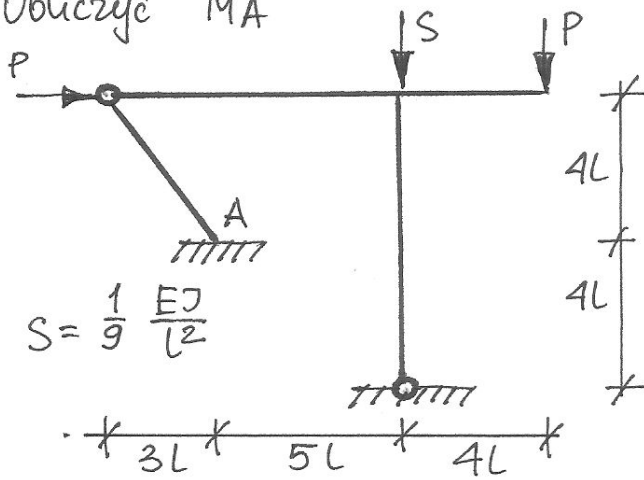


Obliczyć MA

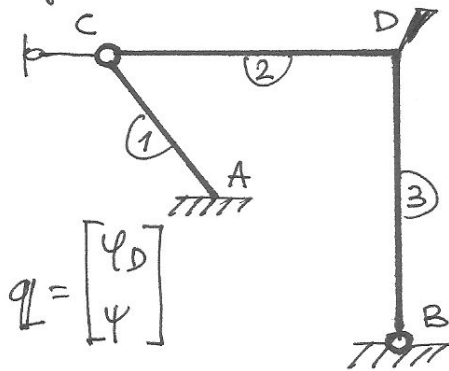


$$S = \frac{1}{9} \frac{EJ}{L^2}$$

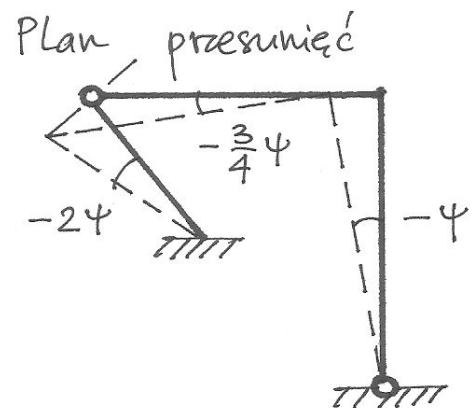
$$S^{(3)} = S \rightarrow \sigma^{(3)} \approx 2,7$$

Schemat geometryczny

wyznaczamy



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



Równania równowagi:

$$\Phi_D^{(2)} + \Phi_D^{(3)} - 4PL = 0$$

$$\Phi_A^{(1)} \cdot (-2\psi) + \Phi_1^{(2)} \cdot \left(-\frac{3}{4}\psi\right) + \Phi_1^{(3)} \cdot (-\psi) + \frac{1}{9} \frac{EJ}{L^2} \cdot 8L \cdot (-\psi) \cdot (-\psi) + P \cdot 4L \cdot (-2\psi) = 0$$

Wzory transformacyjne:

$$\Phi_A^{(1)} = \frac{EJ}{5L} [6\psi]$$

$$\Phi_D^{(2)} = \frac{EJ}{8L} \left[3\varphi_D + \frac{9}{4}\psi \right]$$

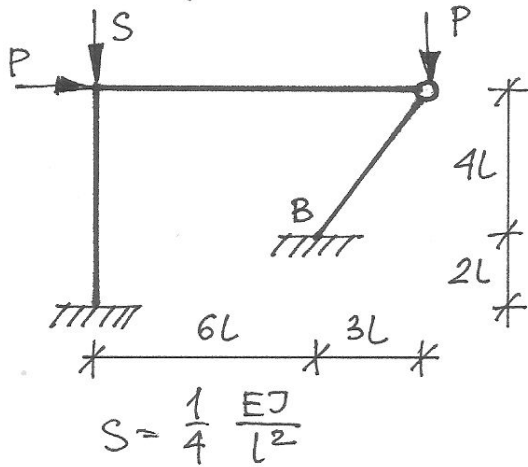
$$\Phi_D^{(3)} = \frac{EJ}{8L} \left[\alpha'(2,7)\varphi_D + \alpha'(2,7)\psi \right]$$

$$\varphi_D = 13,893 \frac{PL^2}{EJ}$$

$$\psi = -7,425 \frac{PL^2}{EJ}$$

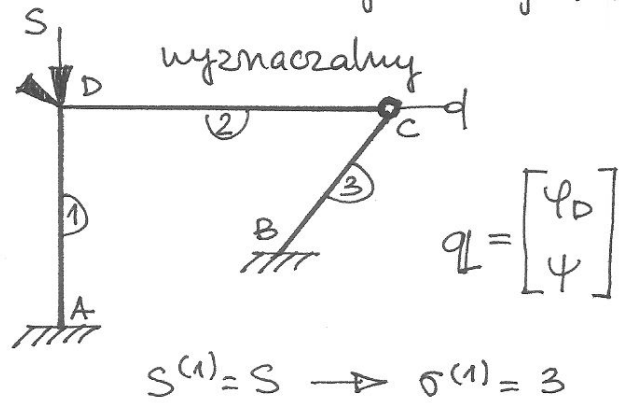
$$\rightarrow \Phi_A^{(1)} = -8,91 PL$$

Obliczyć moment M_B

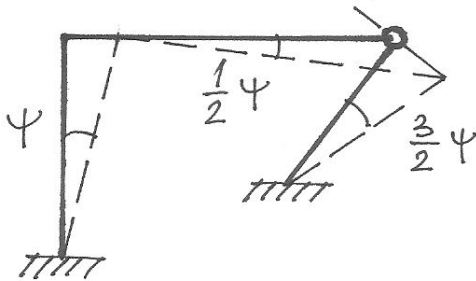


$$S = \frac{1}{4} \frac{EJ}{L^2}$$

Schemat geometrycznie



Plan przesunięć



Równania równowagi:

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

$$[\Phi_A^{(1)} + \Phi_D^{(1)}] \cdot \bar{\psi} + \Phi_D^{(2)} \cdot \frac{1}{2} \bar{\psi} + \Phi_B^{(3)} \cdot \frac{3}{2} \bar{\psi} + \frac{1}{4} \frac{EJ}{L^2} \cdot 6L \cdot \psi \cdot \bar{\psi} + P \cdot 6L \cdot \bar{\psi} + P \cdot 3L \cdot \frac{3}{2} \bar{\psi} = 0$$

Wzory transformacyjne:

$$\Phi_A^{(1)} = \frac{EJ}{6L} [\beta(3) \psi_D - \nu(3) \psi]$$

$$\Phi_D^{(1)} = \frac{EJ}{6L} [\alpha(3) \psi_D - \nu(3) \psi]$$

$$\Phi_D^{(2)} = \frac{EJ}{9L} [3(\psi_D - \frac{1}{2} \psi)]$$

$$\Phi_B^{(3)} = \frac{EJ}{5L} [3(-\frac{3}{2} \psi)]$$

Rozwiązanie:

$$\psi_D = 45,852 \frac{PL^2}{EJ}$$

$$\psi = 35,129 \frac{PL^2}{EJ}$$

$$\rightarrow \Phi_B^{(3)} = -31,616 PL$$