Tresca屈服曲线的导出

Monday, February 20, 2023 11:03 AM

① 单拉：$\sigma_1 = \sigma_s$，$\sigma_2 = \sigma_3 = 0$

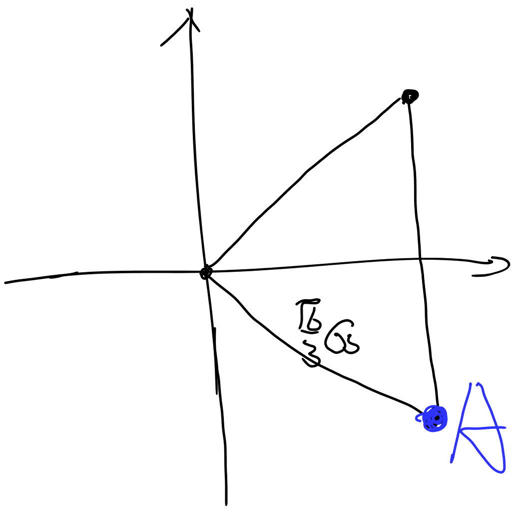
由 $r_\sigma = \sqrt{2 \cdot J_2}$

$= \sqrt{\frac{2}{3}} \cdot \sigma_s$

$= \frac{\sqrt{6}}{3} \sigma_s$，

$\mu_\sigma = \frac{2\sigma_2 - \sigma_1 - \sigma_3}{\sigma_1 - \sigma_3} = -1$，

$\tan\theta = -\frac{1}{\sqrt{3}}$，此时 $\theta = -\frac{\pi}{3}$.



得到A点

② 纯剪：

$\tau = \frac{\sigma_1 - \sigma_3}{2} = \sigma_s$

又 纯剪实验中，

$\sigma_1 = \tau_s$，$\sigma_2 = 0$，$\sigma_3 = -\tau_s$，$\rightarrow x = \frac{1}{\sqrt{2}}(\sigma_1 - \sigma_3)$ $y=0$

$= \sqrt{2}\tau_s$

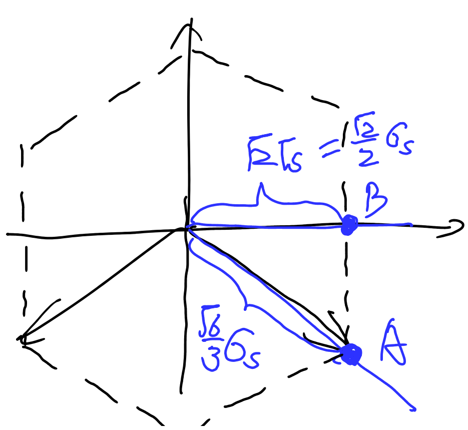
则：第二个点：$r = \sqrt{\frac{2}{6}(\tau_s^2 + \tau_s^2 + (2\tau_s)^2)}$ 　由 $\tau_1 - \tau_3 =$

$= \sqrt{2}\tau_s$ ⟶ 由Tresca准则：

$\sigma_1 - \sigma_3 = \sigma_s$

即：$\tau_s = \frac{\sigma_s}{2}$

$\mu_\sigma = \frac{2\sigma_2 - \sigma_1 - \sigma_3}{\sigma_1 - \sigma_3} = \frac{0}{2\tau_s}$.



得到B点

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$$\boxed{\frac{\sqrt{6}}{3}\times\frac{1}{2}\times\sqrt{3} = \frac{3\sqrt{2}}{6} = \frac{\sqrt{2}}{2}G_5 \ \surd}\ \star$$

③: 区间内: $X = \frac{1}{\sqrt{2}}(G_1 - G_3) = G_5$, $\Longrightarrow$ 为直线

$y = \frac{1}{\sqrt{6}}(2G_2 - G_1 - G_3) \longrightarrow$ 变化.