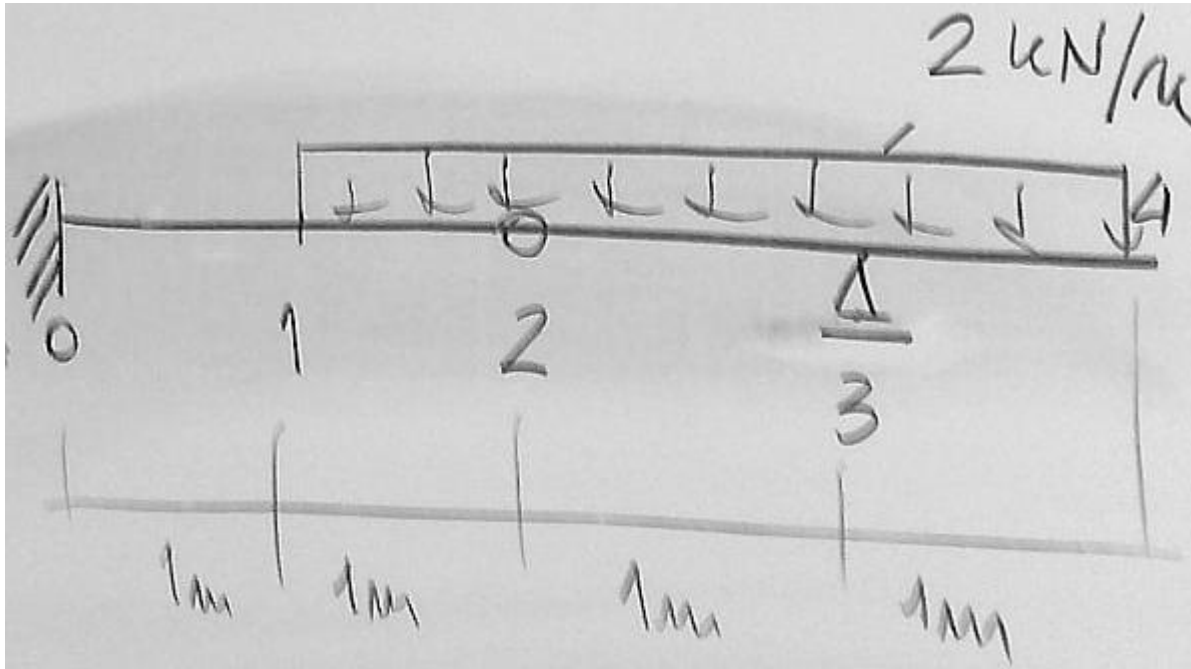


ORIGIN := 0



$$q := 2 \frac{\text{kN}}{\text{m}} \quad P := 0 \text{ kN}$$

$$\underline{L} := 4 \text{ m} \quad b := 10 \text{ cm} \quad h := 15 \text{ cm} \quad \underline{J} := b \cdot \frac{h^3}{12} \quad E := 12 \text{ GPa}$$

$$R3 := \frac{q \cdot 2 \text{ m} \cdot 1 \text{ m}}{1 \text{ m}} \quad T2 := q \cdot 2 \text{ m} - R3 \quad R0 := q \cdot 3 \text{ m} - R3$$

$$M0 := T2 \cdot 2 \text{ m} + q \cdot 1 \text{ m} \cdot 1.5 \text{ m} \quad T2 = 0 \cdot \text{kN} \quad M0 = 3 \cdot \text{kN} \cdot \text{m} \quad R3 = 4 \cdot \text{kN}$$

$$n := 4 \quad \Delta := \frac{L}{n} = 1 \text{ m} \quad \alpha := \frac{\Delta^2}{E \cdot J} \quad \alpha = 2.963 \times 10^{-3} \cdot \frac{1}{\text{kN}}$$

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

$$M2(x) := M1(x) - q \cdot \frac{(x - 1\text{m})^2}{2}$$

$$M3(x) := -q \cdot \frac{(4\text{m} - x)^2}{2}$$

$$i := 0 \dots n \quad X_i := i \cdot \Delta$$

$$i := 0 \dots 1 \quad M_i := M1(X_i)$$

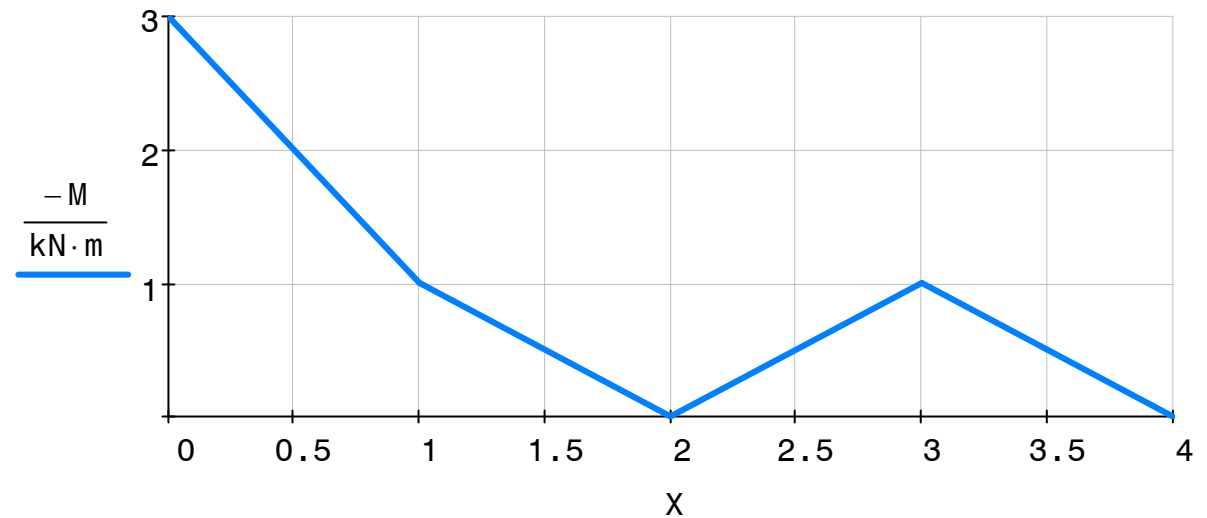
$$i := 2 \dots 3 \quad M_i := M2(X_i)$$

$$i := 3 \dots n \quad M_i := M3(X_i)$$

Układ równań metody różnic skończonych

$$A \cdot y = \alpha \cdot M$$

$$M = \begin{bmatrix} & 0 \\ 0 & -3 \\ 1 & -1 \\ 2 & 0 \\ 3 & -1 \\ 4 & 0 \end{bmatrix} \cdot \text{kN} \cdot \text{m} \quad X = \begin{bmatrix} & 0 \\ 0 & 0 \\ 1 & 1 \\ 2 & 2 \\ 3 & 3 \\ 4 & 4 \end{bmatrix} \text{m}$$



$$A := \begin{pmatrix} 0 & 2 & 0 & 0 & 0 \\ 1 & -2 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & -2 & 1 \\ 0 & 0 & 0 & 1 & 0 \end{pmatrix}$$

$$y := \text{lsolve}(A, \alpha \cdot M)$$

$$y = \begin{pmatrix} 0 \\ -4.444 \\ -11.852 \\ 0 \\ 8.889 \end{pmatrix} \cdot \text{mm}$$

