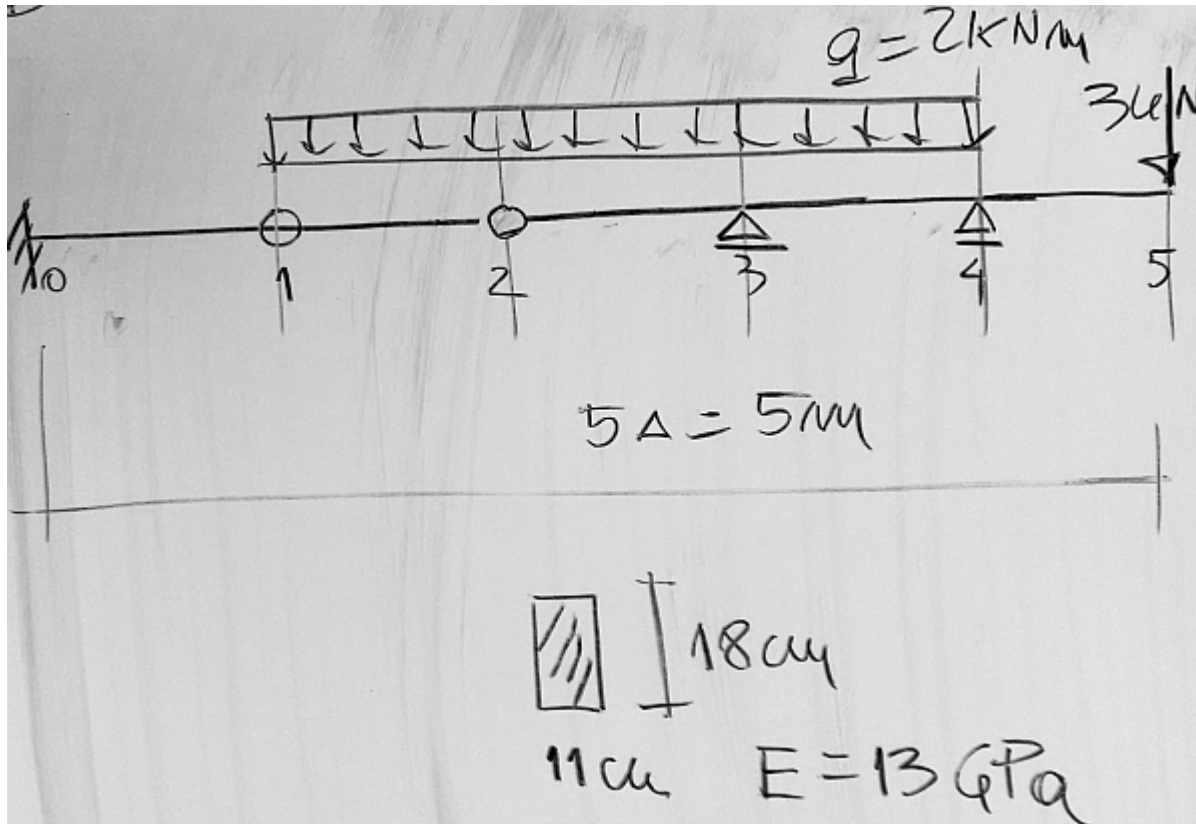


Metoda różnic skończonych - ugięcie belki



$$P := 3\text{ kN} \quad q := 2 \frac{\text{kN}}{\text{m}} \quad E := 13\text{ GPa}$$

$$b := 11\text{ cm} \quad h := 18\text{ cm}$$

$$L := 5\text{ m} \quad J := b \cdot \frac{h^3}{12} = 5346 \cdot \text{cm}^4$$

$$n := 5 \quad \Delta := \frac{L}{n} = 1\text{ m}$$

$$\alpha := \frac{\Delta^2}{E \cdot J} = 1.43889 \cdot \frac{1}{\text{MN}}$$

$$T1 := q \cdot \frac{1\text{ m}}{2} \quad R1 := T1 = 1 \cdot \text{kN} \quad R3 := \frac{q \cdot 2\text{ m} \cdot 1\text{ m} - P \cdot 1\text{ m} + T1 \cdot 2\text{ m}}{1\text{ m}} = 3 \cdot \text{kN}$$

dokładność $y \pm 0.0005\text{ mm}$

$$M1(x) := -T1 \cdot (1\text{ m} - x) \quad M2(x) := M1(x) - q \cdot \frac{(x - 1\text{ m})^2}{2} \quad M3(x) := M2(x) + R3 \cdot (x - 3\text{ m})$$

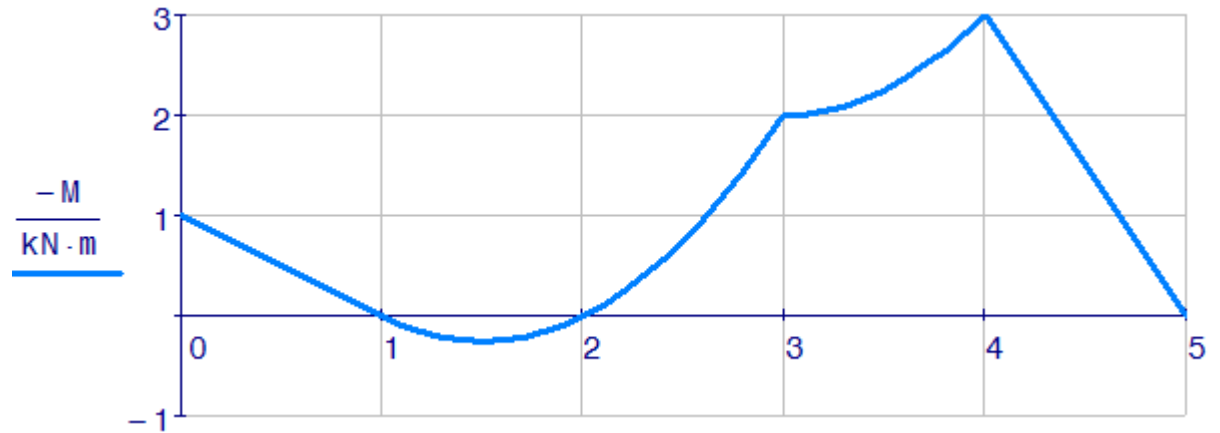
$$M4(x) := -P \cdot (5\text{ m} - x)$$

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

	0
0	-1
1	0
2	0
3	-2
4	-3
5	0

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

	0
0	0
1	1
2	2
3	3
4	4
5	5



Warunki brzegowe

$$y_1 = 0 \quad \varphi_0 = 0 \text{ -----} > \quad 2 y_1 = \alpha M_0$$

$$y_3 = 0 \quad y_4 = 0$$

Równania MRS

$$2 y_1 = \alpha M_0$$

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

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

$$y =$$

	0
0	0.000
1	-0.719
2	-2.878
3	0.000
4	0.000
5	-4.317

$$\cdot \text{mm}$$

$$\alpha = 1.43889 \cdot \frac{1}{\text{MN}}$$

