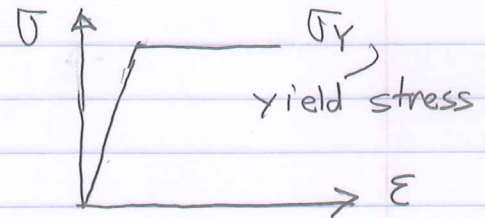


28. Stress transformation: Application to allowable stress design for ductile material

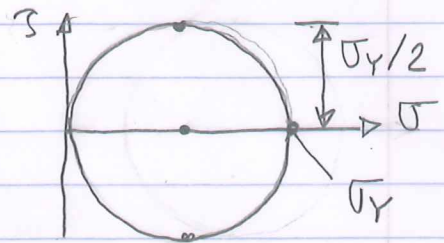
Ductile material

← □ → σ, ϵ



However, yielding is actually associated with shearing. Yielding occurs when the maximum shear stress on any plane reaches some critical value. From the test above, this critical value is

$$\tau_Y = \frac{1}{2} \sigma_Y$$



The design criteria can be written as

$$\tau_{\max} \leq \tau_Y$$

In the general case, $\frac{\sigma_a - \sigma_c}{2} \leq \frac{\sigma_Y}{2} / \text{F.S.}$

$$\text{Or, } \sigma_a - \sigma_c \leq \sigma_Y / \text{F.S.}$$

$$\text{where } \sigma_a \geq \sigma_b \geq \sigma_c$$