big(i\,p-2\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{z}\,\big)^2}{4\,(b\,m-2\,c\,s-2\,b\,u+c\,v)}\right)+$$

$$2\,i\,\sqrt{-\frac{i\,\big(i\,p-2\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{z}\,\big)^2}{b\,m-2\,c\,s-2\,b\,u+c\,v}}\,\,(b\,m-2\,c\,s-2\,b\,u+c\,v)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\,\big(i\,p-2\,(b\,m-2\,c\,s-2\,b\,u+c\,v)\,\sqrt{z}\,\big)^2}{4\,(b\,m-2\,c\,s-2\,b\,u+c\,v)}\right)\Bigg)\Bigg)-$$

$$\frac{1}{(b\,m+2\,c\,s-2\,b\,u-c\,v)^2}\Bigg(e^{\frac{i\,p^2}{4\,b\,m+8\,c\,s-8\,b\,u-4\,c\,v}}\,(i\,(b\,m+2\,c\,s-2\,b\,u-c\,v))^{-2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\,\big(p+2\,i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)\,\sqrt{z}\,\big)^{h+k}$$

$$\left(-\frac{i\left(i\,p+2\,(-b\,m-2\,c\,s+2\,b\,u+c\,v)\sqrt{z}\right)^2}{b\,m+2\,c\,s-2\,b\,u-c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(p\left(p+2\,i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$\left.-\frac{i\left(i\,p+2\,(-b\,m-2\,c\,s+2\,b\,u+c\,v)\sqrt{z}\right)^2}{4\,b\,m+8\,c\,s-8\,b\,u-4\,c\,v}\right)+2\,i\,(b\,m+2\,c\,s-2\,b\,u-c\,v)$$

$$\Gamma\left(\frac{1}{2}(h+k+2),-\frac{i\left(i\,p+2\,(-b\,m-2\,c\,s+2\,b\,u+c\,v)\sqrt{z}\right)^2}{4\,b\,m+8\,c\,s-8\,b\,u-4\,c\,v}\right)$$

$$\left.\left.\left.\left.\sqrt{-\frac{i\left(i\,p+2\,(-b\,m-2\,c\,s+2\,b\,u+c\,v)\sqrt{z}\right)^2}{b\,m+2\,c\,s-2\,b\,u-c\,v}}\right)\right)\right)\right)\text{/; } m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\, e^{p\,z}\sin^m\left(b\,z^r\right)\cos^v(c\,z)$

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$$\int z^n\,e^{p\,z}\sin^m\left(b\,z^2\right)\cos^v(c\,z)\,dz = 2^{-m-v-1}\left(\frac{2\,(-p)^{-n}\;\Gamma(n+1,-p\,z)\,(m\bmod 2-1)\,(v\bmod 2-1)}{p}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}+\right.$$

$$2\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}z^{n+1}\binom{v}{s}\left(E_{-n}(-(p+c\,i\,(2\,s-v))\,z)+E_{-n}(-(p-2\,i\,c\,s+i\,c\,v)\,z)\right)+$$

$$i^{-m}\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{i\,b\,(2\,k-m)}}\left((-1)^m\,e^{\frac{i\,p^2}{8\,b\,k-4\,b\,m}}\sum_{q=0}^{n}2^{q-n}\,(i\,b\,(2\,k-m))^{-n-\frac{1}{2}}\,(-p)^{n-q}\right.\right.$$

$$\left.(p+2\,b\,i\,(2\,k-m)\,z)^{q+1}\left(\frac{i\,(p+2\,b\,i\,(2\,k-m)\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i\,(p+2\,b\,i\,(2\,k-m)\,z)^2}{b\,(8\,k-4\,m)}\right)\right)+$$

$$\frac{1}{\sqrt{i\,b\,(m-2\,k)}}\left(e^{\frac{i\,p^2}{4\,b\,m-8\,b\,k}}\sum_{q=0}^{n}2^{q-n}\,(i\,b\,(m-2\,k))^{-n-\frac{1}{2}}\,(-p)^{n-q}\,(p+2\,b\,i\,(m-2\,k)\,z)^{q+1}\right.$$

$$\left.\left.\left(-\frac{i\,(p+2\,b\,i\,(m-2\,k)\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(p+2\,b\,i\,(m-2\,k)\,z)^2}{b\,(8\,k-4\,m)}\right)\right)\right)+$$

$$\imath^{-m}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(-\frac{1}{\sqrt{\imath\, b\,(2\,k-m)}}\Bigg(e^{\frac{1}{4}\imath\left(\frac{(p+2\,\imath\, c\,s-\imath\, c\,v)^2}{2\,b\,k-b\,m}+4\,m\,\pi\right)}\sum_{q=0}^{n}2^{q-n}\,(\imath\, b\,(2\,k-m))^{-n-\frac{1}{2}}\,(\imath\, c\,(v-2\,s)-p)^{n-q}$$

$$\left(-\frac{\imath\,(\imath\, p+c\,(v-2\,s)+2\,b\,(m-2\,k)\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-q-1)}(p+\imath\,(2\,c\,s-c\,v+4\,b\,k\,z-2\,b\,m\,z))^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{\imath\,(\imath\, p+c\,(v-2\,s)+2\,b\,(m-2\,k)\,z)^2}{b\,(8\,k-4\,m)}\right)\Bigg)-$$

$$\frac{1}{\sqrt{\imath\, b\,(2\,k-m)}}\Bigg(e^{\frac{1}{4}\imath\left(\frac{(p-2\,\imath\, c\,s+\imath\, c\,v)^2}{2\,b\,k-b\,m}+4\,m\,\pi\right)}\mathrm{Sum}\Bigg(2^{q-n}\,(\imath\, b\,(2\,k-m))^{-n-\frac{1}{2}}\,(\imath\, c\,(2\,s-v)-p)^{n-q}$$

$$\left(-\frac{\imath\,(-\imath\, p-2\,c\,s+c\,v+4\,b\,k\,z-2\,b\,m\,z)^2}{2\,b\,k-b\,m}\right)^{\frac{1}{2}(-q-1)}(p+\imath\,(-2\,c\,s+c\,v+4\,b\,k\,z-2\,b\,m\,z))^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{\imath\,(-\imath\, p-2\,c\,s+c\,v+4\,b\,k\,z-2\,b\,m\,z)^2}{4\,(2\,b\,k-b\,m)}\right),\{q,0,n\}\Bigg)\Bigg)-$$

$$\frac{1}{\sqrt{\imath\, b\,(m-2\,k)}}\Bigg(e^{-\frac{\imath\,(p+c\,\imath\,(2\,s-v))^2}{b\,(8\,k-4\,m)}}\sum_{q=0}^{n}2^{q-n}\,(\imath\, b\,(m-2\,k))^{-n-\frac{1}{2}}\,(\imath\, c\,(v-2\,s)-p)^{n-q}$$

$$\left(\frac{\imath\,(\imath\, p-2\,c\,s+c\,v+4\,b\,k\,z-2\,b\,m\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-q-1)}(p-\imath\,(-2\,c\,s+c\,v+4\,b\,k\,z-2\,b\,m\,z))^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{\imath\,(\imath\, p-2\,c\,s+c\,v+4\,b\,k\,z-2\,b\,m\,z)^2}{b\,(8\,k-4\,m)}\right)\Bigg)-$$

$$\frac{1}{\sqrt{\imath\, b\,(m-2\,k)}}\Bigg(e^{-\frac{\imath\,(p+c\,\imath\,(v-2\,s))^2}{b\,(8\,k-4\,m)}}\sum_{q=0}^{n}2^{q-n}\,(\imath\, b\,(m-2\,k))^{-n-\frac{1}{2}}\,(\imath\, c\,(2\,s-v)-p)^{n-q}$$

$$\left(\frac{\imath\,(\imath\, p+2\,c\,s-c\,v+4\,b\,k\,z-2\,b\,m\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-q-1)}(p+c\,\imath\,(v-2\,s)+2\,b\,\imath\,(m-2\,k)\,z)^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{\imath\,(p+c\,\imath\,(v-2\,s)+2\,b\,\imath\,(m-2\,k)\,z)^2}{b\,(8\,k-4\,m)}\right)\Bigg)\Bigg)\Bigg)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

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$$\int z^n e^{p z} \sin^m\left(b \sqrt{z}\right) \cos^\nu(c z)\, dz = 2^{-m-\nu-1} \left(\frac{2 (-p)^{-n} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -p z) (m \bmod 2 - 1) (\nu \bmod 2 - 1)}{p} - 2 \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \right.$$

$$\left(-\Gamma(n+1, -(p - 2 i c s + i c \nu) z) (i c (2 s - \nu) - p)^{-n-1} - (-p - 2 i c s + i c \nu)^{-n-1} \Gamma(n+1, -(p + c i (2 s - \nu)) z)\right) -$$

$$i^{-m} 4^{-n} p^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u e^{\frac{b^2 (m-2u)^2}{4p}} \binom{m}{u} \left((-1)^m \right.$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h} 4^k (-i b (m - 2u))^{-h-k+2n} \left(\frac{\left(2 i \sqrt{z}\, p + b (m - 2u)\right)^2}{p} \right)^{\frac{1}{2}(-h-k-1)} \left(2 p \sqrt{z} - i b (m - 2u)\right)^{h+k}$$

$$\binom{k}{h} \binom{n}{k} \left(b (m - 2u) \left(2 i \sqrt{z}\, p + b (m - 2u)\right) \Gamma\left(\frac{1}{2}(h + k + 1), \frac{\left(2 i \sqrt{z}\, p + b (m - 2u)\right)^2}{4p} \right) - \right.$$

$$\left. 2 p \sqrt{\frac{\left(2 i \sqrt{z}\, p + b (m - 2u)\right)^2}{p}}\, \Gamma\left(\frac{1}{2}(h + k + 2), \frac{\left(2 i \sqrt{z}\, p + b (m - 2u)\right)^2}{4p} \right) \right) +$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} -(-1)^{k-h} 4^k (i b (m - 2u))^{-h-k+2n} \left(\frac{\left(b (m - 2u) - 2 i p \sqrt{z}\right)^2}{p} \right)^{\frac{1}{2}(-h-k-1)} \left(2 \sqrt{z}\, p + b i (m - 2u)\right)^{h+k}$$

$$\binom{k}{h} \binom{n}{k} \left(b (m - 2u) \left(b (m - 2u) - 2 i p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1), \frac{\left(b (m - 2u) - 2 i p \sqrt{z}\right)^2}{4p} \right) - 2 p \right.$$

$$\left.\left.\left. \sqrt{\frac{\left(b (m - 2u) - 2 i p \sqrt{z}\right)^2}{p}}\, \Gamma\left(\frac{1}{2}(h + k + 2), \frac{\left(b (m - 2u) - 2 i p \sqrt{z}\right)^2}{4p} \right) \right) \right) \right) + i^{-m} 4^{-n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s}$$

$$\sum_{u=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^u \binom{m}{u} \left(e^{\frac{b^2 (m-2u)^2}{4 (p + c i (2 s - \nu))}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (i b (m - 2u))^{-h-k+2n} \left(b i (m - 2u) + 2 (p + c i (2 s - \nu)) \sqrt{z}\right)^{h+k} \right.\right.$$

$$\left(\frac{\left(b\,(m-2\,u)+2\,(-i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{p+c\,i\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(b\,i\,(m-2\,u)\left(b\,i\,(m-2\,u)+\right.\right.$$

$$\left.2\,(p+c\,i\,(2\,s-v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(b\,(m-2\,u)+2\,(-i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{4\,(p+c\,i\,(2\,s-v))}\right)+$$

$$2\,\sqrt{\frac{\left(b\,(m-2\,u)+2\,(-i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{p+c\,i\,(2\,s-v)}}\;(p+c\,i\,(2\,s-v))$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(b\,(m-2\,u)+2\,(-i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{4\,(p+c\,i\,(2\,s-v))}\right)\right)\right)\right)$$

$$(p+c\,i\,(2\,s-v))^{-2\,(n+1)}+(-1)^m\,e^{\frac{b^2\,(m-2\,u)^2}{4\,(p+c\,i\,(2\,s-v))}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b\,(m-2\,u))^{-h-k+2\,n}\right.$$

$$\left(2\,(p+c\,i\,(2\,s-v))\,\sqrt{z}\,-i\,b\,(m-2\,u)\right)^{h+k}\left(\frac{\left(b\,(m-2\,u)+2\,(i\,p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{p+c\,i\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2\,(p+c\,i\,(2\,s-v))\,\sqrt{\frac{\left(b\,(m-2\,u)+2\,(i\,p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{p+c\,i\,(2\,s-v)}}\;\Gamma\left(\frac{1}{2}\,(h+k+2),\right.\right.$$

$$\left.\frac{\left(b\,(m-2\,u)+2\,(i\,p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(p+c\,i\,(2\,s-v))}\right)-i\,b\,(m-2\,u)\left(2\,(p+c\,i\,(2\,s-v))\,\sqrt{z}\,-\right.$$

$$\left.\left.\left.i\,b\,(m-2\,u)\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(b\,(m-2\,u)+2\,(i\,p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(p+c\,i\,(2\,s-v))}\right)\right)\right)$$

$$(p+c\,i\,(2\,s-v))^{-2\,(n+1)}+e^{\frac{b^2\,(m-2\,u)^2}{4\,(p-2\,i\,c\,s+i\,c\,v)}}\,(p-2\,i\,c\,s+i\,c\,v)^{-2\,(n+1)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\right.$$

$$(i\,b\,(m-2\,u))^{-h-k+2\,n}\left(b\,i\,(m-2\,u)+2\,(p-2\,i\,c\,s+i\,c\,v)\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{\left(b\,(m-2\,u)+2\,(-i\,p-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left(b\,i\,(m-2\,u)\left(b\,i\,(m-2\,u)+2\,(p-2\,i\,c\,s+i\,c\,v)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(b\,(m-2\,u)+2\,(-i\,p-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{4\,(p-2\,i\,c\,s+i\,c\,v)}\right)+$$

$$2\,\sqrt{\frac{\left(b\,(m-2\,u)+2\,(-i\,p-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}}\,(p-2\,i\,c\,s+i\,c\,v)$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(b\,(m-2\,u)+2\,(-i\,p-2\,c\,s+c\,v)\,\sqrt{z}\right)^2}{4\,(p-2\,i\,c\,s+i\,c\,v)}\right)\right)+(-1)^m$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-i\,b\,(m-2\,u))^{-h-k+2\,n}\left(\frac{\left(b\,(m-2\,u)+2\,(i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\left(2\,(p-2\,i\,c\,s+i\,c\,v)\,\sqrt{z}-i\,b\,(m-2\,u)\right)^{h+k}\binom{k}{h}\binom{n}{k}$$

$$\left(2\,(p-2\,i\,c\,s+i\,c\,v)\,\sqrt{\frac{\left(b\,(m-2\,u)+2\,(i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{p-2\,i\,c\,s+i\,c\,v}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(b\,(m-2\,u)+2\,(i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{4\,(p-2\,i\,c\,s+i\,c\,v)}\right)-$$

$$b\,(m-2\,u)\left(b\,(m-2\,u)+2\,(i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.$$

$$\left.\left.\left.\left.\left.\frac{\left(b\,(m-2\,u)+2\,(i\,p+2\,c\,s-c\,v)\,\sqrt{z}\right)^2}{4\,(p-2\,i\,c\,s+i\,c\,v)}\right)\right)\right)\right)\right)\,/;\,m\in\mathbb{N}^+\land v\in\mathbb{N}^+\land n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\,\sin^m(b\,z)\cos^v\left(c\,z^r\right)$

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$$\int z^n e^{p z} \sin^m(b z) \cos^\nu(c z^2)\, dz = 2^{-m-\nu-1} \left(\frac{2 (-p)^{-n}\ \Gamma(n+1, -p z) (m \bmod 2 - 1) (\nu \bmod 2 - 1)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + \right.$$

$$2 \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{1}{2} i m \pi} z^{n+1} \binom{m}{k} \left(e^{i m \pi} E_{-n}((-2 b i k + i b m - p) z) + E_{-n}((-i b (m - 2 k) - p) z) \right) +$$

$$\binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(\frac{1}{\sqrt{i c (2 s - \nu)}} \left(e^{\frac{i p^2}{8 c s - 4 c \nu}} \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (i c (2 s - \nu))^{-n-\frac{1}{2}} (p + 2 c i (2 s - \nu) z)^{q+1} \right.\right.$$

$$\left. \left(\frac{i (p + 2 c i (2 s - \nu) z)^2}{c (2 s - \nu)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (p + 2 c i (2 s - \nu) z)^2}{c (8 s - 4 \nu)} \right) \right) +$$

$$\frac{1}{\sqrt{i c (\nu - 2 s)}} \left(e^{\frac{i p^2}{4 c \nu - 8 c s}} \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (i c (\nu - 2 s))^{-n-\frac{1}{2}} (p + 2 c i (\nu - 2 s) z)^{q+1} \right.$$

$$\left.\left.\left(\frac{i (p + 2 c i (\nu - 2 s) z)^2}{c (\nu - 2 s)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (p + 2 c i (\nu - 2 s) z)^2}{c (8 s - 4 \nu)} \right) \right) \right) -$$

$$i^{-m} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{\sqrt{i c (\nu - 2 s)}} \left(e^{\frac{1}{4} i \left(\frac{(b i (2 k - m) + p)^2}{c (\nu - 2 s)} + 4 m \pi \right)} \sum_{q=0}^{n} 2^{q-n} (i b (m - 2 k) - p)^{n-q} \right.\right.$$

$$(i c (\nu - 2 s))^{-n-\frac{1}{2}} \left(\frac{i (b (m - 2 k) + i p + 4 c s z - 2 c \nu z)^2}{c (2 s - \nu)} \right)^{\frac{1}{2}(-q-1)}$$

$$\left. (2 i b k - i b m + p + 2 c i (\nu - 2 s) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (b (m - 2 k) + i p + 4 c s z - 2 c \nu z)^2}{c (8 s - 4 \nu)} \right) \right) +$$

$$\frac{1}{\sqrt{i c (2 s - \nu)}} \left(e^{i \left(m \pi - \frac{(b (m - 2 k) + i p)^2}{c (8 s - 4 \nu)} \right)} \sum_{q=0}^{n} 2^{q-n} (i b (m - 2 k) - p)^{n-q} (i c (2 s - \nu))^{-n-\frac{1}{2}} \right.$$

$$(b i (2 k - m) + p + 2 c i (2 s - \nu) z)^{q+1} \left(-\frac{i (b (m - 2 k) + i p + 2 c (\nu - 2 s) z)^2}{c (2 s - \nu)} \right)^{\frac{1}{2}(-q-1)}$$

$$\left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (b (m - 2 k) + i p + 2 c (\nu - 2 s) z)^2}{c (8 s - 4 \nu)} \right) \right) +$$

$$\frac{1}{\sqrt{i c (\nu - 2 s)}} \left(e^{\frac{i (b i (m - 2 k) + p)^2}{4 c (\nu - 2 s)}} \sum_{q=0}^{n} \left(i b \left(k - \frac{m}{2} \right) - \frac{p}{2} \right)^{n-q} (i c (\nu - 2 s))^{-n-\frac{1}{2}} \right.$$

$$(b\,i\,(m-2\,k)+p+2\,c\,i\,(v-2\,s)\,z)^{q+1}\left(\frac{i\,(b\,i\,(m-2\,k)+p+2\,c\,i\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(b\,i\,(m-2\,k)+p+2\,c\,i\,(v-2\,s)\,z)^2}{c\,(8\,s-4\,v)}\right)\Bigg)+$$

$$\frac{1}{\sqrt{i\,c\,(2\,s-v)}}\left(e^{-\frac{i\,(b\,i\,(m-2\,k)+p)^2}{4\,c\,(v-2\,s)}}\sum_{q=0}^{n}\left(i\,b\left(k-\frac{m}{2}\right)-\frac{p}{2}\right)^{n-q}(i\,c\,(2\,s-v))^{-n-\frac{1}{2}}\right.$$

$$\left(-\frac{i\,(-2\,b\,k+b\,m-i\,p+4\,c\,s\,z-2\,c\,v\,z)^2}{2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}(b\,i\,(m-2\,k)+p+4\,i\,c\,s\,z-2\,i\,c\,v\,z)^{q+1}$$

$$\left.\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(-2\,b\,k+b\,m-i\,p+4\,c\,s\,z-2\,c\,v\,z)^2}{4\,(2\,c\,s-c\,v)}\right)\right)\Bigg)\Bigg)\Bigg)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

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$$\int z^n\,e^{p\,z}\sin^m(b\,z)\cos^v\!\left(c\,\sqrt{z}\right)dz = -2^{-m-v}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-p\,z)\,(1-m\bmod 2)\,(1-v\bmod 2)\,(-p)^{-n-1}-$$

$$2^{-m-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{1}{2}i\,m\,\pi}\,\Gamma(n+1,\,(-i\,b\,(m-2\,k)-p)\,z)\,(-i\,b\,(m-2\,k)-p)^{-n-1}+\right.$$

$$\left.e^{\frac{i\,m\,\pi}{2}}(i\,b\,(m-2\,k)-p)^{-n-1}\,\Gamma(n+1,\,(i\,b\,(m-2\,k)-p)\,z)\right)+2^{-m-2\,n-v-1}\,p^{-2\,(n+1)}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{\frac{c^2\,(v-2\,s)^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,c\,(v-2\,s))^{-h-i+2\,n}\left(2\,p\,\sqrt{z}-i\,c\,(v-2\,s)\right)^{h+i}\left(-\frac{\left(2\,p\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\right.$$

$$\binom{i}{h}\binom{n}{i}\left(2\,p\,\sqrt{-\frac{\left(2\,p\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{p}}\;\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(2\,p\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,p}\right)-\right.$$

$$\left.i\,c\,(v-2\,s)\left(2\,p\,\sqrt{z}-i\,c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(2\,p\,\sqrt{z}-i\,c\,(v-2\,s)\right)^2}{4\,p}\right)\right)+$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,c\,(v-2\,s))^{-h-i+2\,n}\left(2\,\sqrt{z}\,p+c\,i\,(v-2\,s)\right)^{h+i}\left(-\frac{\left(2\,\sqrt{z}\,p+c\,i\,(v-2\,s)\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left(c\,i\,(v-2s)\left(2\sqrt{z}\;p+c\,i\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(2\sqrt{z}\;p+c\,i\,(v-2s)\right)^2}{4p}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\;p+c\,i\,(v-2s)\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(2\sqrt{z}\;p+c\,i\,(v-2s)\right)^2}{4p}\right)\right)\right)+$$

$$2^{-m-2n-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{\frac{c^2(v-2s)^2}{4(p-i\,b\,(m-2k))}+\frac{i\,m\,\pi}{2}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,c\,(v-2s))^{-h-i+2n}\right.\right.$$

$$\left(2\,(p-i\,b\,(m-2k))\sqrt{z}\;-i\,c\,(v-2s)\right)^{h+i}\left(-\frac{\left(2\,(p-i\,b\,(m-2k))\sqrt{z}\;-i\,c\,(v-2s)\right)^2}{p-i\,b\,(m-2k)}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left(2\,(p-i\,b\,(m-2k))\sqrt{-\frac{\left(2\,(p-i\,b\,(m-2k))\sqrt{z}\;-i\,c\,(v-2s)\right)^2}{p-i\,b\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+i+2),\right.\right.$$

$$\left.-\frac{\left(2\,(p-i\,b\,(m-2k))\sqrt{z}\;-i\,c\,(v-2s)\right)^2}{4\,(p-i\,b\,(m-2k))}\right)-i\,c\,(v-2s)\left(2\,(p-i\,b\,(m-2k))\sqrt{z}\;-\right.$$

$$\left.\left.\left.i\,c\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(2\,(p-i\,b\,(m-2k))\sqrt{z}\;-i\,c\,(v-2s)\right)^2}{4\,(p-i\,b\,(m-2k))}\right)\right)\right)$$

$$(p-i\,b\,(m-2k))^{-2(n+1)}+e^{\frac{c^2(v-2s)^2}{4(p-i\,b\,(m-2k))}+\frac{i\,m\,\pi}{2}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,c\,(v-2s))^{-h-i+2n}\right.$$

$$\left(2\sqrt{z}\;(p-i\,b\,(m-2k))+c\,i\,(v-2s)\right)^{h+i}\left(-\frac{\left(2\sqrt{z}\;(p-i\,b\,(m-2k))+c\,i\,(v-2s)\right)^2}{p-i\,b\,(m-2k)}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left(c\,i\,(v-2s)\left(2\sqrt{z}\;(p-i\,b\,(m-2k))+c\,i\,(v-2s)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(2\sqrt{z}\,(p-\mathbb{i}\,b\,(m-2k))+c\,\mathbb{i}\,(v-2s)\right)^2}{4\,(p-\mathbb{i}\,b\,(m-2k))}\right)+$$

$$2\sqrt{-\frac{\left(2\sqrt{z}\,(p-\mathbb{i}\,b\,(m-2k))+c\,\mathbb{i}\,(v-2s)\right)^2}{p-\mathbb{i}\,b\,(m-2k)}}\,(p-\mathbb{i}\,b\,(m-2k))$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(2\sqrt{z}\,(p-\mathbb{i}\,b\,(m-2k))+c\,\mathbb{i}\,(v-2s)\right)^2}{4\,(p-\mathbb{i}\,b\,(m-2k))}\right)\right)\right)(p-\mathbb{i}\,b\,(m-2k))^{-2(n+1)}+$$

$$e^{\frac{c^2(v-2s)^2}{4(b\,\mathbb{i}\,(m-2k)+p)}-\frac{\mathbb{i}\,m\,\pi}{2}}\,(b\,\mathbb{i}\,(m-2k)+p)^{-2(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-\mathbb{i}\,c\,(v-2s))^{-h-i+2n}$$

$$\left(2\,(b\,\mathbb{i}\,(m-2k)+p)\sqrt{z}-\mathbb{i}\,c\,(v-2s)\right)^{h+i}\left(-\frac{\left(2\,(b\,\mathbb{i}\,(m-2k)+p)\sqrt{z}-\mathbb{i}\,c\,(v-2s)\right)^2}{b\,\mathbb{i}\,(m-2k)+p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left(2\,(b\,\mathbb{i}\,(m-2k)+p)\sqrt{-\frac{\left(2\,(b\,\mathbb{i}\,(m-2k)+p)\sqrt{z}-\mathbb{i}\,c\,(v-2s)\right)^2}{b\,\mathbb{i}\,(m-2k)+p}}\,\Gamma\left(\frac{1}{2}(h+i+2),\right.\right.$$

$$\left.-\frac{\left(2\,(b\,\mathbb{i}\,(m-2k)+p)\sqrt{z}-\mathbb{i}\,c\,(v-2s)\right)^2}{4\,(b\,\mathbb{i}\,(m-2k)+p)}\right)-\mathbb{i}\,c\,(v-2s)\left(2\,(b\,\mathbb{i}\,(m-2k)+p)\sqrt{z}-\right.$$

$$\left.\left.\mathbb{i}\,c\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(2\,(b\,\mathbb{i}\,(m-2k)+p)\sqrt{z}-\mathbb{i}\,c\,(v-2s)\right)^2}{4\,(b\,\mathbb{i}\,(m-2k)+p)}\right)\right)+$$

$$e^{\frac{c^2(v-2s)^2}{4(b\,\mathbb{i}\,(m-2k)+p)}-\frac{\mathbb{i}\,m\,\pi}{2}}\,(b\,\mathbb{i}\,(m-2k)+p)^{-2(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(\mathbb{i}\,c\,(v-2s))^{-h-i+2n}$$

$$\left(2\sqrt{z}\,(b\,\mathbb{i}\,(m-2k)+p)+c\,\mathbb{i}\,(v-2s)\right)^{h+i}\left(-\frac{\left(2\sqrt{z}\,(b\,\mathbb{i}\,(m-2k)+p)+c\,\mathbb{i}\,(v-2s)\right)^2}{b\,\mathbb{i}\,(m-2k)+p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left(c\,\mathbb{i}\,(v-2s)\left(2\sqrt{z}\,(b\,\mathbb{i}\,(m-2k)+p)+c\,\mathbb{i}\,(v-2s)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(2\sqrt{z}\,(b\,i\,(m-2k)+p)+c\,i\,(v-2s)\right)^2}{4\,(b\,i\,(m-2k)+p)}\right)+$$

$$2\sqrt{-\frac{\left(2\sqrt{z}\,(b\,i\,(m-2k)+p)+c\,i\,(v-2s)\right)^2}{b\,i\,(m-2k)+p}}\;(b\,i\,(m-2k)+p)$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(2\sqrt{z}\,(b\,i\,(m-2k)+p)+c\,i\,(v-2s)\right)^2}{4\,(b\,i\,(m-2k)+p)}\right)\right)\right) /; m\in\mathbb{N}^+ \land v\in\mathbb{N}^+ \land n\in\mathbb{N}$$

Involving $z^n\, e^{p\,z^r}\, \sin^m(b\,z)\cos^v(c\,z^r)$

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$$\int z^n\, e^{p\,z^2}\sin^m(b\,z)\cos^v\left(c\,z^2\right)dz =$$

$$2^{-m-v-1}\left(-z^{n+1}\left(-p\,z^2\right)^{\frac{1}{2}(-n-1)}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\left(\frac{n+1}{2}, -p\,z^2\right)(m \bmod 2-1)(v \bmod 2-1)+z^{n+1}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\Gamma\left(\frac{n+1}{2}, -(p+c\,i\,(2s-v))\,z^2\right)\left(-(p+c\,i\,(2s-v))\,z^2\right)^{\frac{1}{2}(-n-1)}+\left(-(p-2\,i\,c\,s+i\,c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}\right.$$

$$\left.\left.\Gamma\left(\frac{n+1}{2}, -(p-2\,i\,c\,s+i\,c\,v)\,z^2\right)\right)\right)+i^{-m}\binom{v}{\frac{v}{2}}(v \bmod 2-1)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\, e^{\frac{b^2(m-2k)^2}{4p}}\, p^{-n-1}\binom{m}{k}\left(\sum_{q=0}^{n}\left(i\,b\left(k-\frac{m}{2}\right)\right)^{n-q}\left(\frac{(2\,b\,k-b\,m+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(b\,i\,(m-2k)+2\,p\,z)^{q+1}\right.$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{(2\,b\,k-b\,m+2\,i\,p\,z)^2}{4\,p}\right)+(-1)^m\sum_{q=0}^{n}2^{q-n}\,(i\,b\,(m-2k))^{n-q}$$

$$\left.\left(\frac{(b\,(m-2k)+2\,i\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}(b\,i\,(2k-m)+2\,p\,z)^{q+1}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{(b\,(m-2k)+2\,i\,p\,z)^2}{4\,p}\right)\right)-$$

$$i^{-m}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\left((-1)^k\binom{m}{k}\left(e^{\frac{b^2(m-2k)^2}{4(p+c\,i\,(v-2s))}+i\,m\,\pi}\sqrt{p+2\,i\,c\,s-i\,c\,v}\sum_{q=0}^{n}2^{q-n}\,(i\,b\,(m-2k))^{n-q}\,(p-2\,i\,c\,s+i\,c\,v)^{-n-\frac{1}{2}}\right.\right.$$

$$\left(\frac{(-2\,b\,k+b\,m+2\,i\,p\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{p-2\,i\,c\,s+i\,c\,v}\right)^{\frac{1}{2}(-q-1)}(b\,i\,(2k-m)+2\,(p-2\,i\,c\,s+i\,c\,v)\,z)^{q+1}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{(-2\,b\,k+b\,m+2\,i\,p\,z+4\,c\,s\,z-2\,c\,v\,z)^2}{4\,(p-2\,i\,c\,s+i\,c\,v)}\right)+$$

$$e^{\frac{b^2 (m-2k)^2}{4(p+c i (v-2s))}} \sqrt{p+c i (2s-v)} \sum_{q=0}^{n} \left(i b \left(k-\frac{m}{2}\right)\right)^{n-q} (p-2 i c s+i c v)^{-n-\frac{1}{2}}$$

$$\left(\frac{(2bk-bm+2ipz+4csz-2cvz)^2}{p-2ics+icv}\right)^{\frac{1}{2}(-q-1)} (b i (m-2k)+2(p-2ics+icv)z)^{q+1}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(2bk-bm+2ipz+4csz-2cvz)^2}{4(p-2ics+icv)}\right)+$$

$$e^{\frac{b^2 (m-2k)^2}{4(p+2ics-icv)}} \left(e^{i m \pi} \sqrt{p+c i (v-2s)} \sum_{q=0}^{n} 2^{q-n} (i b (m-2k))^{n-q} (p+2ics-icv)^{-n-\frac{1}{2}}\right.$$

$$\left(\frac{(-2bk+bm+2ipz-4csz+2cvz)^2}{p+2ics-icv}\right)^{\frac{1}{2}(-q-1)} (b i (2k-m)+2(p+2ics-icv)$$

$$z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(-2bk+bm+2ipz-4csz+2cvz)^2}{4(p+2ics-icv)}\right)+$$

$$\sqrt{p-2ics+icv} \sum_{q=0}^{n} \left(i b \left(k-\frac{m}{2}\right)\right)^{n-q} (p+2ics-icv)^{-n-\frac{1}{2}}$$

$$\left(\frac{(2bk-bm+2ipz-4csz+2cvz)^2}{p+2ics-icv}\right)^{\frac{1}{2}(-q-1)} (b i (m-2k)+2(p+2ics-icv)z)^{q+1}$$

$$\left.\left.\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(2bk-bm+2ipz-4csz+2cvz)^2}{4(p+2ics-icv)}\right)\right)\right)\right) \Big/$$

$$\left.\left(\sqrt{p+c i (2s-v)} \sqrt{p+c i (v-2s)}\right)\right) /; m \in \mathbb{N}^+ \wedge v \in \mathbb{N}^+ \wedge n \in \mathbb{N}$$

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$$\int z^n e^{p\sqrt{z}} \sin^m(bz) \cos^v\left(c\sqrt{z}\right) dz = -2^{-m-v+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(2(n+1), -p\sqrt{z}\right) (1-m \bmod 2)(1-v \bmod 2) p^{-2(n+1)} -$$

$$2^{-m-v+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\Gamma\left(2(n+1), (i c (v-2s)-p)\sqrt{z}\right) (i c (v-2s)-p)^{-2(n+1)} +\right.$$

$$\left.(-p-i c (v-2s))^{-2(n+1)} \Gamma\left(2(n+1), (-p-i c (v-2s))\sqrt{z}\right)\right) + 2^{-m-2n-v-1} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\left(e^{\frac{i m \pi}{2} - \frac{i p^2}{4b(m-2k)}} \left(\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i p^{-h-i+2n} \left(p-2 i b (m-2k)\sqrt{z}\right)^{h+i} \left(-\frac{i\left(p-2 i b (m-2k)\sqrt{z}\right)^2}{b(m-2k)}\right)^{\frac{1}{2}(-h-i-1)}\right.\right.$$

$$\binom{i}{h}\binom{n}{i}\left(p\left(p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\,-\frac{i\left(p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^{2}}{4\,b\,(m-2\,k)}\right)-2\,i\,b\right.$$

$$\left.\left.(m-2\,k)\sqrt{-\frac{i\left(p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^{2}}{b\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{i\left(p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^{2}}{4\,b\,(m-2\,k)}\right)\right)\right)$$

$$(-i\,b\,(m-2\,k))^{-2\,(n+1)}+e^{\frac{i\,p^{2}}{4\,b\,(m-2\,k)}-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2\,k))^{-2\,(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^{i}\,p^{-h-i+2\,n}$$

$$\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)^{h+i}\left(\frac{i\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)^{2}}{b\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left(p\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\,\frac{i\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)^{2}}{4\,b\,(m-2\,k)}\right)+\right.$$

$$\left.\left.2\,b\,i\,(m-2\,k)\sqrt{\frac{i\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)^{2}}{b\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+i+2),\,\frac{i\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)^{2}}{4\,b\,(m-2\,k)}\right)\right)\right)+$$

$$2^{-m-2\,n-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{\frac{i\,m\,\pi}{2}-\frac{i\,(p+c\,i\,(v-2\,s))^{2}}{4\,b\,(m-2\,k)}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^{i}\,(p+c\,i\,(v-2\,s))^{-h-i+2\,n}\right.\right.$$

$$\left(-2\,i\,b\,\sqrt{z}\,\,(m-2\,k)+p+c\,i\,(v-2\,s)\right)^{h+i}\left(-\frac{i\left(-2\,i\,b\,\sqrt{z}\,\,(m-2\,k)+p+c\,i\,(v-2\,s)\right)^{2}}{b\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((p+c\,i\,(v-2\,s))\left(-2\,i\,b\,\sqrt{z}\,\,(m-2\,k)+p+c\,i\,(v-2\,s)\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+i+1),\,-\frac{i\left(-2\,i\,b\,\sqrt{z}\,\,(m-2\,k)+p+c\,i\,(v-2\,s)\right)^{2}}{4\,b\,(m-2\,k)}\right)-$$

$$2\,i\,b\,(m-2\,k)\sqrt{-\frac{i\left(-2\,i\,b\,\sqrt{z}\,\,(m-2\,k)+p+c\,i\,(v-2\,s)\right)^{2}}{b\,(m-2\,k)}}$$

$$\Gamma\left(\frac{1}{2}(h+i+2), -\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)+p+c\,i\,(v-2s)\right)^2}{4b(m-2k)}\right)\Bigg)\Bigg)\left(-i\,b\,(m-2k)\right)^{-2(n+1)}+$$

$$e^{\frac{i m\pi}{2}-\frac{i(p-i c(v-2s))^2}{4b(m-2k)}}\,\text{Sum}\Bigg(\text{Sum}\Bigg((-1)^{i-h}\,4^i\,(p-i\,c\,(v-2s))^{-h-i+2n}\left(-2\,i\,b\sqrt{z}\,(m-2k)+p-i\,c\,(v-2s)\right)^{h+i}$$

$$\left(-\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)+p-i\,c\,(v-2s)\right)^2}{b(m-2k)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((p-i\,c\,(v-2s))\left(-2\,i\,b\sqrt{z}\,(m-\right.$$

$$\left.2k)+p-i\,c\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+i+1), -\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)+p-i\,c\,(v-2s)\right)^2}{4b(m-2k)}\right)-$$

$$2\,i\,b\,(m-2k)\sqrt{-\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)+p-i\,c\,(v-2s)\right)^2}{b(m-2k)}}\;\Gamma\Bigg(\frac{1}{2}(h+i+2),$$

$$-\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)+p-i\,c\,(v-2s)\right)^2}{4b(m-2k)}\Bigg)\Bigg), \{h, 0, i\}\Bigg), \{i, 0, n\}\Bigg)\left(-i\,b\,(m-2k)\right)^{-2(n+1)}+$$

$$e^{\frac{i(p+c i(v-2s))^2}{4b(m-2k)}-\frac{i m\pi}{2}}\,(i\,b\,(m-2k))^{-2(n+1)}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(p+c\,i\,(v-2s))^{-h-i+2n}$$

$$\left(2\,b\,i\sqrt{z}\,(m-2k)+p+c\,i\,(v-2s)\right)^{h+i}\left(\frac{i\left(2\,b\,i\sqrt{z}\,(m-2k)+p+c\,i\,(v-2s)\right)^2}{b(m-2k)}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg((p+c\,i\,(v-2s))\left(2\,b\,i\sqrt{z}\,(m-2k)+p+c\,i\,(v-2s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1), \frac{i\left(2\,b\,i\sqrt{z}\,(m-2k)+p+c\,i\,(v-2s)\right)^2}{4b(m-2k)}\right)+$$

$$2\,b\,i\,(m-2k)\sqrt{\frac{i\left(2\,b\,i\sqrt{z}\,(m-2k)+p+c\,i\,(v-2s)\right)^2}{b(m-2k)}}\;\Gamma\Bigg(\frac{1}{2}(h+i+2),$$

$$\left.\left.\frac{i\left(2\,b\,i\sqrt{z}\,(m-2k)+p+c\,i\,(v-2s)\right)^2}{4\,b\,(m-2k)}\right)\right)+e^{\frac{i(p-i c(v-2s))^2}{4b(m-2k)}-\frac{i m\pi}{2}}\,(i\,b\,(m-2k))^{-2(n+1)}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(p-i\,c\,(v-2s))^{-h-i+2n}\left(2\,b\,i\sqrt{z}\,(m-2k)+p-i\,c\,(v-2s)\right)^{h+i}$$

$$\left(\frac{i\left(2\,b\,i\sqrt{z}\,(m-2k)+p-i\,c\,(v-2s)\right)^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\left((p-i\,c\,(v-2s))\left(2\,b\,i\sqrt{z}\,(m-2k)+\right.\right.$$

$$\left.p-i\,c\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+i+1),\,\frac{i\left(2\,b\,i\sqrt{z}\,(m-2k)+p-i\,c\,(v-2s)\right)^2}{4\,b\,(m-2k)}\right)+$$

$$2\,b\,i\,(m-2k)\sqrt{\frac{i\left(2\,b\,i\sqrt{z}\,(m-2k)+p-i\,c\,(v-2s)\right)^2}{b\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+i+2),\right.$$

$$\left.\left.\left.\frac{i\left(2\,b\,i\sqrt{z}\,(m-2k)+p-i\,c\,(v-2s)\right)^2}{4\,b\,(m-2k)}\right)\right)\right)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\,e^{p z}\sin^m(b\,z^r)\cos^v(c\,z^r)$

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$$\int z^n\,e^{p z}\sin^m(b\,z^2)\cos^v(c\,z^2)\,dz=$$

$$2^{-m-v-1}\left(\frac{2\,(-p)^{-n}\,\Gamma(n+1,\,-p\,z)\,(m \bmod 2-1)\,(v \bmod 2-1)}{p}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}+i^{-m}\binom{v}{\frac{v}{2}}(v \bmod 2-1)\right.$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{\sqrt{i\,b\,(2k-m)}}\left((-1)^m\,e^{\frac{i p^2}{8bk-4bm}}\sum_{q=0}^{n}2^{q-n}\,(i\,b\,(2k-m))^{-n-\frac{1}{2}}\,(-p)^{n-q}\,(p+2\,b\,i\,(2k-m)\,z)^{q+1}\right.\right.$$

$$\left.\left(\frac{i\,(p+2\,b\,i\,(2k-m)\,z)^2}{b\,(2k-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(p+2\,b\,i\,(2k-m)\,z)^2}{b\,(8k-4m)}\right)\right)+$$

$$\frac{1}{\sqrt{i\,b\,(m-2k)}}\left(e^{\frac{i p^2}{4bm-8bk}}\sum_{q=0}^{n}2^{q-n}\,(i\,b\,(m-2k))^{-n-\frac{1}{2}}\,(-p)^{n-q}\,(p+2\,b\,i\,(m-2k)\,z)^{q+1}\right.$$

$$\left(-\frac{i\,(p+2\,b\,i\,(m-2\,k)\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},-\frac{i\,(p+2\,b\,i\,(m-2\,k)\,z)^2}{b\,(8\,k-4\,m)}\right)\Bigg)\Bigg)+$$

$$\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(\frac{1}{\sqrt{i\,c\,(2\,s-v)}}\left(e^{\frac{i\,p^2}{8\,c\,s-4\,c\,v}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(i\,c\,(2\,s-v))^{-n-\frac{1}{2}}\,(p+2\,c\,i\,(2\,s-v)\,z)^{q+1}\right.\right.$$

$$\left.\left(\frac{i\,(p+2\,c\,i\,(2\,s-v)\,z)^2}{c\,(2\,s-v)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\frac{i\,(p+2\,c\,i\,(2\,s-v)\,z)^2}{c\,(8\,s-4\,v)}\right)\right)+$$

$$\frac{1}{\sqrt{i\,c\,(v-2\,s)}}\left(e^{\frac{i\,p^2}{4\,c\,v-8\,c\,s}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(i\,c\,(v-2\,s))^{-n-\frac{1}{2}}\,(p+2\,c\,i\,(v-2\,s)\,z)^{q+1}\right.$$

$$\left.\left.\left(\frac{i\,(p+2\,c\,i\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},-\frac{i\,(p+2\,c\,i\,(v-2\,s)\,z)^2}{c\,(8\,s-4\,v)}\right)\right)\right)-$$

$$i^{-m}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\left(\left(e^{\frac{i\,p^2}{-8\,b\,k+4\,b\,m+8\,c\,s-4\,c\,v}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-\frac{1}{2}}\right.\right.\right.$$

$$(p-2\,i\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^{q+1}\left(\frac{i\,(i\,p+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{2\,b\,k-b\,m-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\left.\Gamma\!\left(\frac{q+1}{2},\frac{i\,(i\,p+2\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)\right)\Big/\left(\sqrt{-i\,(2\,b\,k-b\,m-2\,c\,s+c\,v)}\right)+$$

$$\left(e^{i\left(\frac{p^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}+m\,\pi\right)}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(i\,(2\,b\,k-b\,m-2\,c\,s+c\,v))^{-n-\frac{1}{2}}\right.$$

$$\left(-\frac{i\,(i\,p+2\,(-2\,b\,k+b\,m+2\,c\,s-c\,v)\,z)^2}{2\,b\,k-b\,m-2\,c\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}(p+2\,i\,(2\,b\,k-b\,m-2\,c\,s+c\,v)\,z)^{q+1}\binom{n}{q}$$

$$\left.\Gamma\!\left(\frac{q+1}{2},-\frac{i\,(i\,p+2\,(-2\,b\,k+b\,m+2\,c\,s-c\,v)\,z)^2}{8\,b\,k-4\,b\,m-8\,c\,s+4\,c\,v}\right)\right)\Big/\left(\sqrt{i\,(2\,b\,k-b\,m-2\,c\,s+c\,v)}\right)+$$

$$\left(e^{\frac{i\,p^2}{-8\,b\,k+4\,b\,m-8\,c\,s+4\,c\,v}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(-i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-\frac{1}{2}}\right.$$

$$(p-2\,i\,(2\,b\,k-b\,m+2\,c\,s-c\,v)\,z)^{q+1}\left(\frac{i\,(i\,p+2\,(2\,b\,k-b\,m+2\,c\,s-c\,v)\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\Gamma\left(\frac{q+1}{2}, \frac{i\,(i\,p+2\,(2\,b\,k-b\,m+2\,c\,s-c\,v)\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)\Bigg) \Bigg/ \left(\sqrt{-i\,(2\,b\,k-b\,m+2\,c\,s-c\,v)}\right)+$$

$$\Bigg(e^{i\left(\frac{p^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}+m\,\pi\right)} \sum_{q=0}^{n} 2^{q-n}\,(-p)^{n-q}\,(i\,(2\,b\,k-b\,m+2\,c\,s-c\,v))^{-n-\frac{1}{2}}$$

$$(p+2\,i\,(2\,b\,k-b\,m+2\,c\,s-c\,v)\,z)^{q+1} \left(-\frac{i\,(i\,p+2\,(b\,(m-2\,k)+c\,(v-2\,s))\,z)^2}{2\,b\,k-b\,m+2\,c\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i\,(i\,p+2\,(b\,(m-2\,k)+c\,(v-2\,s))\,z)^2}{8\,b\,k-4\,b\,m+8\,c\,s-4\,c\,v}\right)\Bigg) \Bigg/$$

$$\left(\sqrt{i\,(2\,b\,k-b\,m+2\,c\,s-c\,v)}\right)\Bigg)\Bigg) /;\, m\in\mathbb{N}^+ \bigwedge v\in\mathbb{N}^+ \bigwedge n\in\mathbb{N}$$

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$$\int z^n\,e^{p\,z}\sin^m\!\left(b\sqrt{z}\right)\cos^v\!\left(c\sqrt{z}\right)dz = -2^{-m-v}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-p\,z)\,(1-m \bmod 2)\,(1-v \bmod 2)\,(-p)^{-n-1}+$$

$$2^{-m-2\,n-v-1}\,p^{-2\,(n+1)}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{\frac{b^2\,(m-2\,k)^2}{4\,p}-\frac{i\,m\,\pi}{2}}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,b\,(m-2\,k))^{-h-i+2\,n}\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)^{h+i}\left(-\frac{\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg(b\,i\,(m-2\,k)\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)^2}{4\,p}\right)+$$

$$2\sqrt{-\frac{\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b\,i\,(m-2\,k)+2\,p\sqrt{z}\right)^2}{4\,p}\right)\Bigg)+e^{\frac{b^2\,(m-2\,k)^2}{4\,p}+\frac{i\,m\,\pi}{2}}$$

$$\mathrm{Sum}\Bigg(\mathrm{Sum}\Bigg((-1)^{i-h}\,4^i\,(-i\,b\,(m-2\,k))^{-h-i+2\,n}\left(2\,p\sqrt{z}-i\,b\,(m-2\,k)\right)^{h+i}\left(-\frac{\left(2\,p\sqrt{z}-i\,b\,(m-2\,k)\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left(2\,p\sqrt{-\frac{\left(2\,p\sqrt{z}\;-i\,b\,(m-2\,k)\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(2\,p\sqrt{z}\;-i\,b\,(m-2\,k)\right)^2}{4\,p}\right)-i\,b\,(m-2\,k)\right.$$

$$\left.\left.\left.\left(2\,p\sqrt{z}\;-i\,b\,(m-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(2\,p\sqrt{z}\;-i\,b\,(m-2\,k)\right)^2}{4\,p}\right)\right),\,\{h,\,0,\,i\}\right],\,\{i,\,0,\,n\}\right]\right)\right)+$$

$$2^{-m-2\,n-\nu-1}\,p^{-2\,(n+1)}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{c^2\,(\nu-2\,s)^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,c\,(\nu-2\,s))^{-h-i+2\,n}\right.$$

$$\left(2\,p\sqrt{z}\;-i\,c\,(\nu-2\,s)\right)^{h+i}\left(-\frac{\left(2\,p\sqrt{z}\;-i\,c\,(\nu-2\,s)\right)^2}{p}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left(2\,p\sqrt{-\frac{\left(2\,p\sqrt{z}\;-i\,c\,(\nu-2\,s)\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(2\,p\sqrt{z}\;-i\,c\,(\nu-2\,s)\right)^2}{4\,p}\right)-\right.$$

$$\left.\left.i\,c\,(\nu-2\,s)\left(2\,p\sqrt{z}\;-i\,c\,(\nu-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(2\,p\sqrt{z}\;-i\,c\,(\nu-2\,s)\right)^2}{4\,p}\right)\right)\right)+$$

$$e^{\frac{c^2\,(\nu-2\,s)^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,c\,(\nu-2\,s))^{-h-i+2\,n}\left(2\sqrt{z}\;p+c\,i\,(\nu-2\,s)\right)^{h+i}\left(-\frac{\left(2\sqrt{z}\;p+c\,i\,(\nu-2\,s)\right)^2}{p}\right)^{\frac{1}{2}\,(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left(c\,i\,(\nu-2\,s)\left(2\sqrt{z}\;p+c\,i\,(\nu-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(2\sqrt{z}\;p+c\,i\,(\nu-2\,s)\right)^2}{4\,p}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\;p+c\,i\,(\nu-2\,s)\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(2\sqrt{z}\;p+c\,i\,(\nu-2\,s)\right)^2}{4\,p}\right)\right)\right)+$$

$$2^{-m-2\,n-\nu-1}\,p^{-2\,(n+1)}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{\frac{i\,m\,\pi}{2}-\frac{(i\,c\,(\nu-2\,s)-i\,b\,(m-2\,k))^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,c\,(\nu-2\,s)-i\,b\,(m-2\,k))^{-h-i+2\,n}\right.$$

$$\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^{h+i}\left(-\frac{\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((i\,c\,(v-2\,s)-i\,b\,(m-2\,k))\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+$$

$$2\,\sqrt{-\frac{\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2),\right.$$

$$\left.\left.-\frac{\left(-i\,b\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)+e^{-\frac{(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))^2}{4\,p}-\frac{i\,m\,\pi}{2}}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b\,i\,(m-2\,k)+c\,i\,(v-2\,s))^{-h-i+2\,n}\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b\,i\,(m-2\,k)+c\,i\,(v-2\,s))\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\right.\right.$$

$$\left.-\frac{\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\,\sqrt{-\frac{\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}$$

$$\left.p\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)+$$

$$e^{\frac{i\,m\,\pi}{2}-\frac{(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,b\,(m-2\,k)-i\,c\,(v-2\,s))^{-h-i+2\,n}$$

$$\left(-i\, b\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^{h+i}\left(-\frac{\left(-i\, b\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg((-i\, b\,(m-2\,k)-i\, c\,(v-2\,s))\left(-i\, b\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\, -\frac{\left(-i\, b\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+$$

$$2\sqrt{-\frac{\left(-i\, b\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2),\right.$$

$$\left.\left.-\frac{\left(-i\, b\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)\Bigg)+e^{-\frac{(i\, b\,(m-2\,k)-i\, c\,(v-2\,s))^2}{4\,p}-\frac{i\, m\,\pi}{2}}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\, b\,(m-2\,k)-i\, c\,(v-2\,s))^{-h-i+2\,n}\left(b\, i\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b\, i\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((i\, b\,(m-2\,k)-i\, c\,(v-2\,s))\left(b\, i\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\right.$$

$$\left.-\frac{\left(b\, i\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\sqrt{-\frac{\left(b\, i\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}\;p$$

$$\Gamma\left(\frac{1}{2}(h+i+2),\, -\frac{\left(b\, i\,(m-2\,k)-i\, c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)\Bigg)\;/;\; m\in\mathbb{N}^+\land v\in\mathbb{N}^+\land n\in\mathbb{N}$$

Involving $z^{\alpha-1}\, e^{p\, z^r}\, \sin^m(b\, z^r)\cos^v(c\, z^r)$

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$$\int z^{\alpha-1} e^{p z^r} \sin^m(b z^r) \cos^\nu(c z^r)\, dz = \frac{2^{-m-\nu} z^\alpha}{r} \Bigg(-(-p z^r)^{-\frac{\alpha}{r}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{\alpha}{r}, -p z^r\right) (m \bmod 2 - 1)(\nu \bmod 2 - 1) + i^{-m} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Big((-1)^m \Gamma\left(\frac{\alpha}{r}, (-2 b i k + i b m - p) z^r\right) ((-2 b i k + i b m - p) z^r)^{-\frac{\alpha}{r}} + (i (2 b k - b m + i p) z^r)^{-\frac{\alpha}{r}}$$

$$\Gamma\left(\frac{\alpha}{r}, i (2 b k - b m + i p) z^r\right)\Big) + \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \Big(\Gamma\left(\frac{\alpha}{r}, -(p + c i (2 s - \nu)) z^r\right)$$

$$(-(p + c i (2 s - \nu)) z^r)^{-\frac{\alpha}{r}} + (-(p - 2 i c s + i c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -(p - 2 i c s + i c \nu) z^r\right)\Big) -$$

$$i^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \Big(\Gamma\left(\frac{\alpha}{r}, i (2 b k - b m + i p - 2 c s + c \nu) z^r\right) (i (2 b k - b m + i p - 2 c s + c \nu) z^r)^{-\frac{\alpha}{r}} +$$

$$e^{i m \pi} \Big(\Gamma\left(\frac{\alpha}{r}, -i (2 b k - b m - i p - 2 c s + c \nu) z^r\right) (-i (2 b k - b m - i p - 2 c s + c \nu) z^r)^{-\frac{\alpha}{r}} +$$

$$(-i (2 b k - b m - i p + 2 c s - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -i (2 b k - b m - i p + 2 c s - c \nu) z^r\right)\Big) +$$

$$(i (2 b k - b m + i p + 2 c s - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, i (2 b k - b m + i p + 2 c s - c \nu) z^r\right)\Big)\Bigg) /; m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

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$$\int z^n e^{p z^2} \sin^m(b z^2) \cos^v(c z^2)\, dz = -2^{-m-v-1} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -p z^2\right) (1 - m \bmod 2)(1 - v \bmod 2) \left(-p z^2\right)^{\frac{1}{2}(-n-1)} -$$
$$2^{-m-v-1} z^{n+1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{1}{2} i m \pi} \Gamma\left(\frac{n+1}{2}, (-i b (m-2k) - p) z^2\right) \left((-i b (m-2k) - p) z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$
$$\left. e^{\frac{i m \pi}{2}} \left((i b (m-2k) - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b (m-2k) - p) z^2\right)\right) -$$
$$2^{-m-v-1} z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(\Gamma\left(\frac{n+1}{2}, (i c (v-2s) - p) z^2\right) \left((i c (v-2s) - p) z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$
$$\left. \left((-p - i c (v-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-p - i c (v-2s)) z^2\right)\right) -$$
$$2^{-m-v-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \binom{v}{s} \left(e^{-\frac{1}{2} i m \pi} \Gamma\left(\frac{n+1}{2}, (-i b (m-2k) - p + c i (v-2s)) z^2\right) \right.$$
$$\left((-i b (m-2k) - p + c i (v-2s)) z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{i m \pi}{2}} \left((b i (m-2k) - p + c i (v-2s)) z^2\right)^{\frac{1}{2}(-n-1)}$$
$$\Gamma\left(\frac{n+1}{2}, (b i (m-2k) - p + c i (v-2s)) z^2\right) + e^{-\frac{1}{2} i m \pi} \left((-i b (m-2k) - p - i c (v-2s)) z^2\right)^{\frac{1}{2}(-n-1)}$$
$$\Gamma\left(\frac{n+1}{2}, (-i b (m-2k) - p - i c (v-2s)) z^2\right) + e^{\frac{i m \pi}{2}} \left((b i (m-2k) - p - i c (v-2s)) z^2\right)^{\frac{1}{2}(-n-1)}$$
$$\left.\Gamma\left(\frac{n+1}{2}, (b i (m-2k) - p - i c (v-2s)) z^2\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{p\sqrt{z}} \sin^m\left(b\sqrt{z}\right)\cos^\nu\left(c\sqrt{z}\right) dz = -2^{-m-\nu+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}\Gamma\left(2(n+1), -p\sqrt{z}\right)(1-m \bmod 2)(1-\nu \bmod 2)\, p^{-2(n+1)} -$$
$$2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{1}{2} i m\pi}\,\Gamma\left(2(n+1), (-i\, b(m-2k)-p)\sqrt{z}\right)(-i\, b(m-2k)-p)^{-2(n+1)} +\right.$$
$$\left. e^{\frac{i m\pi}{2}}(i\, b(m-2k)-p)^{-2(n+1)}\,\Gamma\left(2(n+1), (i\, b(m-2k)-p)\sqrt{z}\right)\right) -$$
$$2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(\Gamma\left(2(n+1), (i\, c(\nu-2s)-p)\sqrt{z}\right)(i\, c(\nu-2s)-p)^{-2(n+1)} +\right.$$
$$\left.(-p-i\, c(\nu-2s))^{-2(n+1)}\,\Gamma\left(2(n+1), (-p-i\, c(\nu-2s))\sqrt{z}\right)\right) -$$
$$2^{-m-\nu+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\left(e^{-\frac{1}{2} i m\pi}\,\Gamma\left(2(n+1), (-i\, b(m-2k)-p+c\, i(\nu-2s))\sqrt{z}\right)\right.$$
$$(-i\, b(m-2k)-p+c\, i(\nu-2s))^{-2(n+1)} + e^{\frac{i m\pi}{2}}(b\, i(m-2k)-p+c\, i(\nu-2s))^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (b\, i(m-2k)-p+c\, i(\nu-2s))\sqrt{z}\right) + e^{-\frac{1}{2} i m\pi}(-i\, b(m-2k)-p-i\, c(\nu-2s))^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (-i\, b(m-2k)-p-i\, c(\nu-2s))\sqrt{z}\right) + e^{\frac{i m\pi}{2}}(b\, i(m-2k)-p-i\, c(\nu-2s))^{-2(n+1)}$$
$$\left.\Gamma\left(2(n+1), (b\, i(m-2k)-p-i\, c(\nu-2s))\sqrt{z}\right)\right) /;\ m\in\mathbb{N}^+ \land \nu\in\mathbb{N}^+ \land n\in\mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r+e} \sin^m\left(a z^r+q\right)\cos^\nu\left(c z^r+g\right)$

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$$\int z^{\alpha-1} e^{b z^r+e} \sin^m(a z^r+q) \cos^v(c z^r+g)\, dz ==$$

$$-\frac{1}{r}\Bigg(2^{-m-v} z^\alpha \Bigg(e^e \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right) (m \bmod 2-1)(v \bmod 2-1)(-b z^r)^{-\frac{\alpha}{r}} - \binom{v}{\frac{v}{2}} (v \bmod 2-1)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k e^{e-\frac{1}{2} i (4 k q+m(\pi-2 q))} \binom{m}{k} \left(e^{i(4 k q+m(\pi-2 q))} \Gamma\left(\frac{\alpha}{r}, -(b+a i(2 k-m)) z^r\right) (-(b+a i(2 k-m)) z^r)^{-\frac{\alpha}{r}} + \right.$$

$$\left.(-(b-2 i a k+i a m) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -(b-2 i a k+i a m) z^r\right)\right) -$$

$$\binom{m}{\frac{m}{2}} (m \bmod 2-1) \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \binom{v}{s} \left(e^{e+2 i g s-i g v} \Gamma\left(\frac{\alpha}{r}, -(b+c i(2 s-v)) z^r\right) (-(b+c i(2 s-v)) z^r)^{-\frac{\alpha}{r}} + \right.$$

$$\left.e^{e-2 i g s+i g v} (-(b-2 i c s+i c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -(b-2 i c s+i c v) z^r\right)\right) +$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} e^{-\frac{1}{2} i (2 i e+4 k q+m(2 q+\pi)+4 g s+2 g v)} \binom{v}{s} \left(e^{i(\pi m+4 k q+2 g v)} \Gamma\left(\frac{\alpha}{r}, -(b+i(2 a k-a m-2 c s+c v)) z^r\right)\right.$$

$$(-(b+i(2 a k-a m-2 c s+c v)) z^r)^{-\frac{\alpha}{r}} + e^{2 i(m q+2 g s)} (-(b-i(2 a k-a m-2 c s+c v)) z^r)^{-\frac{\alpha}{r}}$$

$$\Gamma\left(\frac{\alpha}{r}, -(b-i(2 a k-a m-2 c s+c v)) z^r\right) + e^{i(\pi m+4 k q+4 g s)} (-(b+i(2 a k-a m+2 c s-c v)) z^r)^{-\frac{\alpha}{r}}$$

$$\Gamma\left(\frac{\alpha}{r}, -(b+i(2 a k-a m+2 c s-c v)) z^r\right) + e^{2 i(m q+g v)} (-(b-i(2 a k-a m+2 c s-c v)) z^r)^{-\frac{\alpha}{r}}$$

$$\left.\left.\left.\Gamma\left(\frac{\alpha}{r}, -(b-i(2 a k-a m+2 c s-c v)) z^r\right)\right)\right)\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n e^{b z^2+e} \sin^m(a z^2+q) \cos^\nu(c z^2+g)\, dz = -2^{-m-\nu-1} e^e z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1 - m \bmod 2)(1 - \nu \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-m-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{e - i(m-2k)q + \frac{i m \pi}{2}} \Gamma\left(\frac{n+1}{2}, (i a (m-2k) - b) z^2\right) \left((i a (m-2k) - b) z^2\right)^{\frac{1}{2}(-n-1)} + e^{e + i(m-2k)q - \frac{i m \pi}{2}} \left((-b - i a (m-2k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b - i a (m-2k)) z^2\right)\right) - 2^{-m-\nu-1} z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{e - i g(\nu-2s)} \Gamma\left(\frac{n+1}{2}, (i c(\nu-2s) - b) z^2\right) \left((i c (\nu-2s) - b) z^2\right)^{\frac{1}{2}(-n-1)} + e^{e + g i (\nu-2s)} \left((-b - i c (\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b - i c (\nu-2s)) z^2\right)\right) - 2^{-m-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \left(e^{e - i(m-2k)q - i g(\nu-2s) + \frac{i m \pi}{2}} \Gamma\left(\frac{n+1}{2}, (-b + a i (m-2k) + c i (\nu-2s)) z^2\right) \left((-b + a i (m-2k) + c i (\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} + e^{e + i(m-2k)q - i g(\nu-2s) - \frac{i m \pi}{2}} \left((-b - i a (m-2k) + c i (\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b - i a (m-2k) + c i (\nu-2s)) z^2\right) + e^{e - i(m-2k)q + g i (\nu-2s) + \frac{i m \pi}{2}} \left((-b + a i (m-2k) - i c (\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b + a i (m-2k) - i c (\nu-2s)) z^2\right) + e^{e + i(m-2k)q + g i (\nu-2s) - \frac{i m \pi}{2}} \left((-b - i a (m-2k) - i c (\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b - i a (m-2k) - i c (\nu-2s)) z^2\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{\sqrt{z}\, b+e} \sin^m\!\left(\sqrt{z}\, a+q\right) \cos^v\!\left(\sqrt{z}\, c+g\right) dz = -2^{-m-v+1} e^e \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\!\left(2(n+1), -b\sqrt{z}\right)(1-m \bmod 2)(1-v \bmod 2)\, b^{-2(n+1)} - 2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Big(e^{e-i(m-2k)q+\frac{i m \pi}{2}}\,\Gamma\!\left(2(n+1), (i a(m-2k)-b)\sqrt{z}\right)(i a(m-2k)-b)^{-2(n+1)} + e^{e+i(m-2k)q-\frac{i m\pi}{2}}(-b-i a(m-2k))^{-2(n+1)}\,\Gamma\!\left(2(n+1), (-b-i a(m-2k))\sqrt{z}\right)\Big) - 2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Big(e^{e-i g(v-2s)}\,\Gamma\!\left(2(n+1), (i c(v-2s)-b)\sqrt{z}\right)(i c(v-2s)-b)^{-2(n+1)} + e^{e+g i(v-2s)}(-b-i c(v-2s))^{-2(n+1)}\,\Gamma\!\left(2(n+1), (-b-i c(v-2s))\sqrt{z}\right)\Big) - 2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\Big(e^{e-i(m-2k)q-i g(v-2s)+\frac{i m\pi}{2}}\,\Gamma\!\left(2(n+1), (-b+a i(m-2k)+c i(v-2s))\sqrt{z}\right)(-b+a i(m-2k)+c i(v-2s))^{-2(n+1)} + e^{e+i(m-2k)q-i g(v-2s)-\frac{i m\pi}{2}}(-b-i a(m-2k)+c i(v-2s))^{-2(n+1)}\,\Gamma\!\left(2(n+1), (-b-i a(m-2k)+c i(v-2s))\sqrt{z}\right) + e^{e-i(m-2k)q+g i(v-2s)+\frac{i m\pi}{2}}(-b+a i(m-2k)-i c(v-2s))^{-2(n+1)}\,\Gamma\!\left(2(n+1), (-b+a i(m-2k)-i c(v-2s))\sqrt{z}\right) + e^{e+i(m-2k)q+g i(v-2s)-\frac{i m\pi}{2}}(-b-i a(m-2k)-i c(v-2s))^{-2(n+1)}\,\Gamma\!\left(2(n+1), (-b-i a(m-2k)-i c(v-2s))\sqrt{z}\right)\Big) /;\, m \in \mathbb{N}^+ \land v \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^n e^{b z^r+d z+e} \sin^m\!\left(a z^r+p z+q\right) \cos^v\!\left(c z^r+f z+g\right)$

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$$\int z^n e^{b z^2+d z+e} \sin^m\!\left(a z^2+p z+q\right) \cos^v\!\left(c z^2+f z+g\right) dz = 2^{-m-v-1} b^{-n-1} e^{-\frac{d^2}{4b}} \Bigg(b^{n+1} e^{\frac{d^2}{4b}}\Bigg(\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{\frac{(i d+(m-2k)p)^2}{4(b+a i(2k-m))}+e+i(2k-m)q+\frac{i m\pi}{2}}\Bigg(\sum_{j=0}^{n}2^{j-n}(-d-2 i k p+i m p)^{n-j}(d+i(2k-m)p+2(b+a i(2k-m))z)^{j+1}\left(-\frac{(d+i(2k-m)p+2(b+a i(2k-m))z)^2}{b+a i(2k-m)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2}, -\frac{(d+i(2k-m)p+2(b+a i(2k-m))z)^2}{4(b+a i(2k-m))}\right)\Bigg)(b+a i(2k-m))^{-n-1} + e^{-\frac{(d+i(m-2k)p)^2}{4(b+a i(m-2k))}+e+i(m-2k)q-\frac{i m\pi}{2}}(b+a i(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-d-i(m-2k)p)^{n-j}$$

$$(d+i(m-2k)p+2(b+a\,i(m-2k))z)^{j+1}\left(-\frac{(d+i(m-2k)p+2(b+a\,i(m-2k))z)^2}{b+a\,i(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+i(m-2k)p+2(b+a\,i(m-2k))z)^2}{4(b+a\,i(m-2k))}\right)\Bigg)\Bigg)+$$

$$\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{\frac{(i\,d-2\,f\,s+f\,v)^2}{4(b+2\,i\,c\,s-i\,c\,v)}+e+g\,i(2s-v)}\left(\sum_{j=0}^{n}2^{j-n}(-d-2\,i\,f\,s+i\,f\,v)^{n-j}\right.\right.$$

$$(d+f\,i(2s-v)+2(b+2\,i\,c\,s-i\,c\,v)z)^{j+1}\left(-\frac{(d+f\,i(2s-v)+2(b+2\,i\,c\,s-i\,c\,v)z)^2}{b+2\,i\,c\,s-i\,c\,v}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+f\,i(2s-v)+2(b+2\,i\,c\,s-i\,c\,v)z)^2}{4(b+2\,i\,c\,s-i\,c\,v)}\right)\Bigg)(b+2\,i\,c\,s-i\,c\,v)^{-n-1}+$$

$$e^{-\frac{(d+f\,i(v-2s))^2}{4(b+c\,i(v-2s))}+e+g\,i(v-2s)}(b+c\,i(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-d-i\,f(v-2s))^{n-j}$$

$$(d+f\,i(v-2s)+2(b+c\,i(v-2s))z)^{j+1}\left(-\frac{(d+f\,i(v-2s)+2(b+c\,i(v-2s))z)^2}{b+c\,i(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+f\,i(v-2s)+2(b+c\,i(v-2s))z)^2}{4(b+c\,i(v-2s))}\right)\Bigg)-\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{1}{2}i(2\,i\,e+m\pi+4kq-2mq+4gs-2gv)}\binom{v}{s}\left(e^{-\frac{(d+i(m-2k)p+f\,i(v-2s))^2}{4(b+a\,i(m-2k)+c\,i(v-2s))}}\left(\sum_{j=0}^{n}2^{j-n}(i(2kp-mp+2fs-fv)-d)^{n-j}\right.\right.$$

$$(d+i(m-2k)p+f\,i(v-2s)+2(b+a\,i(m-2k)+c\,i(v-2s))z)^{j+1}$$
$$\left(-(d+i(m-2k)p+f\,i(v-2s)+2(b+a\,i(m-2k)+c\,i(v-2s))z)^2\right/$$
$$(b+a\,i(m-2k)+c\,i(v-2s))\Big)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$
$$\Gamma\left(\frac{j+1}{2},-(d+i(m-2k)p+f\,i(v-2s)+2(b+a\,i(m-2k)+c\,i(v-2s))z)^2\right/$$
$$(4(b+a\,i(m-2k)+c\,i(v-2s)))\Bigg)\Bigg)(b+a\,i(m-2k)+c\,i(v-2s))^{-n-1}+$$

$$e^{i(-2qm+\pi m+4kq)}\left(e^{-\frac{i(i\,d-2kp+mp+2fs-fv)^2}{4(-i\,b+2ak-am-2cs+cv)}}\left(\sum_{j=0}^{n}2^{j-n}(i(-2kp+mp+2fs-fv)-d)^{n-j}\right.\right.$$
$$\left((i\,d+mp+2fs-fv+2\,i\,bz+2amz+4csz-2cvz-2k(p+2az))^2\right/$$
$$(b+i(2ak-am-2cs+cv))\Big)^{\frac{1}{2}(-j-1)}(d+i(-2fs-4czs+fv-$$

$$2\,i\,b\,z+2\,c\,v\,z+2\,k\,(p+2\,a\,z)-m\,(p+2\,a\,z)))^{j+1}\binom{n}{j}\Gamma\Bigg(\frac{j+1}{2},$$

$$-\Big(i\,(i\,d+m\,p+2\,f\,s-f\,v+2\,i\,b\,z+2\,a\,m\,z+4\,c\,s\,z-2\,c\,v\,z-2\,k\,(p+2\,a\,z))^2\Big)\Big/$$

$$(4\,(-i\,b+2\,a\,k-a\,m-2\,c\,s+c\,v))\Bigg)\Bigg)(b+i\,(2\,a\,k-a\,m-2\,c\,s+c\,v))^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{(i\,d-2\,k\,p+m\,p-2\,f\,s+f\,v)^2}{i\,b-2\,a\,k+a\,m-2\,c\,s+c\,v}+8\,g\,(2\,s-v)\right)}(b+i\,(2\,a\,k-a\,m+2\,c\,s-c\,v))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-d-i\,(2\,k\,p-m\,p+2\,f\,s-f\,v))^{n-j}\,\Big((i\,d+m\,p-2\,f\,s+f\,v+2\,i\,b\,z+2\,a\,m\,z-$$

$$4\,c\,s\,z+2\,c\,v\,z-2\,k\,(p+2\,a\,z))^2\Big/(b+i\,(2\,a\,k-a\,m+2\,c\,s-c\,v))\Big)^{\frac{1}{2}(-j-1)}$$

$$(d+i\,(2\,f\,s+4\,c\,z\,s-f\,v-2\,i\,b\,z-2\,c\,v\,z+2\,k\,(p+2\,a\,z)-m\,(p+2\,a\,z)))^{j+1}\binom{n}{j}$$

$$\Gamma\Bigg(\frac{j+1}{2},\Big(i\,(i\,d+m\,p-2\,f\,s+f\,v+2\,i\,b\,z+2\,a\,m\,z-4\,c\,s\,z+2\,c\,v\,z-2\,k\,(p+2\,a\,z))^2\Big)\Big/$$

$$(4\,(i\,b-2\,a\,k+a\,m-2\,c\,s+c\,v))\Bigg)\Bigg)+e^{\frac{1}{4}i\left(\frac{(i\,d+2\,k\,p-m\,p-2\,f\,s+f\,v)^2}{i\,b+2\,a\,k-a\,m-2\,c\,s+c\,v}+8\,g\,(2\,s-v)\right)}$$

$$(b-i\,(2\,a\,k-a\,m-2\,c\,s+c\,v))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,(2\,k\,p-m\,p-2\,f\,s+f\,v)-d)^{n-j}$$

$$\Big((i\,d+2\,k\,p-m\,p-2\,f\,s+f\,v+2\,i\,b\,z+4\,a\,k\,z-2\,a\,m\,z-4\,c\,s\,z+2\,c\,v\,z)^2\Big/$$

$$(b-i\,(2\,a\,k-a\,m-2\,c\,s+c\,v))\Big)^{\frac{1}{2}(-j-1)}$$

$$(d-i\,(-2\,f\,s-4\,c\,z\,s+f\,v+2\,i\,b\,z+2\,c\,v\,z+2\,k\,(p+2\,a\,z)-m\,(p+2\,a\,z)))^{j+1}$$

$$\binom{n}{j}\Gamma\Bigg(\frac{j+1}{2},\Big(i\,(i\,d+2\,k\,p-m\,p-2\,f\,s+f\,v+2\,i\,b\,z+4\,a\,k\,z-2\,a\,m\,z-4\,c\,s\,z+2\,c\,v\,z)^2\Big)\Big/$$

$$(4\,(i\,b+2\,a\,k-a\,m-2\,c\,s+c\,v))\Bigg)\Bigg)\Bigg)-$$

$$e^{e}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(m\bmod 2-1)\,(v\bmod 2-1)\sum_{j=0}^{n}2^{j-n}\,(-d)^{n-j}\,(d+2\,b\,z)^{j+1}\left(-\frac{(d+2\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}$$

$$\Gamma\Bigg(\frac{j+1}{2},-\frac{(d+2\,b\,z)^2}{4\,b}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.07.21.2770.01

$$\int z^n e^{\sqrt{z}\, b+d\, z+e} \sin^m\left(\sqrt{z}\, a+p\, z+q\right) \cos^\nu\left(\sqrt{z}\, c+f\, z+g\right) dz =$$

$$2^{-m-2n-\nu-1} d^{-2(n+1)} e^{-\frac{b^2}{4d}} \left(e^{\frac{b^2}{4d}} \left(-\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2-1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \right.\right.$$

$$\left(e^{-\frac{(b+a\,i\,(2k-m))^2}{4(d+i\,(2k-m)\,p)}+e+i\,(2k-m)\,q+\frac{i\,m\,\pi}{2}} \left(\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h}\, 4^i\, (b+a\,i\,(2k-m))^{-h-i+2n} \left(b+a\,i\,(2k-m)+\right.\right.\right.$$

$$\left. 2\,(d+i\,(2k-m)\,p)\sqrt{z}\right)^{h+i} \left(-\frac{\left(b+a\,i\,(2k-m)+2\,(d+i\,(2k-m)\,p)\sqrt{z}\right)^2}{d+i\,(2k-m)\,p} \right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i} \left((b+a\,i\,(2k-m)) \left(b+a\,i\,(2k-m)+2\,(d+i\,(2k-m)\,p)\sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(b+a\,i\,(2k-m)+2\,(d+i\,(2k-m)\,p)\sqrt{z}\right)^2}{4\,(d+i\,(2k-m)\,p)}\right) +$$

$$2\,(d+i\,(2k-m)\,p)\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(b+a\,i\,(2k-m)+2\,(d+i\,(2k-m)\,p)\sqrt{z}\right)^2}{4\,(d+i\,(2k-m)\,p)}\right)$$

$$\left.\left. \sqrt{-\frac{\left(b+a\,i\,(2k-m)+2\,(d+i\,(2k-m)\,p)\sqrt{z}\right)^2}{d+i\,(2k-m)\,p}} \right)\right)$$

$$(d+i\,(2k-m)\,p)^{-2(n+1)} + e^{-\frac{(b+a\,i\,(m-2k))^2}{4(d+i\,(m-2k)\,p)}+e+i\,(m-2k)\,q-\frac{i\,m\,\pi}{2}} (d+i\,(m-2k)\,p)^{-2(n+1)}$$

$$\sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h}\, 4^i\, (b+a\,i\,(m-2k))^{-h-i+2n} \left(b+a\,i\,(m-2k)+2\,(d+i\,(m-2k)\,p)\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+a\,i\,(m-2k)+2\,(d+i\,(m-2k)\,p)\sqrt{z}\right)^2}{d+i\,(m-2k)\,p} \right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}$$

$$\binom{n}{i} \left((b+a\,i\,(m-2k)) \left(b+a\,i\,(m-2k)+2\,(d+i\,(m-2k)\,p)\sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(b+a\,i\,(m-2k)+2\,(d+i\,(m-2k)\,p)\sqrt{z}\right)^2}{4\,(d+i\,(m-2k)\,p)}\right)+$$

$$2\,(d+i\,(m-2k)\,p)\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(b+a\,i\,(m-2k)+2\,(d+i\,(m-2k)\,p)\sqrt{z}\right)^2}{4\,(d+i\,(m-2k)\,p)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b+a\,i\,(m-2k)+2\,(d+i\,(m-2k)\,p)\sqrt{z}\right)^2}{d+i\,(m-2k)\,p}}\right)\right)-$$

$$\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\binom{v}{s}\left(e^{-\frac{(b+2\,i\,c\,s-i\,c\,v)^2}{4\,(d+2\,i\,f\,s-i\,f\,v)}+e+g\,i\,(2s-v)}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+2\,i\,c\,s-i\,c\,v)^{-h-i+2n}\right.\right.$$

$$\left(b+c\,i\,(2s-v)+2\,(d+2\,i\,f\,s-i\,f\,v)\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+c\,i\,(2s-v)+2\,(d+2\,i\,f\,s-i\,f\,v)\sqrt{z}\right)^2}{d+2\,i\,f\,s-i\,f\,v}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b+2\,i\,c\,s-i\,c\,v)\left(b+c\,i\,(2s-v)+2\,(d+2\,i\,f\,s-i\,f\,v)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(b+c\,i\,(2s-v)+2\,(d+2\,i\,f\,s-i\,f\,v)\sqrt{z}\right)^2}{4\,(d+2\,i\,f\,s-i\,f\,v)}\right)+$$

$$2\,(d+2\,i\,f\,s-i\,f\,v)\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(b+c\,i\,(2s-v)+2\,(d+2\,i\,f\,s-i\,f\,v)\sqrt{z}\right)^2}{4\,(d+2\,i\,f\,s-i\,f\,v)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b+c\,i\,(2s-v)+2\,(d+2\,i\,f\,s-i\,f\,v)\sqrt{z}\right)^2}{d+2\,i\,f\,s-i\,f\,v}}\right)\right)$$

$$(d+2\,i\,f\,s-i\,f\,v)^{-2(n+1)}+e^{-\frac{(b+c\,i\,(v-2s))^2}{4\,(d+f\,i\,(v-2s))}+e+g\,i\,(v-2s)}\,(d+f\,i\,(v-2s))^{-2(n+1)}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+c\,i\,(v-2s))^{-h-i+2n}\left(b+c\,i\,(v-2s)+2\,(d+f\,i\,(v-2s))\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{d+f\,i\,(v-2\,s)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}$$

$$\binom{n}{i}\Bigg((b+c\,i\,(v-2\,s))\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2\,s))}\right)+$$

$$2\,(d+f\,i\,(v-2\,s))\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d+f\,i\,(v-2\,s))}\right)$$

$$\sqrt{-\frac{\left(b+c\,i\,(v-2\,s)+2\,(d+f\,i\,(v-2\,s))\sqrt{z}\right)^2}{d+f\,i\,(v-2\,s)}}\Bigg)\Bigg)+$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}e^{-\frac{1}{2}i\,(2\,i\,e+m\,\pi+4\,k\,q-2\,m\,q+4\,g\,s-2\,g\,v)}\binom{v}{s}\left(e^{-\frac{(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s))^2}{4\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))}}\left(\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\right.\right.$$

$$4^i\,(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s))^{-h-i+2\,n}$$

$$\left(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\sqrt{z}\right)^{h+i}$$

$$\left(-\left(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\sqrt{z}\right)^2\Big/\right.$$

$$\left.(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}$$

$$\binom{n}{i}\Big((b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s))\Big(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+$$

$$2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\sqrt{z}\Big)\,\Gamma\Big(\frac{1}{2}(h+i+1),$$

$$-\left(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\sqrt{z}\right)^2\Big/$$

$$(4\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s)))\Big)+2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))$$

$$\Gamma\Big(\frac{1}{2}(h+i+2),\,-\Big(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,(d+i\,(m-2\,k)\,p+$$

$$f\,i\,(v-2\,s))\sqrt{z}\Big)^2\Big/(4\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s)))\Big)$$

$$\sqrt{\left(-\left(b+a\,i\,(m-2\,k)+c\,i\,(v-2\,s)+2\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\sqrt{z}\right)^2\Big/\right.}$$

$$\left.\left.(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))\right)\Big)\Big)\Big)\,(d+i\,(m-2\,k)\,p+f\,i\,(v-2\,s))^{-2\,(n+1)}+$$

$$e^{\frac{(i b-2 a k+a m+2 c s-c v)^2}{4 (d+i (2 k p-m p-2 f s+f v))}+2 i (2 k-m) q+i m \pi} (d+i (2 k p-m p-2 f s+f v))^{-2 (n+1)}$$
$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h} 4^i (b+i (2 a k-a m-2 c s+c v))^{-h-i+2 n}$$
$$\left(-\left(b+i\left(a (2 k-m)+c (v-2 s)+2 (-i d+2 k p-m p-2 f s+f v) \sqrt{z}\right)\right)^2 \Big/ (d+i (2 k p-m p-2 f s+f v))\right)^{\frac{1}{2} (-h-i-1)} \left(b+a i (2 k-m)+c i (v-2 s)+2 (d+i (2 k p-m p-2 f s+f v)) \sqrt{z}\right)^{h+i} \binom{i}{h}\binom{n}{i}\Bigg((b+i (2 a k-a m-2 c s+c v)) \left(b+a i (2 k-m)+c i (v-2 s)+2 (d+i (2 k p-m p-2 f s+f v)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+i+1), -\left(b+i\left(a (2 k-m)+c (v-2 s)+2 (-i d+2 k p-m p-2 f s+f v) \sqrt{z}\right)\right)^2 \Big/ (4 (d+i (2 k p-m p-2 f s+f v)))\right)+2 (d+i (2 k p-m p-2 f s+f v)) \Gamma\left(\frac{1}{2} (h+i+2), -\left(b+i\left(a (2 k-m)+c (v-2 s)+2 (-i d+2 k p-m p-2 f s+f v) \sqrt{z}\right)\right)^2 \Big/ (4 (d+i (2 k p-m p-2 f s+f v)))\right) \sqrt{\left(-\left(b+i\left(a (2 k-m)+c (v-2 s)+2 (-i d+2 k p-m p-2 f s+f v) \sqrt{z}\right)\right)^2 \Big/ (d+i (2 k p-m p-2 f s+f v))\right)}\Bigg)+$$
$$e^{\frac{(i b+2 a k-a m-2 c s+c v)^2}{4 (d+i (-2 k p+m p+2 f s-f v))}+2 g i (2 s-v)} (d+i (-2 k p+m p+2 f s-f v))^{-2 (n+1)} \sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}$$
$$4^i (b-i (2 a k-a m-2 c s+c v))^{-h-i+2 n}$$
$$\left(-\left(b-i\left(a (2 k-m)+c (v-2 s)+2 (i d+2 k p-m p-2 f s+f v) \sqrt{z}\right)\right)^2 \Big/ (d+i (-2 k p+m p+2 f s-f v))\right)^{\frac{1}{2} (-h-i-1)}$$
$$\left(b+a i (m-2 k)+c i (2 s-v)+2 (d+i (-2 k p+m p+2 f s-f v)) \sqrt{z}\right)^{h+i}$$
$$\binom{i}{h}\binom{n}{i}\Bigg((b-i (2 a k-a m-2 c s+c v)) \left(b+a i (m-2 k)+c i (2 s-v)+2 (d+i (-2 k p+m p+2 f s-f v)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+i+1), -\left(b-i\left(a (2 k-m)+c (v-2 s)+2 (i d+2 k p-m p-2 f s+f v) \sqrt{z}\right)\right)^2 \Big/ (4 (d+i (-2 k p+m p+2 f s-f v)))\right)+2 (d+i (-2 k p+m p+2 f s-f v)) \Gamma\left(\frac{1}{2} (h+i+2), -\left(b-i\left(a (2 k-m)+c (v-2 s)+2 (i d+2 k p-m p-2 f s+f v) \sqrt{z}\right)\right)^2 \Big/ (4 (d+i (-2 k p+m p+2 f s-f v)))\right) \sqrt{\left(-\left(b-i\left(a (2 k-m)+c (v-2 s)+2 (i d+2 k p-m p-2 f s+f v) \sqrt{z}\right)\right)^2 \Big/\right.}$$

$$(d + i(-2kp + mp + 2fs - fv))\Big)\Big) +$$

$$e^{\frac{(ib-2ak+am-2cs+cv)^2}{4(d+i(2kp-mp+2fs-fv))}+2i(2k-m)q+2gi(2s-v)+im\pi} (d + i(2kp - mp + 2fs - fv))^{-2(n+1)}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h} 4^i (b + i(2ak - am + 2cs - cv))^{-h-i+2n}$$

$$\Big(-\Big(b + i\big(a(2k-m) + c(2s-v) + 2(-id + 2kp - mp + 2fs - fv)\sqrt{z}\big)\Big)^2 \Big/ (d + i(2kp - mp + 2fs - fv))\Big)^{\frac{1}{2}(-h-i-1)}$$

$$\big(b + ai(2k-m) + ci(2s-v) + 2(d + i(2kp - mp + 2fs - fv))\sqrt{z}\big)^{h+i}$$

$$\binom{i}{h}\binom{n}{i}\Big((b + i(2ak - am + 2cs - cv))\big(b + ai(2k-m) + ci(2s-v) + 2(d + i(2kp - mp + 2fs - fv))\sqrt{z}\big)\Gamma\Big(\frac{1}{2}(h+i+1),$$

$$-\Big(b + i\big(a(2k-m) + c(2s-v) + 2(-id + 2kp - mp + 2fs - fv)\sqrt{z}\big)\Big)^2 \Big/ (4(d + i(2kp - mp + 2fs - fv)))\Big) + 2(d + i(2kp - mp + 2fs - fv))$$

$$\Gamma\Big(\frac{1}{2}(h+i+2), -\Big(b + i\big(a(2k-m) + c(2s-v) + 2(-id + 2kp - mp + 2fs - fv)\sqrt{z}\big)\Big)^2 \Big/ (4(d + i(2kp - mp + 2fs - fv)))\Big)$$

$$\sqrt{\Big(-\Big(b + i\big(a(2k-m) + c(2s-v) + 2(-id + 2kp - mp + 2fs - fv)\sqrt{z}\big)\Big)^2 \Big/ (d + i(2kp - mp + 2fs - fv))\Big)}\Big)\Bigg)$$

$$d^{2(n+1)} + e^e \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} (m \bmod 2 - 1)(v \bmod 2 - 1)\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h} 4^i b^{-h-i+2n}\big(b + 2d\sqrt{z}\big)^{h+i}$$

$$\left(-\frac{\big(b + 2d\sqrt{z}\big)^2}{d}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}$$

$$\binom{n}{i}$$

$$\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\, -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\; d$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+i+2),\, -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) /;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Definite integration

For the direct function itself

01.07.21.0017.01

$$\int_0^\infty \frac{\cos(a\,t)-\cos(b\,t)}{t}\,dt = \frac{1}{2}\log\left(\frac{b^2}{a^2}\right)$$

01.07.21.0018.01

$$\int_0^\infty t^k\cos(t)\,dt = -\Gamma(k+1)\sin\left(\frac{k\,\pi}{2}\right) /;\, -1<\operatorname{Re}(k)<0$$

01.07.21.0019.01

$$\int_0^\infty t^{-z}\cos(a\,t)\,dt = \frac{\pi\,a^{z-1}}{2\,\Gamma(z)\cos\left(\frac{\pi z}{2}\right)} /;\, 0<\operatorname{Re}(z)<1\land a\in\mathbb{R}$$

Involving the direct function

01.07.21.0020.01

$$\int_0^{2\pi}\cos(n\,t)\cos(m\,t)\,dt = \frac{\sin(2\,(m-n)\,\pi)}{2\,(m-n)}+\frac{\sin(2\,(m+n)\,\pi)}{2\,(m+n)}$$

01.07.21.0021.01

$$\int_0^{2\pi}\cos^2(n\,t)\,dt = \frac{\sin(4\,n\,\pi)}{4\,n}+\pi$$

01.07.21.0022.01

$$\int_0^\infty \cos\left(t^2\right)dt = \frac{1}{2}\sqrt{\frac{\pi}{2}}$$

01.07.21.0023.01

$$\int_0^\pi \frac{\cos(n\,x)-\cos(n\,\alpha)}{\cos(x)-\cos(\alpha)}\,dx = \frac{\pi\sin(\pi\,\alpha)}{\sin(\alpha)} /.\; n\in\mathbb{N}^+\bigwedge\alpha\in\mathbb{R}$$

Involving related functions

01.07.21.0024.01

$$\int_0^\infty e^{a\,t}\cos(b\,t)\,dt = -\frac{a}{a^2+b^2} /;\, \operatorname{Re}(a)<-|\operatorname{Im}(b)|$$

01.07.21.0025.01

$$\int_0^{2\pi} \cos(n\,t)\sin(m\,t)\,dt = \frac{m\cos(2\pi m + 2n\pi) - n\cos(2\pi m + 2n\pi) + m\cos(2m\pi - 2n\pi) + n\cos(2m\pi - 2n\pi)}{2(n-m)(m+n)} - \frac{m}{(n-m)(m+n)}$$

01.07.21.0026.01

$$\int_0^{\frac{\pi}{2}} \log(\cos(t))\,dt = -\frac{\pi}{2}\log(2)$$

Multidimensional integrals

01.07.21.2771.01

$$\int_0^{\pi}\int_0^{\pi}\int_0^{\pi} \frac{1}{\varepsilon - \cos(x_1)\cos(x_2)\cos(x_3)}\,dx_3\,dx_2\,dx_1 = \frac{4\pi}{\varepsilon} K\left(\frac{1}{2}\left(1 - \sqrt{1 - \frac{1}{\varepsilon^2}}\right)\right)^2 /;\ |\varepsilon| > 1$$

Lattice Green's function body-centered cubic lattice

01.07.21.2772.01

$$\int_0^{\pi}\int_0^{\pi}\int_0^{\pi} \frac{1}{\varepsilon - \cos(x_1)\cos(x_2)\cos(x_3)}\,dx_3\,dx_2\,dx_1 = 4\pi K(k_+)K(k_-) + 2i\pi\left(K(k_+)^2 - K(k_-)^2\right) /;$$
$$|\varepsilon| < 1 \bigwedge k_+ = \frac{1}{2}\left(\sqrt{1-\varepsilon^2} + 1\right) \bigwedge k_- = \frac{1}{2}\left(1 - \sqrt{1-\varepsilon^2}\right)$$

Lattice Green's function body-centered cubic lattice

Integral transforms

Fourier exp transforms

01.07.22.0001.01

$$\mathcal{F}_t[\cos(a\,t)](x) = \sqrt{\frac{\pi}{2}}\,\delta(x-a) + \sqrt{\frac{\pi}{2}}\,\delta(a+x) /;\ a \in \mathbb{R}$$

Inverse Fourier exp transforms

01.07.22.0002.01

$$\mathcal{F}_t^{-1}[\cos(t)](z) = \sqrt{\frac{\pi}{2}}\,\delta(z-1) + \sqrt{\frac{\pi}{2}}\,\delta(z+1)$$

Fourier cos transforms

01.07.22.0003.01

$$\mathcal{F}c_t[\cos(a\,t)](z) = \sqrt{\frac{\pi}{2}}\,(\delta(a-z) + \delta(a+z)) /;\ a \in \mathbb{R}$$

Fourier sin transforms

01.07.22.0004.01

$$\mathcal{F}s_t[\cos(a\,t)](z) == -\sqrt{\frac{2}{\pi}}\ \frac{z}{a^2 - z^2}\ /;\ a \in \mathbb{R}$$

Laplace transforms

01.07.22.0005.01

$$\mathcal{L}_t[\cos(t)](z) == \frac{z}{1 + z^2}$$

Mellin transforms

01.07.22.0006.01

$$\mathcal{M}_t[\cos(t)](z) == \Gamma(z)\cos\left(\frac{\pi\,z}{2}\right)\ /;\ 0 < \mathrm{Re}(z) < 1$$

Hankel transforms

01.07.22.0007.01

$$\mathcal{H}_{t;\nu}\left[t^{\alpha-1}\cos(t)\right](z) == \frac{1}{\Gamma(\nu+1)}\left(2^{-\nu} z^{\nu+\frac{1}{2}} \cos\left(\frac{1}{4}\pi\,(2\,\alpha + 2\,\nu + 1)\right)\Gamma\left(\alpha + \nu + \frac{1}{2}\right){}_2F_1\left(\frac{1}{4}(2\,\alpha + 2\,\nu + 1),\ \frac{1}{4}(2\,\alpha + 2\,\nu + 3);\ \nu + 1;\ z^2\right)\right)\ /;$$
$$\mathrm{Re}(\alpha + \nu) > -\frac{1}{2} \bigwedge \mathrm{Re}(\alpha) < 1$$

Hilbert transforms

01.07.22.0008.01

$$\mathcal{H}_t[\cos(t)](x) == -\sin(x)$$

Summation

Finite summation

01.07.23.0001.01

$$\sum_{k=0}^{n} \cos(a\,k) == \csc\left(\frac{a}{2}\right)\sin\left(\frac{1}{2}a\,(n+1)\right)\cos\left(\frac{a\,n}{2}\right)$$

01.07.23.0002.01

$$\sum_{k=0}^{n} (-1)^k \cos(a\,k) == \cos\left(\frac{1}{2}(a + n\,(a + \pi))\right)\sec\left(\frac{a}{2}\right)\cos\left(\frac{1}{2}n\,(a + \pi)\right)$$

01.07.23.0003.01

$$\sum_{k=0}^{n} \cos(a\,k + z) == \csc\left(\frac{a}{2}\right)\sin\left(\frac{1}{2}a\,(n+1)\right)\cos\left(\frac{a\,n}{2} + z\right)$$

01.07.23.0004.01

$$\sum_{k=0}^{n} (-1)^k \cos(a\,k + z) == \cos\left(\frac{1}{2}(a + n\,(a + \pi))\right)\sec\left(\frac{a}{2}\right)\cos\left(\frac{1}{2}n\,(a + \pi) + z\right)$$

01.07.23.0005.01

$$\sum_{k=1}^{n}\cos((2k-1)a) = \frac{1}{2}\csc(a)\sin(2na)$$

01.07.23.0006.01

$$\sum_{k=1}^{n}(-1)^k\cos((2k-1)a) = -\sec(a)\sin^2\left(n\left(a-\frac{\pi}{2}\right)\right)$$

01.07.23.0007.01

$$\sum_{k=1}^{n}k\cos(ka) = \frac{1}{4}\csc^2\left(\frac{a}{2}\right)(-n\cos((n+1)a)+(n+1)\cos(na)-1)$$

01.07.23.0008.01

$$\sum_{k=1}^{n}z^k\cos(ka) = \frac{z\left(\cos(an)z^{n+1}-\cos(na+a)z^n-z+\cos(a)\right)}{z^2-2\cos(a)z+1}$$

01.07.23.0009.01

$$\sum_{k=1}^{n}\cos^{2q}\left(\frac{2k\pi p}{n}+\alpha\right) = \frac{n\,2^{-q}(2q-1)!!}{q!} /; p\in\mathbb{N}^+\bigwedge q\in\mathbb{N}^+\bigwedge 2pq<n$$

01.07.23.0021.01

$$\sum_{k=0}^{n-1}\frac{1}{z^2-2\cos\left(\frac{k}{n}2\pi\right)z+1} = \frac{n(z^n+1)}{(1-z^n)\left(1-z^2\right)} /; n\in\mathbb{N}$$

Infinite summation

01.07.23.0010.01

$$\sum_{k=1}^{\infty}\frac{\cos(kx)}{k} = \frac{1}{2}\log\left(\frac{1}{2(1-\cos(x))}\right) /; 0<\operatorname{Re}(x)<2\pi$$

01.07.23.0011.01

$$\sum_{k=1}^{\infty}\frac{(-1)^{k-1}\cos(kx)}{k} = \log\left(2\cos\left(\frac{x}{2}\right)\right) /; |\operatorname{Re}(x)|<\pi$$

01.07.23.0012.01

$$\sum_{k=1}^{\infty}\frac{\cos(kx)}{k^2} = \frac{x^2}{4}-\frac{\pi x}{2}+\frac{\pi^2}{6} /; 0\le\operatorname{Re}(x)\le 2\pi$$

01.07.23.0013.01

$$\sum_{k=1}^{\infty}\frac{(-1)^{k-1}\cos(kx)}{k^2} = \frac{\pi^2}{12}-\frac{x^2}{4} /; |\operatorname{Re}(x)|\le\pi$$

01.07.23.0014.01

$$\sum_{k=1}^{\infty}\frac{\cos(kx)}{a^2+k^2} = \frac{\pi\cosh((\pi-x)a)}{(2a)\sinh(\pi a)}-\frac{1}{2a^2} /; 0\le\operatorname{Re}(x)\le 2\pi$$

01.07.23.0015.01

$$\sum_{k=1}^{\infty}\frac{(-1)^k\cos(kx)}{a^2+k^2} = \frac{\pi\cosh(xa)}{(2a)\sinh(\pi a)}-\frac{1}{2a^2} /; |\operatorname{Re}(x)|\le\pi$$

01.07.23.0016.01

$$\sum_{k=1}^{\infty} e^{-k a} \cos(k x) = \frac{\sinh(a)}{2(\cosh(a) - \cos(x))} - \frac{1}{2} \;/;\; \text{Re}(a) > 0$$

01.07.23.0017.01

$$\sum_{k=0}^{\infty} z^k \cos(k x) = \frac{1 - z\cos(x)}{z^2 - 2\cos(x)\, z + 1} \;/;\; |z| < 1$$

01.07.23.0018.01

$$\sum_{k=1}^{\infty} \frac{z^k \cos(k x)}{k} = \log\left(\frac{1}{\sqrt{z^2 - 2\cos(x)\, z + 1}}\right) \;/;\; 0 < \text{Re}(x) < 2\pi \wedge |z| < 1$$

01.07.23.0019.01

$$\sum_{k=0}^{\infty} \frac{\cos(k x)}{k!} = e^{\cos(x)} \cos(\sin(x))$$

01.07.23.0020.01

$$\sum_{k=0}^{\infty} \frac{z^k \cos(k x)}{k!} = e^{z\cos(x)} \cos(z \sin(x))$$

01.07.23.0022.01

$$\sum_{k=1}^{\infty} \cos(k x) = \pi \sum_{k=-\infty}^{\infty} \delta(x - 2\pi k) - \frac{1}{2} \;/;\; x \in \mathbb{R}$$

Above relation holds in a distributional sense for $x \in \mathbb{R}$.

01.07.23.0023.01

$$\sum_{k=1}^{\infty} \cos(k x) = \frac{1}{2} \,\text{DiracComb}\left(\frac{x}{2\pi}\right) - \frac{1}{2} \;/;\; x \in \mathbb{R}$$

Above relation holds in a distributional sense for $x \in \mathbb{R}$.

01.07.23.0024.01

$$\sum_{k=1}^{\infty} k \cos(k x) = -\frac{1}{4} \csc^2\left(\frac{x}{2}\right) \;/;\; x \in \mathbb{R}$$

Above relation holds in a distributional sense for $x \in \mathbb{R}$.

01.07.23.0025.01

$$\sum_{k=1}^{\infty} k^{2m+1} \cos(k x) = \frac{1}{2}\left(1 - i\cot\left(\frac{x}{2}\right)\right) \sum_{k=0}^{2m+1} \frac{(-1)^k k!}{2^k} \mathcal{S}_{2m+1}^{(k)} \left(i\cot\left(\frac{x}{2}\right) + 1\right)^k \;/;\; x \in \mathbb{R} \wedge m \in \mathbb{N}$$

Above relation holds in a distributional sense for $x \in \mathbb{R}$.

01.07.23.0026.01

$$\sum_{k=1}^{\infty} k^{2m} \cos(k x) = \frac{(-1)^m}{2} \frac{\partial^{2m} \text{DiracComb}\left(\frac{x}{2\pi}\right)}{\partial x^{2m}} - \frac{\delta_m}{2} \;/;\; x \in \mathbb{R} \wedge m \in \mathbb{N}$$

Above relation holds in a distributional sense for $x \in \mathbb{R}$.

Products

Finite products

01.07.24.0001.01

$$\prod_{k=1}^{n-1}\left(1+\cos\left(\frac{k\pi}{n}\right)\right)=\frac{n}{2^{n-1}}\ /;\ n\in\mathbb{N}^+$$

01.07.24.0002.01

$$\prod_{k=1}^{n-1}\left(1-\cos\left(\frac{k\pi}{n}\right)\right)=\frac{n}{2^{n-1}}\ /;\ n\in\mathbb{N}^+$$

01.07.24.0003.01

$$\prod_{k=1}^{n-1}\cos\left(\frac{k\pi}{n}\right)=-\frac{(-1)^{\frac{n+1}{2}}\,(1-(-1)^n)}{2^n}\ /;\ n\in\mathbb{N}^+$$

01.07.24.0004.01

$$\prod_{k=1}^{n-1}\cos\left(\frac{\pi k}{n}+z\right)=\frac{2^{1-n}}{\cos(z)}\sin\left(n\left(z+\frac{\pi}{2}\right)\right)\ /;\ n\in\mathbb{N}^+$$

01.07.24.0005.01

$$\prod_{k=1}^{n-1}\cos\left(\frac{2\pi k}{n}+z\right)=(-2)^{1-n}\sec(z)\left(\cos(n z)-\cos\left(\frac{n\pi}{2}\right)\right)\ /;\ n\in\mathbb{N}^+$$

01.07.24.0006.01

$$\prod_{k=1}^{2n-1}\cos\left(\frac{k\pi}{n}\right)=2^{1-2n}\,((-1)^n-1)\ /;\ n\in\mathbb{N}^+$$

01.07.24.0007.01

$$\prod_{k=1}^{\left\lfloor\frac{n-1}{2}\right\rfloor}\cos\left(\frac{\pi k}{n}\right)=2^{\frac{1-n}{2}}\left(\frac{1}{2}(1-(-1)^n)+\frac{1}{2}(1+(-1)^n)\sqrt{n}\right)\ /;\ n\in\mathbb{N}^+$$

Infinite products

01.07.24.0008.01

$$\prod_{k=1}^{\infty}\cos\left(\frac{z}{2^k}\right)=\frac{\sin(z)}{z}$$

Representations through more general functions

Through hypergeometric functions

Involving $_0F_1$

01.07.26.0001.01

$$\cos(z)={}_0F_1\left(;\frac{1}{2};-\frac{z^2}{4}\right)$$

01.07.26.0003.01

$$\cos(z) = -\left(z - \frac{\pi}{2}\right) {}_0F_1\left(; \frac{3}{2}; -\frac{1}{4}\left(z - \frac{\pi}{2}\right)^2\right)$$

01.07.26.0002.01

$$\cos^2(z) = \frac{1}{2} + \frac{1}{2}\, {}_0F_1\left(; \frac{1}{2}; -z^2\right)$$

01.07.26.0095.01

$$\cos^3(z) = \frac{3}{4}\, {}_0F_1\left(; \frac{1}{2}; -\frac{z^2}{4}\right) + \frac{1}{4}\, {}_0F_1\left(; \frac{1}{2}; -\frac{9\, z^2}{4}\right)$$

Involving ${}_pF_q$

01.07.26.0096.01

$$\cos(z) = \left(\frac{\pi}{2} - z\right) {}_3F_2\left(\frac{z}{\pi} - \frac{1}{2}, \frac{z}{\pi} - \frac{1}{2}, \frac{z}{\pi} - \frac{1}{2}; 1, 1; -1\right) - \frac{2}{\pi^2}\left(\frac{\pi}{2} - z\right)^3 {}_3F_2\left(\frac{z}{\pi} + \frac{1}{2}, \frac{z}{\pi} + \frac{1}{2}, \frac{z}{\pi} + \frac{1}{2}; 2, 2; -1\right)$$

Brychkov Yu.A. (2005)

01.07.26.0004.01

$$\cos^2(z) = \left(z - \frac{\pi}{2}\right)^2 {}_1F_2\left(1; 2, \frac{3}{2}; -\left(z - \frac{\pi}{2}\right)^2\right)$$

Through Meijer *G*

Classical cases for the direct function itself

01.07.26.0005.01

$$\cos(z) = \sqrt{\pi}\; G_{0,2}^{1,0}\left(\frac{z^2}{4} \,\middle|\, 0, \tfrac{1}{2}\right)$$

01.07.26.0006.01

$$\cos\left(a + \sqrt{z}\right) = \sqrt{\pi}\; G_{1,3}^{2,0}\left(\frac{z}{4} \,\middle|\, \begin{matrix} \frac{a}{\pi} + \frac{1}{2} \\ 0, \frac{1}{2}, \frac{a}{\pi} + \frac{1}{2} \end{matrix}\right)$$

Classical cases for powers of cos

01.07.26.0007.01

$$\cos^n\left(\sqrt{z}\right) = 2^{-n-1}\left((-1)^n + 1\right)\binom{n}{\frac{n}{2}} + 2^{1-n}\sqrt{\pi}\sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor}\binom{n}{k} G_{0,2}^{1,0}\left(\frac{1}{4}\, z\,(n - 2\,k)^2 \,\middle|\, 0, \tfrac{1}{2}\right) /; n \in \mathbb{N}^+$$

Classical cases involving exp

01.07.26.0089.01

$$e^{-\frac{\sqrt[3]{z}}{\sqrt{3}}} \cos\left(\sqrt[3]{z}\right) = \frac{1}{2}\sqrt{3}\; G_{1,4}^{3,0}\left(\frac{8\, z}{81\sqrt{3}} \,\middle|\, \begin{matrix} \frac{1}{2} \\ 0, \frac{1}{3}, \frac{2}{3}, \frac{1}{2} \end{matrix}\right)$$

01.07.26.0097.01

$$e^{-\sqrt[4]{z}} \cos\left(\sqrt[4]{z}\right) = \frac{1}{\sqrt{2\,\pi}}\; G_{0,4}^{3,0}\left(\frac{z}{64} \,\middle|\, 0, \tfrac{1}{4}, \tfrac{3}{4}, \tfrac{1}{2}\right)$$

01.07.26.0090.01

$$e^{-\sqrt{3}\,\sqrt[6]{z}}\cos\left(\sqrt[6]{z}\right) = \frac{\sqrt{3}}{4\pi^{3/2}} G_{0,6}^{5,0}\left(\frac{z}{729} \,\middle|\, 0, \frac{1}{6}, \frac{1}{3}, \frac{2}{3}, \frac{5}{6}, \frac{1}{2}\right)$$

Classical cases involving sinh

01.07.26.0091.01

$$\cos\left(\sqrt[4]{z}\right)\sinh\left(\sqrt[4]{z}\right) = -\sqrt{2}\,\pi^{3/2} G_{1,5}^{2,0}\left(\frac{z}{64} \,\middle|\, \begin{matrix} 0 \\ \frac{1}{4}, \frac{3}{4}, 0, 0, \frac{1}{2} \end{matrix}\right)$$

Classical cases involving cosh

01.07.26.0008.01

$$\cos(z)\cosh(z) = \sqrt{2}\,\pi^{3/2} G_{0,4}^{1,0}\left(\frac{z^4}{64} \,\middle|\, 0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}\right)$$

Classical cases involving sin, Ci, Si

01.07.26.0009.01

$$\cos\left(\sqrt{z}\right)\operatorname{Ci}\left(\sqrt{z}\right) + \sin\left(\sqrt{z}\right)\operatorname{Si}\left(\sqrt{z}\right) = -\frac{1}{2}\pi^{3/2} G_{2,4}^{2,1}\left(\frac{z}{4} \,\middle|\, \begin{matrix} 0, \frac{1}{2} \\ 0, 0, \frac{1}{2}, \frac{1}{2} \end{matrix}\right)$$

01.07.26.0010.01

$$\cos\left(\sqrt{z}\right)\operatorname{Ci}\left(\sqrt{z}\right) + \sin\left(\sqrt{z}\right)\left(\operatorname{Si}\left(\sqrt{z}\right) - \frac{\pi}{2}\right) = -\frac{1}{2\sqrt{\pi}} G_{1,3}^{3,1}\left(\frac{z}{4} \,\middle|\, \begin{matrix} 0 \\ 0, 0, \frac{1}{2} \end{matrix}\right)$$

01.07.26.0011.01

$$\sin\left(\sqrt{z}\right)\operatorname{Ci}\left(\sqrt{z}\right) - \cos\left(\sqrt{z}\right)\operatorname{Si}\left(\sqrt{z}\right) = -\frac{1}{2}\pi^{3/2} G_{2,4}^{2,1}\left(\frac{z}{4} \,\middle|\, \begin{matrix} \frac{1}{2}, 1 \\ \frac{1}{2}, \frac{1}{2}, 1, 0 \end{matrix}\right)$$

01.07.26.0012.01

$$\sin\left(\sqrt{z}\right)\operatorname{Ci}\left(\sqrt{z}\right) - \cos\left(\sqrt{z}\right)\left(\operatorname{Si}\left(\sqrt{z}\right) - \frac{\pi}{2}\right) = \frac{1}{2\sqrt{\pi}} G_{1,3}^{3,1}\left(\frac{z}{4} \,\middle|\, \begin{matrix} \frac{1}{2} \\ 0, \frac{1}{2}, \frac{1}{2} \end{matrix}\right)$$

Classical cases involving $\cos^{-1}$ in the arguments and unit step θ

01.07.26.0013.01

$$\frac{\theta(1-|z|)}{\sqrt{1-z}}\cos\left(\nu\cos^{-1}\left(\sqrt{z}\right)\right) = \sqrt{\pi}\, G_{2,2}^{2,0}\left(z \,\middle|\, \begin{matrix} \frac{\nu+1}{2}, \frac{1-\nu}{2} \\ 0, \frac{1}{2} \end{matrix}\right) /; z \notin (-1, 0)$$

Classical cases involving $\tan^{-1}$ in the arguments

01.07.26.0014.01

$$(z+1)^{\nu/2}\cos\left(\nu\tan^{-1}\left(\sqrt{z}\right)\right) = \frac{2^{-\nu-1}}{\Gamma(-\nu)} G_{2,2}^{1,2}\left(z \,\middle|\, \begin{matrix} \frac{1+\nu}{2}, \frac{\nu}{2}+1 \\ 0, \frac{1}{2} \end{matrix}\right)$$

Classical cases involving $\cot^{-1}$ in the arguments

01.07.26.0015.01

$$(z+1)^{\nu/2}\cos\left(\nu\cot^{-1}\left(\sqrt{z}\right)\right) = \frac{2^{-\nu-1}}{\Gamma(-\nu)} G_{2,2}^{2,1}\left(z \,\middle|\, \begin{array}{c} \frac{\nu}{2}+1, \frac{\nu+1}{2} \\ 0, \frac{1}{2} \end{array}\right) /; z \notin (-1, 0)$$

Classical cases involving $\sec^{-1}$ in the arguments and unit step θ

01.07.26.0016.01

$$\frac{\theta(|z|-1)}{\sqrt{z-1}}\cos\left(\nu\sec^{-1}\left(\sqrt{z}\right)\right) = \sqrt{\pi}\, G_{2,2}^{0,2}\left(z \,\middle|\, \begin{array}{c} 0, \frac{1}{2} \\ -\frac{\nu}{2}, \frac{\nu}{2} \end{array}\right)$$

Classical cases involving Bessel J

01.07.26.0017.01

$$\cos\left(\sqrt{z}\right) J_\nu\left(\sqrt{z}\right) = \frac{1}{\sqrt{2}} G_{2,4}^{1,2}\left(z \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ \frac{\nu}{2}, -\frac{\nu}{2}, \frac{\nu+1}{2}, \frac{1-\nu}{2} \end{array}\right)$$

01.07.26.0018.01

$$\cos\left(a+\sqrt{z}\right) J_\nu\left(\sqrt{z}\right) = \frac{1}{\sqrt{2}} G_{3,5}^{2,2}\left(z \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4}, \frac{a}{\pi}+\frac{\nu+1}{2} \\ \frac{\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2}, \frac{1-\nu}{2}, \frac{a}{\pi}+\frac{\nu+1}{2} \end{array}\right)$$

Classical cases involving cos, sin, J

01.07.26.0019.01

$$\cos\left(\sqrt{z}\right) J_{-\nu}\left(\sqrt{z}\right) + \sin\left(\sqrt{z}\right) J_\nu\left(\sqrt{z}\right) = -\sqrt{2}\,\sin\left(\frac{1}{4}(2\nu-1)\pi\right) G_{2,4}^{2,1}\left(z \,\middle|\, \begin{array}{c} \frac{3}{4}, \frac{1}{4} \\ -\frac{\nu}{2}, \frac{\nu+1}{2}, \frac{\nu}{2}, \frac{1-\nu}{2} \end{array}\right)$$

01.07.26.0020.01

$$\cos\left(\sqrt{z}\right) J_{-\nu}\left(\sqrt{z}\right) - \sin\left(\sqrt{z}\right) J_\nu\left(\sqrt{z}\right) = \sqrt{2}\,\sin\left(\frac{1}{4}\pi(2\nu+1)\right) G_{2,4}^{2,1}\left(z \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ -\frac{\nu}{2}, \frac{\nu+1}{2}, \frac{1-\nu}{2}, \frac{\nu}{2} \end{array}\right)$$

01.07.26.0098.01

$$J_\nu\left(\sqrt{z}\right)\cos\left(\sqrt{z}\right) + J_{-\nu}\left(\sqrt{z}\right)\sin\left(\sqrt{z}\right) = \sqrt{2}\,\sin\left(\frac{1}{4}\pi(2\nu+1)\right) G_{2,4}^{2,1}\left(z \,\middle|\, \begin{array}{c} \frac{3}{4}, \frac{1}{4} \\ \frac{\nu}{2}, \frac{1-\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2} \end{array}\right)$$

01.07.26.0099.01

$$\sin\left(\sqrt{z}\right) J_{-\nu}\left(\sqrt{z}\right) - \cos\left(\sqrt{z}\right) J_\nu\left(\sqrt{z}\right) = \sqrt{2}\,\sin\left(\frac{1}{4}\pi(2\nu-1)\right) G_{2,4}^{2,1}\left(z \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ \frac{\nu}{2}, \frac{1-\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2} \end{array}\right)$$

Classical cases involving Bessel Y

01.07.26.0021.01

$$\cos\left(\sqrt{z}\right) Y_\nu\left(\sqrt{z}\right) = \frac{1}{\sqrt{2}} G_{3,5}^{2,2}\left(z \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4}, -\frac{\nu+1}{2} \\ -\frac{\nu}{2}, \frac{\nu}{2}, -\frac{\nu+1}{2}, \frac{1-\nu}{2}, \frac{\nu+1}{2} \end{array}\right)$$

Classical cases involving sin and Bessel J, Y

01.07.26.0022.01

$$\cos\left(\sqrt{z}\right) Y_\nu\left(\sqrt{z}\right) + \sin\left(\sqrt{z}\right) J_\nu\left(\sqrt{z}\right) = -\sqrt{2}\, G_{2,4}^{3,0}\left(z \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ -\frac{\nu}{2}, \frac{\nu}{2}, \frac{\nu+1}{2}, \frac{1-\nu}{2} \end{array}\right)$$

01.07.26.0023.01

$$\sin\left(\sqrt{z}\right) Y_\nu\left(\sqrt{z}\right) - \cos\left(\sqrt{z}\right) J_\nu\left(\sqrt{z}\right) = -\sqrt{2}\, G_{2,4}^{3,0}\left(z \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ \frac{1-\nu}{2}, \frac{\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2} \end{array}\right)$$

01.07.26.0024.01

$$\cos\left(\sqrt{z}\right) Y_\nu\left(\sqrt{z}\right) - \sin\left(\sqrt{z}\right) J_\nu\left(\sqrt{z}\right) = -\frac{\cos(\nu\pi)}{\pi^2\sqrt{2}}\, G_{2,4}^{3,2}\left(z \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ -\frac{\nu}{2}, \frac{\nu}{2}, \frac{\nu+1}{2}, \frac{1-\nu}{2} \end{array}\right)$$

01.07.26.0025.01

$$\sin\left(\sqrt{z}\right) Y_\nu\left(\sqrt{z}\right) + \cos\left(\sqrt{z}\right) J_\nu\left(\sqrt{z}\right) = \frac{\cos(\nu\pi)}{\pi^2\sqrt{2}}\, G_{2,4}^{3,2}\left(z \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ \frac{1-\nu}{2}, \frac{\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2} \end{array}\right)$$

01.07.26.0026.01

$$\sin\left(a+\sqrt{z}\right) J_\nu\left(\sqrt{z}\right) - \cos\left(a+\sqrt{z}\right) Y_\nu\left(\sqrt{z}\right) = \frac{\cos(\pi\nu)}{\pi^2\sqrt{2}}\, G_{3,5}^{4,2}\left(z \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4}, \frac{1-\nu}{2} - \frac{a}{\pi} \\ -\frac{\nu}{2}, \frac{1-\nu}{2}, \frac{\nu}{2}, \frac{\nu+1}{2}, \frac{1-\nu}{2} - \frac{a}{\pi} \end{array}\right)$$

01.07.26.0100.01

$$\cos\left(a+\sqrt{z}\right) J_\nu\left(\sqrt{z}\right) + \sin\left(a+\sqrt{z}\right) Y_\nu\left(\sqrt{z}\right) = \frac{\cos(\pi\nu)}{\sqrt{2}\,\pi^2}\, G_{3,5}^{4,2}\left(z \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4}, -\frac{a}{\pi} - \frac{\nu}{2} \\ \frac{1-\nu}{2}, -\frac{\nu}{2}, \frac{\nu}{2}, \frac{\nu+1}{2}, -\frac{a}{\pi} - \frac{\nu}{2} \end{array}\right)$$

Classical cases involving ${}_0F_1$

01.07.26.0027.01

$$\cos(z)\, {}_0F_1\left(; b; -\frac{z^2}{4}\right) = 2^{b-\frac{3}{2}}\, \Gamma(b)\, G_{2,4}^{1,2}\left(z^2 \,\middle|\, \begin{array}{c} \frac{3-2b}{4}, \frac{5-2b}{4} \\ 0, \frac{1}{2}, 1-b, \frac{3}{2}-b \end{array}\right)$$

01.07.26.0028.01

$$\cos(a+z)\, {}_0F_1\left(; b; -\frac{z^2}{4}\right) = 2^{b-\frac{3}{2}}\, \Gamma(b)\, G_{3,5}^{2,2}\left(z^2 \,\middle|\, \begin{array}{c} \frac{3-2b}{4}, \frac{5-2b}{4}, \frac{a}{\pi}+\frac{1}{2} \\ 0, \frac{1}{2}, 1-b, \frac{3}{2}-b, \frac{a}{\pi}+\frac{1}{2} \end{array}\right) /; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.07.26.0101.01

$$\cos(a+z)\, {}_0F_1\left(; b; -\frac{z^2}{4}\right) = 2^{b-\frac{3}{2}}\, \Gamma(b) \left(\cos(a)\, G_{2,4}^{1,2}\left(z^2 \,\middle|\, \begin{array}{c} \frac{1}{4}(3-2b), \frac{1}{4}(5-2b) \\ 0, \frac{1}{2}, 1-b, \frac{3}{2}-b \end{array}\right) - \frac{\sin(a)}{z}\, G_{2,4}^{1,2}\left(z^2 \,\middle|\, \begin{array}{c} \frac{5}{4}-\frac{b}{2}, \frac{7}{4}-\frac{b}{2} \\ 1, \frac{1}{2}, \frac{3}{2}-b, 2-b \end{array}\right)\right)$$

01.07.26.0102.01

$$\cos\left(2\sqrt{z}\right) {}_0F_1(; b; -z) = 2^{b-\frac{3}{2}}\, \Gamma(b)\, G_{2,4}^{1,2}\left(4z \,\middle|\, \begin{array}{c} \frac{3-2b}{4}, \frac{5-2b}{4} \\ 0, \frac{1}{2}, 1-b, \frac{3}{2}-b \end{array}\right)$$

01.07.26.0029.01

$$\cos\left(a+2\sqrt{z}\right) {}_0F_1(; b; -z) = 2^{b-\frac{3}{2}}\, \Gamma(b)\, G_{3,5}^{2,2}\left(4z \,\middle|\, \begin{array}{c} \frac{3-2b}{4}, \frac{5-2b}{4}, \frac{a}{\pi}+\frac{1}{2} \\ 0, \frac{1}{2}, 1-b, \frac{3}{2}-b, \frac{a}{\pi}+\frac{1}{2} \end{array}\right)$$

Classical cases involving ${}_0\tilde{F}_1$

01.07.26.0030.01

$$\cos(z)\,{}_0\tilde{F}_1\left(;b;-\frac{z^2}{4}\right) = 2^{b-\frac{3}{2}}\,G_{2,4}^{1,2}\left(z^2\,\middle|\,\begin{matrix}\frac{3-2b}{4},\frac{5-2b}{4}\\0,\frac{1}{2},1-b,\frac{3}{2}-b\end{matrix}\right)$$

01.07.26.0031.01

$$\cos(a+z)\,{}_0\tilde{F}_1\left(;b;-\frac{z^2}{4}\right) = 2^{b-\frac{3}{2}}\,G_{3,5}^{2,2}\left(z^2\,\middle|\,\begin{matrix}\frac{3-2b}{4},\frac{5-2b}{4},\frac{a}{\pi}+\frac{1}{2}\\0,\frac{1}{2},1-b,\frac{3}{2}-b,\frac{a}{\pi}+\frac{1}{2}\end{matrix}\right)\,/;\,-\frac{\pi}{2}<\arg(z)\leq\frac{\pi}{2}$$

01.07.26.0103.01

$$\cos(a+z)\,{}_0\tilde{F}_1\left(;b;-\frac{z^2}{4}\right) = 2^{b-\frac{3}{2}}\left(\cos(a)\,G_{2,4}^{1,2}\left(z^2\,\middle|\,\begin{matrix}\frac{1}{4}(3-2b),\frac{1}{4}(5-2b)\\0,\frac{1}{2},1-b,\frac{3}{2}-b\end{matrix}\right)-\frac{\sin(a)}{z}\,G_{2,4}^{1,2}\left(z^2\,\middle|\,\begin{matrix}\frac{5}{4}-\frac{b}{2},\frac{7}{4}-\frac{b}{2}\\1,\frac{1}{2},\frac{3}{2}-b,2-b\end{matrix}\right)\right)$$

01.07.26.0104.01

$$\cos\left(2\sqrt{z}\right)\,{}_0\tilde{F}_1(;b;-z) = 2^{b-\frac{3}{2}}\,G_{2,4}^{1,2}\left(4z\,\middle|\,\begin{matrix}\frac{1}{4}(3-2b),\frac{1}{4}(5-2b)\\0,\frac{1}{2},1-b,\frac{3}{2}-b\end{matrix}\right)$$

01.07.26.0032.01

$$\cos\left(a+2\sqrt{z}\right)\,{}_0\tilde{F}_1(;b;-z) = 2^{b-\frac{3}{2}}\,G_{3,5}^{2,2}\left(4z\,\middle|\,\begin{matrix}\frac{3-2b}{4},\frac{5-2b}{4},\frac{a}{\pi}+\frac{1}{2}\\0,\frac{1}{2},1-b,\frac{3}{2}-b,\frac{a}{\pi}+\frac{1}{2}\end{matrix}\right)$$

Generalized cases for the direct function itself

01.07.26.0033.01

$$\cos(z) = \sqrt{\pi}\,G_{0,2}^{1,0}\left(\frac{z}{2},\frac{1}{2}\,\middle|\,0,\frac{1}{2}\right)$$

01.07.26.0034.01

$$\cos(a+z) = \sqrt{\pi}\,G_{1,3}^{2,0}\left(\frac{z}{2},\frac{1}{2}\,\middle|\,\begin{matrix}\frac{a}{\pi}+\frac{1}{2}\\0,\frac{1}{2},\frac{a}{\pi}+\frac{1}{2}\end{matrix}\right)$$

Generalized cases for powers of cos

01.07.26.0035.01

$$\cos^n(z) = 2^{-n-1}\left((-1)^n+1\right)\binom{n}{\frac{n}{2}}+2^{1-n}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}\binom{n}{k}\,G_{0,2}^{1,0}\left(\frac{1}{2}z(n-2k),\frac{1}{2}\,\middle|\,0,\frac{1}{2}\right)\,/;\,n\in\mathbb{N}^+$$

01.07.26.0092.01

$$\cos^{2n}(z) = 1-2^{1-2n}\sqrt{\pi}\sum_{k=0}^{n-1}\binom{2n}{k}\,G_{1,3}^{1,1}\left((n-k)z,\frac{1}{2}\,\middle|\,\begin{matrix}1\\1,0,\frac{1}{2}\end{matrix}\right)\,/;\,n\in\mathbb{N}^+$$

Generalized cases involving exp

01.07.26.0036.01

$$e^{-z}\cos(z) = \frac{1}{\sqrt{2\pi}}\,G_{0,4}^{3,0}\left(\frac{z}{2\sqrt{2}},\frac{1}{4}\,\middle|\,0,\frac{1}{4},\frac{3}{4},\frac{1}{2}\right)$$

01.07.26.0037.01

$$\exp\left(-\frac{z}{\sqrt{3}}\right)\cos(z) = \frac{\sqrt{3}}{2}\, G_{1,4}^{3,0}\left(\frac{2z}{3\sqrt{3}}, \frac{1}{3} \,\middle|\, \begin{matrix} \frac{1}{2} \\ 0, \frac{1}{3}, \frac{2}{3}, \frac{1}{2} \end{matrix}\right)$$

01.07.26.0038.01

$$e^{-\sqrt{3}\, z}\cos(z) = \frac{\sqrt{3}}{4\pi^{3/2}}\, G_{0,6}^{5,0}\left(\frac{z}{3}, \frac{1}{6} \,\middle|\, 0, \frac{1}{6}, \frac{1}{3}, \frac{2}{3}, \frac{5}{6}, \frac{1}{2}\right)$$

Generalized cases involving sinh

01.07.26.0039.01

$$\cos(z)\sinh(z) = -\sqrt{2}\,\pi^{3/2}\, G_{1,5}^{2,0}\left(\frac{z}{2\sqrt{2}}, \frac{1}{4} \,\middle|\, \begin{matrix} 0 \\ \frac{1}{4}, \frac{3}{4}, 0, 0, \frac{1}{2} \end{matrix}\right)$$

Generalized cases involving cosh

01.07.26.0093.01

$$\cos(z)\cosh(z) = \sqrt{2}\,\pi^{3/2}\, G_{0,4}^{1,0}\left(\frac{z}{2\sqrt{2}}, \frac{1}{4} \,\middle|\, 0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}\right)$$

Generalized cases involving sin, Ci, Si

01.07.26.0040.01

$$\cos(z)\,\mathrm{Ci}(z) + \sin(z)\,\mathrm{Si}(z) = -\frac{1}{2}\pi^{3/2}\, G_{2,4}^{2,1}\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} 0, \frac{1}{2} \\ 0, 0, \frac{1}{2}, \frac{1}{2} \end{matrix}\right)$$

01.07.26.0041.01

$$\cos(z)\,\mathrm{Ci}(z) + \sin(z)\left(\mathrm{Si}(z) - \frac{\pi}{2}\right) = -\frac{1}{2\sqrt{\pi}}\, G_{1,3}^{3,1}\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} 0 \\ 0, 0, \frac{1}{2} \end{matrix}\right)$$

01.07.26.0042.01

$$\sin(z)\,\mathrm{Ci}(z) - \cos(z)\,\mathrm{Si}(z) = -\frac{1}{2}\pi^{3/2}\, G_{2,4}^{2,1}\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{2}, 1 \\ \frac{1}{2}, \frac{1}{2}, 1, 0 \end{matrix}\right)$$

01.07.26.0043.01

$$\sin(z)\,\mathrm{Ci}(z) - \cos(z)\left(\mathrm{Si}(z) - \frac{\pi}{2}\right) = \frac{1}{2\sqrt{\pi}}\, G_{1,3}^{3,1}\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{2} \\ 0, \frac{1}{2}, \frac{1}{2} \end{matrix}\right)$$

Generalized cases involving sin and Fresnel *C*, *S*

01.07.26.0044.01

$$\cos(z)\, C\left(\sqrt{\frac{2z}{\pi}}\right) + \sin(z)\, S\left(\sqrt{\frac{2z}{\pi}}\right) = \sqrt{\frac{\pi}{2}}\, G_{1,3}^{1,1}\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{4} \\ \frac{1}{4}, 0, \frac{1}{2} \end{matrix}\right)$$

01.07.26.0045.01

$$\cos(z)\, S\left(\sqrt{\frac{2z}{\pi}}\right) - \sin(z)\, C\left(\sqrt{\frac{2z}{\pi}}\right) = -\sqrt{\frac{\pi}{2}}\, G_{1,3}^{1,1}\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{3}{4} \\ \frac{3}{4}, 0, \frac{1}{2} \end{matrix}\right)$$

01.07.26.0046.01

$$\cos(z)\left(\frac{1}{2}-C\left(\sqrt{\frac{2z}{\pi}}\right)\right)+\sin(z)\left(\frac{1}{2}-S\left(\sqrt{\frac{2z}{\pi}}\right)\right)=(2\pi)^{-3/2}\,G_{1,3}^{3,1}\left(\frac{z}{2},\frac{1}{2}\,\middle|\,\begin{array}{c}\frac{1}{4}\\ 0,\frac{1}{4},\frac{1}{2}\end{array}\right)$$

01.07.26.0047.01

$$\cos(z)\left(\frac{1}{2}-S\left(\sqrt{\frac{2z}{\pi}}\right)\right)-\sin(z)\left(\frac{1}{2}-C\left(\sqrt{\frac{2z}{\pi}}\right)\right)=(2\pi)^{-3/2}\,G_{1,3}^{3,1}\left(\frac{z}{2},\frac{1}{2}\,\middle|\,\begin{array}{c}\frac{3}{4}\\ 0,\frac{1}{2},\frac{3}{4}\end{array}\right)$$

01.07.26.0105.01

$$\cos\left(\frac{\pi z^2}{2}\right)C(z)+\sin\left(\frac{\pi z^2}{2}\right)S(z)=\sqrt{\frac{\pi}{2}}\,G_{1,3}^{1,1}\left(\frac{\sqrt{\pi}\,z}{2},\frac{1}{4}\,\middle|\,\begin{array}{c}\frac{1}{4}\\ \frac{1}{4},0,\frac{1}{2}\end{array}\right)$$

01.07.26.0106.01

$$\cos\left(\frac{\pi z^2}{2}\right)S(z)-\sin\left(\frac{\pi z^2}{2}\right)C(z)=-\sqrt{\frac{\pi}{2}}\,G_{1,3}^{1,1}\left(\frac{\sqrt{\pi}\,z}{2},\frac{1}{4}\,\middle|\,\begin{array}{c}\frac{3}{4}\\ \frac{3}{4},0,\frac{1}{2}\end{array}\right)$$

01.07.26.0107.01

$$\cos\left(\frac{\pi z^2}{2}\right)\left(\frac{1}{2}-C(z)\right)+\sin\left(\frac{\pi z^2}{2}\right)\left(\frac{1}{2}-S(z)\right)=(2\pi)^{-3/2}\,G_{1,3}^{3,1}\left(\frac{\sqrt{\pi}\,z}{2},\frac{1}{4}\,\middle|\,\begin{array}{c}\frac{1}{4}\\ 0,\frac{1}{4},\frac{1}{2}\end{array}\right)$$

01.07.26.0108.01

$$\cos\left(\frac{\pi z^2}{2}\right)\left(\frac{1}{2}-C(z)\right)+\sin\left(\frac{\pi z^2}{2}\right)\left(\frac{1}{2}-S(z)\right)=(2\pi)^{-3/2}\,G_{1,3}^{3,1}\left(\frac{\sqrt{\pi}\,z}{2},\frac{1}{4}\,\middle|\,\begin{array}{c}\frac{3}{4}\\ 0,\frac{1}{2},\frac{3}{4}\end{array}\right)$$

Generalized cases involving $\cos^{-1}$ in the arguments and unit step θ

01.07.26.0048.01

$$\frac{\theta(1-|z|)}{\sqrt{1-z^2}}\cos\left(\nu\cos^{-1}(z)\right)=\sqrt{\pi}\,G_{2,2}^{2,0}\left(z,\frac{1}{2}\,\middle|\,\begin{array}{c}\frac{\nu+1}{2},\frac{1-\nu}{2}\\ 0,\frac{1}{2}\end{array}\right)$$

Generalized cases involving $\tan^{-1}$ in the arguments

01.07.26.0049.01

$$\left(z^2+1\right)^{\nu/2}\cos\left(\nu\tan^{-1}(z)\right)=\frac{2^{-\nu-1}}{\Gamma(-\nu)}\,G_{2,2}^{1,2}\left(z,\frac{1}{2}\,\middle|\,\begin{array}{c}\frac{\nu}{2}+1,\frac{\nu+1}{2}\\ 0,\frac{1}{2}\end{array}\right)$$

Generalized cases involving $\cot^{-1}$ in the arguments

01.07.26.0050.01

$$\left(z^2+1\right)^{\nu/2}\cos\left(\nu\cot^{-1}(z)\right)=\frac{2^{-\nu-1}}{\Gamma(-\nu)}\,G_{2,2}^{2,1}\left(z,\frac{1}{2}\,\middle|\,\begin{array}{c}\frac{\nu}{2}+1,\frac{\nu+1}{2}\\ 0,\frac{1}{2}\end{array}\right)\;/;\;\mathrm{Re}(z)>0$$

Generalized cases involving $\sec^{-1}$ in the arguments and unit step θ

01.07.26.0051.01

$$\frac{\theta(|z|-1)}{\sqrt{z^2-1}}\cos\left(\nu\sec^{-1}(z)\right)=\sqrt{\pi}\,G_{2,2}^{0,2}\left(z,\frac{1}{2}\,\middle|\,\begin{array}{c}0,\frac{1}{2}\\ -\frac{\nu}{2},\frac{\nu}{2}\end{array}\right)\;/;\;\mathrm{Re}(z)>0$$

Generalized cases involving Bessel J

01.07.26.0052.01

$$\cos(z)\, J_\nu(z) = \frac{1}{\sqrt{2}}\, G_{2,4}^{1,2}\left(z, \frac{1}{2} \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ \frac{\nu}{2}, -\frac{\nu}{2}, \frac{\nu+1}{2}, \frac{1-\nu}{2} \end{array}\right)$$

01.07.26.0053.01

$$\cos(a+z)\, J_\nu(z) = \frac{1}{\sqrt{2}}\, G_{3,5}^{2,2}\left(z, \frac{1}{2} \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4}, \frac{a}{\pi} + \frac{\nu+1}{2} \\ \frac{\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2}, \frac{1-\nu}{2}, \frac{a}{\pi} + \frac{\nu+1}{2} \end{array}\right)$$

Generalized cases involving cos, sin, J

01.07.26.0054.01

$$\cos(z)\, J_{-\nu}(z) + \sin(z)\, J_\nu(z) = -\sqrt{2}\, \sin\left(\frac{1}{4}\pi(2\nu-1)\right) G_{2,4}^{2,1}\left(z, \frac{1}{2} \,\middle|\, \begin{array}{c} \frac{3}{4}, \frac{1}{4} \\ -\frac{\nu}{2}, \frac{\nu+1}{2}, \frac{1-\nu}{2}, \frac{\nu}{2} \end{array}\right)$$

01.07.26.0055.01

$$\cos(z)\, J_{-\nu}(z) - \sin(z)\, J_\nu(z) = \sqrt{2}\, \sin\left(\frac{1}{4}\pi(2\nu+1)\right) G_{2,4}^{2,1}\left(z, \frac{1}{2} \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ -\frac{\nu}{2}, \frac{\nu+1}{2}, \frac{1-\nu}{2}, \frac{\nu}{2} \end{array}\right)$$

01.07.26.0109.01

$$\sin(z)\, J_{-\nu}(z) + \cos(z)\, J_\nu(z) = \sqrt{2}\, \sin\left(\frac{1}{4}\pi(2\nu+1)\right) G_{2,4}^{2,1}\left(z, \frac{1}{2} \,\middle|\, \begin{array}{c} \frac{3}{4}, \frac{1}{4} \\ \frac{\nu}{2}, \frac{1-\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2} \end{array}\right)$$

01.07.26.0110.01

$$\sin(z)\, J_{-\nu}(z) - \cos(z)\, J_\nu(z) = \sqrt{2}\, \sin\left(\frac{1}{4}\pi(2\nu-1)\right) G_{2,4}^{2,1}\left(z, \frac{1}{2} \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ \frac{\nu}{2}, \frac{1-\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2} \end{array}\right)$$

Generalized cases involving Bessel Y

01.07.26.0056.01

$$\cos(z)\, Y_\nu(z) = \frac{1}{\sqrt{2}}\, G_{3,5}^{2,2}\left(z, \frac{1}{2} \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4}, -\frac{\nu+1}{2} \\ -\frac{\nu}{2}, \frac{\nu}{2}, -\frac{\nu+1}{2}, \frac{1-\nu}{2}, \frac{\nu+1}{2} \end{array}\right)$$

01.07.26.0094.01

$$\cos(a+z)\, Y_\nu(z) = \frac{1}{\sqrt{2}}\, G_{3,5}^{2,2}\left(z, \frac{1}{2} \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4}, \frac{a}{\pi} + \frac{\nu}{2} \\ \frac{\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2}, \frac{1-\nu}{2}, \frac{a}{\pi} + \frac{\nu}{2} \end{array}\right) - \frac{\cos(\pi\nu)}{\pi^2\sqrt{2}}\, G_{3,5}^{4,2}\left(z, \frac{1}{2} \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4}, \frac{1-\nu}{2} - \frac{a}{\pi} \\ -\frac{\nu}{2}, \frac{1-\nu}{2}, \frac{\nu}{2}, \frac{\nu+1}{2}, \frac{1-\nu}{2} - \frac{a}{\pi} \end{array}\right)$$

Generalized cases involving sin and Bessel J, Y

01.07.26.0057.01

$$\sin(z)\, J_\nu(z) + \cos(z)\, Y_\nu(z) = -\sqrt{2}\, G_{2,4}^{3,0}\left(z, \frac{1}{2} \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ -\frac{\nu}{2}, \frac{\nu}{2}, \frac{\nu+1}{2}, \frac{1-\nu}{2} \end{array}\right)$$

01.07.26.0058.01

$$\cos(z)\, J_\nu(z) - \sin(z)\, Y_\nu(z) = \sqrt{2}\, G_{2,4}^{3,0}\left(z, \frac{1}{2} \,\middle|\, \begin{array}{c} \frac{1}{4}, \frac{3}{4} \\ \frac{1-\nu}{2}, \frac{\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2} \end{array}\right)$$

01.07.26.0059.01

$$\sin(z)\,J_\nu(z)-\cos(z)\,Y_\nu(z)=\frac{\cos(\nu\pi)}{\pi^2\sqrt{2}}\,G_{2,4}^{3,2}\left(z,\frac{1}{2}\;\middle|\;\begin{array}{c}\frac{1}{4},\frac{3}{4}\\ -\frac{\nu}{2},\frac{\nu}{2},\frac{\nu+1}{2},\frac{1-\nu}{2}\end{array}\right)$$

01.07.26.0060.01

$$\cos(z)\,J_\nu(z)+\sin(z)\,Y_\nu(z)=\frac{\cos(\nu\pi)}{\pi^2\sqrt{2}}\,G_{2,4}^{3,2}\left(z,\frac{1}{2}\;\middle|\;\begin{array}{c}\frac{1}{4},\frac{3}{4}\\ \frac{1-\nu}{2},\frac{\nu}{2},\frac{\nu+1}{2},-\frac{\nu}{2}\end{array}\right)$$

01.07.26.0061.01

$$\sin(a+z)\,J_\nu(z)-\cos(a+z)\,Y_\nu(z)=\frac{\cos(\pi\nu)}{\pi^2\sqrt{2}}\,G_{3,5}^{4,2}\left(z,\frac{1}{2}\;\middle|\;\begin{array}{c}\frac{1}{4},\frac{3}{4},\frac{1-\nu}{2}-\frac{a}{\pi}\\ -\frac{\nu}{2},\frac{1-\nu}{2},\frac{\nu}{2},\frac{\nu+1}{2},\frac{1-\nu}{2}-\frac{a}{\pi}\end{array}\right)$$

01.07.26.0111.01

$$\cos(a+z)\,J_\nu(z)+\sin(a+z)\,Y_\nu(z)=\frac{\cos(\pi\nu)}{\sqrt{2}\,\pi^2}\,G_{3,5}^{4,2}\left(z,\frac{1}{2}\;\middle|\;\begin{array}{c}\frac{1}{4},\frac{3}{4},-\frac{a}{\pi}-\frac{\nu}{2}\\ \frac{1-\nu}{2},-\frac{\nu}{2},\frac{\nu}{2},\frac{\nu+1}{2},-\frac{a}{\pi}-\frac{\nu}{2}\end{array}\right)$$

Generalized cases involving ${}_0F_1$

01.07.26.0112.01

$$\cos(z)\,{}_0F_1\left(;b;-\frac{z^2}{4}\right)=2^{b-\frac{3}{2}}\,\Gamma(b)\,G_{3,5}^{2,2}\left(z,\frac{1}{2}\;\middle|\;\begin{array}{c}\frac{1}{4}(3-2b),\frac{1}{4}(5-2b),\frac{1}{2}\\ 0,\frac{1}{2},1-b,\frac{3}{2}-b,\frac{1}{2}\end{array}\right)$$

01.07.26.0113.01

$$\cos(a+z)\,{}_0F_1\left(;b;-\frac{z^2}{4}\right)=2^{b-\frac{3}{2}}\,\Gamma(b)\,G_{3,5}^{2,2}\left(z,\frac{1}{2}\;\middle|\;\begin{array}{c}\frac{3-2b}{4},\frac{5-2b}{4},\frac{a}{\pi}+\frac{1}{2}\\ 0,\frac{1}{2},1-b,\frac{3}{2}-b,\frac{a}{\pi}+\frac{1}{2}\end{array}\right)$$

Generalized cases involving ${}_0\tilde{F}_1$

01.07.26.0114.01

$$\cos(z)\,{}_0\tilde{F}_1\left(;b;-\frac{z^2}{4}\right)=2^{b-\frac{3}{2}}\,G_{3,5}^{2,2}\left(z,\frac{1}{2}\;\middle|\;\begin{array}{c}\frac{1}{4}(3-2b),\frac{1}{4}(5-2b),\frac{1}{2}\\ 0,\frac{1}{2},1-b,\frac{3}{2}-b,\frac{1}{2}\end{array}\right)$$

01.07.26.0115.01

$$\cos(a+z)\,{}_0\tilde{F}_1\left(;b;-\frac{z^2}{4}\right)=2^{b-\frac{3}{2}}\,G_{3,5}^{2,2}\left(z,\frac{1}{2}\;\middle|\;\begin{array}{c}\frac{1}{4}(3-2b),\frac{1}{4}(5-2b),\frac{a}{\pi}+\frac{1}{2}\\ 0,\frac{1}{2},1-b,\frac{3}{2}-b,\frac{a}{\pi}+\frac{1}{2}\end{array}\right)$$

Through other functions

Involving Bessel functions

01.07.26.0062.01

$$\cos(z)=\sqrt{\frac{\pi z}{2}}\,J_{-\frac{1}{2}}(z)$$

01.07.26.0063.01

$$\cos(z)=\sqrt{\frac{\pi i z}{2}}\,I_{-\frac{1}{2}}(i z)$$

01.07.26.0064.01

$$\cos(z) == -\sqrt{\frac{\pi z}{2}}\; Y_{\frac{1}{2}}(z)$$

01.07.26.0065.01

$$\cos(z) == \sqrt{-\frac{i z}{2\pi}}\; K_{-\frac{1}{2}}(-i z) + \sqrt{\frac{i z}{2\pi}}\; K_{-\frac{1}{2}}(i z)$$

Involving Jacobi functions

01.07.26.0066.01

$$\cos(z) == \operatorname{cd}(z \mid 0)$$

01.07.26.0067.01

$$\cos(z) == \operatorname{cn}(z \mid 0)$$

01.07.26.0068.01

$$\cos(z) == \frac{1}{\operatorname{cn}(i z \mid 1)}$$

01.07.26.0069.01

$$\cos(z) == -\frac{i}{\operatorname{cs}\left(\frac{\pi i}{2} - i z \,\middle|\, 1\right)}$$

01.07.26.0070.01

$$\cos(z) == \frac{1}{\operatorname{dc}(z \mid 0)}$$

01.07.26.0071.01

$$\cos(z) == \frac{1}{\operatorname{dn}(i z \mid 1)}$$

01.07.26.0072.01

$$\cos(z) == \frac{1}{\operatorname{ds}\left(\frac{\pi}{2} - z \,\middle|\, 0\right)}$$

01.07.26.0073.01

$$\cos(z) == -\frac{i}{\operatorname{ds}\left(\frac{\pi i}{2} - i z \,\middle|\, 1\right)}$$

01.07.26.0074.01

$$\cos(z) == \frac{1}{\operatorname{nc}(z \mid 0)}$$

01.07.26.0075.01

$$\cos(z) == \operatorname{nc}(i z \mid 1)$$

01.07.26.0076.01

$$\cos(z) == \operatorname{nd}(i z \mid 1)$$

01.07.26.0077.01

$$\cos(z) == \frac{1}{\operatorname{ns}\left(\frac{\pi}{2} - z \,\middle|\, 0\right)}$$

01.07.26.0078.01

$$\cos(z) = -i\,\mathrm{sc}\left(\frac{\pi i}{2} - i z \,\middle|\, 1\right)$$

01.07.26.0079.01

$$\cos(z) = -i\,\mathrm{sd}\left(\frac{\pi i}{2} - i z \,\middle|\, 1\right)$$

01.07.26.0080.01

$$\cos(z) = \mathrm{sd}\left(\frac{\pi}{2} - z \,\middle|\, 0\right)$$

01.07.26.0081.01

$$\cos(z) = \mathrm{sn}\left(\frac{\pi}{2} - z \,\middle|\, 0\right)$$

Involving Mathieu functions

01.07.26.0082.01

$$\cos\left(\sqrt{a}\; z\right) = \frac{1}{\sqrt{a}}\,\mathrm{Se}_z(a, 0, z)$$

01.07.26.0083.01

$$\cos\left(\sqrt{a}\; z\right) = \mathrm{Ce}(a, 0, z)$$

Involving some elliptic-type functions

01.07.26.0084.01

$$\cos(z) = E\left(\frac{\pi}{2} - z \,\middle|\, 1\right) /;\ 0 \le \mathrm{Re}(z) \le \pi$$

Involving some hypergeometric-type functions

01.07.26.0085.01

$$\cos(\pi z) = \frac{\pi}{\Gamma\left(\frac{1}{2} - z\right)\Gamma\left(z + \frac{1}{2}\right)}$$

01.07.26.0086.01

$$\cos(z) = 1 - \sqrt{\frac{\pi z}{2}}\; \boldsymbol{H}_{\frac{1}{2}}(z)$$

01.07.26.0087.01

$$\cos(z) = 1 + \sqrt{\frac{\pi i z}{2}}\; \boldsymbol{L}_{\frac{1}{2}}(i z)$$

01.07.26.0088.01

$$\cos(n z) = T_n(\cos(z))$$

Representations through equivalent functions

With inverse function

01.07.27.0001.01

$$\cos\left(\cos^{-1}(z)\right) = z$$

01.07.27.0003.02

$$\cos^{-1}(\cos(z)) = z \;/;\; 0 < \mathrm{Re}(z) < \pi \lor \mathrm{Re}(z) = 0 \land \mathrm{Im}(z) \geq 0 \lor \mathrm{Re}(z) = \pi \land \mathrm{Im}(z) \leq 0$$

01.07.27.0055.01

$$\cos^{-1}(\cos(z)) = -z \;/;\; -\pi < \mathrm{Re}(z) < 0 \lor \mathrm{Re}(z) = 0 \land \mathrm{Im}(z) \leq 0 \lor \mathrm{Re}(z) = -\pi \land \mathrm{Im}(z) \geq 0$$

01.07.27.0002.02

$$\cos^{-1}(\cos(z)) = \sqrt{z^2} \;/;\; |\mathrm{Re}(z)| < \pi \lor \mathrm{Re}(z) = -\pi \land \mathrm{Im}(z) \geq 0 \lor \mathrm{Re}(z) = \pi \land \mathrm{Im}(z) \leq 0$$

01.07.27.0056.01

$$\cos^{-1}(\cos(z)) = \frac{\pi}{2}\left(1 + (-1)^k\right) + (-1)^k (z - \pi (k+1)) \;/;$$
$$(k\pi < \mathrm{Re}(z) < (k+1)\pi \bigvee \mathrm{Re}(z) = k\pi \bigwedge \mathrm{Im}(z) \geq 0 \bigvee \mathrm{Re}(z) = (k+1)\pi \bigwedge \mathrm{Im}(z) \leq 0) \bigwedge k \in \mathbb{Z}$$

01.07.27.0004.01

$$\cos^{-1}(\cos(z)) = \frac{\pi}{2}\left(1 - (-1)^{\left\lfloor -\frac{\mathrm{Re}(z)}{\pi} \right\rfloor}\right) + (-1)^{\left\lfloor -\frac{\mathrm{Re}(z)}{\pi} \right\rfloor}\left(\left(\left(1 + (-1)^{\left\lfloor \frac{\mathrm{Re}(z)}{\pi} \right\rfloor + \left\lfloor -\frac{\mathrm{Re}(z)}{\pi} \right\rfloor}\right)\theta(\mathrm{Im}(z)) - 1\right)\left(z + \pi\left\lfloor -\frac{\mathrm{Re}(z)}{\pi} \right\rfloor\right)\right)$$

01.07.27.0057.01

$$\cos^{-1}(\cos(z)) = \begin{cases} (-1)^{\left\lfloor \frac{\mathrm{Re}(z)}{\pi} \right\rfloor}\left(-z + \pi\left\lfloor \frac{\mathrm{Re}(z)}{\pi} \right\rfloor - \frac{\pi}{2}\right) + \frac{\pi}{2} & \frac{\mathrm{Re}(z)}{\pi} \in \mathbb{Z} \bigwedge \mathrm{Im}(z) \leq 0 \\ (-1)^{\left\lfloor \frac{\mathrm{Re}(z)}{\pi} \right\rfloor}\left(z - \pi\left\lfloor \frac{\mathrm{Re}(z)}{\pi} \right\rfloor - \frac{\pi}{2}\right) + \frac{\pi}{2} & \mathrm{True} \end{cases}$$

With related functions

Involving exp

01.07.27.0005.01

$$\cos(z) = \frac{e^{iz} + e^{-iz}}{2}$$

Involving sin

01.07.27.0006.01

$$\cos(z) = \sin\left(\frac{\pi}{2} - z\right)$$

01.07.27.0007.01

$$\cos(z) = \sin\left(z + \frac{\pi}{2}\right)$$

01.07.27.0008.01

$$\cos(z) = \frac{\sqrt{-z^2}}{z}\sqrt{\sin^2(z) - 1} \;/;\; 0 < \mathrm{Re}(z) < \pi$$

01.07.27.0009.02

$$\cos(z) = \sqrt{1 - \sin^2(z)} \;/;\; |\mathrm{Re}(z)| < \frac{\pi}{2} \bigvee \mathrm{Re}(z) = -\frac{\pi}{2} \bigwedge \mathrm{Im}(z) \geq 0 \bigvee \mathrm{Re}(z) = \frac{\pi}{2} \bigwedge \mathrm{Im}(z) \leq 0$$

01.07.27.0010.01

$$\cos(z) = \sqrt{1 - \sin^2(z)}\,(-1)^{\left\lfloor \frac{1}{2} - \frac{\mathrm{Re}(z)}{\pi} \right\rfloor}\left(1 - \left(1 + (-1)^{\left\lfloor \frac{\mathrm{Re}(z)}{\pi} - \frac{1}{2} \right\rfloor + \left\lfloor \frac{1}{2} - \frac{\mathrm{Re}(z)}{\pi} \right\rfloor}\right)\theta(\mathrm{Im}(z))\right)$$

01.07.27.0011.01

$$\cos^2(z) = 1 - \sin^2(z)$$

01.07.27.0012.01

$$\cos^2(z) + \sin^2(z) == 1$$

01.07.27.0013.01

$$\cos^2(z) - \sin^2(z) == \cos(2\,z)$$

01.07.27.0014.01

$$\cos(z) + i\sin(z) == e^{i\,z}$$

01.07.27.0015.01

$$\cos(z) - i\sin(z) == e^{-i\,z}$$

01.07.27.0016.01

$$\cos(z) + \sin(z) == \sqrt{2}\,\cos\left(\frac{\pi}{4} - z\right)$$

01.07.27.0017.01

$$\cos(z) - \sin(z) == \sqrt{2}\,\cos\left(\frac{\pi}{4} + z\right)$$

01.07.27.0018.01

$$a\cos(z) + b\sin(z) == \sqrt{\frac{b^2}{a^2} + 1}\;a\cos\left(z - \tan^{-1}\left(\frac{b}{a}\right)\right)$$

01.07.27.0019.01

$$\cos\left(z + \frac{\pi}{2}\right) == -\sin(z)$$

01.07.27.0020.01

$$\cos\left(\frac{\pi}{2} - z\right) == \sin(z)$$

Involving tan

01.07.27.0021.01

$$\cos(z) == \frac{1 - \tan^2\left(\frac{z}{2}\right)}{1 + \tan^2\left(\frac{z}{2}\right)}$$

01.07.27.0022.01

$$\cos(z) == \frac{1}{\sqrt{1 + \tan^2(z)}} \;/;\; |\mathrm{Re}(z)| < \frac{\pi}{2}$$

01.07.27.0023.01

$$\cos(z) == \frac{1}{\sqrt{1 + \tan^2(z)}}\,(-1)^{\left\lfloor \frac{1}{2} - \frac{\mathrm{Re}(z)}{\pi} \right\rfloor}\left(1 - \left(1 + (-1)^{\left\lfloor \frac{\mathrm{Re}(z)}{\pi} - \frac{1}{2} \right\rfloor + \left\lfloor \frac{1}{2} - \frac{\mathrm{Re}(z)}{\pi} \right\rfloor}\right)\theta(-\mathrm{Im}(z))\right)$$

01.07.27.0024.01

$$\cos^2(z) == \frac{1}{1 + \tan^2(z)}$$

Involving cot

01.07.27.0025.01

$$\cos(z) = \frac{\cot^2\left(\frac{z}{2}\right) - 1}{\cot^2\left(\frac{z}{2}\right) + 1}$$

01.07.27.0026.01

$$\cos(z) = \frac{\cot(z)}{\sqrt{\cot^2(z) + 1}} \text{ /; } 0 < \operatorname{Re}(z) < \pi$$

01.07.27.0027.01

$$\cos(z) = \frac{\cot(z)}{\sqrt{1 + \cot^2(z)}} (-1)^{\left\lfloor \frac{\operatorname{Re}(z)}{\pi} \right\rfloor} \left(1 - \left(1 + (-1)^{\left\lfloor \frac{\operatorname{Re}(z)}{\pi} \right\rfloor + \left\lfloor -\frac{\operatorname{Re}(z)}{\pi} \right\rfloor}\right) \theta(\operatorname{Im}(z))\right)$$

01.07.27.0028.01

$$\cos^2(z) = \frac{\cot^2(z)}{\cot^2(z) + 1}$$

Involving csc

01.07.27.0029.01

$$\cos(z) = \frac{1}{\csc\left(\frac{\pi}{2} - z\right)}$$

01.07.27.0030.01

$$\cos(z) = \frac{1}{\csc\left(\frac{\pi}{2} + z\right)}$$

01.07.27.0031.01

$$\cos(z) = z \sqrt{\frac{1}{z^2}} \frac{\sqrt{\csc^2(z) - 1}}{\csc(z)} \text{ /; } |\operatorname{Re}(z)| < \frac{\pi}{2}$$

01.07.27.0032.01

$$\cos(z) = -z \sqrt{-\frac{1}{z^2}} \frac{\sqrt{1 - \csc^2(z)}}{\csc(z)} \text{ /; } \operatorname{Im}(z) \neq 0$$

01.07.27.0033.01

$$\cos^2(z) = \frac{\csc^2(z) - 1}{\csc^2(z)}$$

Involving sec

01.07.27.0034.01

$$\cos(z) = \frac{1}{\sec(z)}$$

Involving sinh

01.07.27.0035.01

$$\cos(z) = -i \sinh\left(\frac{\pi i}{2} - i z\right)$$

01.07.27.0036.01

$$\cos(z) = -i \sinh\left(\frac{\pi i}{2} + i z\right)$$

01.07.27.0037.01

$$\cos(z) = \sqrt{1 + \sinh^2(i z)} \;/;\; |\mathrm{Re}(z)| < \frac{\pi}{2}$$

01.07.27.0038.01

$$\cos(z) = \sqrt{1 + \sinh^2(i z)} \,(-1)^{\left\lfloor \frac{1}{2} - \frac{\mathrm{Re}(z)}{\pi} \right\rfloor} \left(1 - \left(1 + (-1)^{\left\lfloor \frac{\mathrm{Re}(z)}{\pi} - \frac{1}{2} \right\rfloor + \left\lfloor \frac{1}{2} - \frac{\mathrm{Re}(z)}{\pi} \right\rfloor}\right) \theta(\mathrm{Im}(z))\right)$$

01.07.27.0039.01

$$\cos^2(z) = 1 + \sinh^2(i z)$$

Involving cosh

01.07.27.0040.01

$$\cos(z) = \cosh(i z)$$

01.07.27.0041.01

$$\cos(i z) = \cosh(z)$$

Involving tanh

01.07.27.0042.01

$$\cos(z) = \frac{1 + \tanh^2\left(\frac{i z}{2}\right)}{1 - \tanh^2\left(\frac{i z}{2}\right)}$$

01.07.27.0043.01

$$\cos(z) = \frac{1}{\sqrt{1 - \tanh^2(i z)}} \;/;\; |\mathrm{Re}(z)| < \frac{\pi}{2}$$

01.07.27.0044.01

$$\cos(z) = \frac{1}{\sqrt{1 - \tanh^2(i z)}} (-1)^{\left\lfloor \frac{1}{2} - \frac{\mathrm{Re}(z)}{\pi} \right\rfloor} \left(1 - \left(1 + (-1)^{\left\lfloor \frac{\mathrm{Re}(z)}{\pi} - \frac{1}{2} \right\rfloor + \left\lfloor \frac{1}{2} - \frac{\mathrm{Re}(z)}{\pi} \right\rfloor}\right) \theta(-\mathrm{Im}(z))\right)$$

01.07.27.0045.01

$$\cos^2(z) = \frac{1}{1 - \tanh^2(i z)}$$

Involving coth

01.07.27.0046.01

$$\cos(z) = \frac{\coth^2\left(\frac{i z}{2}\right) + 1}{\coth^2\left(\frac{i z}{2}\right) - 1}$$

01.07.27.0047.01

$$\cos(z) = \frac{i \coth(i z)}{\sqrt{1 - \coth^2(i z)}} \;/;\; 0 < \mathrm{Re}(z) < \pi$$

01.07.27.0048.01

$$\cos(z) = \frac{i \coth(i z)}{\sqrt{1 - \coth^2(i z)}} (-1)^{\left\lfloor \frac{\text{Re}(z)}{\pi} \right\rfloor} \left(1 - \left(1 + (-1)^{\left\lfloor \frac{\text{Re}(z)}{\pi} \right\rfloor + \left\lfloor -\frac{\text{Re}(z)}{\pi} \right\rfloor}\right) \theta(\text{Im}(z))\right)$$

01.07.27.0049.01

$$\cos^2(z) = \frac{\coth^2(i z)}{\coth^2(i z) - 1}$$

Involving csch

01.07.27.0050.01

$$\cos(z) = -\frac{i}{\text{csch}\left(\frac{i \pi}{2} - i z\right)}$$

01.07.27.0051.01

$$\cos(z) = -\frac{i}{\text{csch}\left(\frac{i \pi}{2} + i z\right)}$$

01.07.27.0052.01

$$\cos(z) = -\frac{i \sqrt{-z^2}}{z} \frac{\sqrt{\text{csch}^2(i z) + 1}}{\text{csch}(i z)} /; \text{Im}(z) \neq 0$$

01.07.27.0053.01

$$\cos^2(z) = \frac{\text{csch}^2(i z) + 1}{\text{csch}^2(i z)}$$

Involving sech

01.07.27.0054.01

$$\cos(z) = \frac{1}{\text{sech}(i z)}$$

Inequalities

01.07.29.0001.01

$$\cos(x) < \frac{\sin(x)}{x} /; 0 < x < 4.493409 \land x \in \mathbb{R}$$

01.07.29.0002.01

$$|\cos(x)| \leq 1 /; x \in \mathbb{R}$$

01.07.29.0003.01

$$|\cos(x)| \leq \cosh(x) /; x \in \mathbb{R}$$

01.07.29.0004.01

$$|\cos(z)| \leq \cosh(|z|)$$

Zeros

01.07.30.0001.01

$$\cos(z) = 0 /; z = \pi k + \frac{\pi}{2} \bigwedge k \in \mathbb{Z}$$

Theorems

Fourier cos transforms

$$\hat{f}(y) == \int_0^\infty f(x)\cos(x\,y)\,dx \Leftrightarrow f(x) == \frac{2}{\pi}\int_0^\infty \hat{f}(y)\cos(x\,y)\,dy.$$

Fourier series

$$f(x) \sim \frac{a_0}{2} + \sum_{k=1}^\infty a_k \cos\left(\frac{\pi\,k\,x}{r}\right) + b_k \sin\left(\frac{\pi\,k\,x}{r}\right) /;\ a_k == \frac{1}{r}\int_{-r}^r f(t)\cos\left(\frac{\pi\,k\,t}{r}\right)dt \bigwedge b_k == \frac{1}{r}\int_{-r}^r f(t)\sin\left(\frac{\pi\,k\,t}{r}\right)dt$$

De Moivre's theorem

$$(\cos(z) + i\sin(z))^n == \cos(n\,z) + i\sin(n\,z) /;\quad n \in \mathbb{N}$$

The law of cosines

For a triangle in the Euclidean plane with edges a, b, c and opposite angles α, β, γ, the following holds:

$a^2 == b^2 + c^2 - 2\,b\,c\cos(\alpha)$, $b^2 == a^2 + c^2 - 2\,a\,c\cos(\beta)$, $c^2 == a^2 + b^2 - 2\,a\,b\cos(\gamma)$.

The Dirichlet function

The Dirichlet function $\lim_{m\to\infty}\lim_{n\to\infty}\cos^{2n}(m!\,\pi\,x)$ is equal to one at the rational points x and to zero at the irrational points.

Green's function of the Schrödinger equation for the harmonic oscillator

The Green's function of the Schrödinger equation for the harmonic oscillator

$$-\frac{\partial^2 G(x', x; t)}{\partial x^2} + \frac{\omega^2 x^2}{4} G(x', x; t) - \frac{\partial G(x', x; t)}{\partial t} == -i\,\delta(t)\,\delta(x' - x)$$

is given by

$$G(x', x; t) == \frac{1}{\sqrt{4\,i\,\pi}}\sqrt{\frac{\omega}{\sin(\omega\,t)}}\exp\left(\frac{i}{4}\frac{\omega}{\sin(\omega\,t)}\left(\left(x'^2 + x^2\right)\cos(\omega\,t) - 2\,x\,x'\right)\right).$$

Brachistochrone problem

The solution of the brachistochrone problem—to find the curve that connects two points in such a way that a point mass slides down this curve in the fastest possible way—can be parametrized by $\{C(\vartheta - \sin(\vartheta) + \mu(1 - \cos(\vartheta))),\ C(1 - \cos(\vartheta) + \mu(\vartheta + \sin(\vartheta)))\}$, where μ is the kinetic friction coefficient.

Friedel oscillations

The screened Coulomb potential in an electron gas has the asymptotic form $V(r) \propto \frac{\pi}{k_F(1+2\pi k_F r)} \frac{\cos(k_F r)}{r^3}$ where k_F is the Fermi wave length.

Other information

Value properties

01.07.33.0001.01

$$(x \in \mathbb{Q} \bigwedge \cos(x^\circ) \in \mathbb{Q}) \Rightarrow \left(\cos(x) = 0 \bigvee \cos(x) = \frac{1}{2} \bigvee \cos(x) = -\frac{1}{2} \bigvee \cos(x) = 1 \bigvee \cos(x) = -1\right)$$

History

– Ahmes (c. 2000 BC, Egypt) used cos in a book

– F. Viete (1590) evaluated $\cos(n z)$

– E. Gunther (1636) introduced the notation "Cosi" and the word "cosinus" (replacing "complementi sinus")

– I. Newton (1665) found series expansion for cos

– J. Keill (1726); L. Euler (1748)

The function cos is encountered often in mathematics and the natural sciences.

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