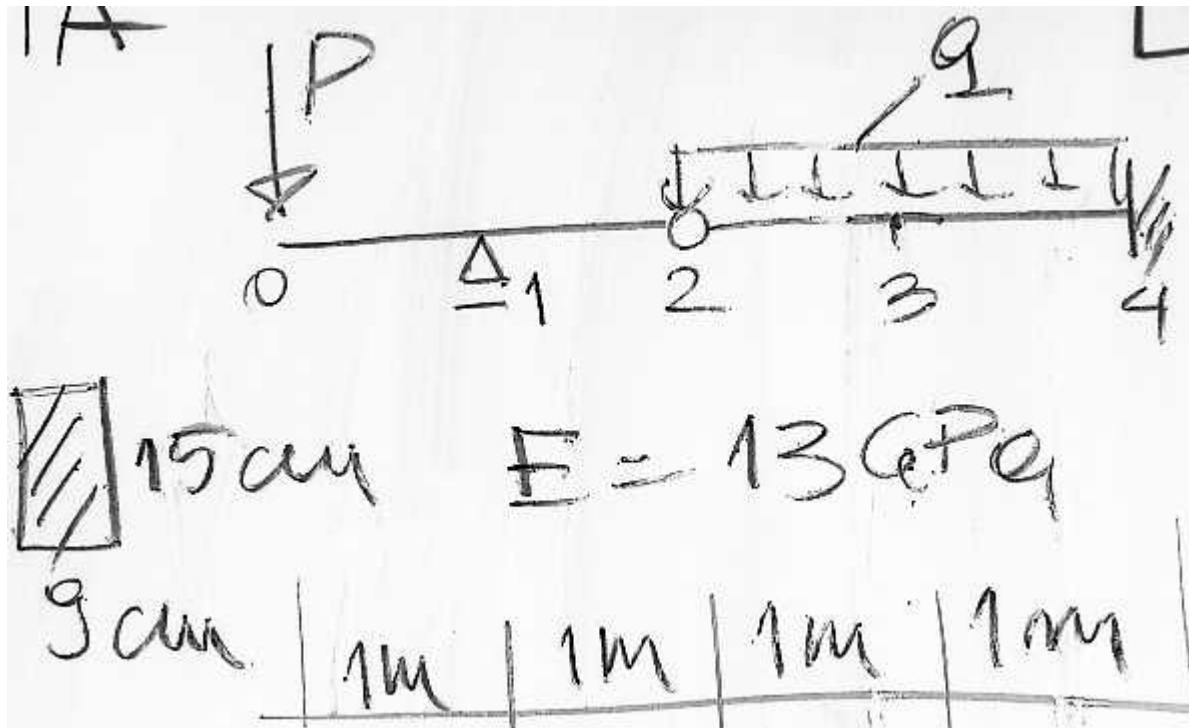


Grupa 1A - Metoda różnic skończonych - ugięcie belki



$$P := 5 \text{ kN} \quad q := 3 \frac{\text{kN}}{\text{m}} \quad E := 13 \text{ GPa}$$

$$b := 9 \text{ cm} \quad h := 15 \text{ cm}$$

$$L := 4 \text{ m} \quad J := b \cdot \frac{h^3}{12} = 2531.25 \cdot \text{cm}^4$$

$$n := 4 \quad \Delta := \frac{L}{n} = 1 \text{ m}$$

$$\alpha := \frac{\Delta^2}{E \cdot J} = 3.03894 \cdot \frac{1}{\text{MN}}$$

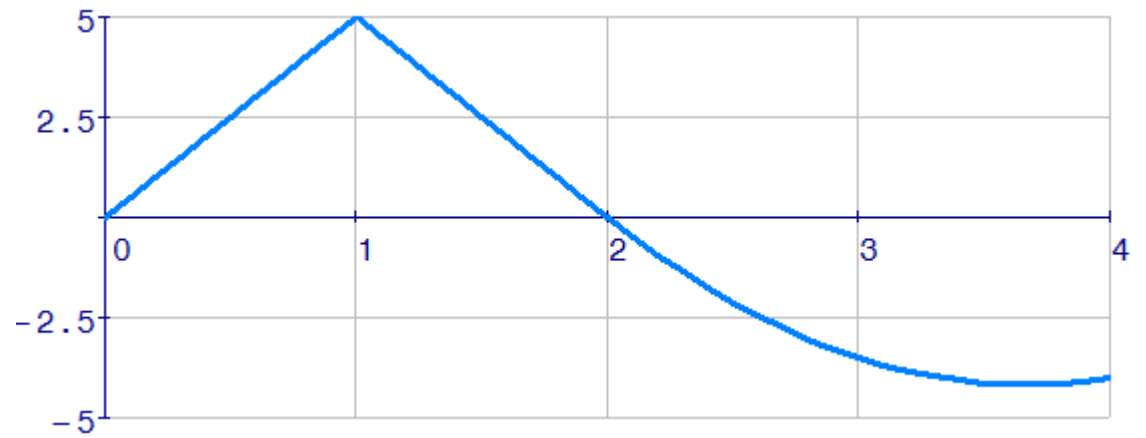
dokładność $y \pm 0.0005 \text{ mm}$

$$R1 := \frac{P \cdot 2 \text{ m}}{1 \text{ m}}$$

$$M1(x) := -P \cdot x \quad M2(x) := M1(x) + R1 \cdot (x - 1 \text{ m})$$

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

$$M = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & 0 \\ \hline 1 & -5 \\ \hline 2 & 0 \\ \hline 3 & 3.5 \\ \hline 4 & 4 \\ \hline \end{array} \cdot \text{kN} \cdot \text{m}$$

$$X = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & 0 \\ \hline 1 & 1 \\ \hline 2 & 2 \\ \hline 3 & 3 \\ \hline 4 & 4 \\ \hline \end{array} \text{m}$$


Warunki brzegowe

$$y_1 = 0 \quad y_4 = 0 \quad \varphi_4 = 0 \quad \text{-----} > \quad 2y_3 = \alpha M_4$$

$$\alpha = 3.03894 \cdot \frac{1}{\text{MN}}$$

Równania MRS

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

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

$$2y_3 = \alpha M_4$$

$$y = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & -37.987 \\ \hline 1 & 0.000 \\ \hline 2 & 22.792 \\ \hline 3 & 6.078 \\ \hline 4 & 0.000 \\ \hline \end{array} \cdot \text{mm}$$
