$$I_\nu(z) = \left(\frac{z}{2}\right)^\nu \sum_{k=0}^{\infty} \frac{\left(\frac{z}{2}\right)^{2k}}{k!\,\Gamma(\nu+k+1)} \tag{17.2.20}$$

$$I_\nu(z) = \frac{e^{-z}\left(\frac{z}{2}\right)^\nu}{\Gamma(\nu+1)} \sum_{k=0}^{\infty} \frac{\left(\nu+\frac{1}{2}\right)_k 2^k z^k}{(2\nu+1)_k k!} \tag{17.2.21}$$

$$\mathsf{i}_n^{(1)}(z) = \frac{\sqrt{\pi}}{(2n+1)\,\Gamma\!\left(n+\frac{1}{2}\right)} \left(\frac{z}{2}\right)^n \sum_{k=0}^{\infty} \frac{\left(\frac{z^2}{4}\right)^k}{k!\left(n+\frac{3}{2}\right)_k} \tag{17.2.22}$$

$$\mathsf{i}_n^{(1)}(z) = \frac{\sqrt{\pi}e^{-iz}}{(2n+1)\,\Gamma\!\left(n+\frac{1}{2}\right)} \left(\frac{z}{2}\right)^n \sum_{k=0}^{\infty} \frac{(n+1)_k\,(2z)^k}{k!(2n+2)_k} \tag{17.2.23}$$

$$I_\nu(z) = \sum_{k=0}^{\infty} \left(\frac{\left((-1)^k e^z + e^{-z+\frac{(2\nu+1)i\pi}{2}}\right)(\nu,k)}{\sqrt{2\pi z}\,(2z)^k} \right) \tag{17.2.24}$$

$$I_\nu(z) = \sum_{k=0}^{\infty} \left(\frac{\left((-1)^k e^z + e^{-z-\frac{(2\nu+1)i\pi}{2}}\right)(\nu,k)}{\sqrt{2\pi z}\,(2z)^k} \right) \tag{17.2.25}$$

$$K_\nu(z) = \sqrt{\frac{\pi}{2z}}e^{-z} \sum_{k=0}^{\infty} \left(\frac{(\nu,k)}{(-2z)^k} \right) \tag{17.2.27}$$

$$\frac{I_{\nu+1}(z)}{I_\nu(z)} = \frac{\frac{z}{2(\nu+1)}}{1} + \mathop{\mathrm{K}}_{m=2}^{\infty} \frac{\frac{1}{4(\nu+m-1)(\nu+m)}z^2}{1} \tag{17.2.32}$$

$$\frac{\mathsf{i}_{n+1}^{(1)}(z)}{\mathsf{i}_n^{(1)}(z)} = \frac{\frac{z}{2n+3}}{1} + \mathop{\mathrm{K}}_{m=2}^{\infty} \frac{\frac{1}{4\left(\left(n+\frac{1}{2}\right)+m-1\right)\left(\left(n+\frac{1}{2}\right)+m\right)}z^2}{1} \tag{17.2.33}$$

$$\frac{\nu}{z} - \frac{K_{\nu+1}(z)}{K_\nu(z)} = \frac{1}{1} + \frac{\frac{-2\nu-1}{2z}}{1} - 1 \mathop{\mathrm{K}}_{m=3}^{\infty} \frac{\frac{\frac{m}{2}+\nu}{2z}}{1} \tag{17.2.34}$$

$$\frac{I_{\nu+1}(z)}{I_\nu(z)} = \frac{z}{2\nu+2+z} + \mathop{\mathrm{K}}_{m=2}^{\infty} \frac{-(2\nu+2m-1)\,z}{2\nu+m+1+2z} \tag{17.2.38}$$

$$\frac{\mathsf{i}_{n+1}^{(1)}(z)}{\mathsf{i}_n^{(1)}(z)} = \frac{z}{2n+3+z} + \mathop{\mathrm{K}}_{m=2}^{\infty} \frac{-2\,(n+m)\,z}{2n+m+2+2z} \tag{17.2.39}$$

$$\frac{\nu}{z} - \frac{K_{\nu+1}(z)}{K_\nu(z)} = \frac{\nu}{z} - \frac{2\nu+1+2z}{2z} - \frac{1}{z} \mathop{\mathrm{K}}_{m=0}^{\infty} \frac{\nu^2 - \frac{(2m-1)^2}{4}}{2\,(z+m)} \tag{17.2.40}$$