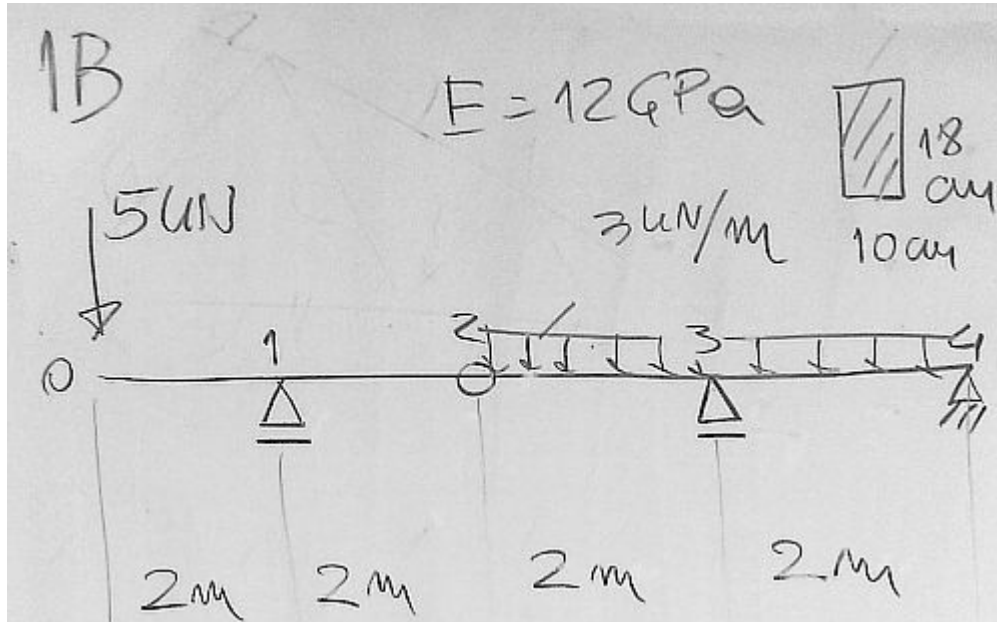


Metoda różnic skończonych - ugięcie belki



$$P := 5 \text{ kN} \quad q := 3 \frac{\text{kN}}{\text{m}} \quad E := 12 \text{ GPa}$$

$$L := 8 \text{ m} \quad b := 10 \text{ cm} \quad h := 18 \text{ cm} \quad J := b \cdot \frac{h^3}{12} = 4.860000 \times 10^3 \cdot \text{cm}^4$$

$$R1 := \frac{P \cdot 4}{2} = 10 \cdot \text{kN} \quad T2 := 5 \text{ kN} \quad R3 := \frac{q \cdot 4 \text{ m} \cdot 2 \text{ m} - T2 \cdot 4 \text{ m}}{2 \text{ m}} = 2 \cdot \text{kN}$$

$$n := 4 \quad \Delta := \frac{L}{n} = 2 \text{ m} \quad \alpha := \frac{\Delta^2}{E \cdot J} \quad \alpha = 6.859 \cdot \frac{1}{\text{MN}}$$

$$M1(x) := -P \cdot x$$

$$M2(x) := M1(x) + R1 \cdot (x - 2m) \quad M3(x) := M2(x) - q \cdot \frac{(x - 4m)^2}{2} \quad M4(x) := M3(x) + R3 \cdot (x - 6m)$$

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

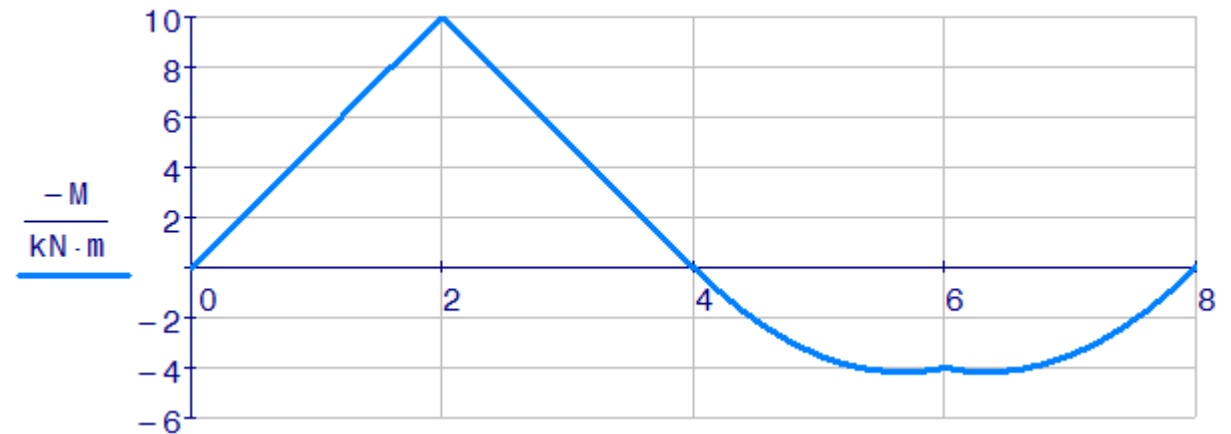
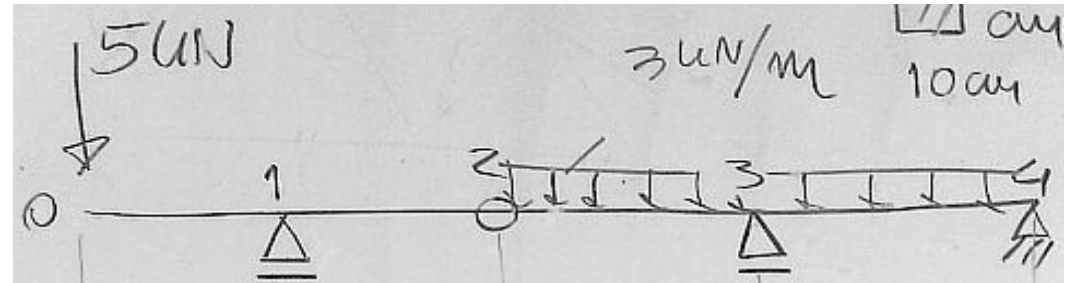
$$i := 0..1 \quad M_i := M1(X_i)$$

$$i := 1..2 \quad M_i := M2(X_i)$$

$$i := 2..3 \quad M_i := M3(X_i)$$

$$i := 3..n \quad M_i := M4(X_i)$$

M =		0		· kN · m		X =		0		m	
		0	0					0	0		
		1	-10					1	2		
		2	0					2	4		
		3	4					3	6		
		4	0					4	8		



Równania MRS

M =		0		· kN · m		y =		0		· mm	
		0	0					0	-96.02		
		1	-10					1	0.00		
		2	0					2	27.43		
		3	4					3	0.00		
		4	0					4	0.00		

$$y_1 = 0 \quad y_3 = 0 \quad y_4 = 0 \quad \alpha = 6.85871 \cdot \frac{1}{\text{MN}}$$

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

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