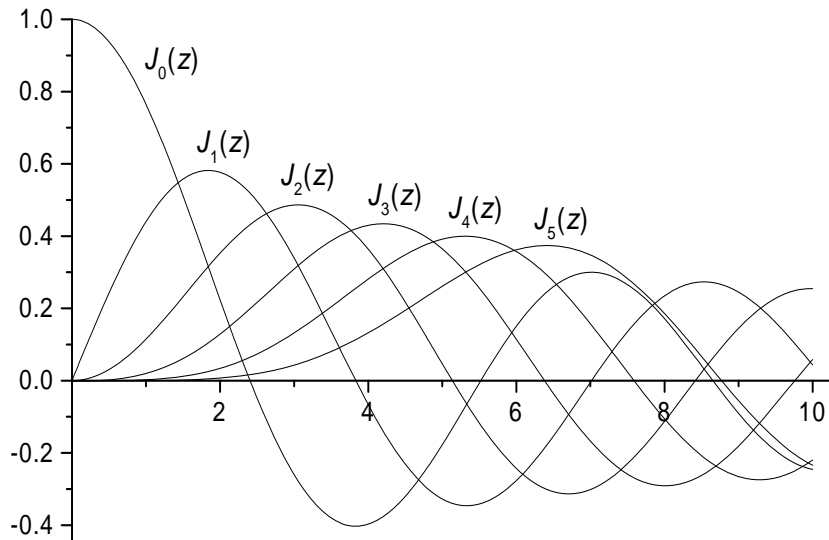


Besselovy funkce

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

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

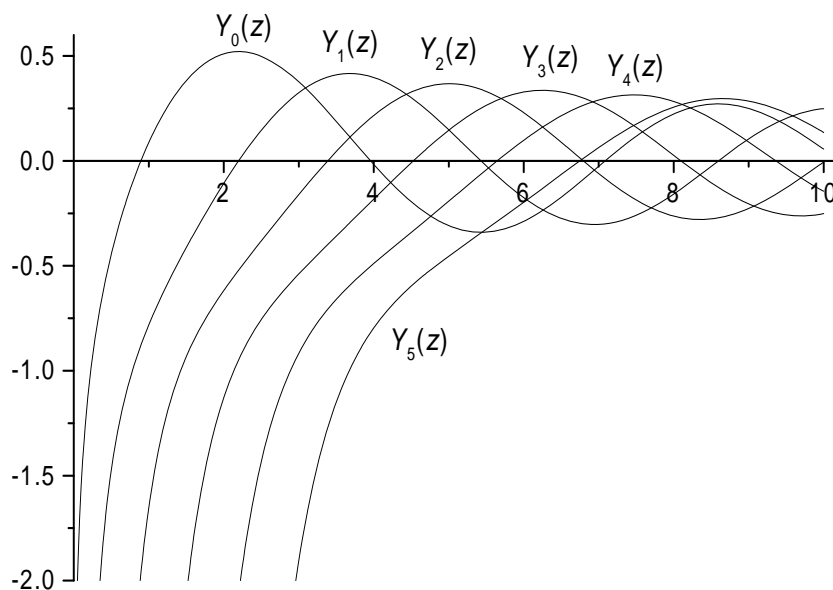
Besselova funkce 1. druhu: $J_n(z) = \sum_{m=0}^{\infty} \frac{(-1)^m \left(\frac{z}{2}\right)^{2m+n}}{m!(m+n)!}$



Besselova funkce 2. druhu (Neumannova, Weberova):

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

$\gamma_e = 0.577215665\dots$



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

Modifikované Besselovy funkce

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

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

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

