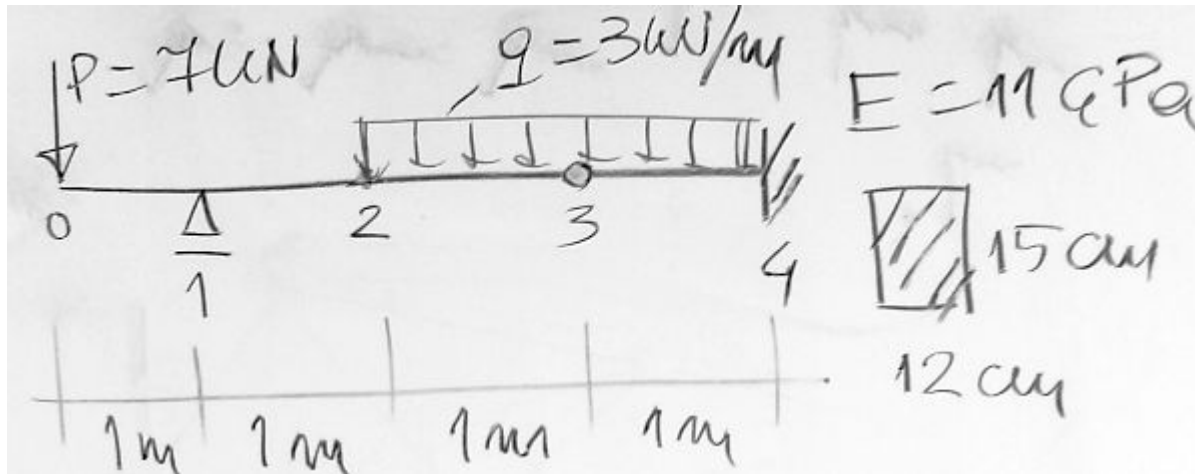


Metoda różnic skończonych - ugięcie belki



$$R1 := \frac{P \cdot 3\text{m} + q \cdot 1\text{m} \cdot 0.5\text{m}}{2\text{m}}$$

$$M1(x) := -P \cdot x$$

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

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

$$P := 7\text{kN} \quad q := 3 \frac{\text{kN}}{\text{m}} \quad E := 11\text{GPa}$$

$$b := 12\text{cm} \quad h := 15\text{cm}$$

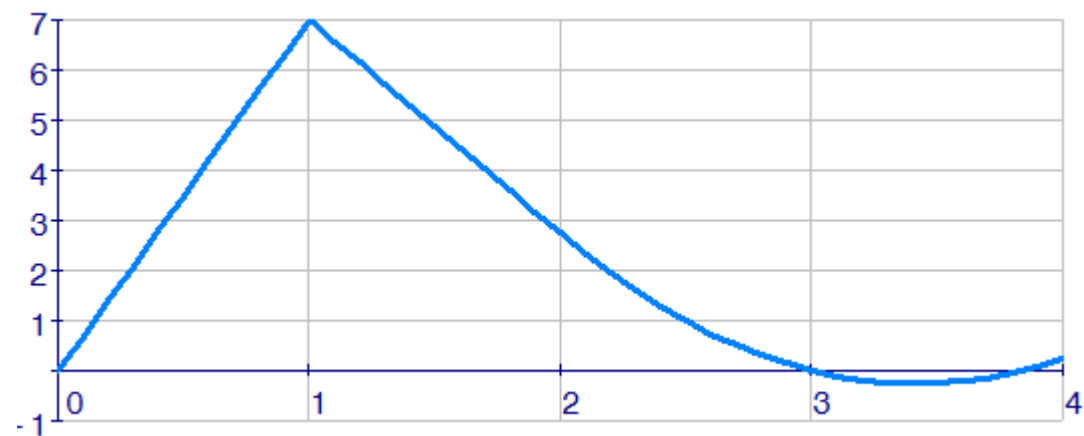
$$J := b \cdot \frac{h^3}{12} = 3375.0000 \cdot \text{cm}^4$$

$$\Delta = 1\text{m}$$

$$\alpha := \frac{\Delta^2}{E \cdot J} = 2.6936 \cdot \frac{1}{\text{MN}}$$

dokładność $y \pm 0.005\text{mm}$

$$M = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & 0 \\ \hline 1 & -7 \\ \hline 2 & -2.75 \\ \hline 3 & 0 \\ \hline 4 & -0.25 \\ \hline \end{array} \cdot \text{kN} \cdot \text{m} \quad X = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & 0 \\ \hline 1 & 1 \\ \hline 2 & 2 \\ \hline 3 & 3 \\ \hline 4 & 4 \\ \hline \end{array} \text{m}$$



Warunki brzegowe

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

$$\alpha = 2.6936 \cdot \frac{1}{\text{MN}}$$

Równania MRS

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

$$y_1 - 2y_2 + y_3 = \alpha M_2$$

$$2y_3 = \alpha M_4$$

$$y = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & -22.39 \\ \hline 1 & 0.00 \\ \hline 2 & 3.54 \\ \hline 3 & -0.34 \\ \hline 4 & 0.00 \\ \hline \end{array} \cdot \text{mm}$$

