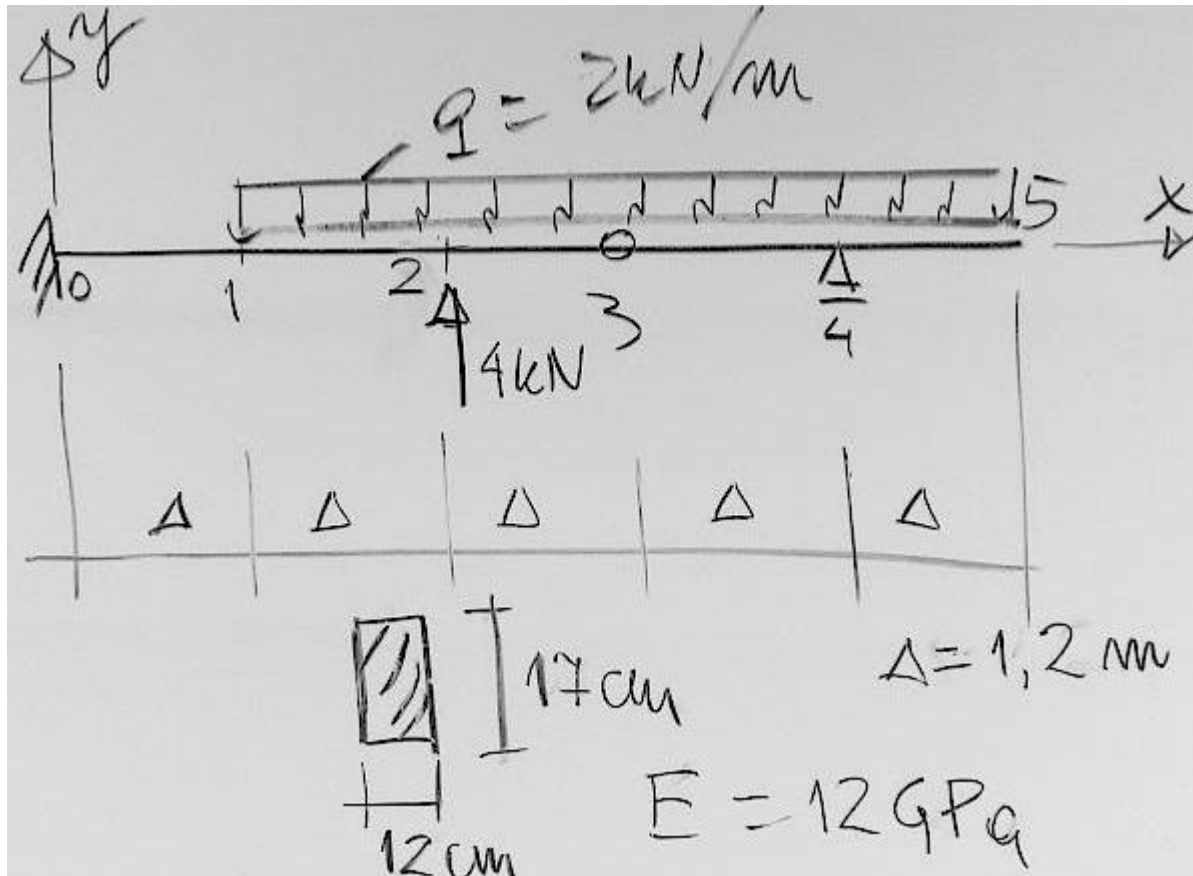


## B1 Metoda różnic skończonych - ugięcie belki



$$P := 4 \text{ kN} \quad q := 2 \frac{\text{kN}}{\text{m}} \quad E := 12 \text{ GPa}$$

$$b := 12 \text{ cm} \quad h := 17 \text{ cm} \quad L := 5 \cdot 1.2 \text{ m}$$

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

$$J := b \cdot \frac{h^3}{12} = 4913 \cdot \text{cm}^4$$

$$\alpha := \frac{\Delta^2}{E \cdot J} = 2.4425 \cdot \frac{1}{\text{MN}}$$

dokładność  $y \pm 0.005 \text{ mm}$

$$R4 := q \cdot 2 \cdot \Delta = 4.8 \cdot \text{kN} \quad M4(x) := -q \cdot \frac{(L-x)^2}{2} \quad M3(x) := M4(x) + R4 \cdot (4\Delta - x)$$

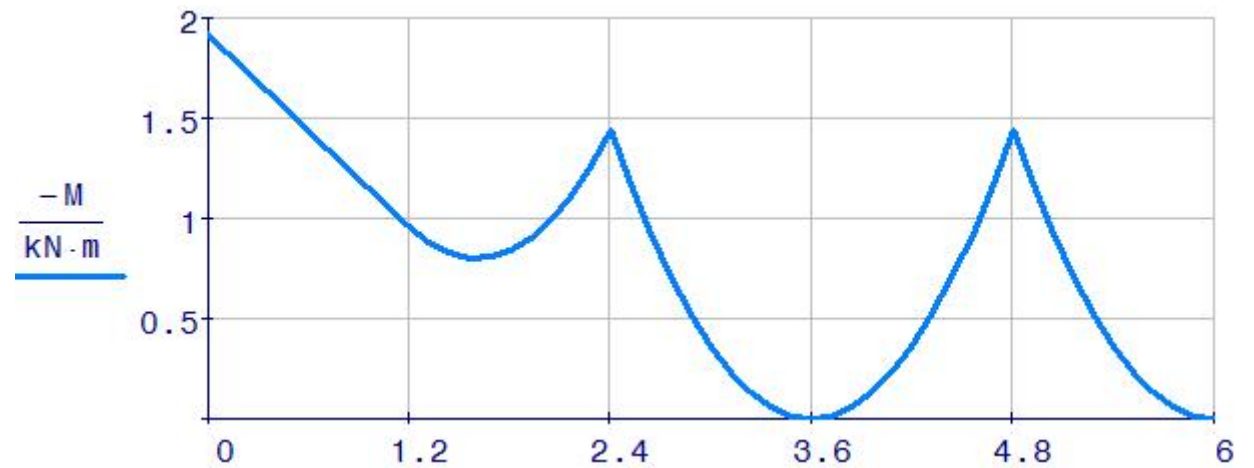
$$M2(x) := M3(x) + P \cdot (2\Delta - x) \quad M1(x) := M2(x) + q \cdot \frac{(\Delta - x)^2}{2}$$

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

	0
0	-1.92
1	-0.96
2	-1.44
3	0
4	-1.44
5	0

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

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



*Warunki brzegowe*

$$y_0 = 0 \quad \varphi_0 = 0 \quad \text{-----} \rightarrow \quad 2y_1 = \alpha M_0 \quad y_4 = 0$$

*Równania MRS*

$$2y_1 = \alpha M_0$$

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

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

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

$$y =$$

	0
0	-0.000
1	-2.345
2	-7.034
3	-15.241
4	0.000
5	11.724

$$\cdot \text{mm}$$

$$\alpha = 2.4425 \cdot \frac{1}{\text{MN}}$$

