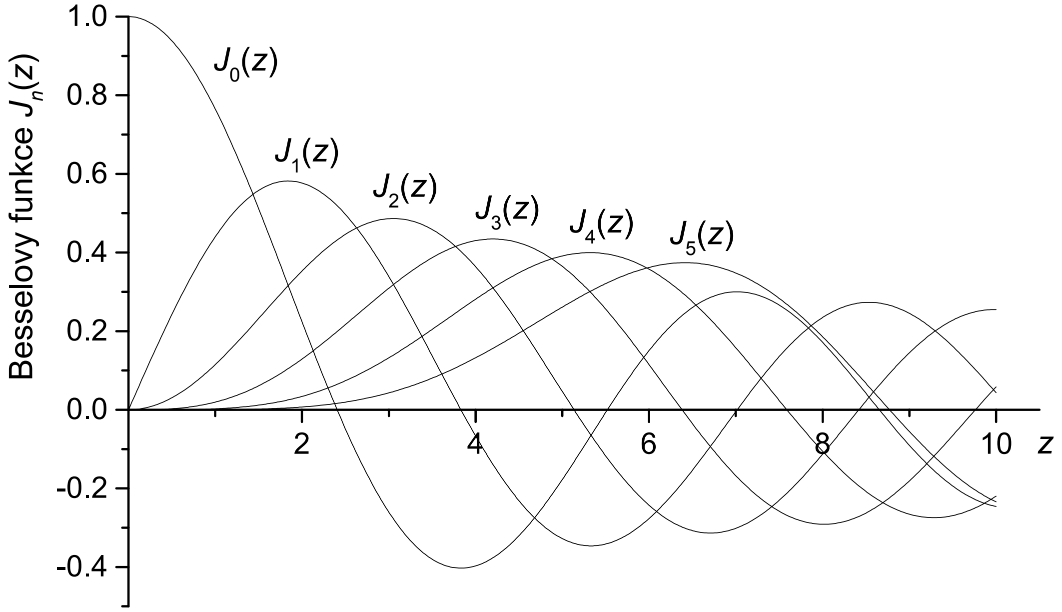
Besselovy funkce

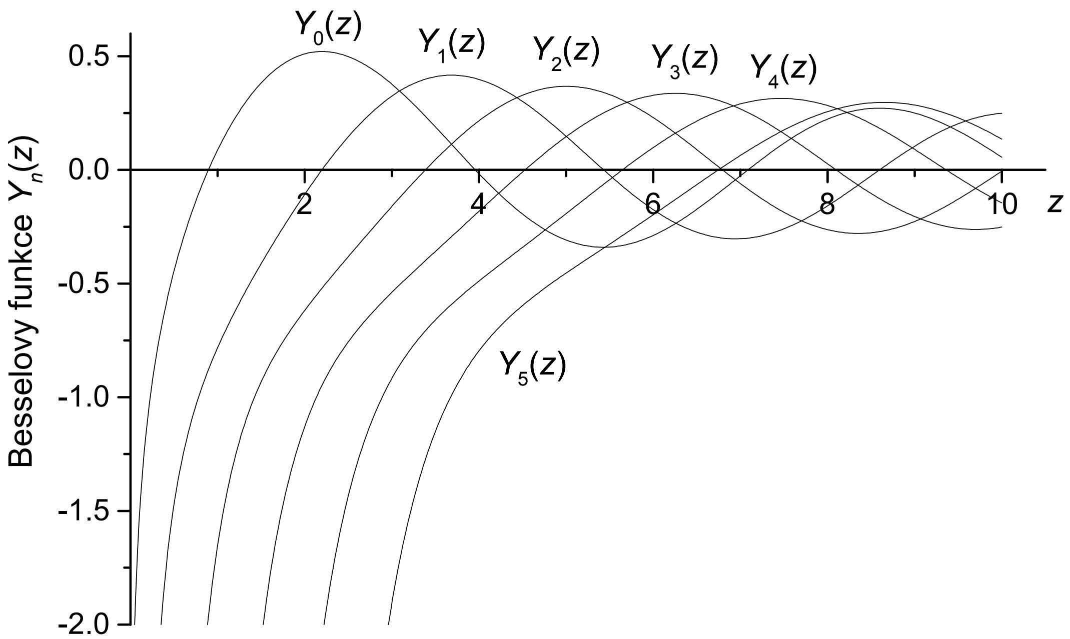
$$z^2\frac{d^2Z(z)}{dz^2}+z\frac{dZ(z)}{dz}+(z^2-n^2)Z(z)=0$$

$$Z(z)=AJ_n(z)+BY_n(z)\qquad Z_{n+1}(z)=\frac{2n}{z}Z_n(z)-Z_{n-1}(z)$$

Besselova funkce 1. druhu: $J_n(z)=\sum_{m=0}^{\infty}\frac{(-1)^m\left(\frac{z}{2}\right)^{2m+n}}{m!(m+n)!}$



Besselova funkce 2. druhu: $Y_n(z)=\frac{2}{\pi}\left(\gamma_e+\ln\frac{z}{2}\right)J_n(z)-\frac{1}{\pi}\sum_{m=0}^{n-1}\frac{(m-n-1)}{m!}\left(\frac{2}{z}\right)^{n-2m}$

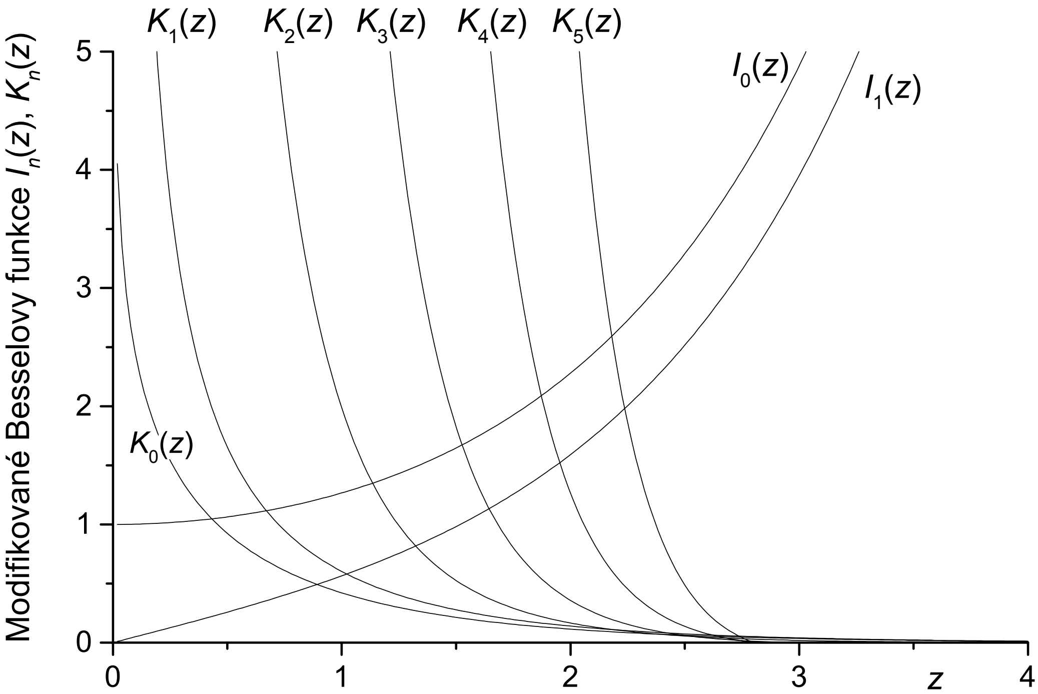


Modifikované Besselovy funkce

$$z^2 \frac{d^2 Z(z)}{dz^2} + z \frac{dZ(z)}{dz} - (z^2 + n^2) Z(z) = 0$$

$$Z(z) = A I_n(z) + B K_n(z) \qquad I_n(z) = (-i)^n J_n(iz),\ K_n(z) = \frac{i^{n+1}\pi}{2} H_n^{(1)}(iz)$$

$$I_n(z) = (z/2)^n \sum_{k=0}^{\infty} \frac{(z/2)^{2k}}{k!(k+n)!}$$



Hankelova funkce prvého a druhého druhu: $H_n^{1,2} = J_n(z) \pm i Y_n(z)$