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

**T3.25A.** Integrands involving exponentials and algebraic functions on the interval $(0, \infty)$.

1. $$\int_0^\infty \frac{e^{-qx}}{\sqrt{x}}\,dx = \sqrt{\frac{\pi}{q}}, \quad q > 0.$$

2. $$\int_0^\infty \frac{e^{-\mu x}\,dx}{\sqrt{x+\beta}} = \sqrt{\frac{\pi}{\mu}}e^{\beta\mu}\left[1 - \operatorname{erf}(\sqrt{\beta\mu})\right], \quad \Re\{\mu\} > 0,\ |\arg\beta| < \pi.$$

3. $$\int_0^\infty \frac{e^{-px}\,dx}{\sqrt{x(x+a)}} = e^{ap/2}K_0\left(\frac{ap}{2}\right), \quad a > 0,\ p > 0.$$

4. $$\int_0^\infty \frac{(x+\beta)e^{-\mu x}\,dx}{\sqrt{x^2+2\beta x}} = \beta e^{\beta\mu}\,K_1(\beta\mu), \quad \Re\{\mu\} > 0,\ |\arg\beta| < \pi.$$

5. $$\int_0^\infty \frac{xe^{-\mu x}\,dx}{\sqrt{x^2+\beta^2}} = \frac{\beta\pi}{2}\left[\mathbf{H}_1(\beta\mu) - Y_1(\beta\mu)\right] - \beta, \quad |\arg\beta| < \frac{\pi}{2},\ \Re\{\mu\} > 0.$$

6. $$\int_0^\infty \frac{e^{-\mu x}\,dx}{(1+\cos t + x)\sqrt{x^2+2x}} = \frac{\exp\left(2\mu\cos^2\frac{t}{2}\right)}{\sin t}\left(t - \sin t\int_0^u K_0(v)\,e^{-v\cos t}\,dv\right),$$
$$\Re\{\mu\} > 0.$$

7. $$\int_0^\infty \frac{e^{-\mu x}\,dx}{x+\sqrt{x^2+\beta^2}} = \frac{\pi}{2\beta\mu}\left[\mathbf{H}_1(\beta\mu) - Y_1(\beta\mu)\right] - \frac{1}{\beta^2\mu^2}, \quad |\arg\beta| < \frac{\pi}{2},\ \Re\{\mu\} > 0.$$

8. $$\int_0^\infty \frac{e^{-\mu x}\,dx}{\sqrt{(x+a)^3}} = \frac{2}{\sqrt{a}} - 2\sqrt{\pi\mu}\,e^{\alpha\mu}\left(1 - \operatorname{erf}\left(\sqrt{a\mu}\right)\right), \quad |\arg a| < \pi,\ \Re\{\mu\} > 0.$$

9. $$\int_0^\infty x^{n-1/2}e^{-\mu x}\,dx = \sqrt{\pi}\cdot\frac{1}{2}\cdot\frac{3}{2}\cdots\frac{2n-1}{2}\,\mu^{-n-1/2}$$
$$= \sqrt{\pi}\,2^{-n}\,\mu^{-n-1/2}(2n-1)!!, \quad n \geq 0;\ \Re\{\mu\} > 0.$$

10. $$\int_0^\infty x^{n-1/2}(2+x)^{n-1/2}\,e^{-px}\,dx = \frac{(2n-1)!!}{p^n}\,e^p\,K_n(p), \quad p>0,\ n=0,\,1,\,2,\ldots.$$

11. $$\int_0^\infty \left[\left(x+\sqrt{x^2+\beta^2}\right)^n + (x-\sqrt{x^2+\beta^2})^n\right]e^{-\mu x}\,dx = 2\beta^{n+1}\,O_n(\beta\mu), \quad \Re\{\mu\}>0.$$

12. $$\int_0^\infty \frac{\left(x+\sqrt{1+x^2}\right)^n}{\sqrt{1+x^2}}e^{-\mu x}\,dx = \frac{1}{2}[S_n(\mu)-\pi\mathbf{E}_n(\mu)-\pi Y_n(\mu)], \quad \Re\{\mu\}>0.$$

13. $$\int_0^\infty \frac{\left(x-\sqrt{1+x^2}\right)^n}{\sqrt{1+x^2}}e^{-\mu x}\,dx = -\frac{1}{2}[S_n(\mu)+\pi\mathbf{E}_n(\mu)+\pi Y_n(\mu)], \quad \Re\{\mu\}>0.$$