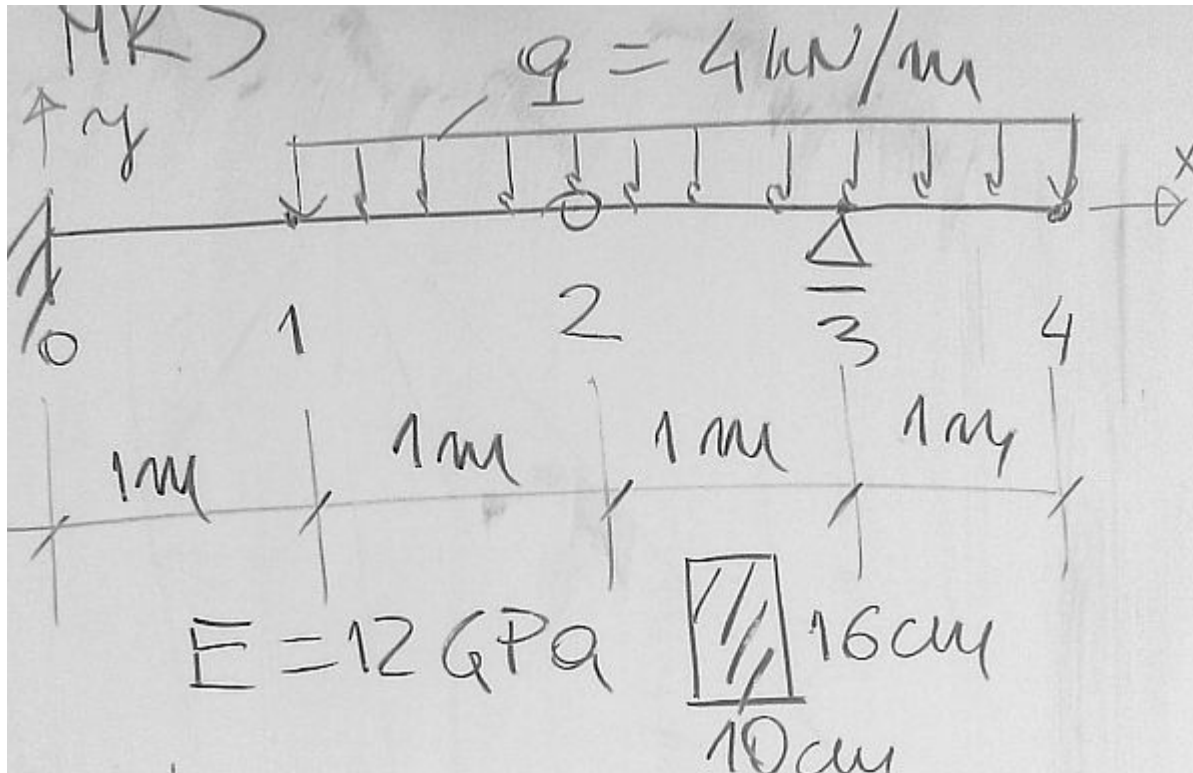


Metoda różnic skończonych - ugięcie belki



$$P := 0\text{ kN} \quad q := 4 \frac{\text{kN}}{\text{m}} \quad E := 12\text{ GPa}$$

$$b := 10\text{ cm} \quad h := 16\text{ cm}$$

$$L := 4\text{ m} \quad J := b \cdot \frac{h^3}{12} = 3413.3333 \cdot \text{cm}^4$$

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

$$\alpha := \frac{\Delta^2}{E \cdot J} = 2.44141 \cdot \frac{1}{\text{MN}}$$

$$R3 := q \cdot 2\text{ m}$$

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

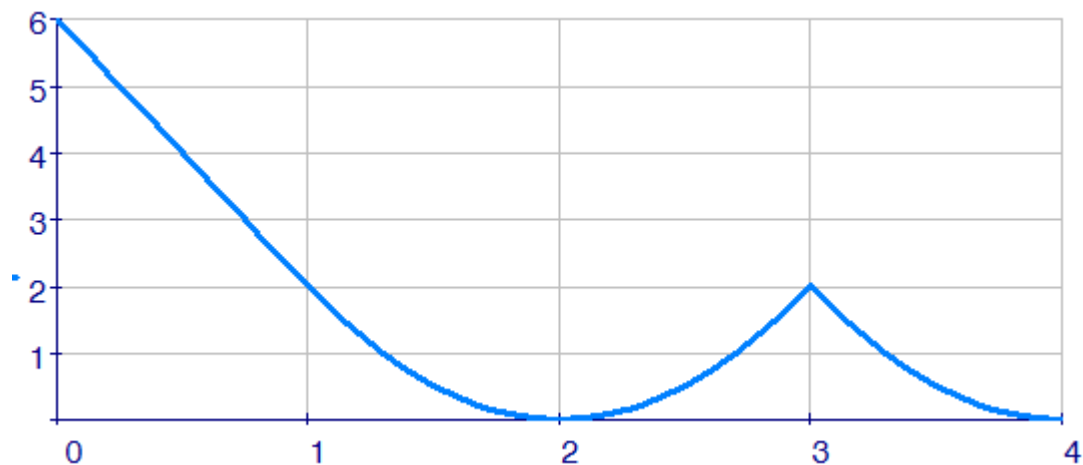
$$M2(x) := M3(x) + R3 \cdot (3\text{ m} - x)$$

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

dokładność $y \pm 0.005\text{ mm}$

$$M = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & -6 \\ \hline 1 & -2 \\ \hline 2 & 0 \\ \hline 3 & -2 \\ \hline 4 & 0 \\ \hline \end{array} \cdot \text{kN} \cdot \text{m}$$

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



Warunki brzegowe

$$y_0 = 0 \quad \varphi_0 = 0 \quad y_3 = 0$$

$$\alpha = 2.44141 \cdot \frac{1}{\text{MN}}$$

Równania MRS

$$2 y_1 = \alpha M_0$$

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

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

$$y = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & 0.00 \\ \hline 1 & -7.32 \\ \hline 2 & -19.53 \\ \hline 3 & 0.00 \\ \hline 4 & 14.65 \\ \hline \end{array} \cdot \text{mm}$$