TEMA 1

$E := 20\ \text{MPa}$ $\qquad \mu := 0.3$

$\sigma_{x.A} := -80\ \text{kPa} \quad \sigma_{y.A} := -60\ \text{kPa} \quad \sigma_{z.A} := -280\ \text{kPa} \quad \tau_{xy.A} := -20\ \text{kPa}$

$\sigma_{x.B} := -107\ \text{kPa} \quad \sigma_{y.B} := -107\ \text{kPa} \quad \sigma_{z.B} := -107\ \text{kPa} \quad \tau_{xy.B} := -0\ \text{kPa}$

Para el tensor "A"

$$\sigma_{m.A} := \frac{\sigma_{x.A} + \sigma_{y.A} + \sigma_{z.A}}{3} = -140\ \text{kPa}$$

$$T_{T.Desv.A} := \begin{bmatrix} \sigma_{x.A} & \tau_{xy.A} & 0\ \text{kPa} \\ \tau_{xy.A} & \sigma_{y.A} & 0\ \text{kPa} \\ 0\ \text{kPa} & 0\ \text{kPa} & \sigma_{z.A} \end{bmatrix} - \begin{bmatrix} \sigma_{m.A} & 0\ \text{kPa} & 0\ \text{kPa} \\ 0\ \text{kPa} & \sigma_{m.A} & 0\ \text{kPa} \\ 0\ \text{kPa} & 0\ \text{kPa} & \sigma_{m.A} \end{bmatrix} = \begin{bmatrix} 60 & -20 & 0 \\ -20 & 80 & 0 \\ 0 & 0 & -140 \end{bmatrix} \text{kPa}$$

$$\varepsilon_{x.A} := \frac{\sigma_{x.A}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{y.A} + \sigma_{z.A}\right) = 0.0011 \qquad \varepsilon_{y.A} := \frac{\sigma_{y.A}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{x.A} + \sigma_{z.A}\right) = 0.0024$$

$$\varepsilon_{z.A} := \frac{\sigma_{z.A}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{y.A} + \sigma_{x.A}\right) = -0.0119 \qquad \gamma_{xy.A} := \frac{\tau_{xy.A}}{\dfrac{E}{2 \cdot (1 + \mu)}} = -0.0026 \qquad \varepsilon_{xy.A} := \frac{\gamma_{xy.A}}{2} = -0.0013$$

$$T_{\varepsilon.A} := \begin{bmatrix} \varepsilon_{x.A} & \varepsilon_{xy.A} & 0 \\ \varepsilon_{xy.A} & \varepsilon_{y.A} & 0 \\ 0 & 0 & \varepsilon_{z.A} \end{bmatrix} = \begin{bmatrix} 0.0011 & -0.0013 & 0 \\ -0.0013 & 0.0024 & 0 \\ 0 & 0 & -0.0119 \end{bmatrix} \qquad \varepsilon_{v.A} := \varepsilon_{x.A} + \varepsilon_{y.A} + \varepsilon_{z.A} = -0.0084$$

Para el tensor "B"

$$\sigma_{m.B} := \frac{\sigma_{x.B} + \sigma_{y.B} + \sigma_{z.B}}{3} = -107\ \text{kPa}$$

$$T_{T.Desv.B} := \begin{bmatrix} \sigma_{x.B} & \tau_{xy.B} & 0\ \text{kPa} \\ \tau_{xy.B} & \sigma_{y.B} & 0\ \text{kPa} \\ 0\ \text{kPa} & 0\ \text{kPa} & \sigma_{z.B} \end{bmatrix} - \begin{bmatrix} \sigma_{m.B} & 0\ \text{kPa} & 0\ \text{kPa} \\ 0\ \text{kPa} & \sigma_{m.B} & 0\ \text{kPa} \\ 0\ \text{kPa} & 0\ \text{kPa} & \sigma_{m.B} \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} \text{kPa}$$

$$\varepsilon_{x.B} := \frac{\sigma_{x.B}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{y.B} + \sigma_{z.B}\right) = -0.0021 \qquad \varepsilon_{y.B} := \frac{\sigma_{y.B}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{x.B} + \sigma_{z.B}\right) = -0.0021$$

$$\varepsilon_{z.B} := \frac{\sigma_{z.B}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{y.B} + \sigma_{x.B}\right) = -0.0021$$

$$T_{\varepsilon.B} := \begin{bmatrix} \varepsilon_{x.B} & 0 & 0 \\ 0 & \varepsilon_{y.B} & 0 \\ 0 & 0 & \varepsilon_{z.B} \end{bmatrix} = \begin{bmatrix} -0.0021 & 0 & 0 \\ 0 & -0.0021 & 0 \\ 0 & 0 & -0.0021 \end{bmatrix} \qquad \varepsilon_{v.B} := \varepsilon_{x.B} + \varepsilon_{y.B} + \varepsilon_{z.B} = -0.0064$$

TEMA 2

$E := 20\ \text{MPa}$ $\mu := 0.3$

$\sigma_{x.A} := -90\ \text{kPa}$ $\sigma_{y.A} := -60\ \text{kPa}$ $\sigma_{z.A} := -300\ \text{kPa}$ $\tau_{xy.A} := -15\ \text{kPa}$

$\sigma_{x.B} := -135\ \text{kPa}$ $\sigma_{y.B} := -135\ \text{kPa}$ $\sigma_{z.B} := -135\ \text{kPa}$ $\tau_{xy.B} := -0\ \text{kPa}$

Para el tensor "A"

$$\sigma_{m.A} := \frac{\sigma_{x.A} + \sigma_{y.A} + \sigma_{z.A}}{3} = -150\ \text{kPa}$$

$$T_{T.Desv.A} := \begin{bmatrix} \sigma_{x.A} & \tau_{xy.A} & 0\ \text{kPa} \\ \tau_{xy.A} & \sigma_{y.A} & 0\ \text{kPa} \\ 0\ \text{kPa} & 0\ \text{kPa} & \sigma_{z.A} \end{bmatrix} - \begin{bmatrix} \sigma_{m.A} & 0\ \text{kPa} & 0\ \text{kPa} \\ 0\ \text{kPa} & \sigma_{m.A} & 0\ \text{kPa} \\ 0\ \text{kPa} & 0\ \text{kPa} & \sigma_{m.A} \end{bmatrix} = \begin{bmatrix} 60 & -15 & 0 \\ -15 & 90 & 0 \\ 0 & 0 & -150 \end{bmatrix} \text{kPa}$$

$$\varepsilon_{x.A} := \frac{\sigma_{x.A}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{y.A} + \sigma_{z.A}\right) = 0.0009 \qquad \varepsilon_{y.A} := \frac{\sigma_{y.A}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{x.A} + \sigma_{z.A}\right) = 0.0028$$

$$\varepsilon_{z.A} := \frac{\sigma_{z.A}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{y.A} + \sigma_{x.A}\right) = -0.0127 \qquad \gamma_{xy.A} := \frac{\tau_{xy.A}}{\frac{E}{2 \cdot (1+\mu)}} = -0.002 \qquad \varepsilon_{xy.A} := \frac{\gamma_{xy.A}}{2} = -0.001$$

$$T_{\varepsilon.A} := \begin{bmatrix} \varepsilon_{x.A} & \varepsilon_{xy.A} & 0 \\ \varepsilon_{xy.A} & \varepsilon_{y.A} & 0 \\ 0 & 0 & \varepsilon_{z.A} \end{bmatrix} = \begin{bmatrix} 0.0009 & -0.001 & 0 \\ -0.001 & 0.0028 & 0 \\ 0 & 0 & -0.0127 \end{bmatrix} \qquad \varepsilon_{v.A} := \varepsilon_{x.A} + \varepsilon_{y.A} + \varepsilon_{z.A} = -0.009$$

Para el tensor "B"

$$\sigma_{m.B} := \frac{\sigma_{x.B} + \sigma_{y.B} + \sigma_{z.B}}{3} = -135\ \text{kPa}$$

$$T_{T.Desv.B} := \begin{bmatrix} \sigma_{x.B} & \tau_{xy.B} & 0\ \text{kPa} \\ \tau_{xy.B} & \sigma_{y.B} & 0\ \text{kPa} \\ 0\ \text{kPa} & 0\ \text{kPa} & \sigma_{z.B} \end{bmatrix} - \begin{bmatrix} \sigma_{m.B} & 0\ \text{kPa} & 0\ \text{kPa} \\ 0\ \text{kPa} & \sigma_{m.B} & 0\ \text{kPa} \\ 0\ \text{kPa} & 0\ \text{kPa} & \sigma_{m.B} \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} \text{kPa}$$

$$\varepsilon_{x.B} := \frac{\sigma_{x.B}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{y.B} + \sigma_{z.B}\right) = -0.0027 \qquad \varepsilon_{y.B} := \frac{\sigma_{y.B}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{x.B} + \sigma_{z.B}\right) = -0.0027$$

$$\varepsilon_{z.B} := \frac{\sigma_{z.B}}{E} - \frac{\mu}{E} \cdot \left(\sigma_{y.B} + \sigma_{x.B}\right) = -0.0027$$

$$T_{\varepsilon.B} := \begin{bmatrix} \varepsilon_{x.B} & 0 & 0 \\ 0 & \varepsilon_{y.B} & 0 \\ 0 & 0 & \varepsilon_{z.B} \end{bmatrix} = \begin{bmatrix} -0.0027 & 0 & 0 \\ 0 & -0.0027 & 0 \\ 0 & 0 & -0.0027 \end{bmatrix} \qquad \varepsilon_{v.B} := \varepsilon_{x.B} + \varepsilon_{y.B} + \varepsilon_{z.B} = -0.0081$$