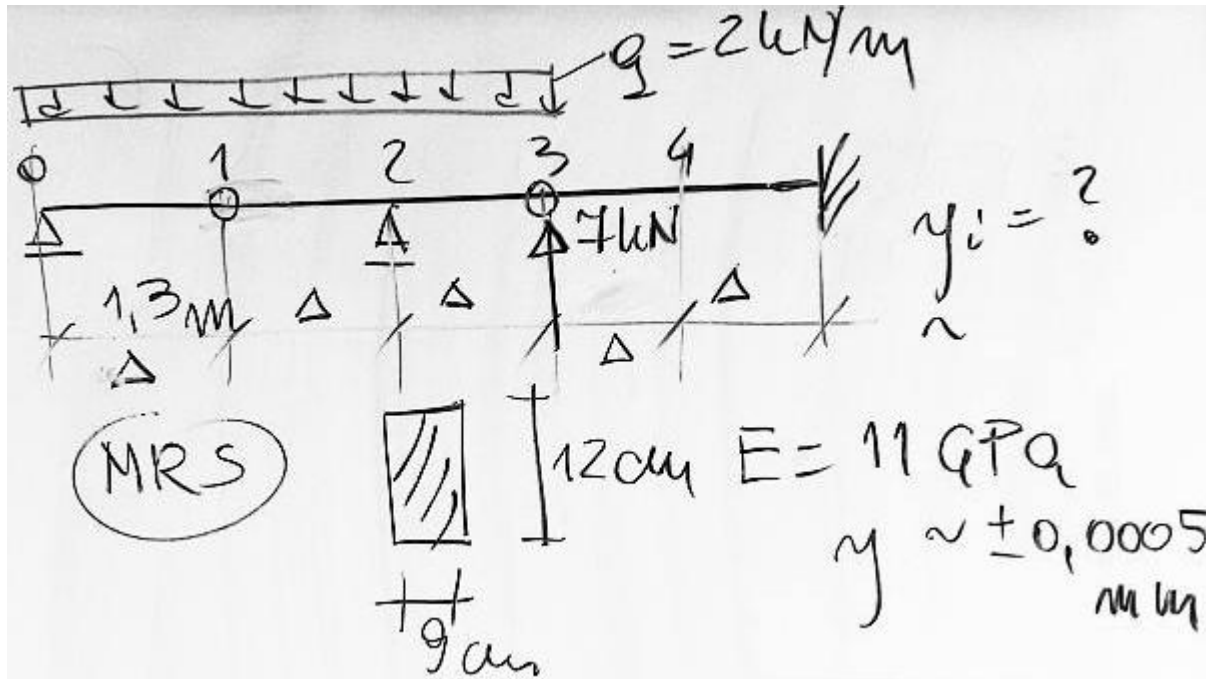


Metoda różnic skończonych - ugięcie belki



$$P := 7 \text{ kN} \quad q := 2 \frac{\text{kN}}{\text{m}} \quad E := 11 \text{ GPa}$$

$$b := 9 \text{ cm} \quad h := 12 \text{ cm} \quad L := 5 \cdot 1.3 \text{ m}$$

$$n := 5 \quad \Delta := \frac{L}{n} = 1.3 \text{ m}$$

$$J := b \cdot \frac{h^3}{12} = 1296 \cdot \text{cm}^4$$

$$\alpha := \frac{\Delta^2}{E \cdot J} = 11.85466 \cdot \frac{1}{\text{MN}}$$

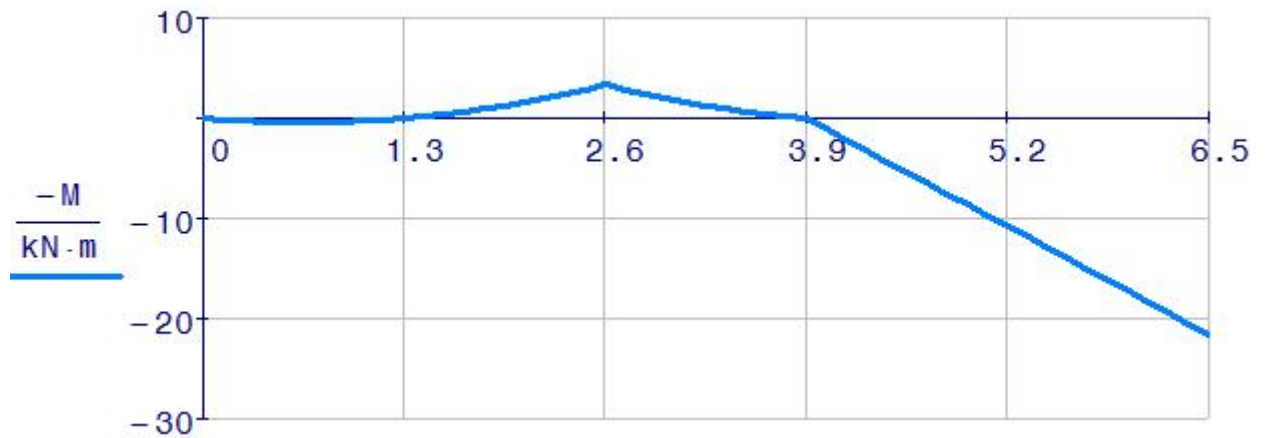
dokładność $y \pm 0.005 \text{ mm}$

$$R_0 := q \cdot \frac{\Delta^2}{2 \cdot \Delta} = 1.3 \cdot \text{kN} \quad R_2 := \frac{q \cdot \frac{(3 \cdot \Delta)^2}{2} - R_0 \cdot 3 \cdot \Delta}{\Delta} = 7.8 \text{ kN}$$

$$M_1(x) := R_0 \cdot x - q \cdot \frac{x^2}{2} \quad M_2(x) := M_1(x) + R_2 \cdot (x - 2 \cdot \Delta) \quad M_3(x) := M_2(x) + P \cdot (x - 3 \cdot \Delta) + q \cdot \frac{(x - 3 \cdot \Delta)^2}{2}$$

	0
0	0
1	0
2	-3.38
3	0
4	10.79
5	21.58

	0
0	0
1	1.3
2	2.6
3	3.9
4	5.2
5	6.5



Warunki brzegowe

$$y_0 = 0 \quad y_2 = 0 \quad y_5 = 0 \quad \varphi_5 = 0 \quad \text{-----} > \quad 2y_4 = \alpha M_5$$

Równania MRS

$$2y_4 = \alpha M_5$$

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

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

	0
0	0.000
1	-423.804
2	-0.000
3	383.735
4	127.912
5	0.000

$y =$ · mm

$$\alpha = 11.85466 \cdot \frac{1}{\text{MN}}$$