

TABLE OF SPECIAL FUNCTIONS

1. Gamma function

$$\Gamma(n) = \int_0^{\infty} u^{n-1} e^{-u} du, \quad n > 0$$

2. Beta function

$$B(m, n) = \int_0^1 u^{m-1} (1-u)^{n-1} du = \frac{\Gamma(m) \Gamma(n)}{\Gamma(m+n)}, \quad m, n > 0$$

3. Bessel function

$$J_n(x) = \frac{x^n}{2^n \Gamma(n+1)} \left\{ 1 - \frac{x^2}{2(2n+2)} + \frac{x^4}{2 \cdot 4(2n+2)(2n+4)} - \dots \right\}$$

4. Modified Bessel function

$$I_n(x) = i^{-n} J_n(ix) = \frac{x^n}{2^n \Gamma(n+1)} \left\{ 1 + \frac{x^2}{2(2n+2)} + \frac{x^4}{2 \cdot 4(2n+2)(2n+4)} + \dots \right\}$$

5. Error function

$$\operatorname{erf}(t) = \frac{2}{\sqrt{\pi}} \int_0^t e^{-u^2} du$$

6. Complementary error function

$$\operatorname{erfc}(t) = 1 - \operatorname{erf}(t) = \frac{2}{\sqrt{\pi}} \int_t^{\infty} e^{-u^2} du$$

7. Exponential integral

$$\operatorname{Ei}(t) = \int_t^{\infty} \frac{e^{-u}}{u} du$$

8. Sine integral

$$\operatorname{Si}(t) = \int_0^t \frac{\sin u}{u} du$$

9. Cosine integral

$$\operatorname{Ci}(t) = \int_t^{\infty} \frac{\cos u}{u} du$$

10. Fresnel sine integral

$$S(t) = \int_0^t \sin u^2 du$$

11. Fresnel cosine integral

$$C(t) = \int_0^t \cos u^2 du$$

12. Laguerre polynomials

$$L_n(t) = \frac{e^t}{n!} \frac{d^n}{dt^n} (t^n e^{-t}), \quad n = 0, 1, 2, \dots$$