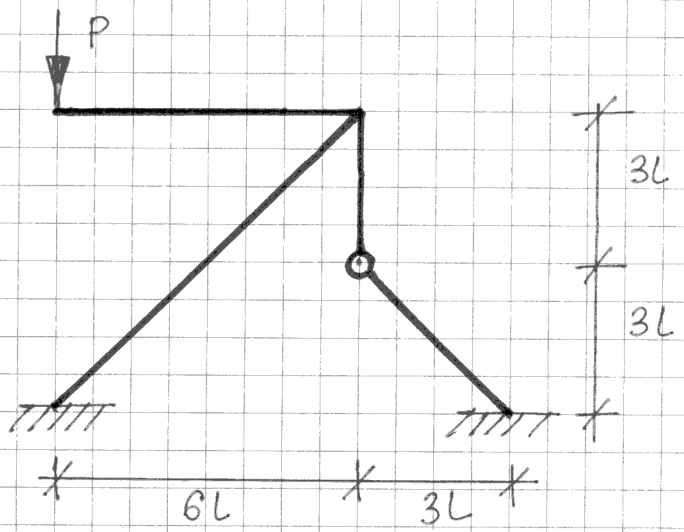
Kolokwium 2.2 , r. ak. 2016/2017 / Test 2.2

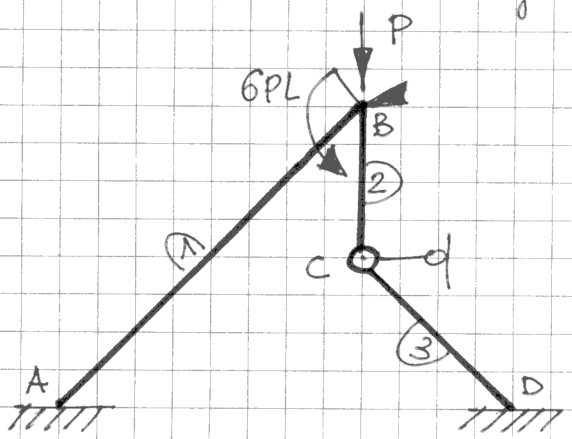
Narysuj wykres M / Find the bending moment diagram.



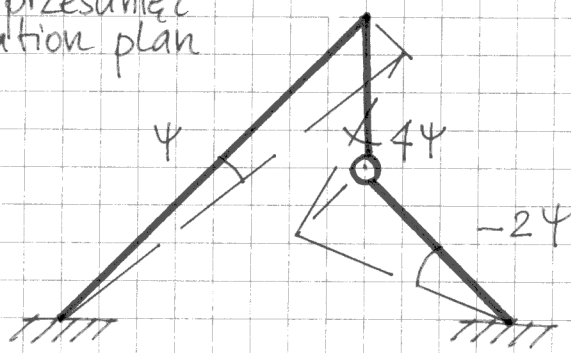
$EJ = const.$

$EA = +\infty$

Schemat zredukowany zastępczy / Primary reduced scheme



Plan przesunięć / Translation plan



Równania równowagi / Equations of equilibrium

$$\phi_B^{(1)} + \phi_B^{(2)} + 6PL = 0$$

$$\left[\phi_A^{(1)} + \phi_B^{(1)}\right] \cdot \bar{\Psi} + \phi_B^{(2)} \cdot 4\bar{\Psi} + \phi_D^{(3)} \cdot (-2\bar{\Psi}) + P \cdot 6L \cdot \bar{\Psi} = 0$$

Wzory transformacyjne / Slope-deflection equations

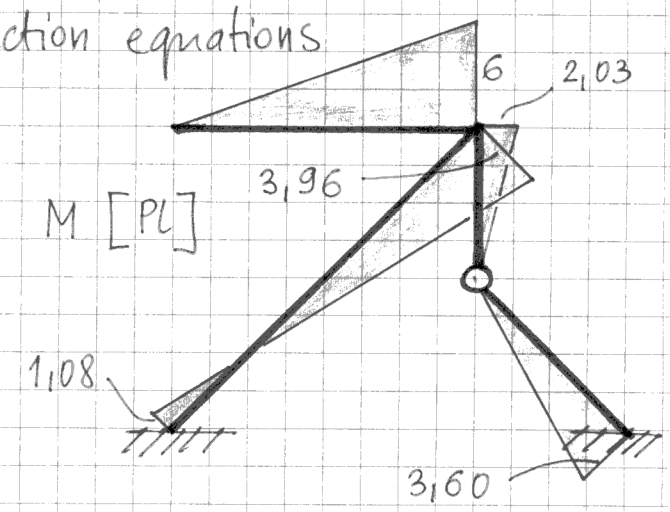
$$\phi_A^{(1)} = \frac{2EJ}{6\sqrt{2}L}\left[\varphi_B - 3\Psi\right] = -1{,}08\,PL$$

$$\phi_B^{(1)} = \frac{2EJ}{6\sqrt{2}L}\left[2\varphi_B - 3\Psi\right] = -3{,}96\,PL$$

$$\phi_B^{(2)} = \frac{3EJ}{3L}\left[\varphi_B - 4\Psi\right] = -2{,}03\,PL$$

$$\phi_D^{(3)} = \frac{3EJ}{3\sqrt{2}L}\left[2\Psi\right] = -3{,}60\,PL$$

M [PL]



$$\frac{EJ}{L}\begin{bmatrix} 1{,}471 & -4{,}707 \\ -4{,}707 & 20{,}243 \end{bmatrix}\begin{bmatrix} \varphi_B \\ \Psi \end{bmatrix} = \begin{bmatrix} -6 \\ 6 \end{bmatrix} PL \rightarrow \varphi_B = -12{,}219\frac{PL^2}{EJ},\ \Psi = -2{,}545\frac{PL^2}{EJ}$$