

Beispiel

$$\sigma_1 = 200 \left[\frac{N}{mm^2} \right], \quad \sigma_2 = -100 \left[\frac{N}{mm^2} \right]$$

$$\tau = 50 \left[\frac{N}{mm^2} \right]$$

Normal spanning hypothesis

$$\begin{aligned} \sigma_v &= \frac{\sigma_1 + \sigma_2}{2} + \sqrt{\left(\frac{\sigma_1 - \sigma_2}{2} \right)^2 + \tau^2} \\ &= \frac{200 - 100}{2} + \sqrt{\left(\frac{200 + 100}{2} \right)^2 + 50^2} \left[\frac{N}{mm^2} \right] \end{aligned}$$

$$\sigma_v = \underline{\underline{208,11}} \left[\frac{N}{mm^2} \right]$$

Schubspannungshypothese

$$\begin{aligned} \sigma_v &= 2 \cdot \sqrt{\left(\frac{\sigma_1 - \sigma_2}{2} \right)^2 + \tau^2} = \sqrt{(\sigma_1 - \sigma_2)^2 + 4\tau^2} \\ &= \sqrt{(200 + 100)^2 + 4 \cdot 50^2} \left[\frac{N}{mm^2} \right] \end{aligned}$$

$$\sigma_v = \underline{\underline{316,23}} \left[\frac{N}{mm^2} \right]$$