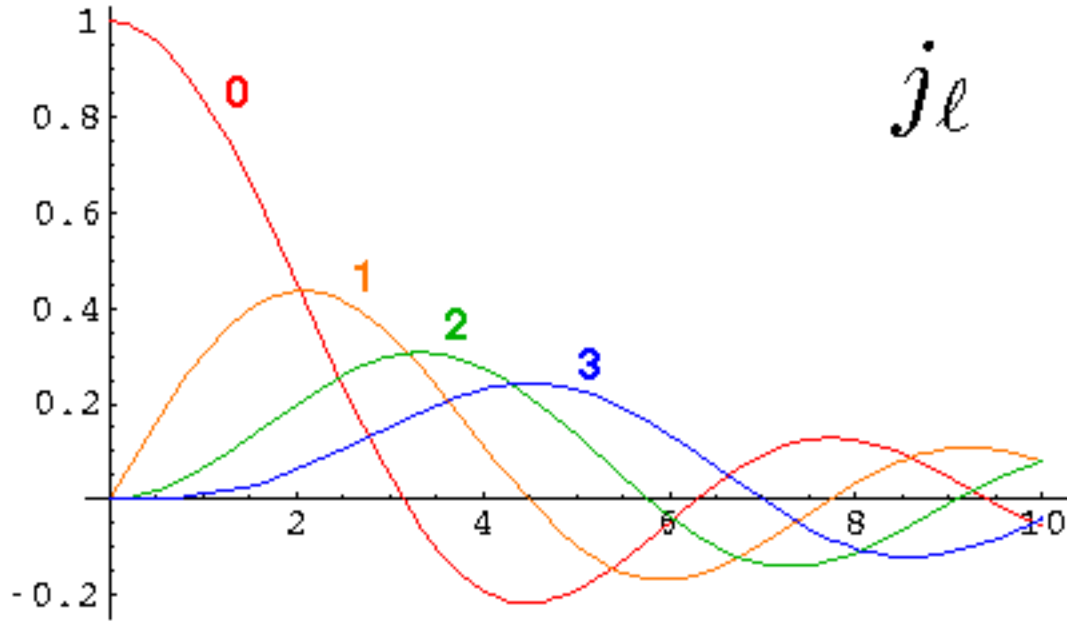
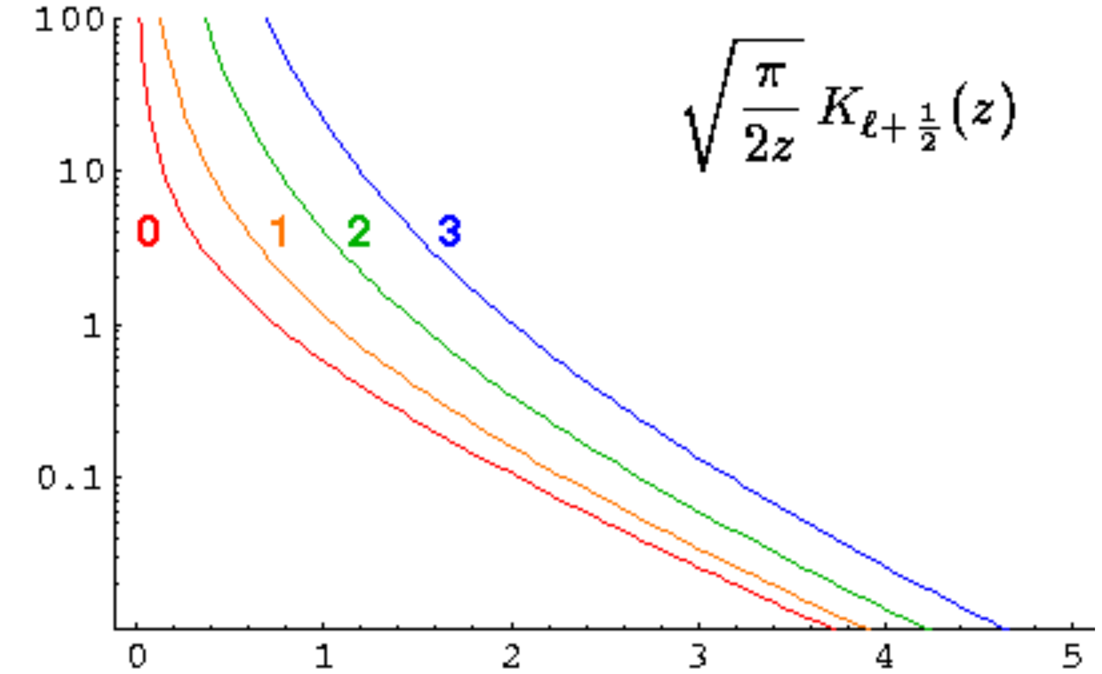


$$j_0(z) = \frac{\sin z}{z}$$

$$j_1(z) = \frac{\sin z}{z^2} - \frac{\cos z}{z}$$

$$j_2(z) = \left(\frac{3}{z^3} - \frac{1}{z}\right)\sin z - \frac{3}{z^2}\cos z$$



$$j_l(z)\begin{cases} \xrightarrow[z\to 0]{} & \frac{(\frac{1}{2})!}{(l+\frac{1}{2})!}\left(\frac{z}{2}\right)^l = \frac{1}{(\frac{3}{2})_l}\left(\frac{z}{2}\right)^l \\ \xrightarrow[z\to\infty]{} & \frac{1}{z}\cos\left(z - \frac{\pi}{2}(l+1)\right)\end{cases}$$

$$\sqrt{\frac{\pi}{2z}}\,K_{l+\frac{1}{2}}(z)\begin{cases} \xrightarrow[z\to 0]{} & (\tfrac{1}{2})!^2\,\frac{(l-\frac{1}{2})!}{(-\frac{1}{2})!}\left(\frac{2}{z}\right)^{l+1} = \frac{\pi}{4}\,(\tfrac{1}{2})_l\left(\frac{2}{z}\right)^{l+1} \\ \xrightarrow[z\to\infty]{} & \frac{\pi}{2z}\,e^{-z}\end{cases}$$

$$\left(-\frac{\partial^2}{\partial\rho^2} - \frac{2}{\rho}\frac{\partial}{\partial\rho} + \frac{l(l+1)}{\rho^2}\right)R(\rho) = \pm R(\rho)$$

$$-\left(\frac{1}{\rho^2}\partial_\rho\rho^2\partial_\rho R\right) + \frac{l(l+1)}{\rho^2}R = \pm R$$

$$-(\rho R)'' + \frac{l(l+1)}{\rho^2}\rho R = \pm\rho R$$

$$R(\rho) = N j_l(\rho) = N\,\frac{(\rho/2)^l(\frac{1}{2})!}{(l+\frac{1}{2})!}\;{}_0F_1\left(\begin{matrix} - \\ l+\frac{3}{2}\end{matrix};-\frac{\rho^2}{4}\right)$$

$$j_l(z) = (\tfrac{1}{2})!\sqrt{\frac{2}{z}}\,J_{l+\frac{1}{2}}(z) = \sqrt{\frac{\pi}{2z}}\,J_{l+\frac{1}{2}}(z)$$

$$\sqrt{\frac{\pi}{2z}}\,K_{0+\frac{1}{2}}(z) = \frac{\pi}{2z}\,e^{-z}$$

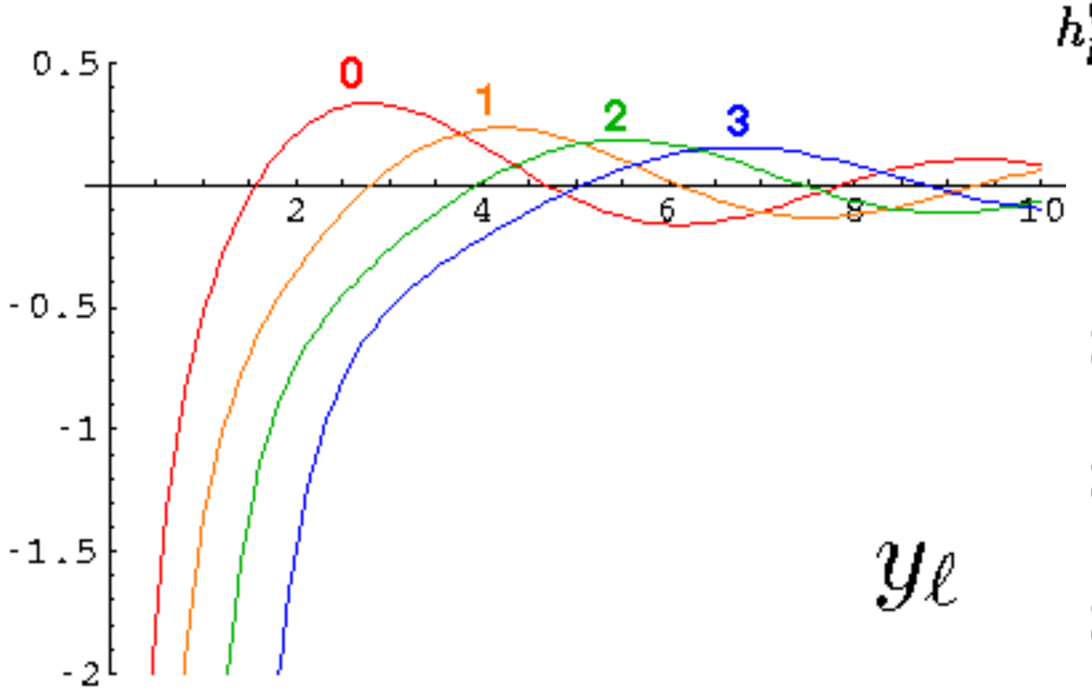
$$\sqrt{\frac{\pi}{2z}}\,K_{1+\frac{1}{2}}(z) = \frac{\pi}{2z}\,e^{-z}\left(1+\frac{1}{z}\right)$$

$$\sqrt{\frac{\pi}{2z}}\,K_{2+\frac{1}{2}}(z) = \frac{\pi}{2z}\,e^{-z}\left(1+\frac{3}{z}+\frac{3}{z^2}\right)$$

$$y_l(z)\begin{cases} \xrightarrow[z\to 0]{} & -\frac{(l-\frac{1}{2})!}{2(-\frac{1}{2})!}\left(\frac{2}{z}\right)^{l+1} = (-\tfrac{1}{2})_{l+1}\left(\frac{2}{z}\right)^{l+1} \\ \xrightarrow[z\to\infty]{} & \frac{1}{z}\sin\left(z - \frac{\pi}{2}(l+1)\right)\end{cases}$$

$$\sqrt{\frac{\pi}{2z}}\,I_{l+\frac{1}{2}}(z)\begin{cases} \xrightarrow[z\to 0]{} & \frac{(\frac{1}{2})!}{(l+\frac{1}{2})!}\left(\frac{z}{2}\right)^l = \frac{1}{(\frac{3}{2})_l}\left(\frac{z}{2}\right)^l \\ \xrightarrow[z\to\infty]{} & \frac{1}{2z}\,e^{z}\end{cases}$$

$$h_l^{(1,2)}(z) = j_l(z) \pm i y_l(z) \xrightarrow[z\to\infty]{} \frac{1}{z}\,e^{\pm i\left(z - \frac{\pi}{2}(l+1)\right)}$$



$$y_0(z) = -\frac{\cos z}{z}$$

$$y_1(z) = -\frac{\cos z}{z^2} - \frac{\sin z}{z}$$

$$y_2(z) = -\left(\frac{3}{z^3} - \frac{1}{z}\right)\cos z - \frac{3}{z^2}\sin z$$