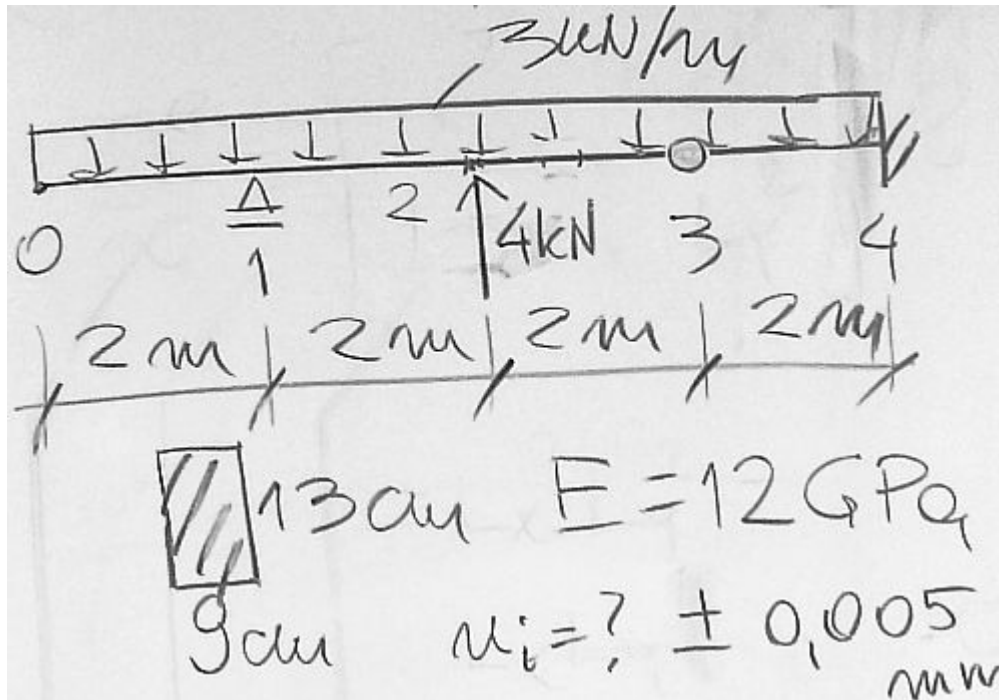


Metoda różnic skończonych - ugięcie belki



$$P := 4 \text{ kN} \quad q := 3 \frac{\text{kN}}{\text{m}} \quad E := 12 \text{ GPa}$$

$$b := 9 \text{ cm} \quad h := 13 \text{ cm}$$

$$L := 8 \text{ m} \quad J := b \cdot \frac{h^3}{12} = 1647.75 \cdot \text{cm}^4$$

$$n := 4 \quad \Delta := \frac{L}{n} = 2 \text{ m}$$

$$\alpha := \frac{\Delta^2}{E \cdot J} = 20.22961 \cdot \frac{1}{\text{MN}}$$

$$R1 := \frac{q \cdot 6 \text{ m} \cdot 3 \text{ m} - P \cdot 2 \text{ m}}{4 \text{ m}} = 11.500 \text{ kN}$$

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

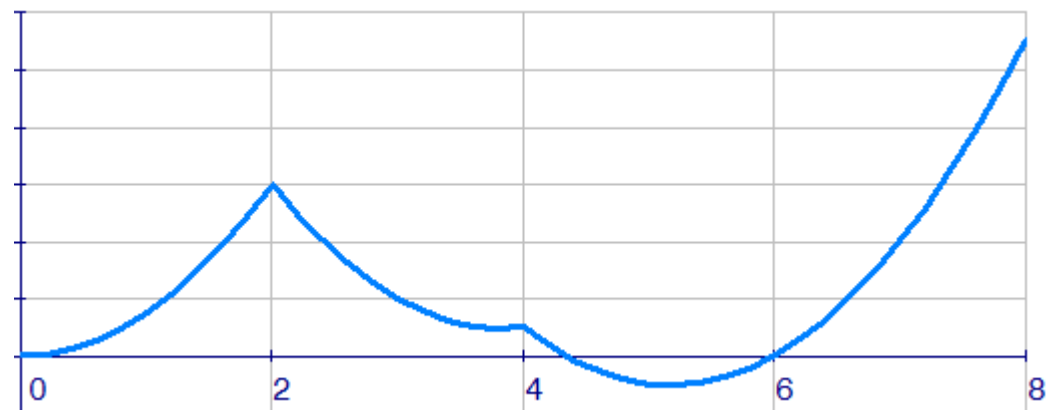
$$M2(x) := M1(x) + R1 \cdot (x - 2 \text{ m})$$

$$M3(x) := M2(x) + P \cdot (x - 4 \text{ m})$$

dokładność $y \pm 0.005 \text{ mm}$

$$M = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & 0 \\ \hline 1 & -6 \\ \hline 2 & -1 \\ \hline 3 & 0 \\ \hline 4 & -11 \\ \hline \end{array} \cdot \text{kN} \cdot \text{m}$$

$$X = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & 0 \\ \hline 1 & 2 \\ \hline 2 & 4 \\ \hline 3 & 6 \\ \hline 4 & 8 \\ \hline \end{array} \text{m}$$



Warunki brzegowe

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

$$\alpha = 20.22961 \cdot \frac{1}{\text{MN}}$$

Równania MRS

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

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

$$2y_3 = \alpha M_4$$

$$y = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & -75.86 \\ \hline 1 & 0.00 \\ \hline 2 & -45.52 \\ \hline 3 & -111.26 \\ \hline 4 & 0.00 \\ \hline \end{array} \cdot \text{mm}$$

