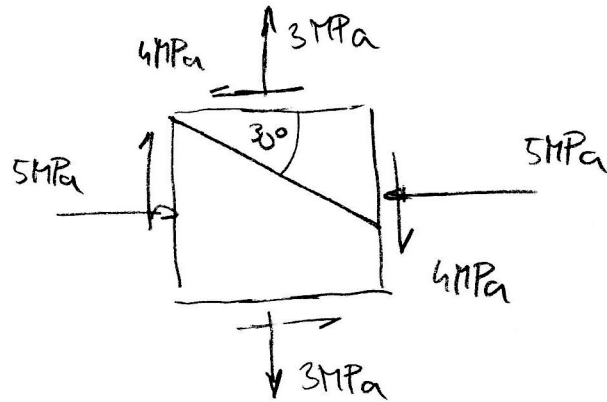


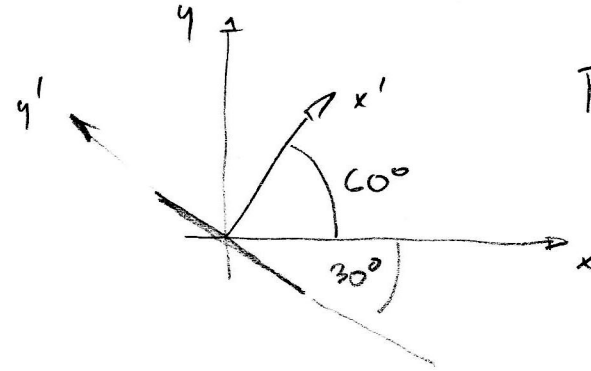
Př: Určete napětí (normálovou a smykovou složku) ve vyznačeném průřezu.



$$\sigma_x = -5 \text{ MPa}$$

$$\sigma_y = 3 \text{ MPa}$$

$$\tau_{xy} = -4 \text{ MPa}$$



$$\Pi_\sigma = \begin{bmatrix} -5 & -4 \\ -4 & 3 \end{bmatrix}$$

$$\Pi_\sigma^{60} = \begin{bmatrix} \cos 60^\circ & -\sin 60^\circ \\ \sin 60^\circ & \cos 60^\circ \end{bmatrix}^T \begin{bmatrix} -5 & -4 \\ -4 & 3 \end{bmatrix} \begin{bmatrix} \cos 60^\circ & -\sin 60^\circ \\ \sin 60^\circ & \cos 60^\circ \end{bmatrix} = \begin{bmatrix} \frac{1}{2} & \frac{\sqrt{3}}{2} \\ -\frac{\sqrt{3}}{2} & \frac{1}{2} \end{bmatrix} \begin{bmatrix} -5 & -4 \\ -4 & 3 \end{bmatrix} \begin{bmatrix} \frac{1}{2} & -\frac{\sqrt{3}}{2} \\ \frac{\sqrt{3}}{2} & \frac{1}{2} \end{bmatrix} =$$

$$= \begin{bmatrix} \frac{1}{2} & \frac{\sqrt{3}}{2} \\ -\frac{\sqrt{3}}{2} & \frac{1}{2} \end{bmatrix} \begin{bmatrix} -\frac{5}{2} - 2\sqrt{3} & +\frac{5\sqrt{3}}{2} - 2 \\ -2 + \frac{5\sqrt{3}}{2} & 2\sqrt{3} + \frac{3}{2} \end{bmatrix} = \begin{bmatrix} \frac{1}{2}(-\frac{5}{2} - 2\sqrt{3}) + \frac{\sqrt{3}}{2}(-2 + \frac{3}{2}\sqrt{3}) & \frac{1}{2}(\frac{5\sqrt{3}}{2} - 2) + \frac{\sqrt{3}}{2}(2\sqrt{3} + \frac{3}{2}) \\ -\frac{\sqrt{3}}{2}(-\frac{5}{2} - 2\sqrt{3}) + \frac{1}{2}(-2 + \frac{3}{2}\sqrt{3}) & -\frac{\sqrt{3}}{2}(\frac{5\sqrt{3}}{2} - 2) + \frac{1}{2}(2\sqrt{3} + \frac{3}{2}) \end{bmatrix} =$$

$$= \begin{bmatrix} -\frac{5}{4} - \sqrt{3} - \sqrt{3} + \frac{9}{4} & \frac{5\sqrt{3}}{4} - 1 + 3 + \frac{3\sqrt{3}}{4} \\ \frac{5\sqrt{3}}{4} + 3 - 1 + \frac{3\sqrt{3}}{4} & -\frac{15}{4} + \sqrt{3} + \sqrt{3} + \frac{3}{4} \end{bmatrix} = \begin{bmatrix} 1 - 2\sqrt{3} & 2 + 2\sqrt{3} \\ 2 + 2\sqrt{3} & -3 + 2\sqrt{3} \end{bmatrix} = \begin{bmatrix} -2.5 & 5.5 \\ 5.5 & 0.5 \end{bmatrix}$$

$$\left. \begin{array}{l} \sigma_x' = -2.5 \\ \tau_{xy}' = 5.5 \end{array} \right\} \text{ MPa}$$

