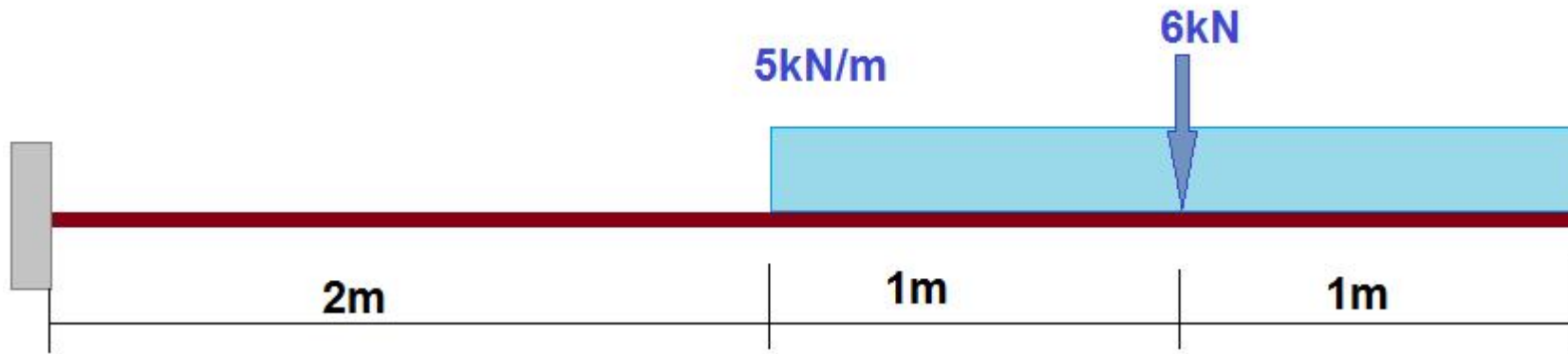


ORIGIN := 0



$$q := 5 \frac{\text{kN}}{\text{m}} \quad P := 6\text{kN}$$

$$L := 4\text{m} \quad b := 10\text{cm} \quad h := 18\text{cm} \quad L1 := 2\text{m} \quad L2 := 3\text{m} \quad n := 8$$

$$\Delta := \frac{L}{n} \quad J := b \cdot \frac{h^3}{12} \quad E := 10^7 \text{ kPa} \quad \alpha := \frac{\Delta^2}{E \cdot J} = 5.144 \times 10^{-7} \frac{1}{\text{N}}$$

$$R0 := P + q \cdot (L - L1)$$

$$M0 := q \cdot (L - L1) \cdot \left[L1 + \frac{(L - L1)}{2} \right] + P \cdot L2$$

$$R0 = 16 \cdot \text{kN}$$

$$M0 = 48 \cdot \text{kN} \cdot \text{m}$$

$$M1(x) := R0 \cdot x - M0$$

$$M2(x) := M1(x) - q \cdot \frac{(x - L1)^2}{2}$$

$$M3(x) := M2(x) - P \cdot (x - L2)$$

$i := 0.. n$

$X_i := i \cdot \Delta$

$i := 0.. 4$

$M_i := M1(X_i)$

$i := 5.. 6$

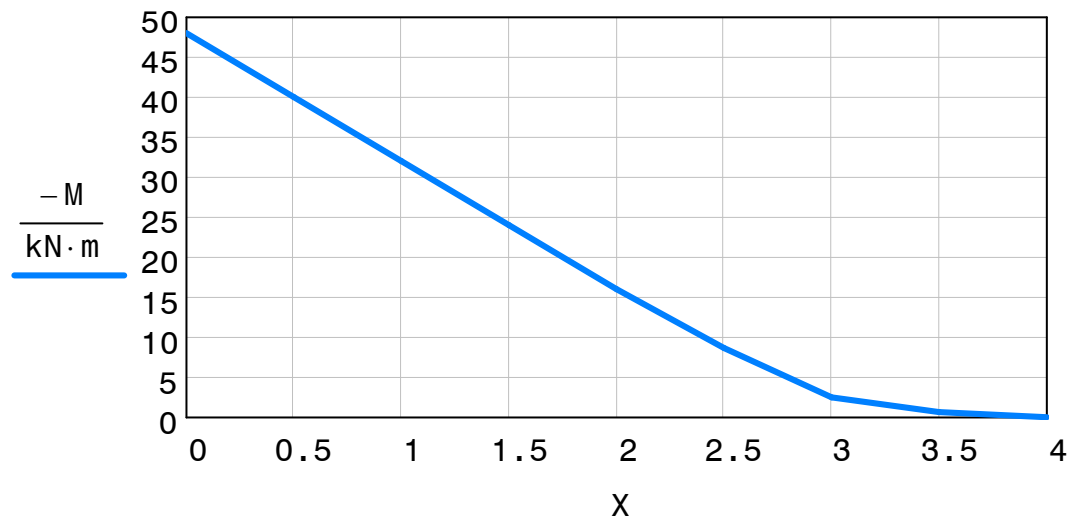
$M_i := M2(X_i)$

$i := 7.. n$

$M_i := M3(X_i)$

$$M = \begin{pmatrix} -48 \\ -40 \\ -32 \\ -24 \\ -16 \\ -8.625 \\ -2.5 \\ -0.625 \\ 0 \end{pmatrix} \cdot \text{kN} \cdot \text{m}$$

$$X = \begin{pmatrix} 0 \\ 0.5 \\ 1 \\ 1.5 \\ 2 \\ 2.5 \\ 3 \\ 3.5 \\ 4 \end{pmatrix} \text{ m}$$



$$A_{n,n} := 0 \quad A_{0,0} := 1 \quad A_{n,1} := 1$$

$$i := 1 .. n - 1$$

$$A_{i,i} := -2 \quad A_{i,i-1} := 1 \quad A_{i,i+1} := 1$$

$$d := \alpha \cdot M \quad d_n := -M_0 \cdot \frac{\alpha}{2} \quad d_0 := 0$$

$$y := \text{lsolve}(A, d) \quad |A| = -1$$

$$A = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & -2 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & -2 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & -2 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & -2 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & -2 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & -2 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & -2 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix} \quad d = \begin{pmatrix} 0 \\ -20.576 \\ -16.461 \\ -12.346 \\ -8.23 \\ -4.437 \\ -1.286 \\ -0.322 \\ -12.346 \end{pmatrix} \cdot \text{mm} \quad y = \begin{pmatrix} 0 \\ -0.012 \\ -0.045 \\ -0.095 \\ -0.156 \\ -0.226 \\ -0.301 \\ -0.376 \\ -0.452 \end{pmatrix} \cdot \text{m}$$

