Esercizio 3.17

Calcolo le quantità legate alla sezione:

$$W_{xx} = W_{yy} = \frac{\pi}{32} l^3 (1-\alpha^4)$$

$$W_p = \frac{\pi}{16} l^3 (1-\alpha^4)$$

$$A = \frac{\pi}{4} l^2 (1-\alpha^2)$$

Noto che alla sezione A-A non è presente sforzo normale.

Calcolo M_f e σ_f:

$$M_{f_{xx}} = (q \cdot l\beta) \cdot (\lambda l + l - \frac{\beta l}{2}) \quad ; \quad M_{f_{yy}} = 0$$

$$\sigma_{f_A} = \frac{q l \beta \cdot (\lambda l + l - \frac{\beta l}{2})}{W_{xx}} \quad ; \quad \sigma_{f_B} = 0$$

$$\sigma_{f_C} = -\frac{q l \beta \cdot (\lambda l + l - \frac{\beta l}{2})}{W_{xx}}$$

Calcolo T e τ_T:

$$T = |q \cdot \beta l|$$

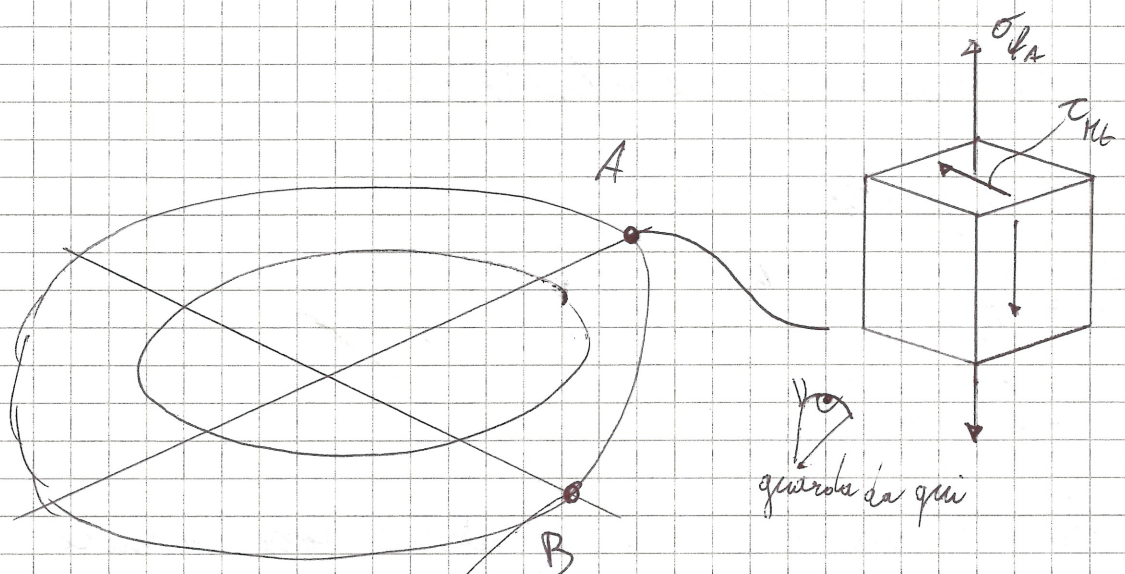
$$|\tau_{T_A}| = 0 \quad ; \quad |\tau_{T_B}| = \frac{q \cdot \beta l}{A} \cdot \frac{4}{3}\left(1 + \frac{1}{\alpha + \frac{1}{\alpha}}\right) \quad ; \quad |\tau_{T_C}| = 0$$

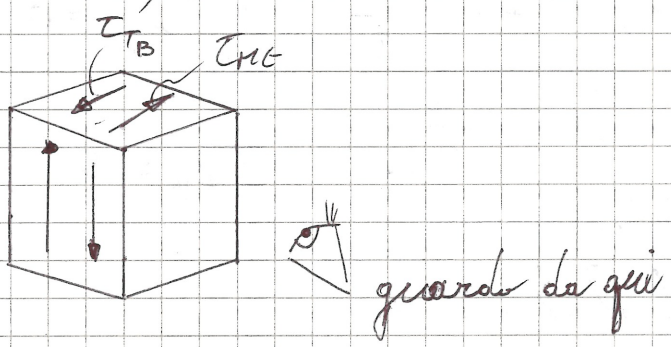
Calcolo M_t e τ_{M_t}:

$$|M_t| = q \cdot \beta l \cdot \lambda l$$

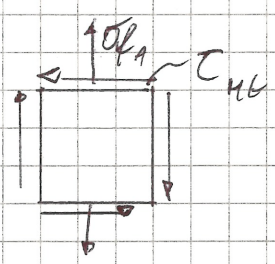
$$|\tau_{M_{t_A}}| = |\tau_{M_{t_B}}| = |\tau_{M_{t_C}}| = \frac{q \cdot \beta l \cdot \lambda l}{W_p}$$

Rappresento i cubetti elementari nei punti A e B.



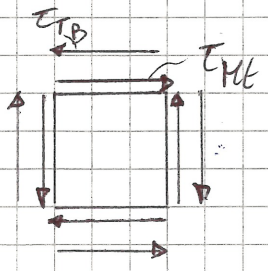


$\sigma_{1-2_A} = ?$



$$\sigma_{1-2_A} = \frac{\sigma_{f_A}}{2} \pm \sqrt{\left(\frac{\sigma_{f_A}}{2}\right)^2 + (\tau_{Mt})^2}$$

$\sigma_{1-2_B} = ?$



$$\sigma_{1-2_B} = \pm \sqrt{(|\tau_{TB}| - |\tau_{Mt}|)^2}$$