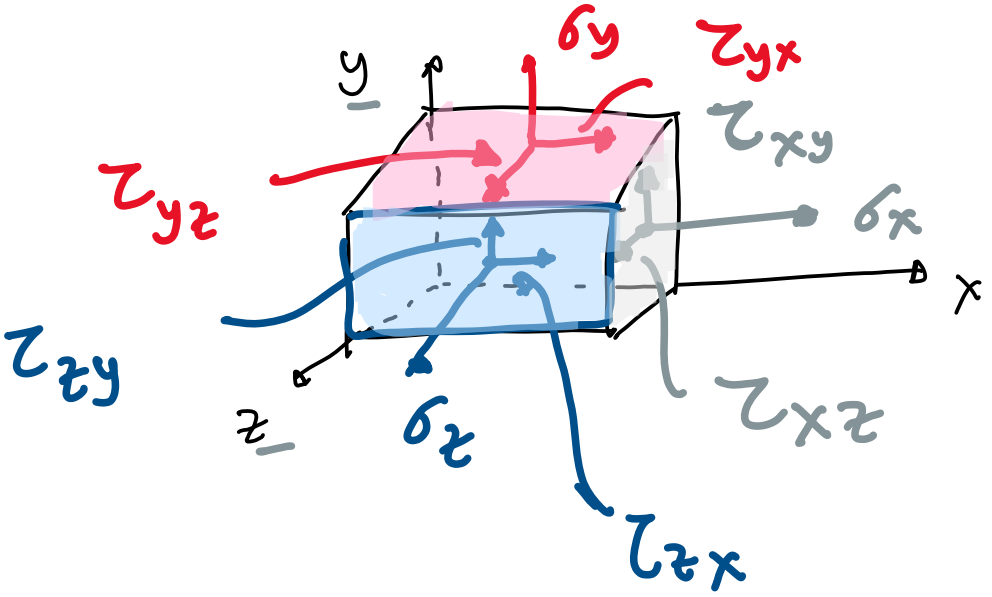
# General 3D stress




$\sigma_z, \tau_{zy}, \tau_{zx}$

$\sigma_y, \tau_{yx}, \tau_{yz}$

$\sigma_x, \tau_{xy}, \tau_{xz}$

} 9 stresses

✓① $\sigma_x, \sigma_y, \tau_{xy} = \tau_{yx}$ → 3 stresses in x-y plane

② $\sigma_y, \sigma_z, \tau_{yz} = \tau_{zy}$ → " " y-z plane

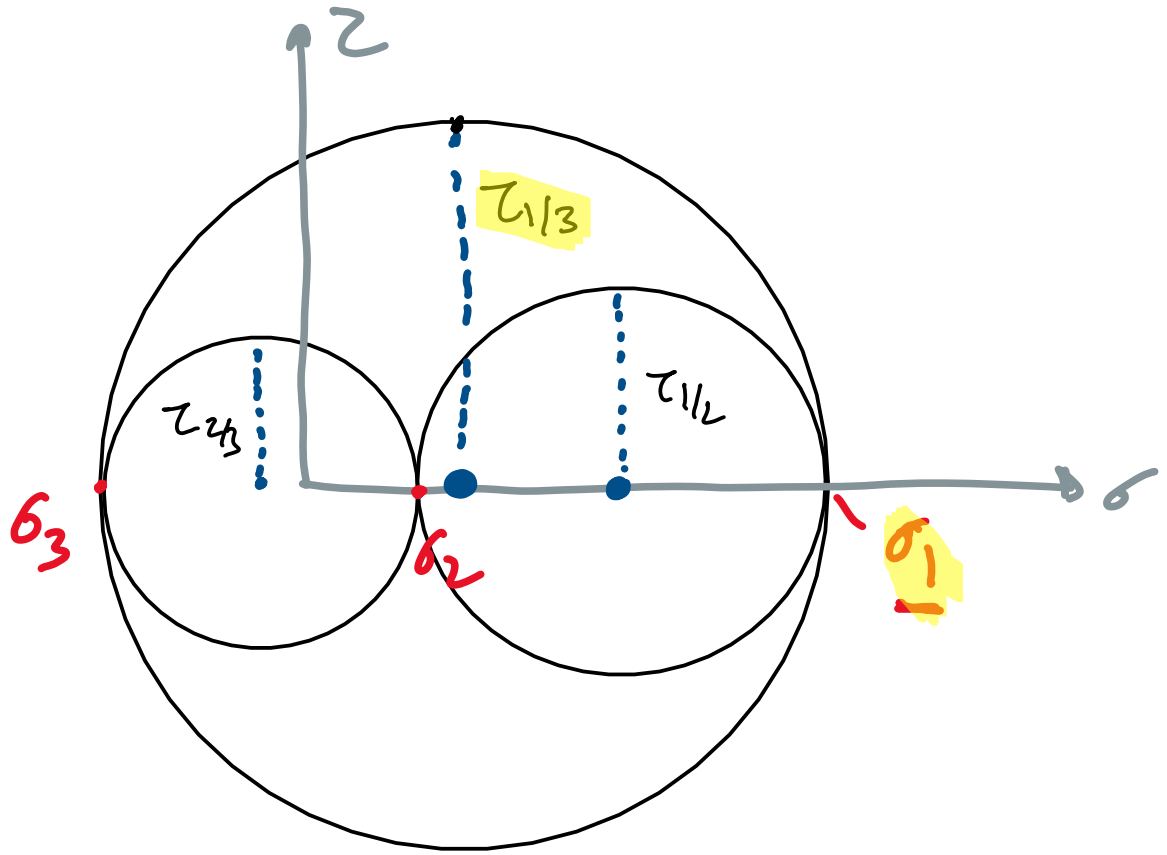
③ $\sigma_z, \sigma_x, \tau_{zx} = \tau_{xz}$ → " " x-z plane

Draw 3 Mohr's circles for ①, ②, ③

$\sigma_a$, $\sigma_b$, $\sigma_c$ — principles stress

Re-arrange in descending order

$\sigma_1 > \sigma_2 \geq \sigma_3$




$\tau_{1/3} = r = \frac{\sigma_1 - \sigma_3}{2}$

$\tau_{1/2} = r = \frac{\sigma_1 - \sigma_2}{2}$

$\tau_{2/3} = \frac{\sigma_2 - \sigma_3}{2}$