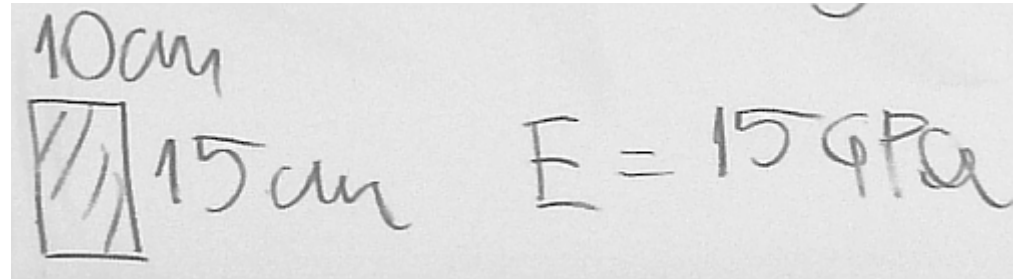
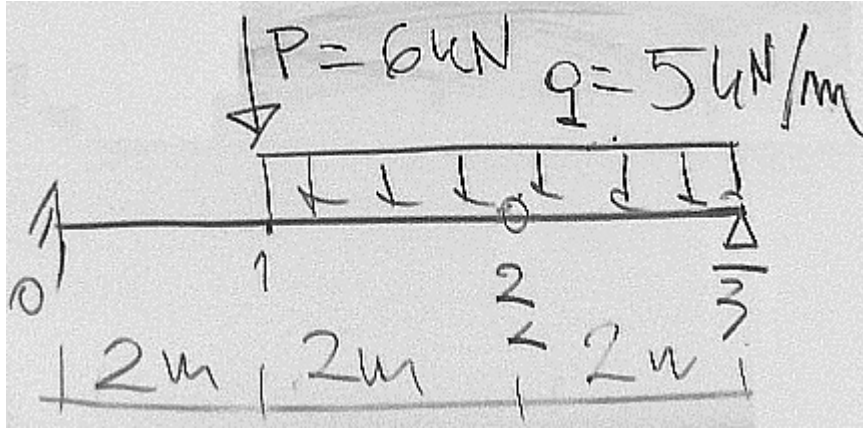


Metoda różnic skończonych - ugięcie belki



$$P := 6 \text{ kN} \quad q := 5 \frac{\text{kN}}{\text{m}} \quad E := 15 \text{ GPa}$$

$$L := 6 \text{ m} \quad b := 10 \text{ cm} \quad h := 15 \text{ cm} \quad J := b \cdot \frac{h^3}{12} = 2.813 \times 10^3 \cdot \text{cm}^4$$

$$R3 := \frac{q \cdot 2 \text{ m}}{2} = 5 \cdot \text{kN}$$

$$n := 3 \quad \Delta := \frac{L}{n} = 2 \text{ m} \quad \alpha := \frac{\Delta^2}{E \cdot J} \quad \alpha = 9.481 \cdot \frac{1}{\text{MN}}$$

$$M1(x) := R3 \cdot (6 \text{ m} - x) - q \cdot \frac{(6 \text{ m} - x)^2}{2}$$

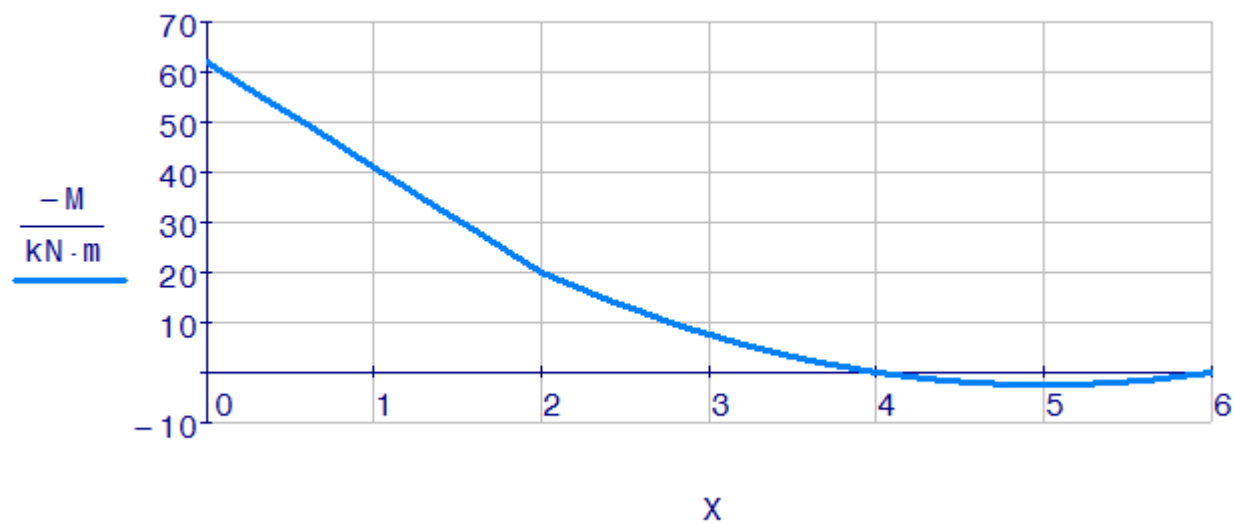
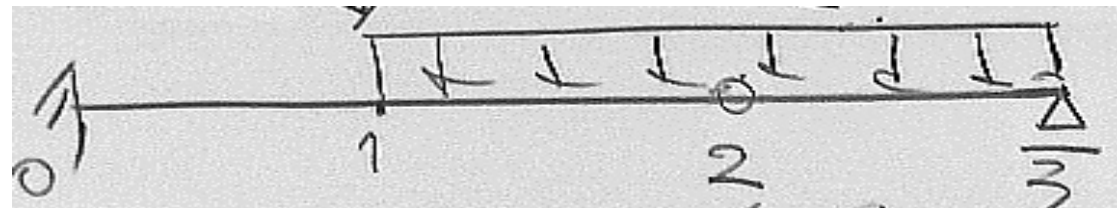
$$M2(x) := M1(x) - P \cdot (2 \text{ m} - x) + q \cdot \frac{(2 \text{ m} - x)^2}{2}$$

$$i := 0..n \quad X_i := i \cdot \Delta$$

$$i := 0..1 \quad M_i := M2(X_i)$$

$$i := 1..n \quad M_i := M1(X_i)$$

$$M = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & -62 \\ \hline 1 & -20 \\ \hline 2 & 0 \\ \hline 3 & 0 \\ \hline \end{array} \cdot \text{kN} \cdot \text{m}$$

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


Równania MRS

$$M = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & -62 \\ \hline 1 & -20 \\ \hline 2 & 0 \\ \hline 3 & 0 \\ \hline \end{array} \cdot \text{kN} \cdot \text{m}$$

$$y = \begin{array}{|c|c|} \hline & 0 \\ \hline 0 & -0.0 \\ \hline 1 & -293.9 \\ \hline 2 & -777.5 \\ \hline 3 & 0.0 \\ \hline \end{array} \cdot \text{mm}$$

$$y_0 = 0 \quad \varphi_0 = 0 \quad y_3 = 0 \quad \alpha = 9.48148 \cdot \frac{1}{\text{MN}}$$

$$2y_1 = \alpha M_0$$

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