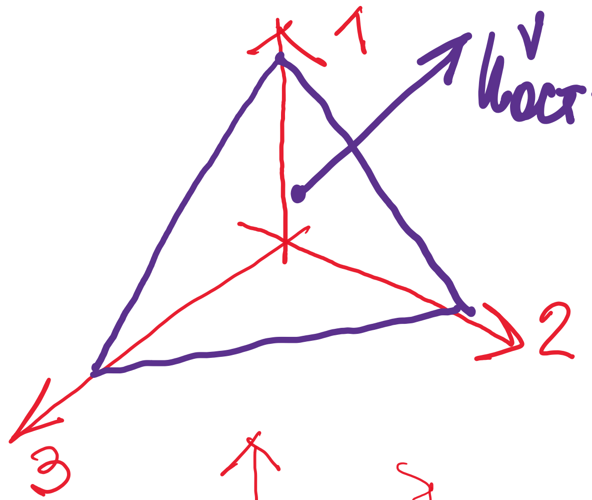
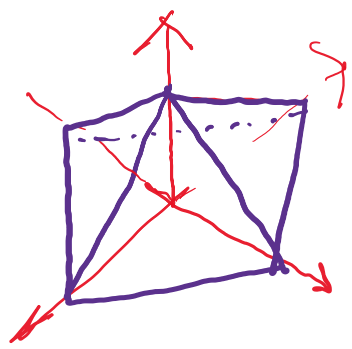
TENSIONES OCTAÉDRICAS



$$\breve{u}_{oct} = \begin{Bmatrix} \sqrt{3}/3 \\ \sqrt{3}/3 \\ \sqrt{3}/3 \end{Bmatrix}$$



- plano octaédrico es con referencia a TERNA PRINCIPAL
- plano octaédrico que tiene igual ángulo respecto de las direcciones ppales

$$\bar{f}_{oct} = [T_{T_P}] \cdot \breve{u}_{oct}$$

EJERCICIO ANTERIOR

$$[T_{T_P}] = \begin{bmatrix} 20 & & \\ & 0 & \\ & & -20 \end{bmatrix} \text{MPa}$$

$$\bar{f}_{oct} = \begin{bmatrix} \sigma_1 & & \\ & \sigma_2 & \\ & & \sigma_3 \end{bmatrix} \breve{u}_{oct}$$

$$\bar{f}_{oct} = \begin{Bmatrix} \sigma_1 \cdot \sqrt{3}/3 \\ \sigma_2 \sqrt{3}/3 \\ \sigma_3 \sqrt{3}/3 \end{Bmatrix}$$

$$\sigma_\pi = \bar{f}_\pi \cdot \breve{u}_\pi$$

pr. escalar de vectores

$$\sigma_{oct} = \underbrace{(\sigma_1 + \sigma_2 + \sigma_3)}_{I_1} \left(\frac{\sqrt{3}}{3}\right)^2 \qquad \boxed{\sigma_{oct} = \frac{I_1}{3}} \qquad \boxed{\tau_{oct} = \frac{1}{3}\sqrt{2I_1 - 6I_2}}$$

TENSOR ESFÉRICO Y TENSOR DESVIADOR

$$[T_T]_{xyz} = \begin{bmatrix} \sigma_x & \tau_{xy} & \tau_{xz} \\ \tau_{yx} & \sigma_y & \tau_{yz} \\ \tau_{zx} & \tau_{zy} & \sigma_z \end{bmatrix} = \begin{bmatrix} \sigma_m & & \\ & \sigma_m & \\ & & \sigma_m \end{bmatrix} + \begin{bmatrix} \sigma_x - \sigma_m & \tau_{xy} & \tau_{xz} \\ \tau_{yx} & \sigma_y - \sigma_m & \tau_{yz} \\ \tau_{zx} & \tau_{zy} & \sigma_z - \sigma_m \end{bmatrix}$$

$$\sigma_m = \frac{\sigma_x + \sigma_y + \sigma_z}{3} = \frac{I_1}{3}$$

TENSOR ESFÉRICO
TENSOR HIDROSTÁTICO
⇓
CAMBIOS DE VOLUMEN

TENSOR DESVIADOR
⇓
CAMBIO FORMA

$$[T_{T_P}]_{123} = \begin{bmatrix} \sigma_1 & & \\ & \sigma_2 & \\ & & \sigma_3 \end{bmatrix} = \begin{bmatrix} \sigma_m & & \\ & \sigma_m & \\ & & \sigma_m \end{bmatrix} + \begin{bmatrix} \sigma_1 - \sigma_m & & \\ & \sigma_2 - \sigma_m & \\ & & \sigma_3 - \sigma_m \end{bmatrix}$$

$$\sigma_m = \frac{\sigma_1 + \sigma_2 + \sigma_3}{3} = \frac{I_1}{3}$$