

$$l := 1.5$$

$$d := 10 \cdot 10^{-3} = 0.01$$

$$A_{sez} := \frac{\pi \cdot d^2}{4} = 7.854 \times 10^{-5}$$

$$E := 206000 \cdot 10^6 = 2.06 \times 10^{11}$$

$$\rho := 7800$$

$$c := \sqrt{\frac{E}{\rho}} = 5139.091$$

$$k_{assiale} := \frac{E \cdot A_{sez}}{l} = 1.079 \times 10^7$$

Rigidezza assiale della barra

$$k := 3 \cdot 10^7$$

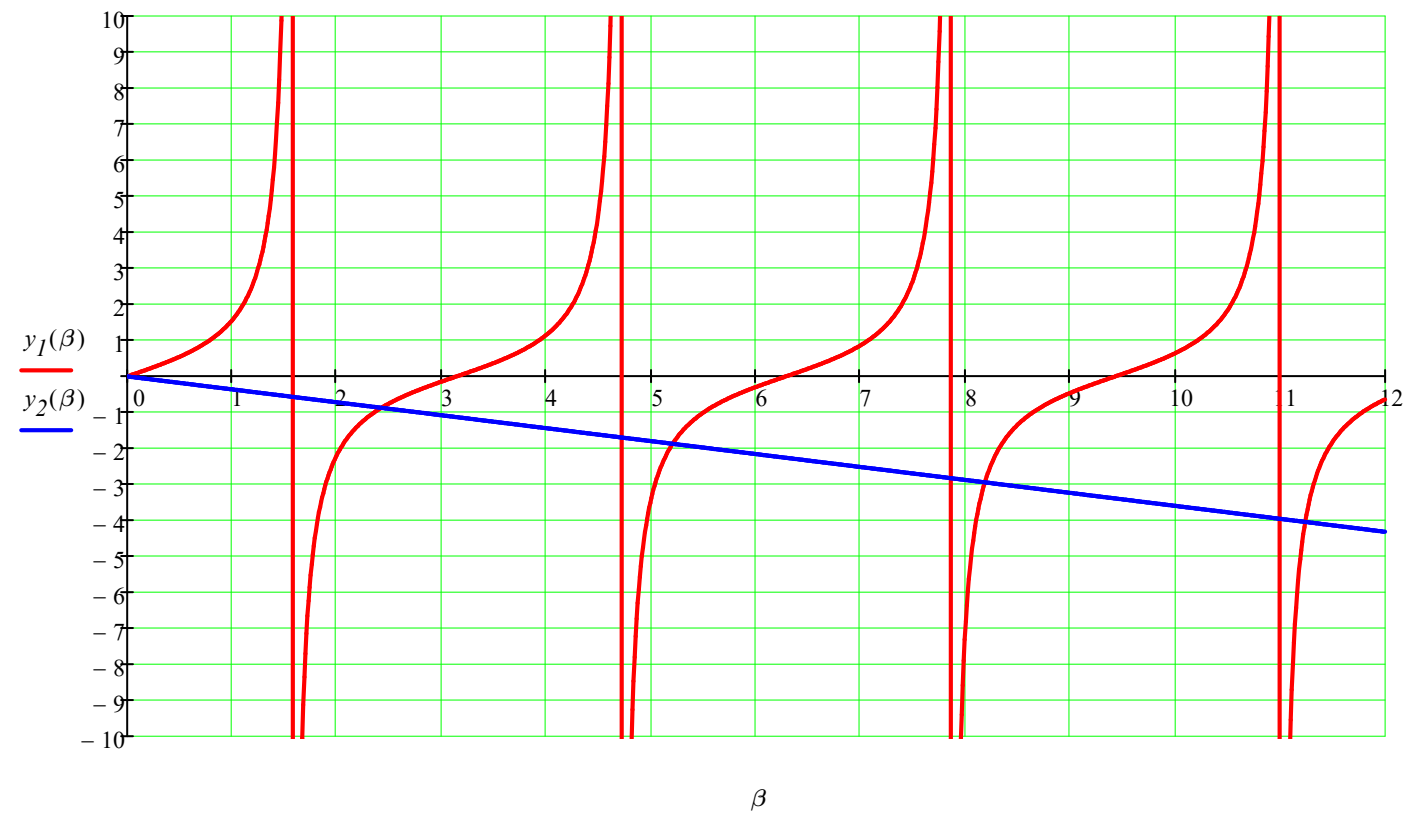
$$y_1(\beta) := \tan(\beta)$$

$$b := \frac{E \cdot A_{sez}}{k \cdot l} = 0.36$$

$$y_2(\beta) := -b \cdot \beta$$

$$\beta := 0, 0.01 .. 12$$

$$FS := 10$$



$$F(\beta) := \tan(\beta) + b \cdot \beta$$

$$\beta := 2$$

$$\beta_1 := \text{root}(F(\beta), \beta) = 2.425$$

$$\beta := 5$$

$$\beta_2 := \text{root}(F(\beta), \beta) = 5.203$$

$$\beta := 8$$

$$\beta_3 := \text{root}(F(\beta), \beta) = 8.182$$

$$\beta := 11$$

$$\beta_4 := \text{root}(F(\beta), \beta) = 11.238$$

rad/s

Hz

$$\beta_1 = 2.425$$

$$\omega_1 := \frac{c}{l} \cdot \beta_1 = 8306.868$$

$$f_1 := \frac{\omega_1}{2 \cdot \pi} = 1322.079$$

$$\beta_2 = 5.203$$

$$\omega_2 := \frac{c}{l} \cdot \beta_2 = 17826.764$$

$$f_2 := \frac{\omega_2}{2 \cdot \pi} = 2837.218$$

$$\beta_3 = 8.182$$

$$\omega_3 := \frac{c}{l} \cdot \beta_3 = 28030.912$$

$$f_3 := \frac{\omega_3}{2 \cdot \pi} = 4461.258$$

$$\beta_4 = 11.238$$

$$\omega_4 := \frac{c}{l} \cdot \beta_4 = 38502.721$$

$$f_4 := \frac{\omega_4}{2 \cdot \pi} = 6127.898$$