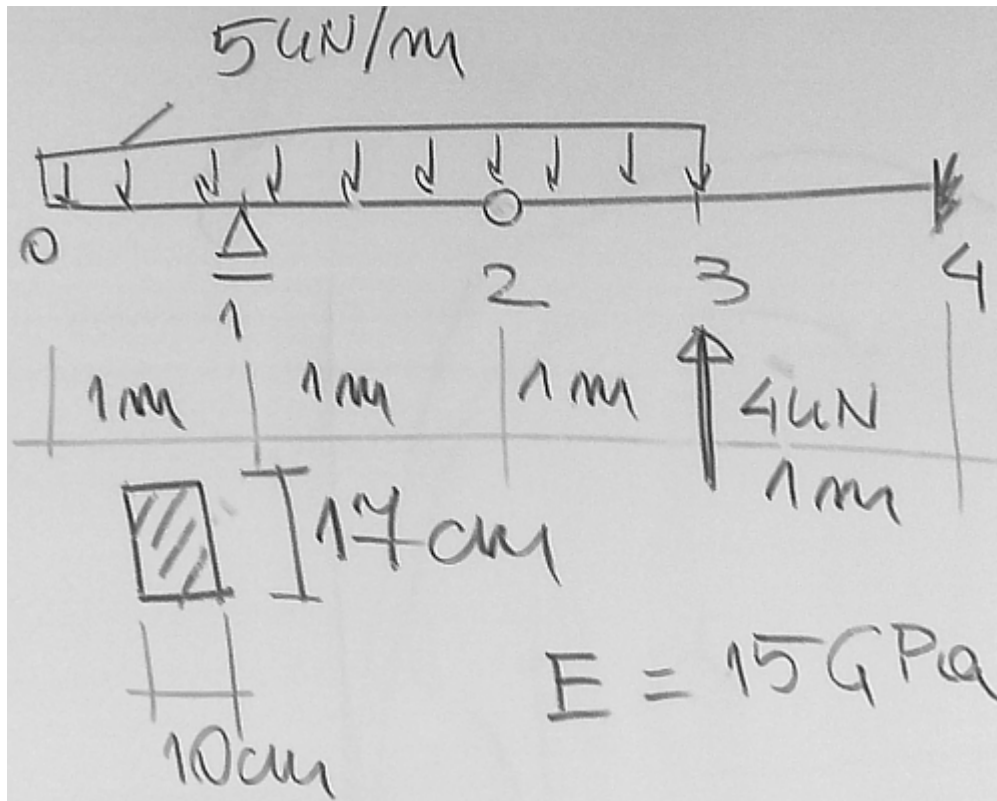


Metoda różnic skończonych - ugięcie belki



$$P := 4 \text{ kN} \quad q := 5 \frac{\text{kN}}{\text{m}} \quad E := 15 \text{ GPa}$$

$$L := 4 \text{ m} \quad b := 10 \text{ cm} \quad h := 17 \text{ cm}$$

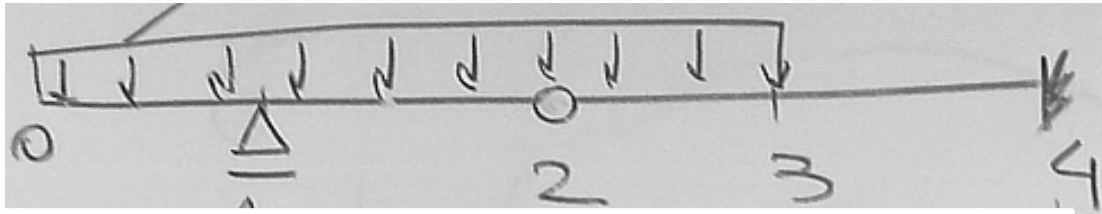
$$J := b \cdot \frac{h^3}{12} = 4.094167 \times 10^3 \cdot \text{cm}^4$$

$$R1 := q \cdot 2 \text{ m} = 10 \cdot \text{kN}$$

$$n := 4 \quad \Delta := \frac{L}{n} = 1 \text{ m} \quad \alpha := \frac{\Delta^2}{E \cdot J} \quad \alpha = 1.6283 \cdot \frac{1}{\text{MN}}$$

$$M1(x) := -q \cdot \frac{x^2}{2} \quad M2(x) := M1(x) + R1 \cdot (x - 1 \text{ m})$$

$$M3(x) := M2(x) + q \cdot \frac{(x - 3 \text{ m})^2}{2} + P \cdot (x - 3 \text{ m})$$



$$M = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & 0 \\ \hline 1 & -2.5 \\ \hline 2 & 0 \\ \hline 3 & -2.5 \\ \hline 4 & -3.5 \\ \hline \end{array} \quad \text{kN} \cdot \text{m}$$

Równania MRS

$$y_1 = 0 \quad y_4 = 0 \quad \varphi_4 = 0$$

$$y_0 - 2y_1 + y_2 = \alpha M_1$$

$$2y_3 = \alpha M_4$$

$$y_2 - 2y_3 + y_4 = \alpha M_3$$

$$\alpha = 1.6283 \cdot \frac{1}{\text{MN}}$$

$$y = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & 5.70 \\ \hline 1 & 0.00 \\ \hline 2 & -9.77 \\ \hline 3 & -2.85 \\ \hline 4 & 0.00 \\ \hline \end{array} \quad \cdot \text{mm}$$

