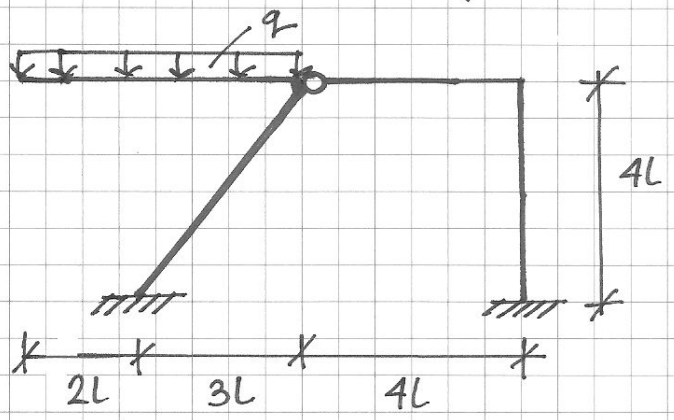
Kolokwium z MK1, 2.3a, r.ak. 2015/16

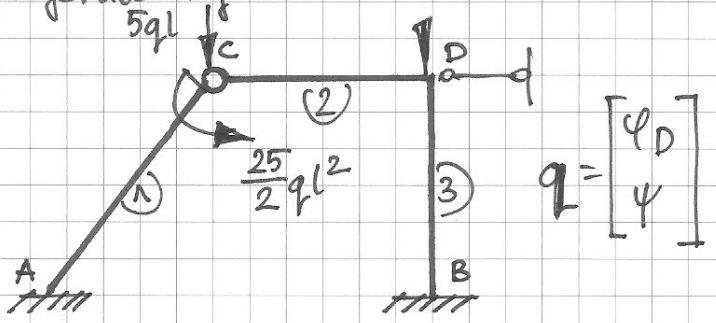
Narysować wykres momentów zginających.

$EJ = const.$

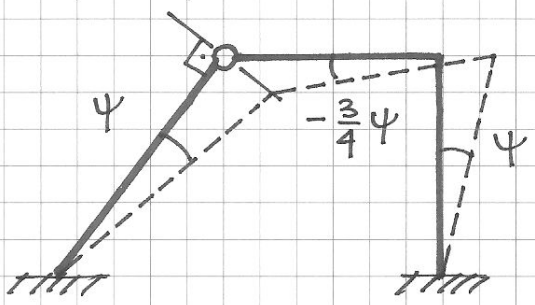
$\varepsilon_e = 0 \quad (EA = \infty)$



Schemat zredukowany geometrycznie



Plan przesunięć



Równania równowagi:

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

$$\Phi_A^{(1)} \cdot \bar{\psi} + \Phi_D^{(2)} \cdot \left(-\tfrac{3}{4}\bar{\psi}\right) + \left[\Phi_D^{(3)} + \Phi_B^{(3)}\right] \cdot \bar{\psi} + \bar{L}_\psi = 0$$

$$\bar{L}_\psi = 5ql \cdot 3L \cdot \bar{\psi} - \frac{25}{2} ql^2 \cdot \bar{\psi}$$

Wzory transformacyjne:

$$\Phi_A^{(1)} = \frac{3EJ}{5L}\left[-\psi\right] - \frac{25}{4} ql^2$$

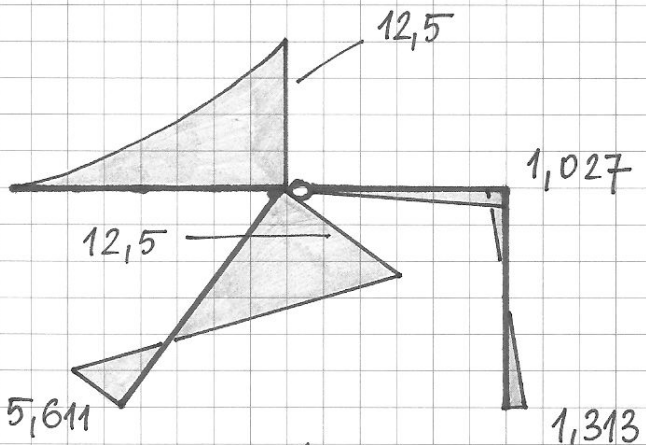
$$\Phi_D^{(2)} = \frac{3EJ}{4L}\left[\varphi_D + \tfrac{3}{4}\psi\right]$$

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

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

$$\varphi_D = -0{,}571 \frac{ql^3}{EJ}$$

$$\psi = -1{,}065 \frac{ql^3}{EJ}$$

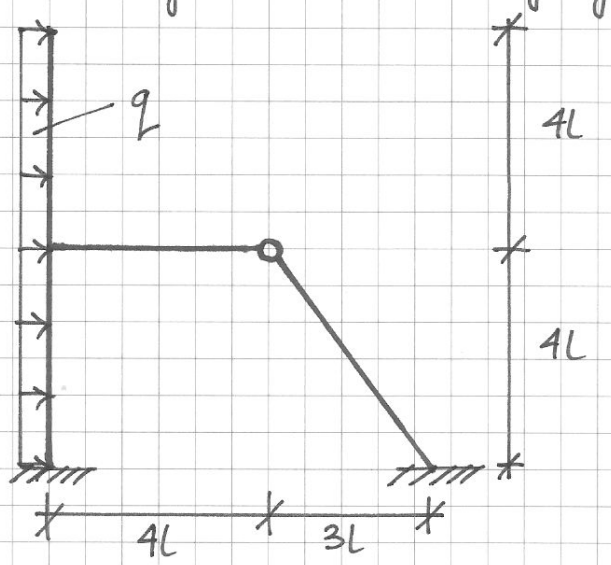


$\frac{M}{ql^2}$

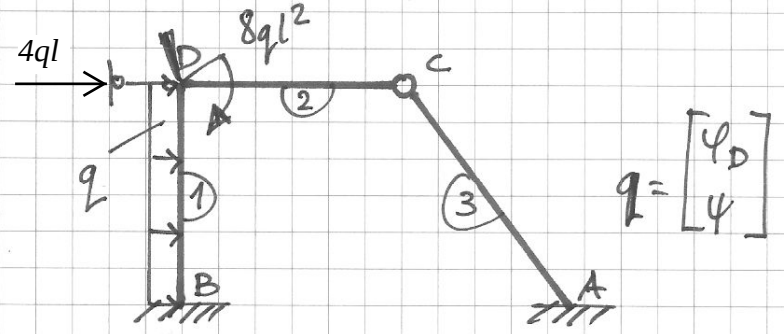
Kolokwium z MK1, 2.3b, r.ak. 2015/16

Narysować wykres momentów zginających. $EJ = const.$

$\varepsilon_e = 0 \quad (EA = \infty)$

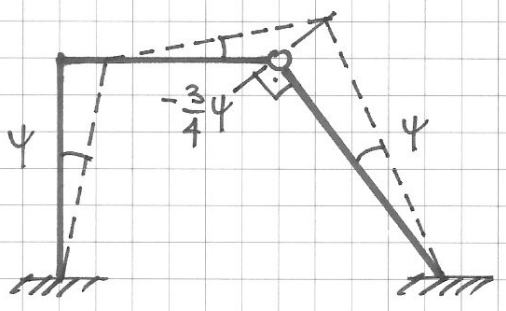


Zredukowany schemat geometrycznie wyznaczalny



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

Plan przesunięć



Równania równowagi:

$$\Phi_D^{(1)} + \Phi_D^{(2)} - 8ql^2 = 0$$

$$\left[\Phi_B^{(1)} + \Phi_D^{(1)}\right] \cdot \overline{\psi} + \Phi_D^{(2)} \cdot \left(-\tfrac{3}{4}\overline{\psi}\right) + \Phi_A^{(3)} \cdot \overline{\psi} + (4ql\ 4l + 4ql\ 2l)\overline{\psi} = 0$$

Wzory transformacyjne:

$$\Phi_B^{(1)} = \frac{2EJ}{4L}\left[\varphi_D - 3\psi\right] - \frac{1}{12}q(4L)^2$$

$$\Phi_D^{(1)} = \frac{2EJ}{4L}\left[2\varphi_D - 3\psi\right] + \frac{1}{12}q(4L)^2$$

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

$$\Phi_A^{(3)} = \frac{3EJ}{5L}\left[-\psi\right]$$

$$\varphi_D = 8{,}006\ \frac{ql^3}{EJ} \qquad \psi = 7{,}834\ \frac{ql^3}{EJ}$$