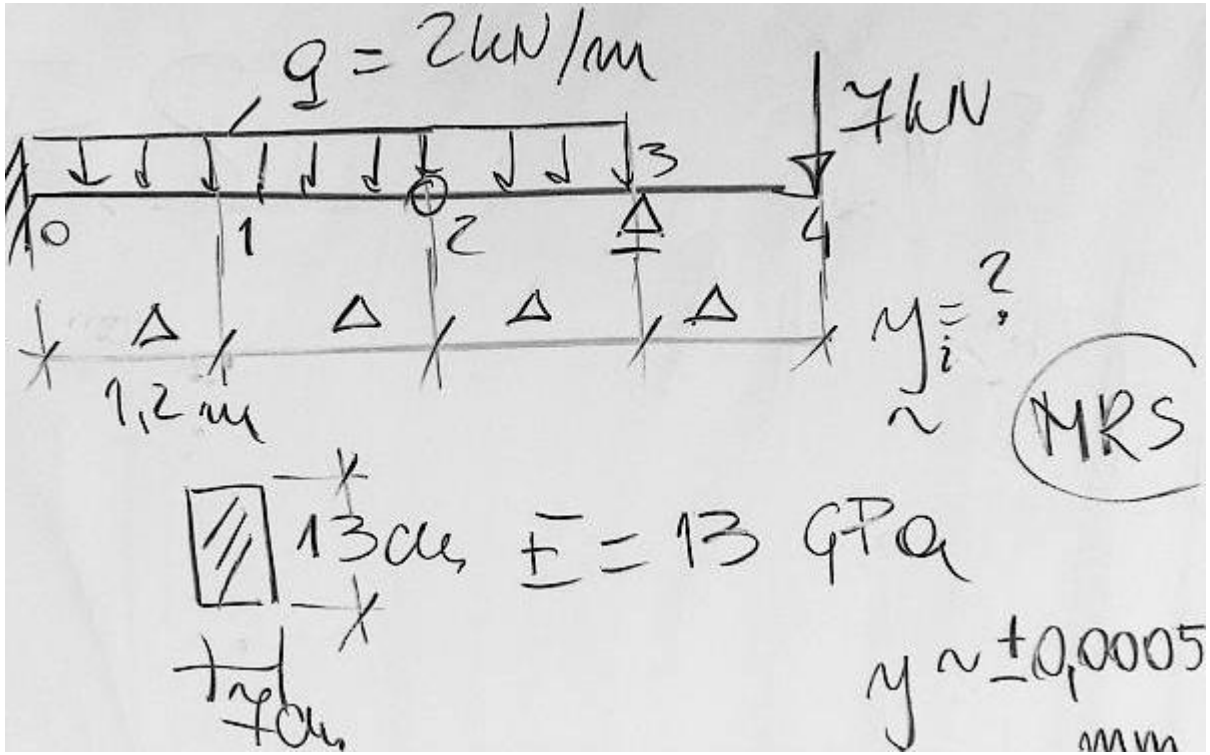
*Metoda różnic skończonych - ugięcie belki*




$P := 7kN \qquad q := 2\frac{kN}{m} \qquad E := 13GPa$

$b := 7cm \qquad h := 13cm \qquad L := 4 \cdot 1.2m$

$n := 4 \qquad \Delta := \frac{L}{n} = 1.2\,m$

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

$\alpha := \frac{\Delta^2}{E \cdot J} = 8.64315 \cdot \frac{1}{MN}$

*dokładność y ±0.005mm*

$$R3 := \frac{q \cdot \frac{\Delta^2}{2} + P \cdot 2 \cdot \Delta}{\Delta} = 15.2 \cdot kN$$

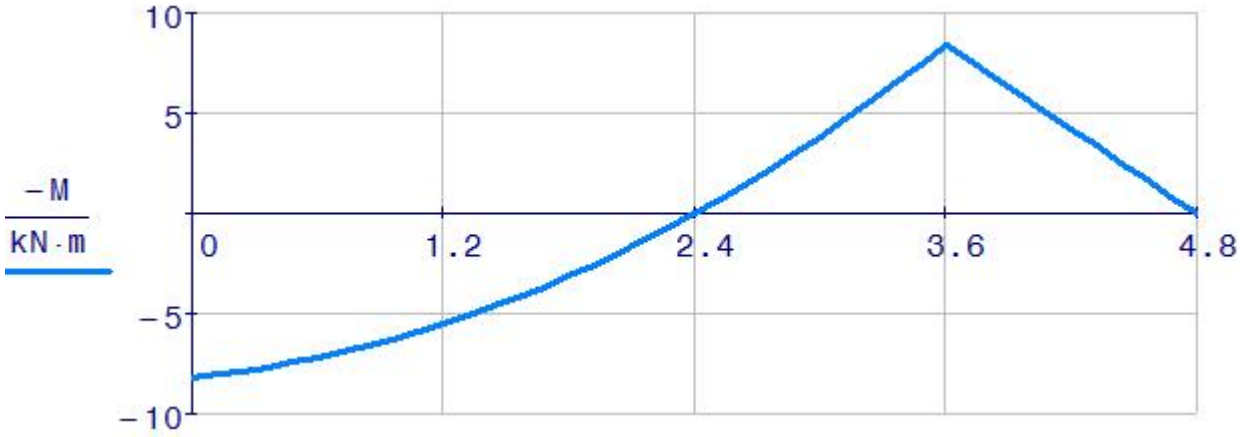
$$M2(x) := -P \cdot (L - x) \qquad M1(x) := M2(x) + R3 \cdot (3 \cdot \Delta - x) - \frac{q \cdot (3 \cdot \Delta - x)^2}{2}$$

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

| | 0 |
|---|---|
| 0 | 8.16 |
| 1 | 5.52 |
| 2 | -0 |
| 3 | -8.4 |
| 4 | 0 |

$\frac{X}{m} =$

| | 0 |
|---|---|
| 0 | 0 |
| 1 | 1.2 |
| 2 | 2.4 |
| 3 | 3.6 |
| 4 | 4.8 |




## *Warunki brzegowe*

$y_0 = 0 \quad \varphi_0 = 0 \quad \text{-----> } 2\,y_1 = \alpha M_0 \qquad y_3 = 0$

## *Równania MRS*

$$2\,y_1 = \alpha M_0$$

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

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

$y =$

| | 0 |
|---|---|
| 0 | -0.000 |
| 1 | 35.264 |
| 2 | 118.238 |
| 3 | 0.000 |
| 4 | -190.841 |

$\cdot mm$

$$\alpha = 8.64315 \cdot \frac{1}{MN}$$