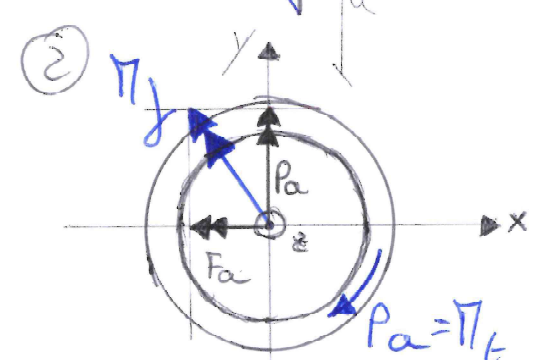
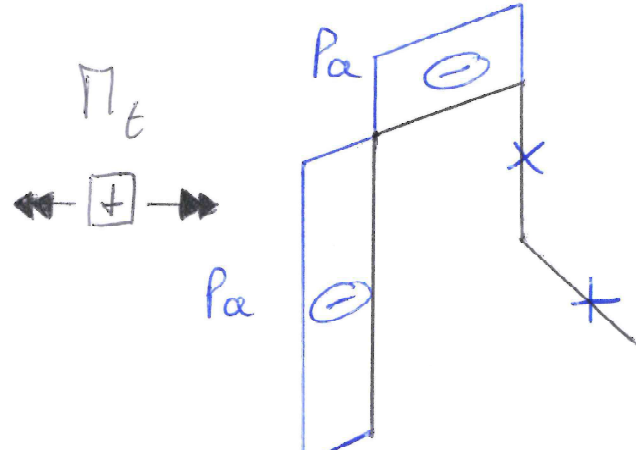
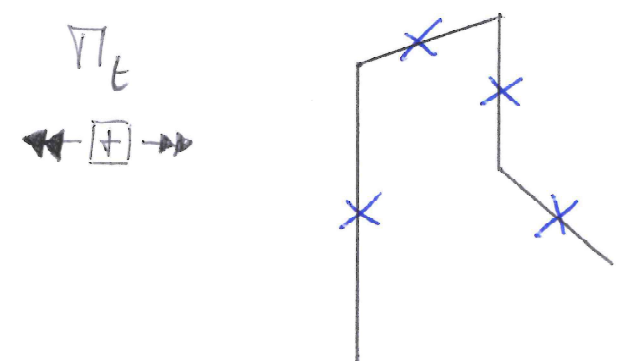
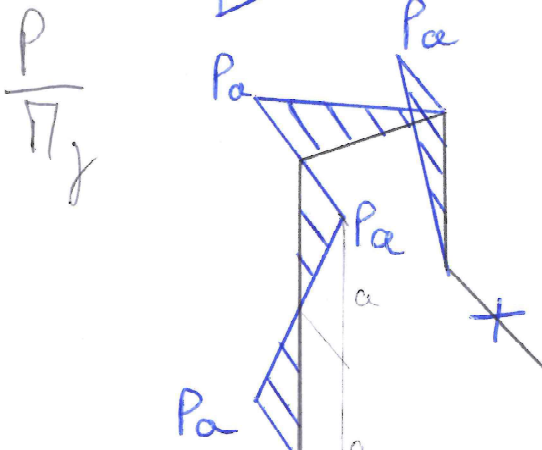
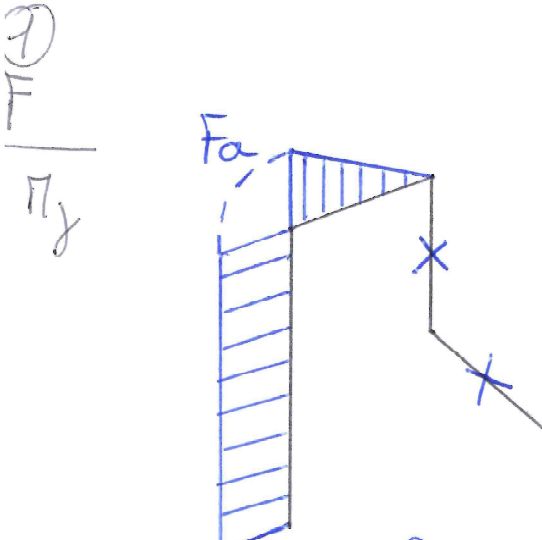


# Esercizio 4



$\Pi_y = \sqrt{(Pa)^2 + (Fa)^2} = 2990,4 \text{ Nm}$   
 $\Pi_t = Pa = 2800 \text{ Nm}$   
 cautela: prima plasticizzazione,  $\sigma_{GT}^*$

$$\sigma_m = \frac{\Pi_y \frac{D}{2}}{\pi \frac{(D^4 - d^4)}{64}} = 111,21 \text{ MPa}$$

$$\tau_m = \frac{\Pi_t \frac{D}{2}}{\pi \frac{(D^4 - d^4)}{32}} = 52,07 \text{ MPa}$$

$$\sigma_{max} = K_{ef} \sigma_m = 194,62 \text{ MPa} \quad \tau_{max} = K_{tt} \tau_m = 70,30 \text{ MPa}$$

$$\sigma_{GT}^* = \sqrt{\sigma_{max}^2 + 4\tau_{max}^2} = 240,10 \text{ MPa}$$

$$\eta_{PP} = \frac{\sigma_m}{\sigma_{GT}^*} = 2,92$$

3)  $\sigma_a = \sigma_m \quad \tau_a = \tau_m \quad \sigma_{mm} = \tau_m = 0 \quad (R = -1)$

$$\sigma_{a,lim} = \frac{0,5 \sigma_R b_2 b_3}{1 + q(K_{ef} - 1)} = 217,61 \text{ MPa}$$

$$\tau_{a,lim} = \frac{0,25 \sigma_R b_2 b_3}{1 + q(K_{tt} - 1)} = 138,60 \text{ MPa}$$

$$H^2 = \left( \frac{\sigma_{a,lim}}{\tau_{a,lim}} \right)^2 = 2,47 \quad (1,71)$$

$$(0,3 \sigma_R \rightarrow 166,31 \text{ MPa})$$

$$\sigma_{GP}^* = \sqrt{\sigma_a^2 + H^2 \tau_a^2} = 138,07 \text{ MPa} \quad (130,40 \text{ MPa})$$

$$\eta = \frac{\sigma_{a, \text{lim}}}{\sigma_{GP}^*} = 1,58 \quad (1,67)$$