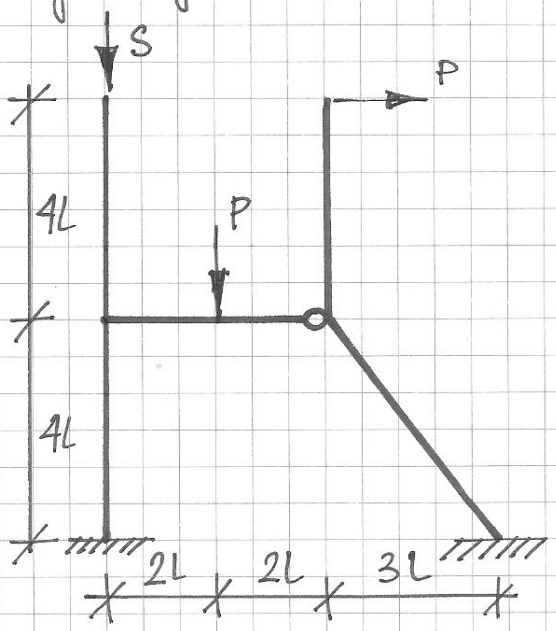
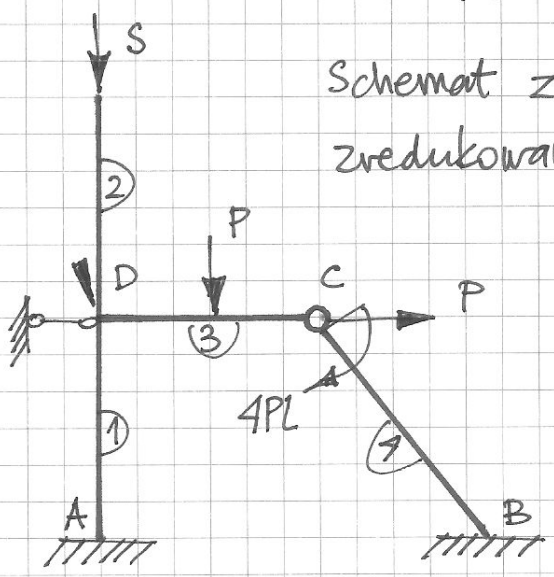
Kolokwium z MK2, 1.3a, r.ak. 2014/2015

Wyznaczyć M_A. $EJ = \text{const}$. $S = \frac{1}{100}\frac{EJ}{l^2}$





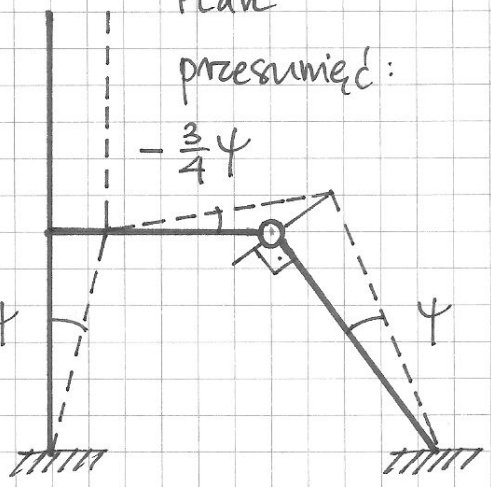
Schemat zastępczy zredukowany

$$\mathbf{q} = \begin{bmatrix} \varphi_D \\ \psi \end{bmatrix}$$

DSO i parametry $\sigma^{(k)}$:

$S^{(1)} = S \qquad \sigma^{(1)} = 0{,}4$

$S^{(2)} = S \qquad \sigma^{(2)} = 0{,}4$



Równania równowagi:

1) $\Phi_D^{(1)} + \Phi_D^{(2)} + \Phi_D^{(3)} = 0$

2) $\left[\Phi_A^{(1)} + \Phi_D^{(1)}\right] \cdot \bar{\varphi} + \Phi_D^{(3)} \cdot \left(-\frac{3}{4}\bar{\psi}\right) + \Phi_B^{(4)} \cdot \bar{\psi} + S \cdot 4L \cdot \psi \cdot \bar{\psi} + P \cdot 2L \cdot \left(-\frac{3}{4}\bar{\psi}\right) + P \cdot 4L \cdot \bar{\psi} + 4PL \cdot \bar{\psi} = 0$

Wzory transformacyjne:

$$\Phi_A^{(1)} = \frac{EJ}{4L}\left[\beta(0{,}4)\varphi_D - \nu(0{,}4)\psi\right]$$

$$\Phi_D^{(1)} = \frac{EJ}{4L}\left[\alpha(0{,}4)\varphi_D - \nu(0{,}4)\psi\right]$$

$$\Phi_D^{(2)} = \frac{EJ}{4L}\left[\alpha^{III}(0{,}4)\varphi_D\right]$$

$$\Phi_D^{(3)} = \frac{3EJ}{4L}\left[\varphi_D + \frac{3}{4}\psi\right] - \frac{3}{16}\cdot P \cdot 4L$$

$$\Phi_B^{(4)} = \frac{3EJ}{5L}\left[-\psi\right] + \frac{1}{2}\cdot 4PL$$

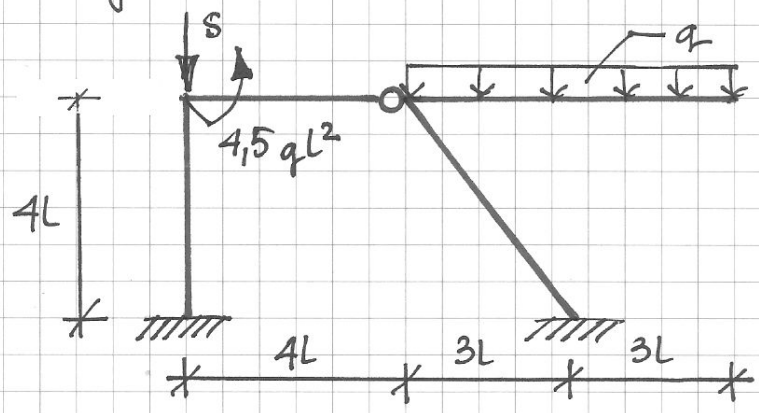
$$\varphi_D = 1{,}941\,\frac{PL^3}{EJ}$$

$$\psi = 2{,}736\,\frac{PL^3}{EJ}$$

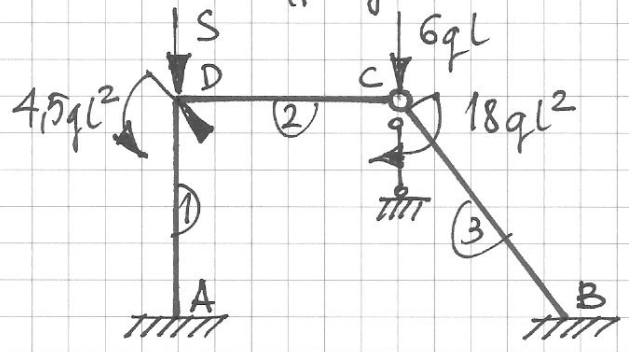
$$M_A = \Phi_A^{(1)} = -3{,}12\,PL$$

Kolokwium z MK2, 1.3b, r.ak. 2014/2015

Obliczyć M_A. $EJ = \text{const}$. $S = \frac{1}{64}\frac{EJ}{l^2}$



Schemat zastępczy zredukowany:

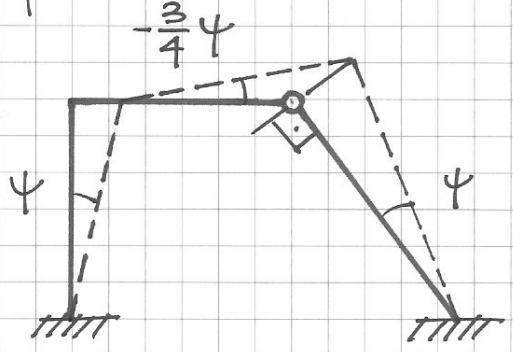


$$\mathbf{q} = \begin{bmatrix} \varphi_D \\ \psi \end{bmatrix}$$

DSO i parametry $\sigma^{(k)}$:

$S^{(1)} = S \quad \sigma^{(1)} = 0,5$

Plan przesunięć:



Równania równowagi:

1) $\Phi_D^{(1)} + \Phi_D^{(2)} + 4,5\,qL^2 = 0$

2) $\left[\Phi_A^{(1)} + \Phi_D^{(1)}\right] \cdot \bar{\psi} + \Phi_D^{(2)} \cdot \left(-\frac{3}{4}\bar{\psi}\right)$
$+ \Phi_B^{(3)} \cdot \bar{\psi} + S \cdot 4L \cdot \psi \cdot \bar{\psi}$
$+ 6qL \cdot 4L \cdot \left(-\frac{3}{4}\bar{\psi}\right) + 18qL^2 \cdot \bar{\psi} = 0$

Wzory transformacyjne:

$$\Phi_A^{(1)} = \frac{EJ}{4L}\left[\beta(0,5)\,\varphi_D - \nu(0,5)\,\psi\right]$$

$$\Phi_D^{(1)} = \frac{EJ}{4L}\left[\alpha(0,5)\,\varphi_D - \nu(0,5)\,\psi\right]$$

$$\Phi_D^{(2)} = \frac{3EJ}{4L}\left[\varphi_D + \frac{3}{4}\psi\right]$$

$$\Phi_B^{(3)} = \frac{3EJ}{5L}\left[-\psi\right] + 9qL^2$$

$\varphi_D = -1,562\,\frac{qL^3}{EJ}$

$\psi = 1,912\,\frac{qL^3}{EJ}$

$M_A \equiv \Phi_A^{(1)} = -3,64\,qL^2$