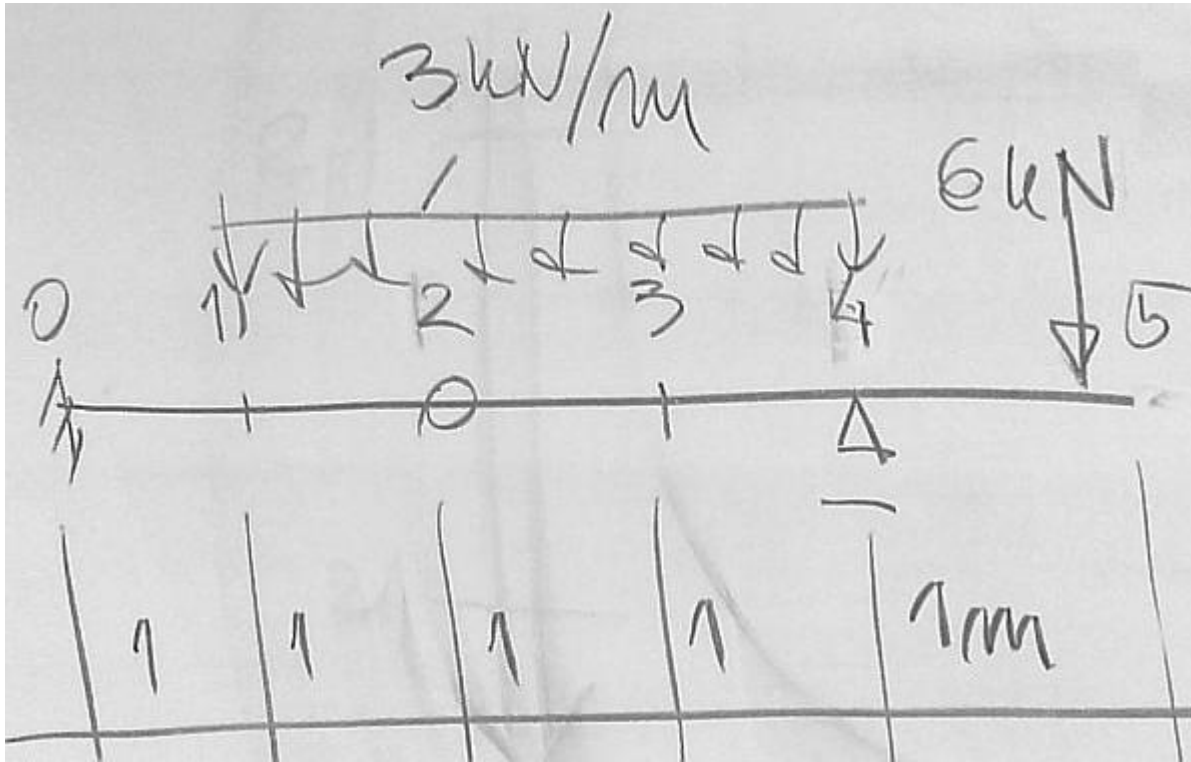


ORIGIN := 0



$$q := 3 \frac{\text{kN}}{\text{m}} \quad P := 6 \text{ kN}$$

$$\underline{L} := 5 \text{ m} \quad b := 10 \text{ cm} \quad h := 18 \text{ cm} \quad \underline{J} := b \cdot \frac{h^3}{12} \quad E := 13 \text{ GPa}$$

$$R4 := \frac{q \cdot 2 \text{ m} \cdot 1 \text{ m} + P \cdot 3 \text{ m}}{2 \text{ m}} \quad T2 := q \cdot 2 \text{ m} + P - R4 \quad R0 := q \cdot 3 \text{ m} + P - R4$$

$$M0 := T2 \cdot 2 \text{ m} + q \cdot 1 \text{ m} \cdot 1.5 \text{ m} \quad T2 = 0 \cdot \text{kN} \quad M0 = 4.5 \cdot \text{kN} \cdot \text{m} \quad R4 = 12 \cdot \text{kN}$$

$$n := 5 \quad \Delta := \frac{L}{n} = 1 \text{ m} \quad \alpha := \frac{\Delta^2}{E \cdot J} \quad \alpha = 1.583 \times 10^{-3} \cdot \frac{1}{\text{kN}}$$

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

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

$$M3(x) := -P \cdot (L - x)$$

$$i := 0 \ldots n \qquad X_i := i \cdot \Delta$$

$$i := 0 \ldots 1 \qquad M_i := M1(X_i)$$

$$i := 2 \ldots 4 \qquad M_i := M2(X_i)$$

$$i := 4 \ldots n \qquad M_i := M3(X_i)$$

M =

| | |
|---|------|
| | 0 |
| 0 | -4.5 |
| 1 | -1.5 |
| 2 | 0 |
| 3 | -1.5 |
| 4 | -6 |
| 5 | 0 |

· kN · m

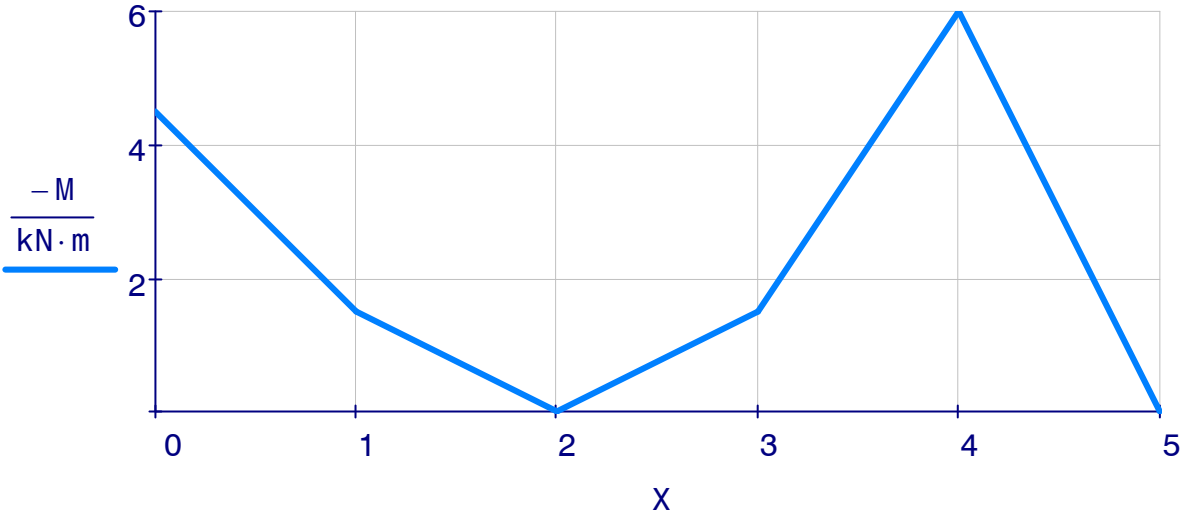
X =

| | |
|---|---|
| | 0 |
| 0 | 0 |
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |

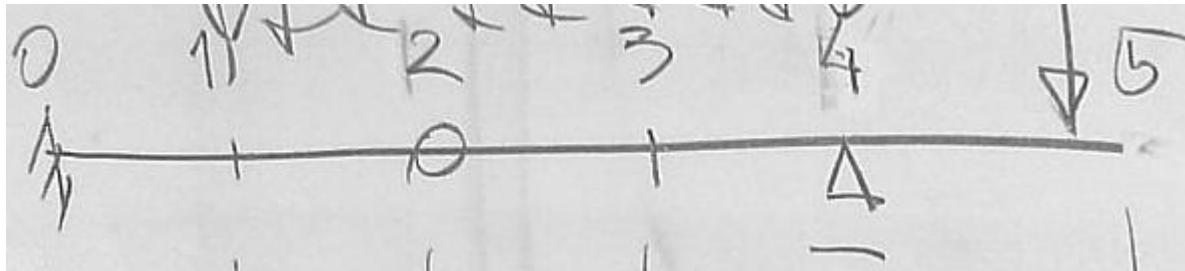
m

Układ równań metody różnic skończonych

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



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



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

$$y = \begin{pmatrix} 0 \\ -3.561 \\ -9.497 \\ -3.561 \\ 0 \\ -5.935 \end{pmatrix} \cdot \text{mm}$$

