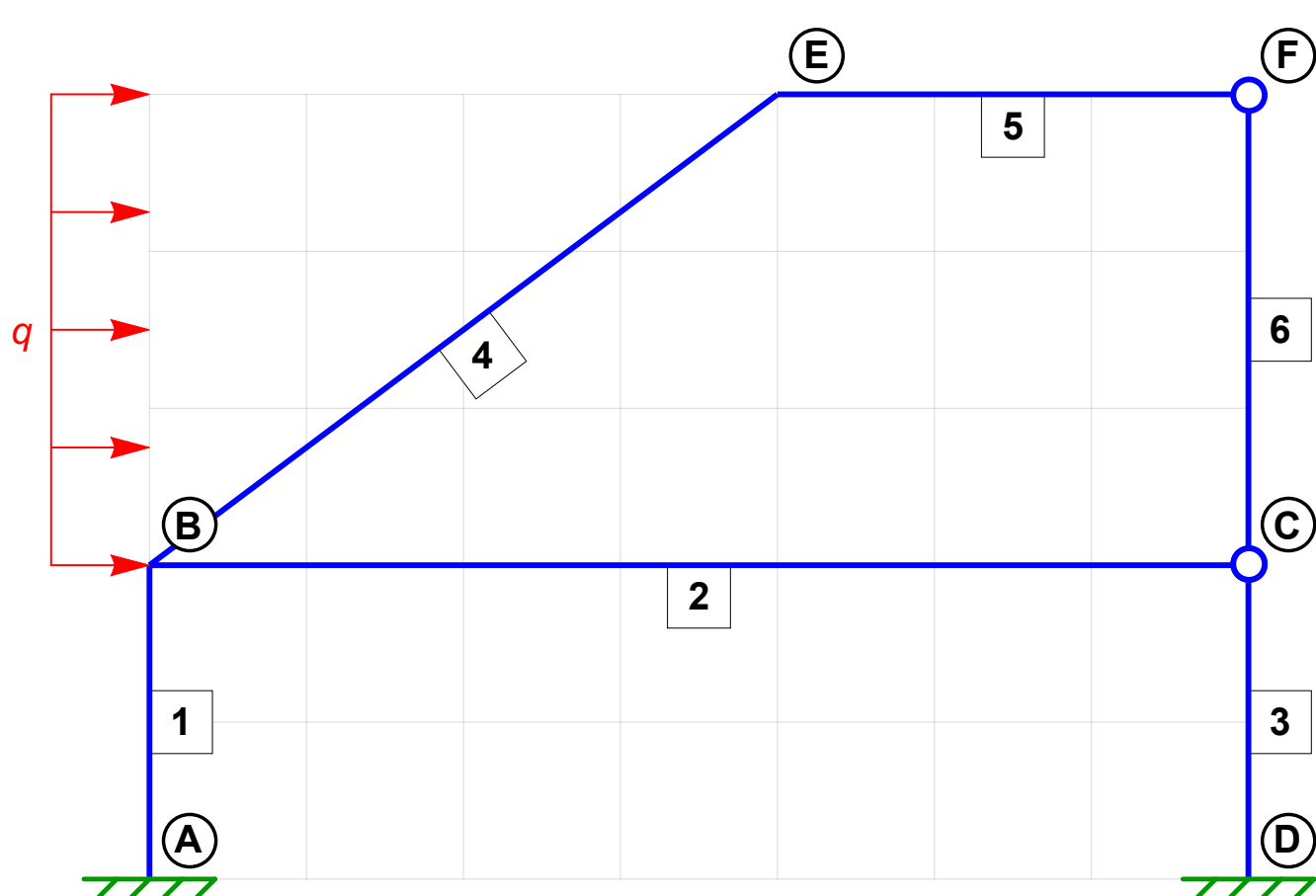


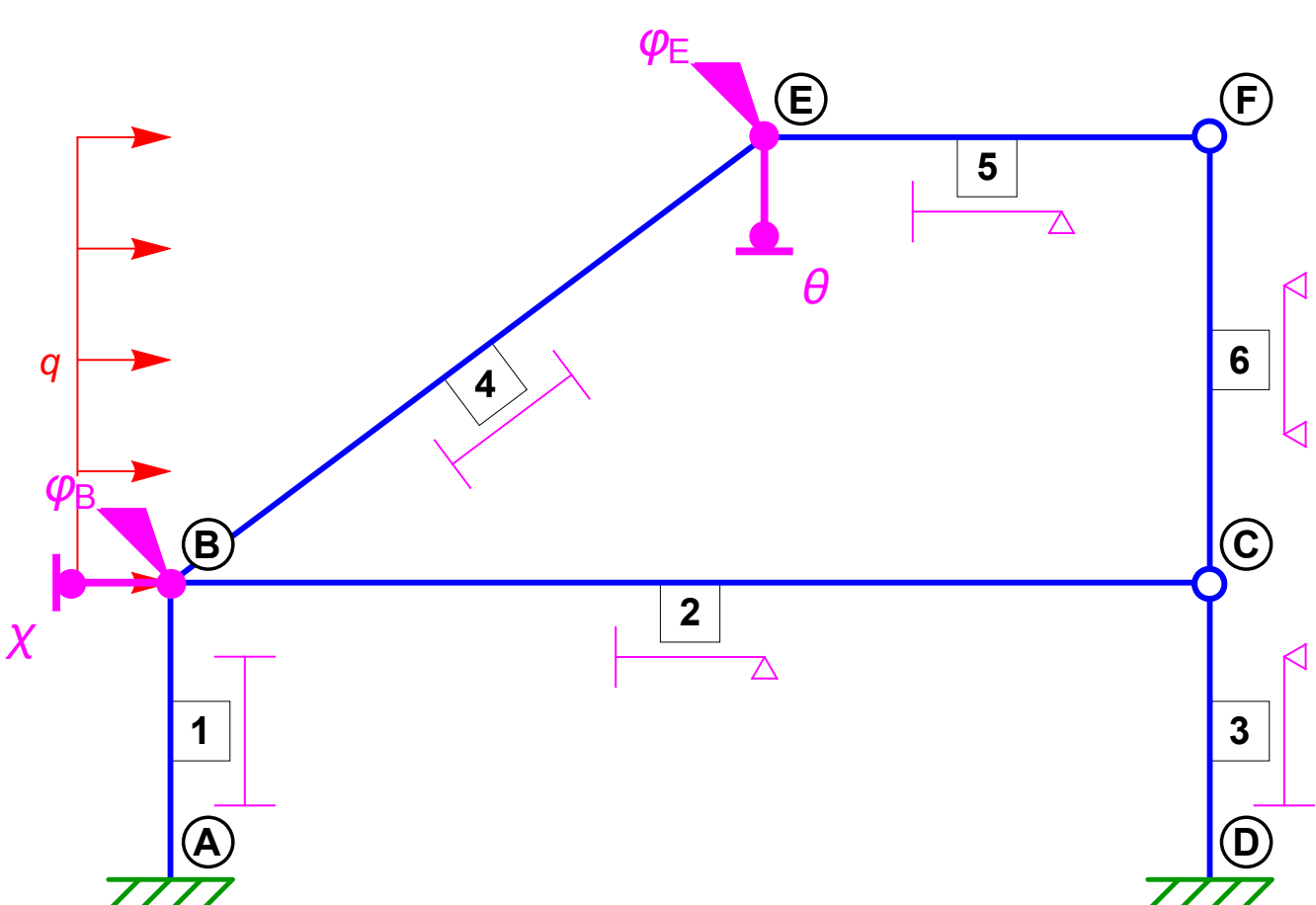
Geometria oraz obciążenia konstrukcji (wymiar oczka siatki – 1):



Wektor niewiadomych:

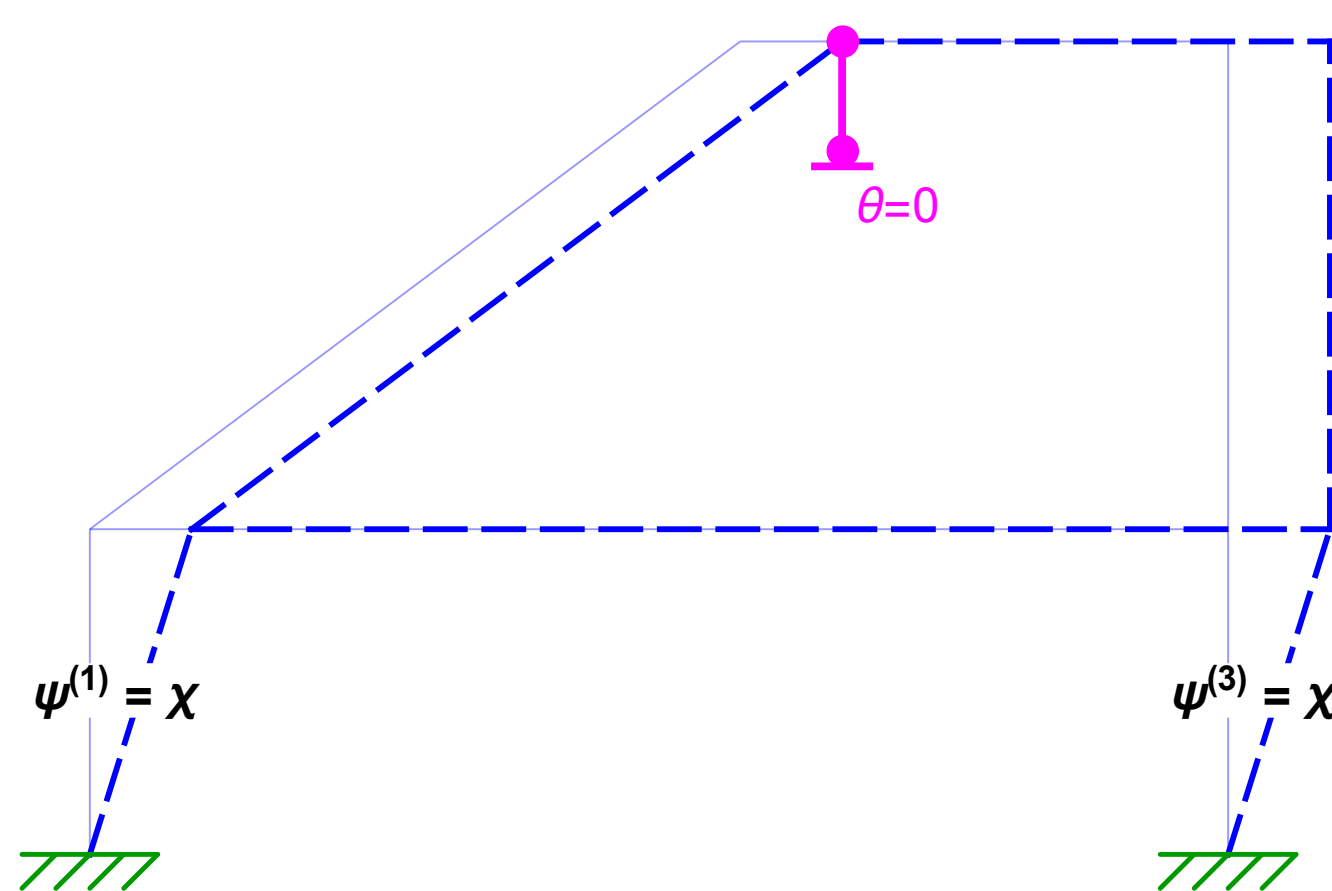
$$\mathbf{q} = \begin{pmatrix} \varphi_B \\ \varphi_E \\ \chi \\ \theta \end{pmatrix}$$

Układ geometrycznie wyznaczalny:

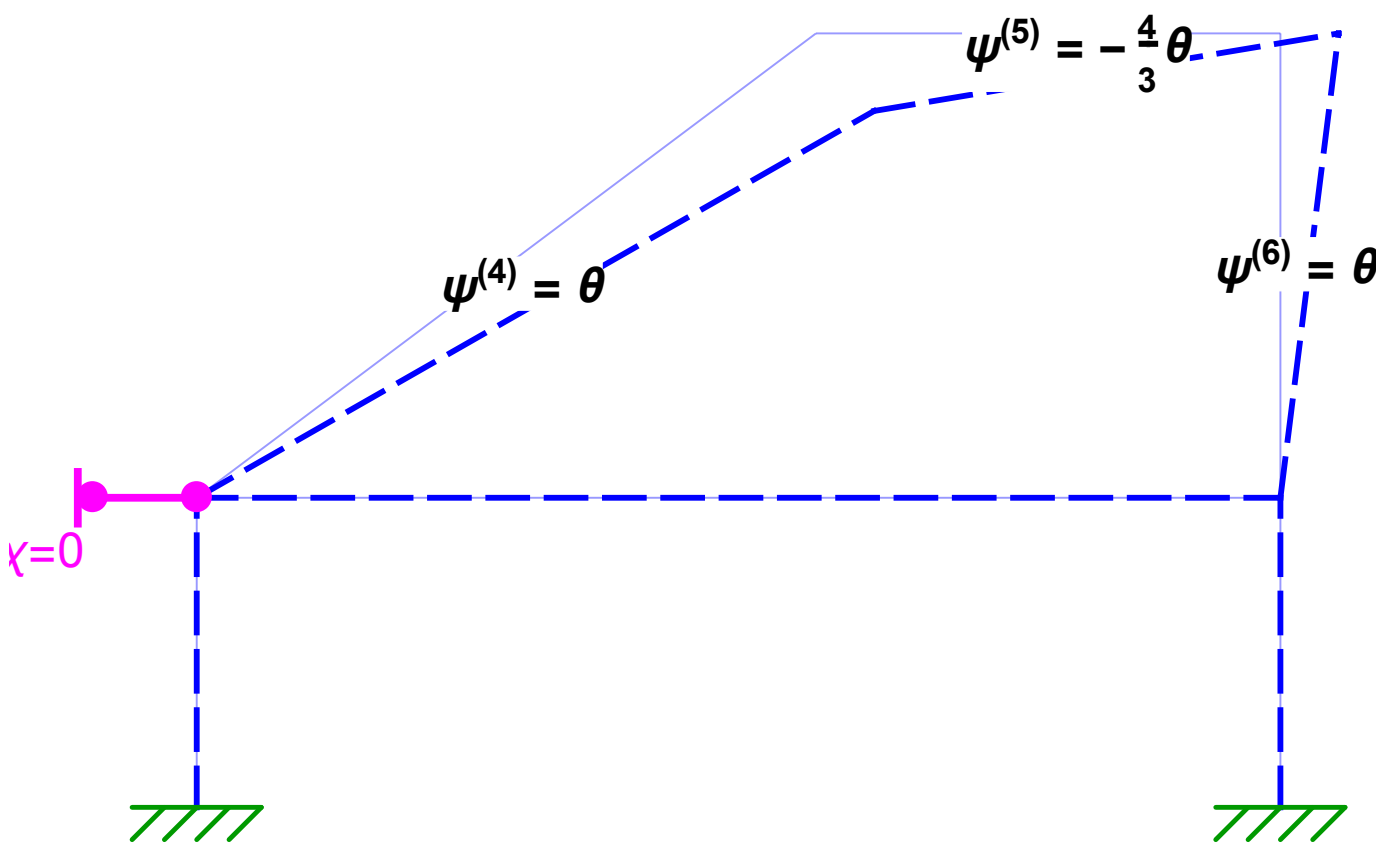


Plany przemieszczeń:

- plan przemieszczeń χ :



- plan przemieszczeń θ :



Ostateczny plan przemieszczeń:

$$\psi^{(1)} = \chi$$

$$\psi^{(2)} = \theta$$

$$\psi^{(3)} = \chi$$

$$\psi^{(4)} = \theta$$

$$\psi^{(5)} = -\frac{4}{3}\theta$$

$$\psi^{(6)} = \theta$$

Momenty wyjściowe:

$$\Phi_B^{04} = -\frac{3}{4} l^2 q$$

$$\Phi_E^{04} = \frac{3}{4} l^2 q$$

Wzory transformacyjne:

$$\Phi_A^1 = \frac{EJ}{1} [\varphi_B - 3\chi]$$

$$\Phi_B^1 = \frac{EJ}{1} [2\varphi_B - 3\chi]$$

$$\Phi_B^2 = \frac{EJ}{1} \left[\frac{3}{7}\varphi_B \right]$$

$$\Phi_D^3 = \frac{EJ}{1} \left[-\frac{3}{2}\chi \right]$$

$$\Phi_B^4 = \frac{EJ}{1} \left[\frac{4}{5}\varphi_B + \frac{2}{5}\varphi_E - \frac{6}{5}\theta \right] - \frac{3}{4} l^2 q$$

$$\Phi_E^4 = \frac{EJ}{1} \left[\frac{2}{5}\varphi_B + \frac{4}{5}\varphi_E - \frac{6}{5}\theta \right] + \frac{3}{4} l^2 q$$

$$\Phi_E^5 = \frac{EJ}{1} \left[\varphi_E + \frac{4}{3}\theta \right]$$

Równania równowagi:

$$\Phi_B^1 + \Phi_B^2 + \Phi_B^4 = 0$$

$$\Phi_E^4 + \Phi_E^5 = 0$$

$$(\Phi_A^1 + \Phi_B^1) \bar{\chi} + \Phi_D^3 \cdot \bar{\chi} + 3 l q \cdot 2 l \bar{\chi} = \bar{0}$$

$$(\Phi_B^4 + \Phi_E^4) \bar{\theta} + \Phi_E^5 \cdot \left(-\frac{4}{3}\bar{\theta}\right) + 3 l q \cdot \frac{3}{2} l \bar{\theta} = \bar{0}$$

$$\frac{EJ}{1} \begin{pmatrix} \frac{113}{35} & \frac{2}{5} & -3 & -\frac{6}{5} \\ \frac{2}{5} & \frac{9}{5} & 0 & \frac{2}{15} \\ -3 & 0 & \frac{15}{2} & 0 \\ -\frac{6}{5} & \frac{2}{15} & 0 & \frac{188}{45} \end{pmatrix} \begin{pmatrix} \varphi_B \\ \varphi_E \\ \chi \\ \theta \end{pmatrix} = l^2 q \begin{pmatrix} \frac{3}{4} \\ \frac{3}{4} \\ 6 \\ \frac{9}{2} \end{pmatrix}$$