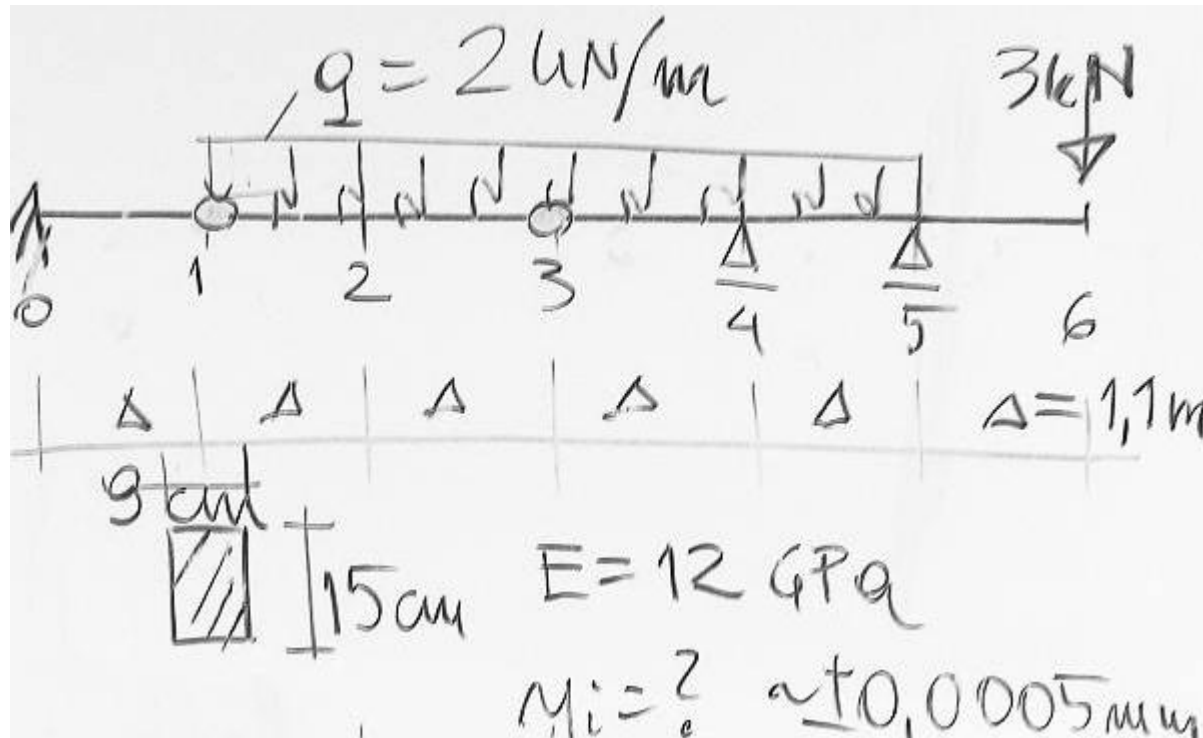


Metoda różnic skończonych - ugięcie belki



$$P := 3 \text{ kN} \quad q := 2 \frac{\text{kN}}{\text{m}} \quad E := 12 \text{ GPa}$$

$$b := 9 \text{ cm} \quad h := 15 \text{ cm} \quad L := 6 \cdot 1.1 \text{ m}$$

$$n := 6 \quad \Delta := \frac{L}{n} = 1.1 \text{ m}$$

$$J := b \cdot \frac{h^3}{12} = 2531.25 \cdot \text{cm}^4$$

$$\alpha := \frac{\Delta^2}{E \cdot J} = 3.98354 \cdot \frac{1}{\text{MN}}$$

dokładność $y \pm 0.005 \text{ mm}$

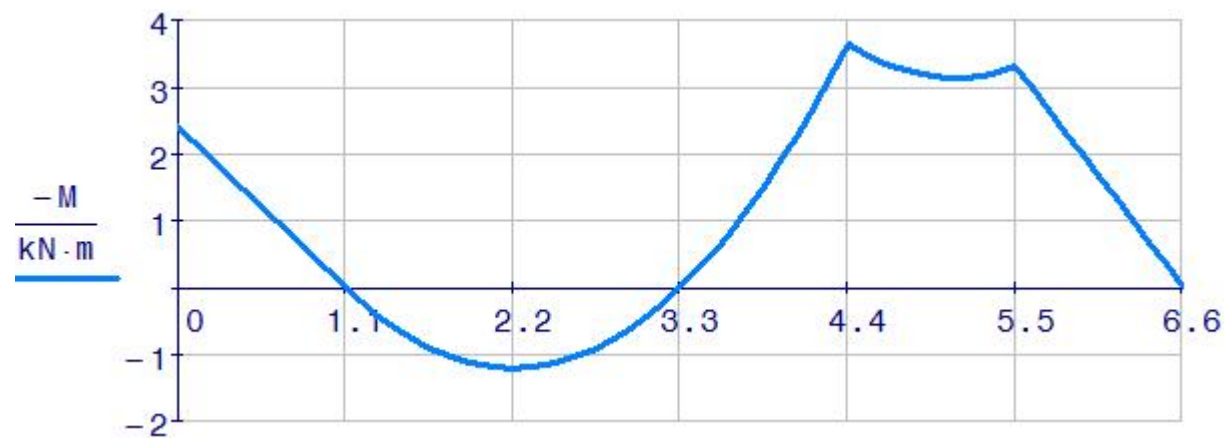
$$T3 := q \cdot \Delta \quad R4 := \frac{T3 \cdot 2\Delta + q \cdot 2\Delta \cdot \Delta - P \cdot \Delta}{\Delta} = 5.8 \cdot \text{kN}$$

$$R5 := P + q \cdot 2\Delta + T3 - R4 = 3.8 \text{ kN}$$

$$M4(x) := -P \cdot (L - x) \quad M3(x) := M4(x) + R5 \cdot (5\Delta - x) - q \cdot \frac{(5\Delta - x)^2}{2} \quad M2(x) := M3(x) + R4 \cdot (4\Delta - x)$$

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

$\frac{M}{\text{kN} \cdot \text{m}} =$		0	$\frac{X}{\text{m}} =$		0
	0	-2.42		0	0
	1	0		1	1.1
	2	1.21		2	2.2
	3	0		3	3.3
	4	-3.63		4	4.4
	5	-3.3		5	5.5
	6	0		6	6.6



Warunki brzegowe

$$y_0 = 0 \quad \varphi_0 = 0 \quad \text{-----} \rightarrow \quad 2 y_1 = \alpha M_0$$

$$y_4 = 0$$

$$y_5 = 0$$

Równania MRS

$$2 y_1 = \alpha M_0$$

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

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

$$y_4 - 2 y_5 + y_6 = \alpha M_5$$

$y =$		0
	0	0.000
	1	-4.820
	2	-12.050
	3	-14.460
	4	0.000
	5	0.000
	6	-13.146

$$\cdot \text{mm} \quad \alpha = 3.98354 \cdot \frac{1}{\text{MN}}$$