

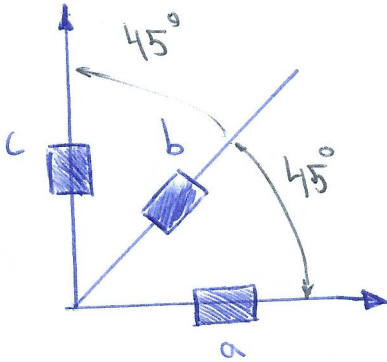
E.5.5

Datuk

$$\begin{cases} G = 80 \text{ GPa} \\ \epsilon_{aa} = 0.5 \cdot 10^{-3} \\ \tau = 120 \text{ MPa} \\ \epsilon_b < 0 \end{cases}$$

Asier Davila Peña

31. taldea



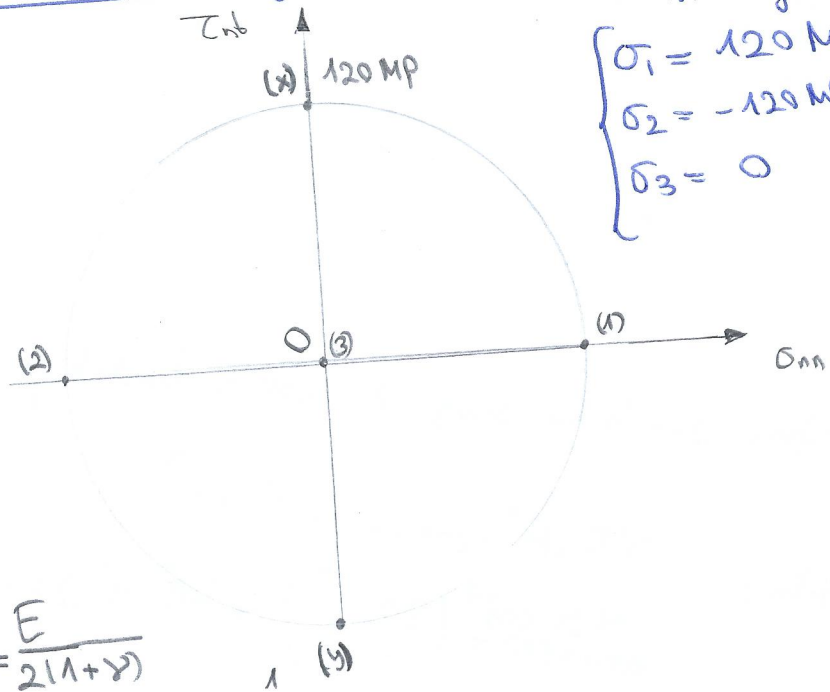
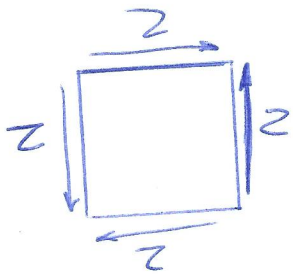
Kortadura purua dute

$$\begin{cases} \sigma_x = \sigma_y = \sigma_z = 0 \\ \tau_{xy} = 120 \text{ MPa} \\ \tau_{xz} = 0 = \tau_{yz} \end{cases}$$

Mochen zirkulara egiten badugu.

Tentsio nagusiak

$$\begin{cases} \sigma_1 = 120 \text{ MPa} \\ \sigma_2 = -120 \text{ MPa} \\ \sigma_3 = 0 \end{cases}$$



$$G = \frac{E}{2(1+\nu)}$$

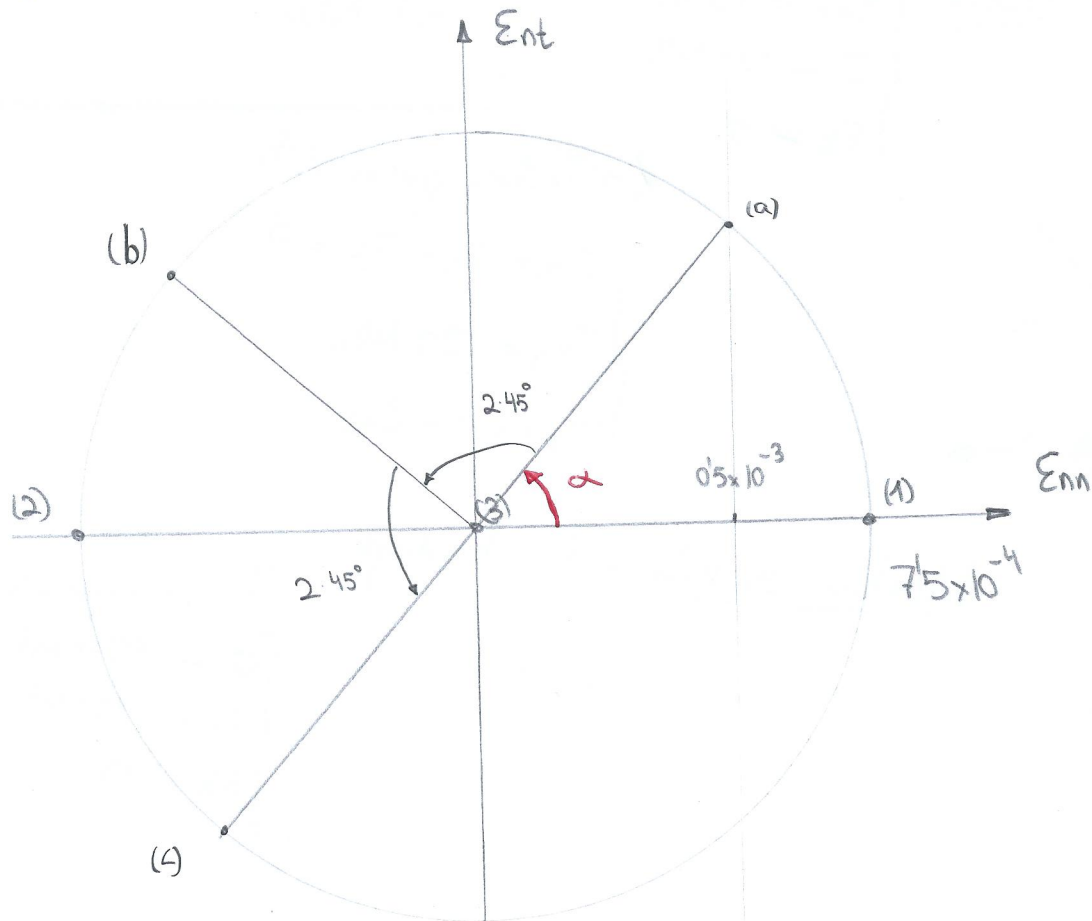
• Deformazio nagusiak lortzeko

$$\epsilon_1 = \frac{1}{E} (\sigma_1 - \nu(\sigma_2 + \sigma_3)) = \frac{\sigma_1 (1 + \nu)}{E} = \frac{\sigma_1}{2G} = \frac{120 \cdot 10^6 \text{ Pa}}{2 \cdot 80 \cdot 10^9 \text{ Pa}} = 7.5 \cdot 10^{-4}$$

$$\epsilon_2 = \frac{1}{E} (\sigma_2 - \nu(\sigma_1 + \sigma_3)) = \frac{\sigma_2 (1 + \nu)}{E} = \frac{\sigma_2}{2G} = \frac{-120 \cdot 10^6 \text{ Pa}}{2 \cdot 80 \cdot 10^9 \text{ Pa}} = -7.5 \cdot 10^{-4}$$

$$\epsilon_3 = \frac{1}{E} (\sigma_3 - \nu(\sigma_1 + \sigma_2)) = \frac{0 - 0}{E} = 0$$

- Deformazioen Mochen zirkulua marrazten (E erradiora $7'5 \times 10^{-4}$)



b negatiboa izan behar denez derrigorrez badakigu ϵ_2 kerraldean egor behar dela.

• α lortzeko:

$$7'5 \times 10^{-4} \cdot \cos(\alpha) = 0'5 \times 10^{-3}$$

$$\alpha = \cos^{-1}\left(\frac{0'5 \times 10^{-3}}{7'5 \times 10^{-4}}\right) = 48^\circ 11' 22,87''$$

ϵ_b lortzeko $\rightarrow 7'5 \times 10^{-4} \cdot \cos(\alpha + 90^\circ) = -5'59 \times 10^{-4} = \epsilon_b$

ϵ_c lortzeko $\rightarrow 7'5 \times 10^{-4} \cdot \cos(\alpha + 140^\circ) = -0'5 \times 10^{-3} = \epsilon_c$

Emaitza

$$\epsilon_{cc} = -5'59 \times 10^{-4}$$

$$\epsilon_{bb} = -0'5 \times 10^{-3}$$