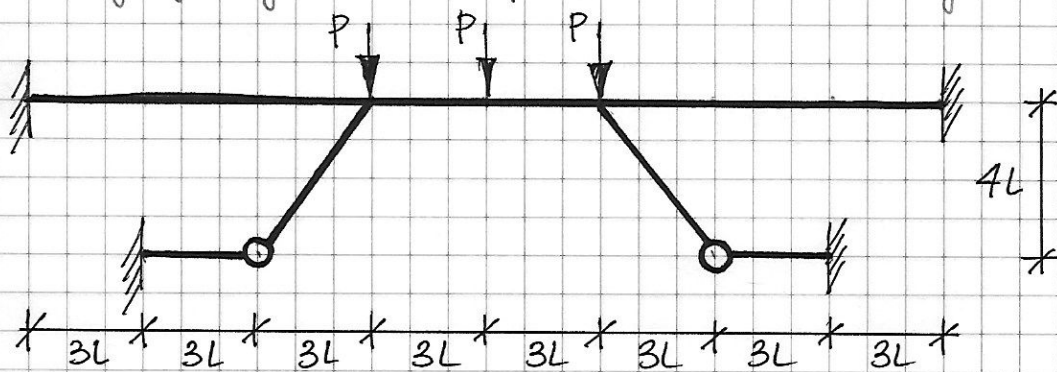


Narysuj wykres M / Find the bending moment diagram.

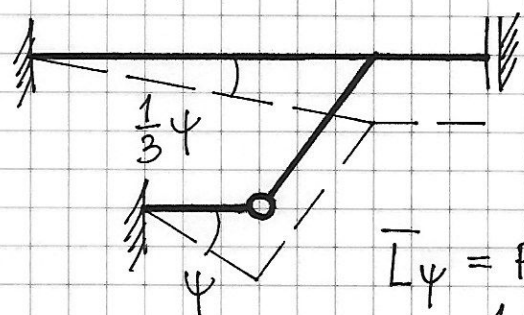
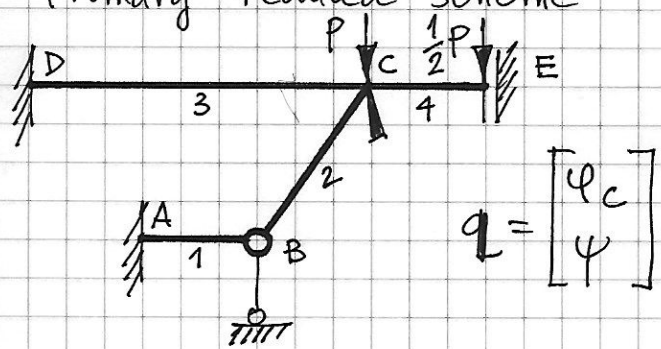
$EJ = \text{const.}$

$EA = +\infty$



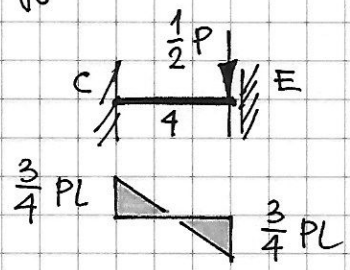
Primary reduced scheme

Plan przesunięć / Translation plan



$$\bar{L}_\psi = P \cdot \left(\frac{1}{3}\psi \cdot 9L\right) + \frac{1}{2}P \cdot \left(\frac{1}{3}\psi \cdot 9L\right) = \frac{9}{2}PL\psi$$

Momenty wyjściowe / Initial moments



Wzory transformacyjne / Slope-deflection equations

$$\Phi_A^{(1)} = \frac{3EJ}{3L} [-\psi] = -4,154 PL$$

$$\Phi_C^{(2)} = \frac{3EJ}{5L} [\psi_c] = 0,728 PL$$

$$\Phi_C^{(3)} = \frac{2EJ}{9L} [2\psi_c - \psi] = -0,383 PL$$

$$\Phi_D^{(3)} = \frac{2EJ}{9L} [\psi_c - \psi] = -0,653 PL$$

$$\Phi_C^{(4)} = \frac{EJ}{3L} [\psi_c] - \frac{3}{4}PL = -0,345 PL$$

$$\Phi_E^{(4)} = -\frac{EJ}{3L} [\psi_c] - \frac{3}{4}PL = -1,155 PL$$

Równania równowagi / Equilibrium equations

$$\left\{ \begin{aligned} \Phi_C^{(2)} + \Phi_C^{(3)} + \Phi_C^{(4)} &= 0 \end{aligned} \right.$$

$$\left\{ \begin{aligned} \Phi_A^{(1)} \cdot \bar{\Psi} + [\Phi_C^{(3)} + \Phi_D^{(3)}] \cdot \frac{1}{3} \bar{\Psi} + \bar{L} \Psi &= 0 \end{aligned} \right.$$

$$\frac{EJ}{L} \begin{bmatrix} \frac{62}{45} & -\frac{2}{9} \\ -\frac{2}{9} & \frac{31}{27} \end{bmatrix} \begin{bmatrix} \psi_C \\ \Psi \end{bmatrix} + \begin{bmatrix} -\frac{3}{4} \\ -\frac{9}{2} \end{bmatrix} PL = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\psi_C = 1,214 \frac{PL^2}{EJ}$$

$$\Psi = 4,154 \frac{PL^2}{EJ}$$

