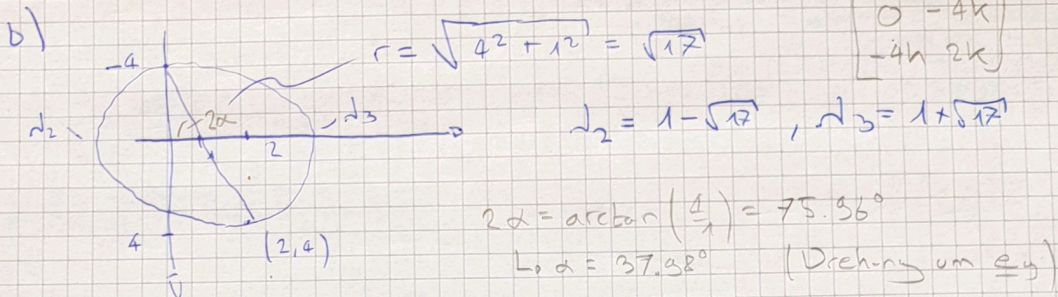


Serie 3

- [S1] a) Richtung: e_y Wert: $-3k$,
weil Hauptspannung $\Leftrightarrow$ Schubspannungen = 0



c)

$$\underline{n}_E = \begin{bmatrix} -1 \\ 2 \\ 2 \end{bmatrix} \frac{1}{3}$$

Wichtig

$$\underline{S} = \underline{I} \underline{n}_E = \begin{bmatrix} 0 & 0 & -4k \\ 0 & -3k & 0 \\ -4k & 0 & 2k \end{bmatrix} \begin{bmatrix} -1 \\ 2 \\ 2 \end{bmatrix} \frac{1}{3}$$

$$= \frac{1}{3} \begin{bmatrix} -8k \\ -6k \\ 8k \end{bmatrix} \quad \sigma_n = \underline{S} \cdot \underline{n}_E = \frac{1}{3} \begin{bmatrix} -8k \\ -6k \\ 8k \end{bmatrix} \begin{bmatrix} -1 \\ 2 \\ 2 \end{bmatrix} \frac{1}{3} = \frac{1}{9} (8 - 12 + 16)k$$

$$= \frac{12}{9}k = \frac{4}{3}k$$

$\frac{4}{3}k > 0 \Rightarrow$ Zugspannung

d)

$$\underline{\sigma}_n = \sigma_n \cdot \underline{n}_E = \frac{4}{3}k \frac{1}{3} \begin{bmatrix} -1 \\ 2 \\ 2 \end{bmatrix} = \frac{4}{9}k \begin{bmatrix} -1 \\ 2 \\ 2 \end{bmatrix}$$

$$\underline{\tau}_n = \underline{S} - \underline{\sigma}_n = \begin{bmatrix} -8/3k \\ -2k \\ 8/3k \end{bmatrix} - \begin{bmatrix} -4/9k \\ 8/9k \\ 8/9k \end{bmatrix}k = \begin{bmatrix} -20/9 \\ -26/9 \\ 16/9 \end{bmatrix}k = \frac{2}{9}k \begin{bmatrix} -10 \\ -13 \\ 8 \end{bmatrix}$$

$$|\underline{\tau}| = \frac{2}{9}k \sqrt{10^2 + 13^2 + 8^2} = \frac{2}{9}k \sqrt{333} = \frac{2}{3}k \sqrt{37}$$