

Beam properties

$$\begin{aligned} a &:= 0 & E &:= 200 \cdot 10^9 \\ b &:= 6 & I &:= 3 \cdot 10^{-4} \end{aligned}$$

$$\underline{L} := 6$$

Load

$$P := 0.5 \cdot 10^6$$

Elastic Curve (b->L)

$$v_3(x) := \frac{(b-a)}{6} \cdot x^3 - \frac{(b^2-a^2)}{4} \cdot x^2 + \frac{1}{24} \left[\Phi(x-b) \cdot (x-b)^4 - \Phi(x-a) \cdot (x-a)^4 \right]$$

$$V_3(x) := \frac{d}{dx} v_3(x)$$

Constants

$$k_1 := v_3(L) = -162 \quad k_2 := V_3(L) = -36$$

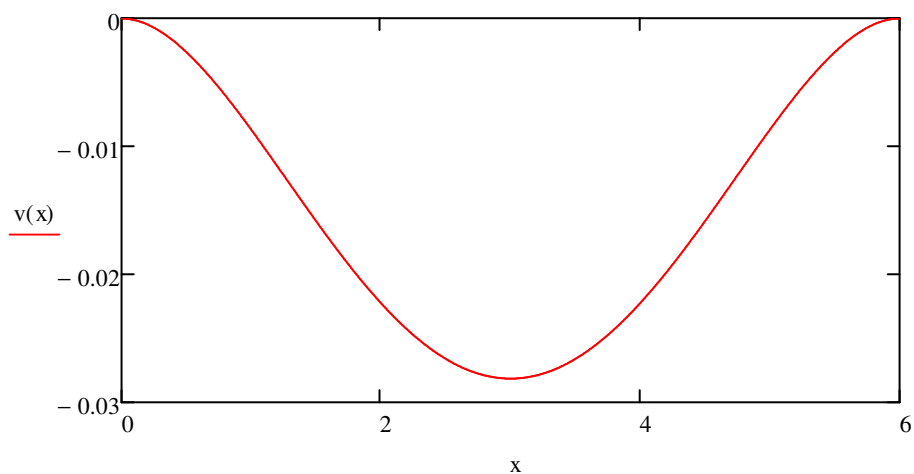
$$M := \frac{4 \cdot L \cdot k_2 - 6 \cdot k_1}{L^2} \quad \underline{R} := \frac{6(L \cdot k_2 - 2 \cdot k_1)}{L^3}$$

Elastic Curve (0->a, a->b)

$$v_1(x) := \frac{x^2 \cdot R}{6} (3 \cdot L - x) \quad v_2(x) := \frac{-M \cdot x^2}{2}$$

Complete Elastic Curve

$$v(x) := \frac{P}{E \cdot I} (v_1(x) + v_2(x) + v_3(x))$$



Reference Elastic Curve And Error Plot

$$v_R(x) := \frac{P}{E \cdot I} \cdot \left(\frac{L}{12} \cdot x^3 - \frac{1}{24} \cdot x^4 - \frac{L^2}{24} \cdot x^2 \right)$$

