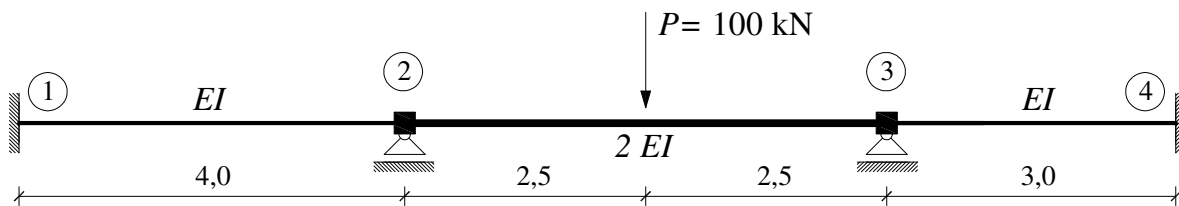


- NEPOZNANICE: φ_2, φ_3



- MOMENTI UPETOSTI:

$$\bar{M}_{12} = \bar{M}_{21} = \bar{M}_{34} = \bar{M}_{43} = 0$$

$$\bar{M}_{23} = \frac{P \times l_{23}}{8} = \frac{100 \times 5}{8} = 62.5 \text{ kNm}$$

$$\bar{M}_{32} = -\bar{M}_{23} = -62.5 \text{ kNm}$$

- KOEFICIJENTI KRUTOSTI:

$$k_{12} = \frac{EI}{l_{12}} = \frac{EI}{4.0} = 0.25EI$$

$$k_{23} = \frac{2EI}{l_{23}} = \frac{2EI}{5.0} = 0.40EI$$

$$k_{34} = \frac{EI}{l_{34}} = \frac{EI}{3.0} = 0.33EI$$

- UKUPNI MOMENTI:

$$M_{12} = m_{12} = 2k_{12}\varphi_2$$

$$M_{21} = m_{21} = 4k_{12}\varphi_2$$

$$M_{23} = m_{23} + \bar{M}_{23} = 4k_{23}\varphi_2 + 2k_{23}\varphi_3 + \bar{M}_{23}$$

$$M_{32} = m_{32} + \bar{M}_{32} = 2k_{23}\varphi_2 + 4k_{23}\varphi_3 + \bar{M}_{32}$$

$$M_{34} = m_{34} = 4k_{34}\varphi_3$$

$$M_{43} = m_{43} = 2k_{34}\varphi_3$$

- UVJETI RAVNOTEŽE:

$$\sum_j M_{2j} = 0 \quad \rightarrow \quad M_{21} + M_{23} = 0$$

$$4k_{12}\varphi_2 + 4k_{23}\varphi_2 + 2k_{23}\varphi_3 + \bar{M}_{23} = 0$$

$$\sum_j M_{3j} = 0 \quad \rightarrow \quad M_{32} + M_{34} = 0$$

$$2k_{23}\varphi_2 + 4k_{23}\varphi_3 + \bar{M}_{32} + 4k_{34}\varphi_3 = 0$$

$$4 \times 0.25EI\varphi_2 + 4 \times 0.40EI\varphi_2 + 2 \times 0.40EI\varphi_3 + 62.5 = 0$$

$$2 \times 0.4EI\varphi_2 + 4 \times 0.40EI\varphi_3 - 62.5 + 4 \times 0.33EI\varphi_3 = 0$$

$$EI\varphi_2 + 1.6EI\varphi_2 + 0.8EI\varphi_3 + 62.5 = 0$$

$$0.8EI\varphi_2 + 1.6EI\varphi_3 + 1.33EI\varphi_3 - 62.5 = 0$$

$$2.6EI\varphi_2 + 0.8EI\varphi_3 + 62.5 = 0$$

$$0.8EI\varphi_2 + 2.93EI\varphi_3 - 62.5 = 0 \quad | \times (-3.25)$$

$$-8.73EI\varphi_3 + 265.625 = 0$$

$$\varphi_3 = \frac{30.415}{EI}$$

$$\varphi_2 = -\frac{33.397}{EI}$$

$$M_{12} = 2 \times 0.25EI \times \left(-\frac{33.397}{EI} \right) = -16.70 \text{ kNm}$$

$$M_{21} = 4 \times 0.25EI \times \left(-\frac{33.397}{EI} \right) = -33.40 \text{ kNm}$$

$$M_{23} = 4 \times 0.40EI \times \left(-\frac{33.397}{EI} \right) + 2 \times 0.4 \times \frac{30.415}{EI} + 62.5 = 33.40 \text{ kNm}$$

$$M_{32} = 2 \times 0.40EI \times \left(-\frac{33.397}{EI} \right) + 4 \times 0.4 \times \frac{30.415}{EI} - 62.5 = -40.55 \text{ kNm}$$

$$M_{34} = 4 \times 0.33 \times \frac{30.415}{EI} = 40.55 \text{ kNm}$$

$$M_{43} = 2 \times 0.33 \times \frac{30.415}{EI} = 20.28 \text{ kNm}$$

