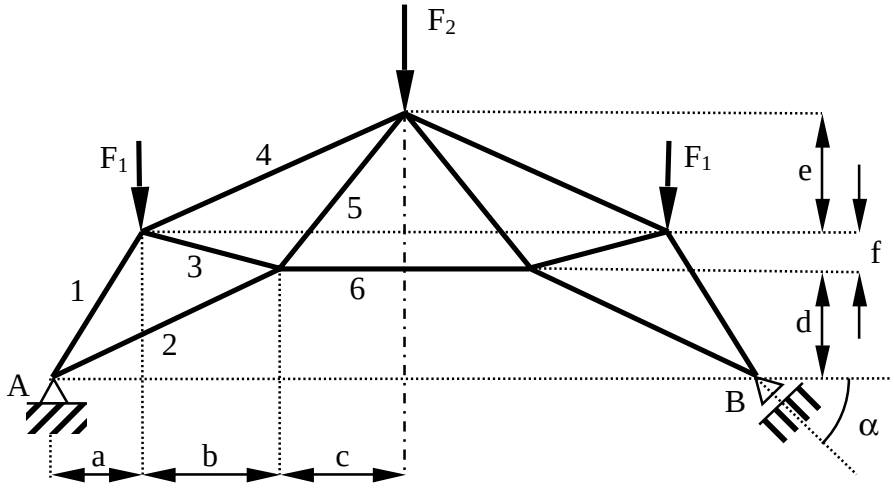
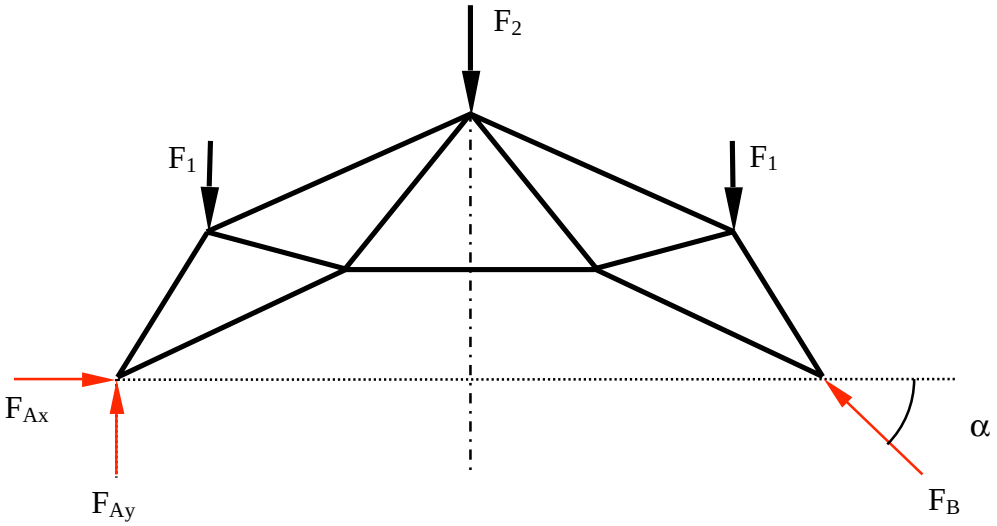


Freikörperbild



Kräftebilanzen

$\rightarrow \qquad F_{Ax} - F_B \cos\alpha = 0$ $\qquad\qquad \uparrow \qquad F_{Ay} - 2F_1 - F_2 + F_B \sin\alpha = 0$

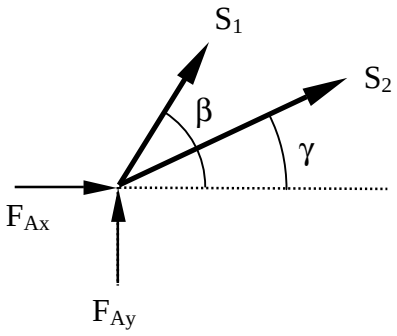
Momentenbilanz (bzgl. A)

$$-F_1 a - F_2\left(a+b+c\right) - F_1\left(a+2b+2c\right) + 2F_B \sin\alpha\left(a+b+c\right) = 0$$

Lagerkräfte

$$F_{Ax} = \frac{2F_1 + F_2}{2\tan\alpha} \qquad F_{Ay} = \frac{2F_1 + F_2}{2} \qquad F_B = F_A = \frac{2F_1 + F_2}{2\sin\alpha}$$

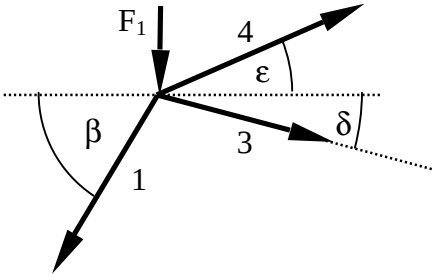
Knotenpunktverfahren



$$\rightarrow \qquad F_{Ax} + S_1 \cos\beta + S_2 \cos\gamma = 0$$

$$\uparrow \qquad F_{Ay} + S_1 \sin\beta + S_2 \sin\gamma = 0$$

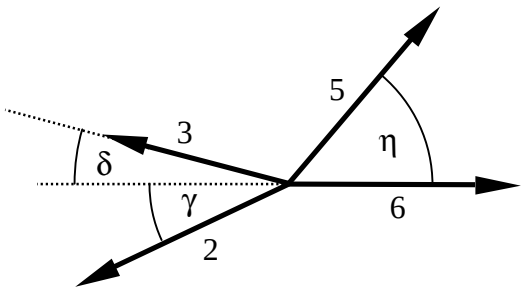
$$\tan\beta = \frac{d+f}{a} \qquad \tan\gamma = \frac{d}{a+b}$$



$$\rightarrow \qquad -S_1 \cos\beta + S_3 \cos\delta + S_4 \cos\varepsilon = 0$$

$$\uparrow \qquad -F_1 - S_1 \sin\beta - S_3 \sin\delta + S_4 \sin\varepsilon = 0$$

$$\tan\delta = \frac{f}{b} \qquad \tan\varepsilon = \frac{e}{b+c}$$



$$\rightarrow \qquad -S_2 \cos\gamma - S_3 \cos\delta + S_5 \cos\eta + S_6 = 0$$

$$\uparrow \qquad -S_2 \sin\gamma + S_3 \sin\delta + S_5 \sin\eta = 0$$

$$\tan\eta = \frac{e+f}{c}$$

Zusammenfassung der Knotenbilanzen in einem linearen Gleichungssystem

$$\begin{pmatrix} \cos\beta & \cos\gamma & 0 & 0 & 0 & 0 \\ \sin\beta & \sin\gamma & 0 & 0 & 0 & 0 \\ -\cos\beta & 0 & \cos\delta & \cos\varepsilon & 0 & 0 \\ -\sin\beta & 0 & -\sin\delta & \sin\varepsilon & 0 & 0 \\ 0 & -\cos\gamma & -\cos\delta & 0 & \cos\eta & 1 \\ 0 & -\sin\gamma & \sin\delta & 0 & \sin\eta & 0 \end{pmatrix} \begin{pmatrix} S_1 \\ S_2 \\ S_3 \\ S_4 \\ S_5 \\ S_6 \end{pmatrix} = \begin{pmatrix} -F_{Ax} \\ -F_{Ay} \\ 0 \\ F_1 \\ 0 \\ 0 \end{pmatrix}$$