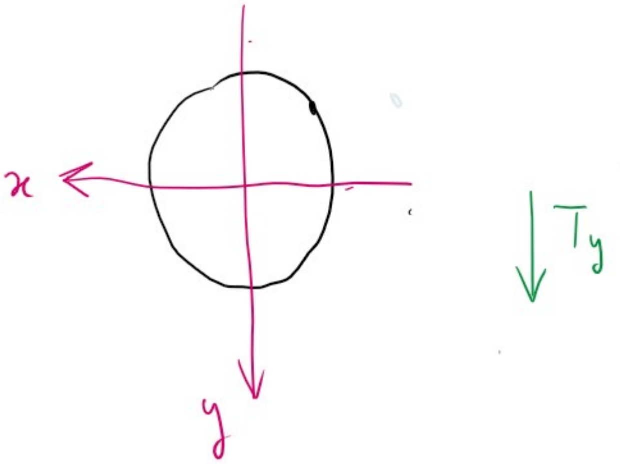
Flusso delle tensioni tangenziali

Tuesday, December 15, 2020 10:30 AM



$$\underline{\underline{T}} = \begin{bmatrix} 0 & 0 & \tau_{zx} \\ 0 & 0 & \tau_{zy} \\ * & * & \sigma_z \end{bmatrix} \qquad \operatorname{div} \underline{\underline{T}} = 0 \Rightarrow \quad \frac{\partial \tau_{zx}}{\partial z} = 0 \qquad \frac{\partial \tau_{zy}}{\partial z} = 0$$

Tensioni tangenziali:

$$\vec{\tau} = \tau_{zx}\,\hat{i} + \tau_{zy}\,\hat{j}$$ non dipende da z ⚠

$$\underline{\underline{T}} = \begin{bmatrix} 0 & 0 & \tau_{zx} \\ 0 & 0 & \tau_{zy} \\ * & * & \sigma_z \end{bmatrix} \qquad \frac{\partial \tau_{zx}}{\partial x} + \frac{\partial \tau_{zy}}{\partial y} + \frac{\partial \sigma_z}{\partial z} = 0 \Leftrightarrow \boxed{\operatorname{div} \vec{\tau} = -\frac{\partial \sigma_z}{\partial z}}$$

$$\left.\begin{aligned} M_x(z) &= -T_y(l - z) \\ \sigma_z(x,y,z) &= \frac{M_x(z)}{I_x}\, y \end{aligned}\right\} \Rightarrow \sigma_z(x,y,z) = -\frac{T_y(l-z)}{I_x}\, y$$

$$\Rightarrow \boxed{\frac{\partial \sigma_z}{\partial z} = \frac{T_y}{I_x}\, y}$$

$$\begin{cases} \operatorname{div} \vec{\tau} = -\dfrac{T_y}{I_x}\, y & \text{in } A \\ \vec{\tau} \cdot \hat{n} = 0 & \text{su } \Gamma \end{cases}$$