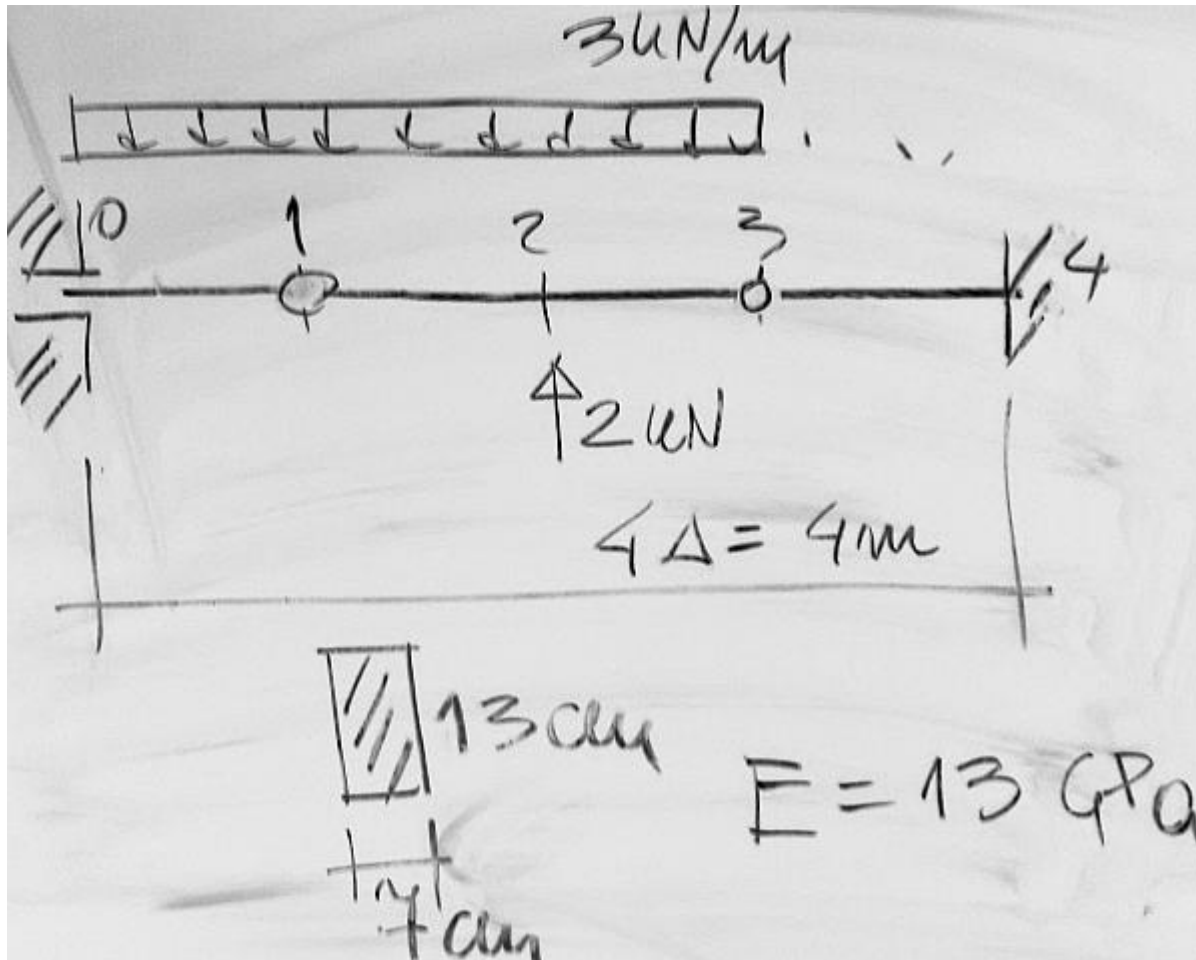


## Metoda różnic skończonych - ugięcie belki



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

$$b := 7 \text{ cm} \quad h := 13 \text{ cm}$$

$$L := 4 \text{ m} \quad J := b \cdot \frac{h^3}{12} = 1281.5833 \cdot \text{cm}^4$$

$$n := 4 \quad \Delta := \frac{L}{n} = 1 \text{ m}$$

$$\alpha := \frac{\Delta^2}{E \cdot J} = 6.00219 \cdot \frac{1}{\text{MN}}$$

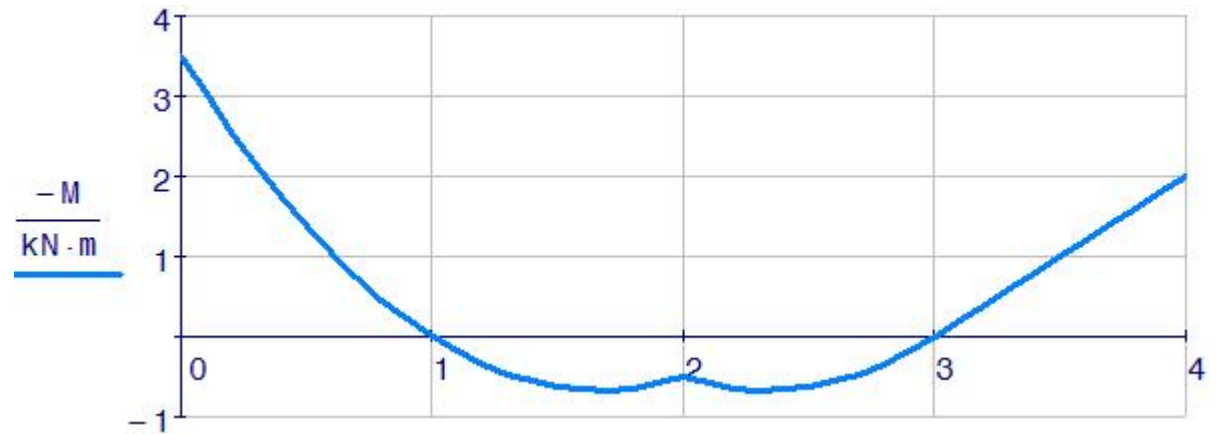
dokładność  $y \pm 0.0005 \text{ mm}$

$$T1 := q \cdot 1 \text{ m} - \frac{P}{2} \quad R0 := T1 + q \cdot 1 \text{ m} = 5 \text{ kN} \quad M0 := T1 \cdot 1 \text{ m} + q \cdot \frac{(1 \text{ m})^2}{2}$$

$$M1(x) := R0 \cdot x - M0 - q \cdot \frac{x^2}{2} \quad M2(x) := M1(x) + P \cdot (x - 2 \text{ m}) \quad M3(x) := M2(x) + q \cdot \frac{(x - 3 \text{ m})^2}{2}$$

$\frac{M}{\text{kN} \cdot \text{m}} =$		0
	0	-3.5
	1	0
	2	0.5
	3	0
	4	-2

$\frac{X}{\text{m}} =$		0
	0	0
	1	1
	2	2
	3	3
	4	4



### Warunki brzegowe

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

$$y_4 = 0 \quad \varphi_4 = 0 \quad \text{-----} > \quad 2 y_3 = \alpha M_4$$

### Równania MRS

$$2 y_1 = \alpha M_0$$

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

$$2 y_3 = \alpha M_4$$

$y =$		0
	0	0.000
	1	-10.504
	2	-9.754
	3	-6.002
	4	0.000

· mm

$$\alpha = 6.00219 \cdot \frac{1}{\text{MN}}$$