! For an efficient use of these tables, first read `HowTo.pdf`.

T2.56D. Integrands involving product of exponentials, trigonometric functions and powers of trigonometric functions on the interval $(-\pi/2, \pi/2)$.

1. $$\int_{-\pi/2}^{\pi/2} e^{i\,\beta x}\,\cos^{\nu-1} x\,dx = \frac{\pi}{2^{\nu-1}\nu\,\mathrm{B}\left(\frac{\nu+\beta+1}{2}, \frac{\nu-\beta+1}{2}\right)}, \quad \Re\{\nu\} > -1.$$

2. $$\int_{-\pi/2}^{\pi/2} e^{i\,\beta\,\sin x}\,\cos^{2\nu} x\,dx$$
$$= \sqrt{\pi}\left(\frac{2}{\beta}\right)^{\nu}\Gamma\left(\nu+\frac{1}{2}\right)J_\nu(\beta), \quad \Re\{\nu\} > -\tfrac{1}{2}.$$

3. $$\int_{-\pi/2}^{\pi/2} e^{i\,ux}\,\cos^{\mu} x\,\left(a^2\,e^{i\,x}+b^2\,e^{-i\,x}\right)^{\nu}\,dx$$
$$= \begin{cases} \dfrac{\pi b^{2\nu}\,{}_2F_1\left(-\nu, \frac{u+\mu+\nu}{2}; 1+\frac{\mu-\nu-u}{2}; \frac{a^2}{b^2}\right)}{2^{\mu}(\mu+1)\mathrm{B}\left(1-\frac{u+\nu-\mu}{2}, 1+\frac{u+\mu+\nu}{2}\right)}, & \text{for } a^2 < b^2, \\ \dfrac{\pi a^{2\nu}\,{}_2F_1\left(-\nu, \frac{u+\mu-\nu}{2}; 1+\frac{\mu-\nu+u}{2}; \frac{b^2}{a^2}\right)}{2^{\mu}(\mu+1)\mathrm{B}\left(1+\frac{u+\mu-\nu}{2}, 1+\frac{\mu+\nu-u}{2}\right)}, & \text{for } b^2 < a^2, \end{cases} \qquad \Re\{\mu\} > -1.$$
