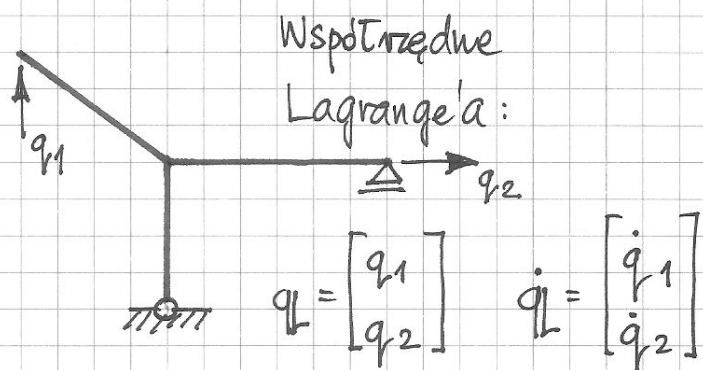
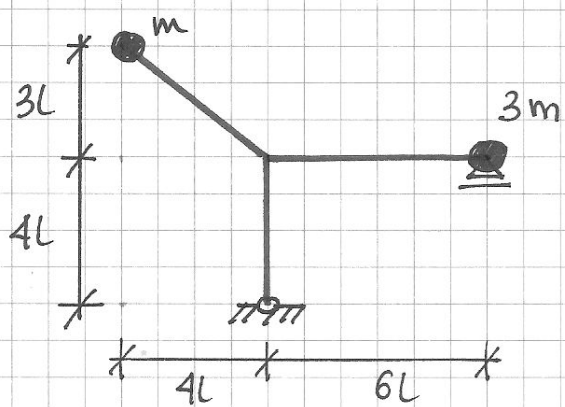
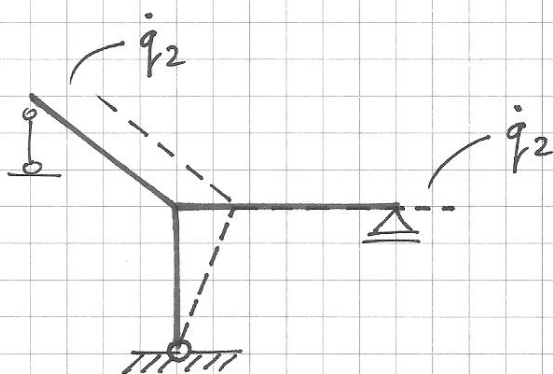
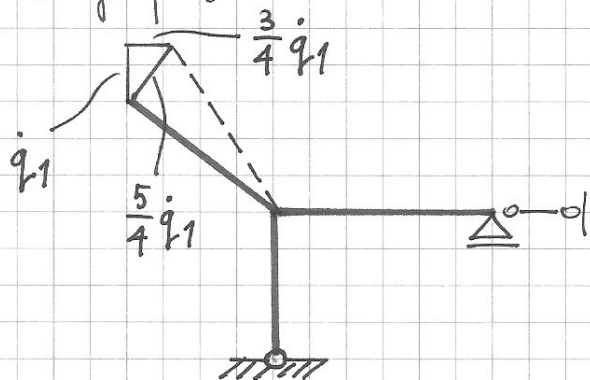


Kolokwium z MK2, 2.2a, r. ak. 2013/2014

Wyznaczyć ω_i . $EJ = \text{const.}$



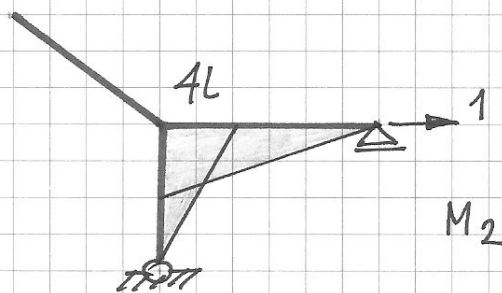
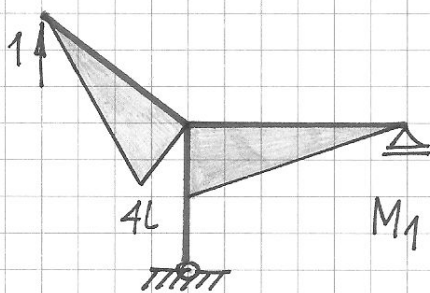
Plany prędkości



Energia kinetyczna:

$$2E_k = \dot{q}^T M \dot{q} = m \cdot \left[\dot{q}_1^2 + \left(\frac{3}{4}\dot{q}_1 + \dot{q}_2 \right)^2 \right] + 3m \dot{q}_2^2$$

$$M = \begin{bmatrix} \frac{25}{16} & \frac{3}{4} \\ \frac{3}{4} & 4 \end{bmatrix} m$$



$$D = \begin{bmatrix} \frac{176}{3} & 32 \\ 32 & \frac{160}{3} \end{bmatrix} \frac{L^3}{EJ}$$

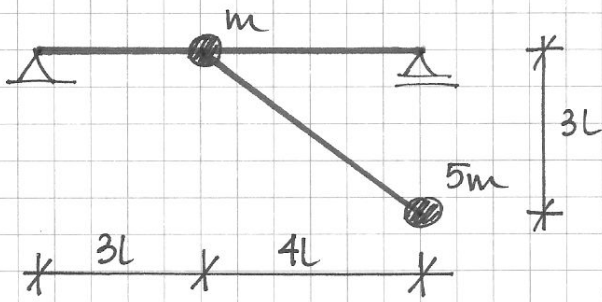
$$II = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\det(II - \omega^2 DM) = 0 \rightarrow \omega_1 = 0,162 \sqrt{\frac{EJ}{mL^3}}$$

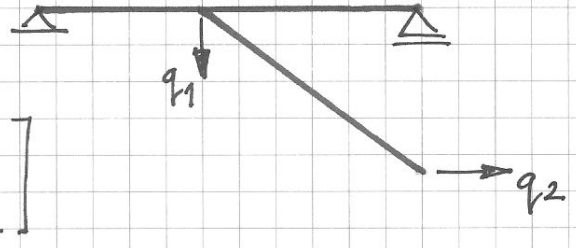
$$\omega_2 = 0,056 \sqrt{\frac{EJ}{mL^3}}$$

Kolokwium z MK2, 2.2b, r.ak. 2013/2014

Wyznaczyć ω_i . $EJ = \text{const.}$

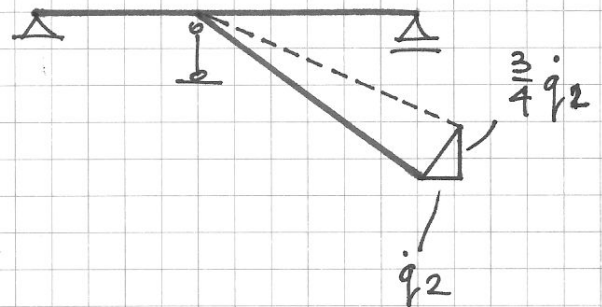
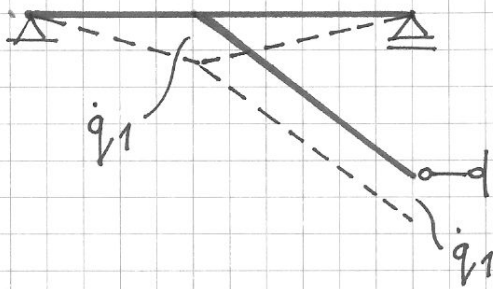


Współrzędne Lagrange'a:



$$q = \begin{bmatrix} q_1 \\ q_2 \end{bmatrix}$$

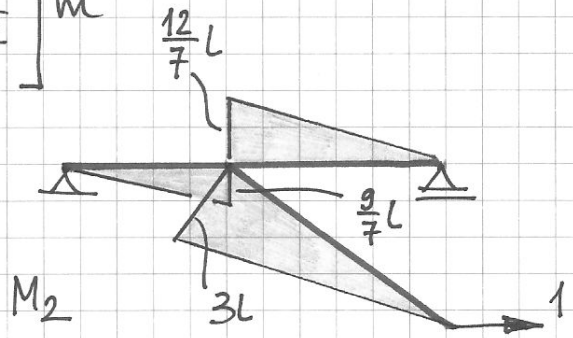
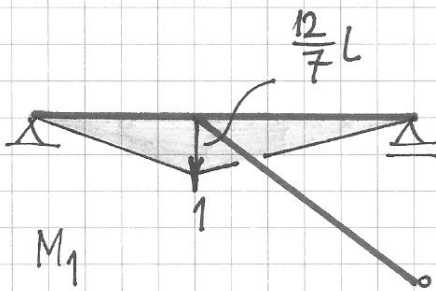
Plany prędkości:



Energia kinetyczna:

$$2E_k = m \dot{q}_1^2 + 5m \left[\left(\dot{q}_1 - \frac{3}{4} \dot{q}_2 \right)^2 + \dot{q}_2^2 \right] = \dot{q}^T M \dot{q}$$

$$M = \begin{bmatrix} 6 & -\frac{20}{3} \\ -\frac{20}{3} & \frac{125}{9} \end{bmatrix} m$$



$$D = \begin{bmatrix} 6,857 & -1,714 \\ -1,714 & 20,571 \end{bmatrix} \frac{L^3}{EJ}$$

$$I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\det(I - \omega^2 D I M) = 0 \rightarrow$$

$$\omega_1 = 0,055 \sqrt{\frac{EJ}{mL^3}}$$

$$\omega_2 = 0,249 \sqrt{\frac{EJ}{mL^3}}$$