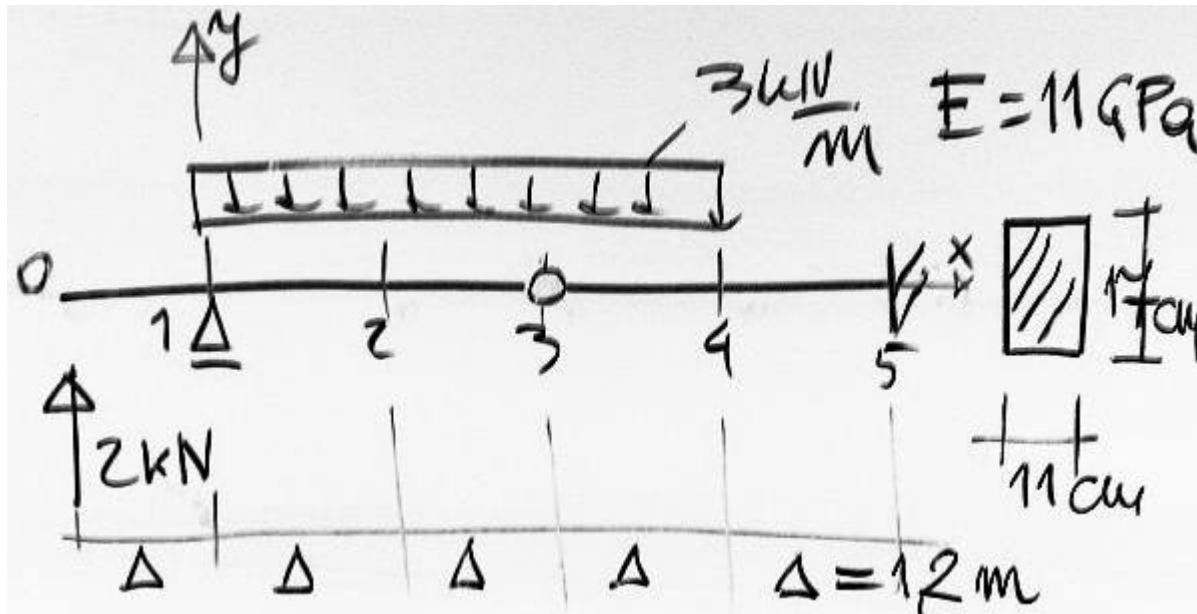


Metoda różnic skończonych - ugięcie belki



$$P := 2 \text{ kN} \quad q := 3 \frac{\text{kN}}{\text{m}} \quad E := 11 \text{ GPa}$$

$$b := 11 \text{ cm} \quad h := 17 \text{ cm} \quad L := 5 \cdot 1.2 \text{ m}$$

$$n := 5 \quad \Delta := \frac{L}{n} = 1.2 \text{ m}$$

$$J := b \cdot \frac{h^3}{12} = 4503.5833 \cdot \text{cm}^4$$

$$\alpha := \frac{\Delta^2}{E \cdot J} = 2.90678 \cdot \frac{1}{\text{MN}}$$

dokładność $y \pm 0.005 \text{ mm}$

$$R1 := \frac{q \cdot 2\Delta \cdot \Delta - P \cdot 3\Delta}{2\Delta} = 0.6 \cdot \text{kN}$$

$$M1(x) := P \cdot x \quad M2(x) := M1(x) - q \cdot \frac{(x - \Delta)^2}{2} + R1 \cdot (x - \Delta)$$

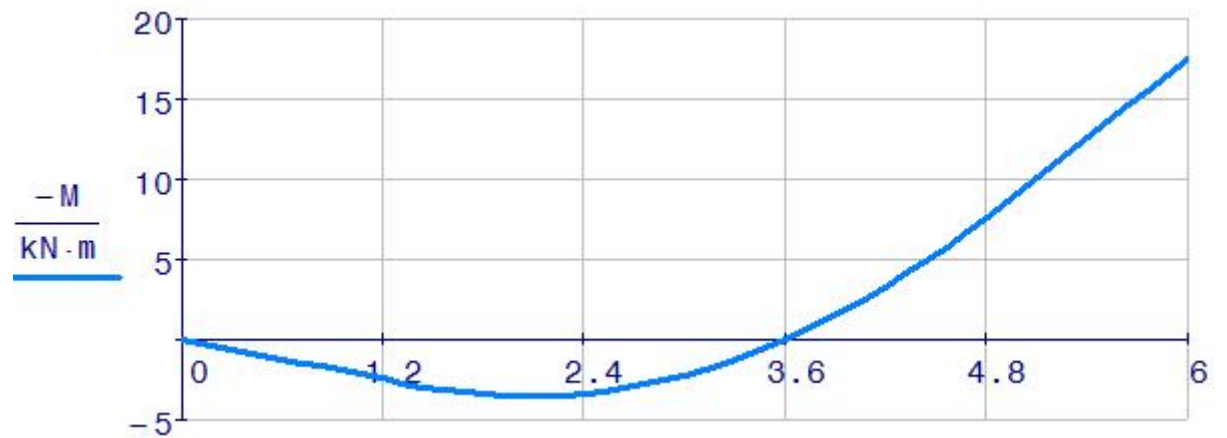
$$M3(x) := M2(x) + q \cdot \frac{(x - 4\Delta)^2}{2}$$

$$\frac{M}{\text{kN} \cdot \text{m}} =$$

	0
0	0
1	2.4
2	3.36
3	0
4	-7.68
5	-17.52

$$\frac{x}{\text{m}} =$$

	0
0	0
1	1.2
2	2.4
3	3.6
4	4.8
5	6



Warunki brzegowe

$$y_0 = 1 \quad y_5 = 0 \quad \varphi_5 = 0 \quad \text{-----} \rightarrow \quad 2 y_4 = \alpha M_5$$

Równania MRS

$$2 y_4 = \alpha M_5$$

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

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

$$y_3 - 2 y_4 + y_5 = \alpha M_4$$

$$y =$$

	0
0	48.485
1	0.000
2	-41.509
3	-73.251
4	-25.463
5	0.000

$$\cdot \text{mm}$$

$$\alpha = 2.90678 \cdot \frac{1}{\text{MN}}$$

