

$$\underline{T} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & \sigma_z \end{bmatrix}$$

$$\sigma_z = K y$$

↑
constante

$$K = \frac{M_x}{I_x}$$

$$\boxed{\sigma_z = \frac{M_x}{I_y} y}$$

Formula
di
Navier.

$$T_x = T_y = M_z = 0$$

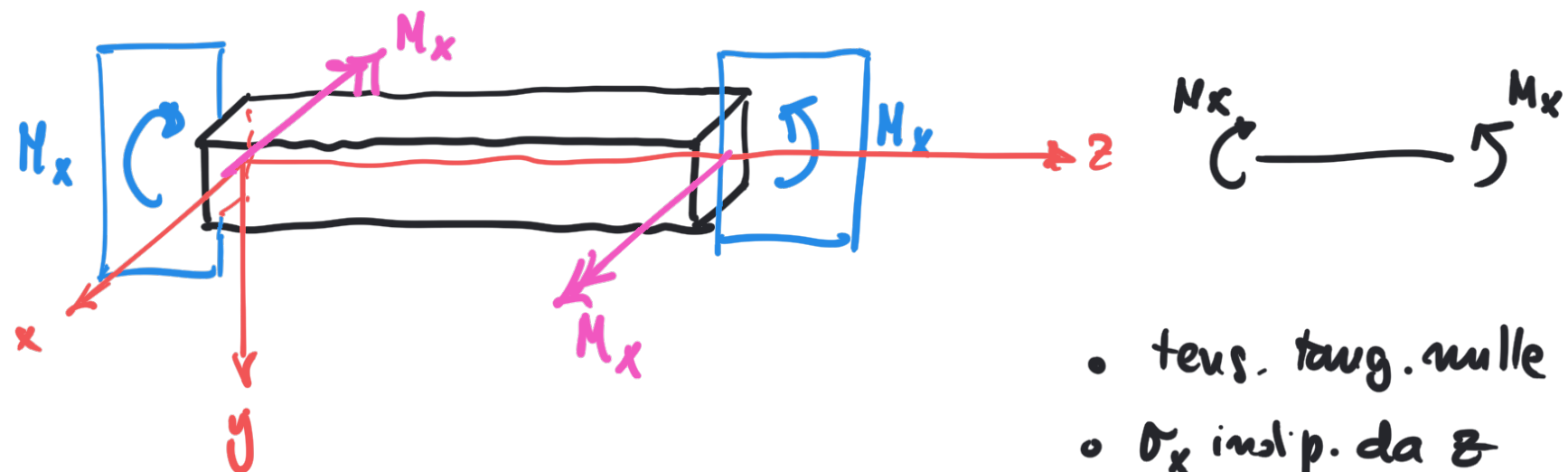
$$N = \int_A \sigma_z dA = \int_A K y dA$$

$$= K S_x = 0$$

$$M_y = - \int_A \sigma_z x dA = - \int_A K x y dA$$

$$= -K I_{xy} = 0$$

$$M_z = \int_A \sigma_z y dA = K \int_A y^2 dA = K I_x$$



- tens. tang. nulle
- σ_x indep. da z
- $y > 0$ trazione
- $y < 0$ compressione
- $y = 0$ $\sigma_z = 0$

↑ piano neutro

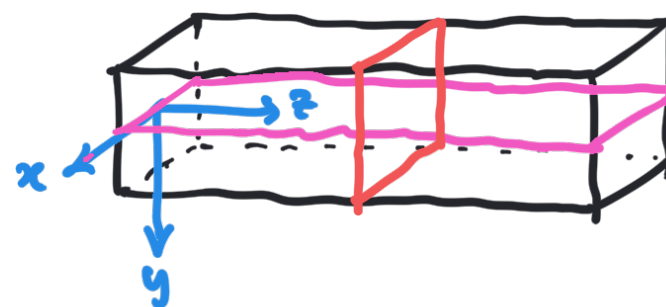
$$\sigma_z = Ky$$

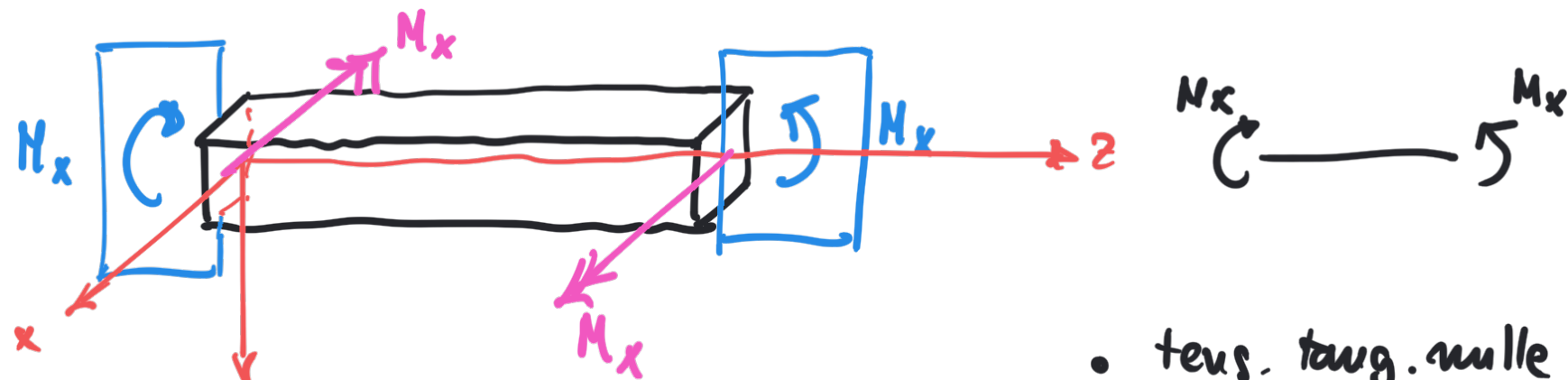
↑
costante

$$K = \frac{M_x}{I_x}$$

$$\sigma_z = \frac{M_x}{I_x} y$$

Formula
di
Navier.

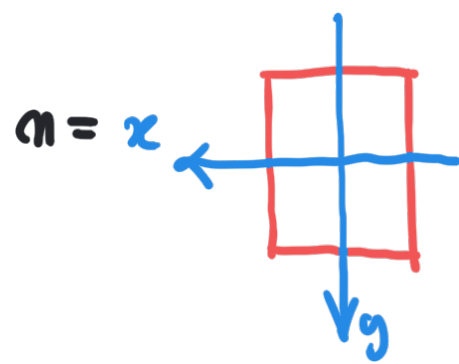




$$\underline{\underline{\underline{T}}} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & \frac{M_x}{I_x} y \end{bmatrix}$$

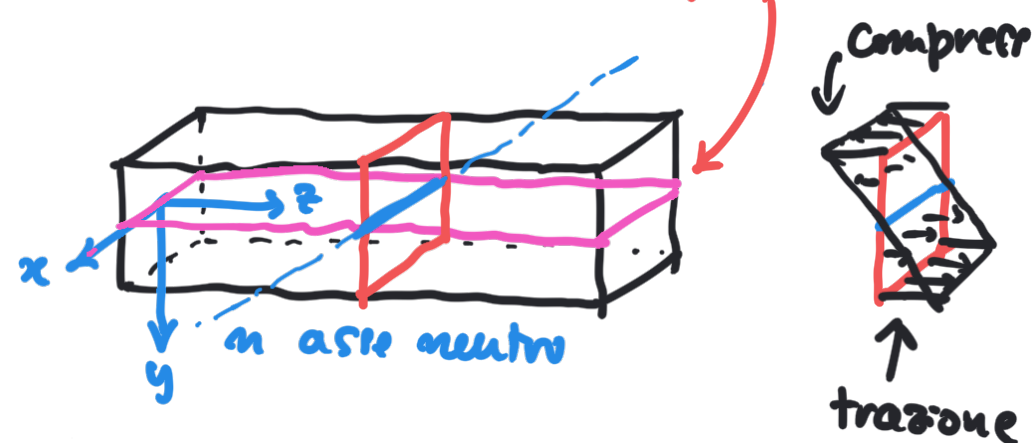
$$\sigma_z = \frac{M_x}{I_x} y$$

Formula
di
Navier.

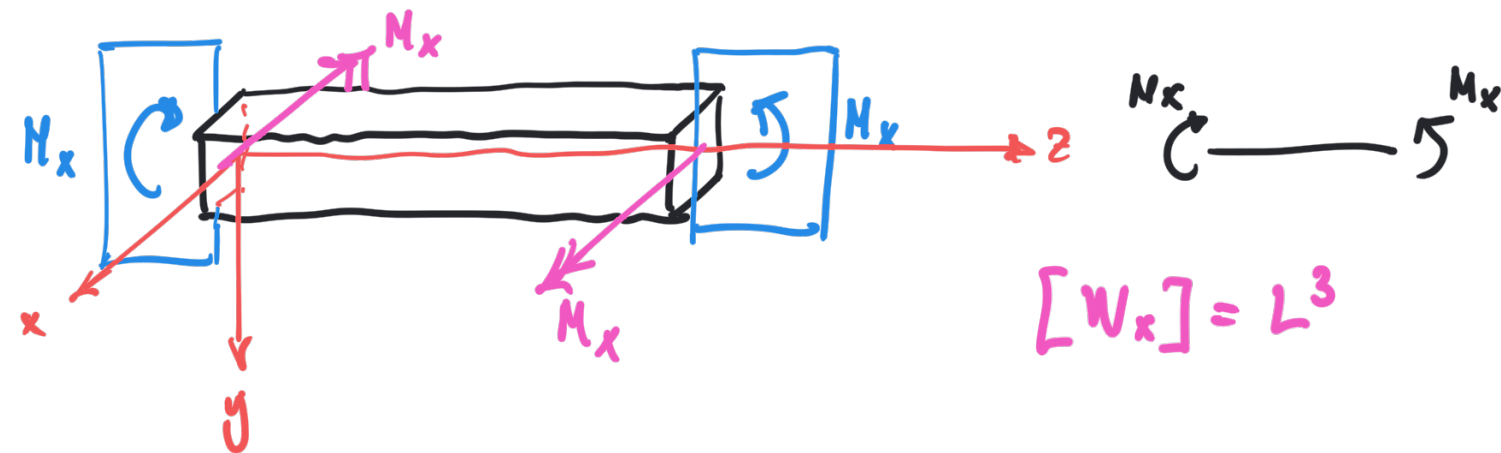


- tens. tang. nulle
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↑ piano neutro



Il modulo di resistenza è generalmente tabellato nei cosiddetti "sapori".



$$[W_x] = L^3$$

$$\sigma_z = \frac{M_x}{I_y} y$$

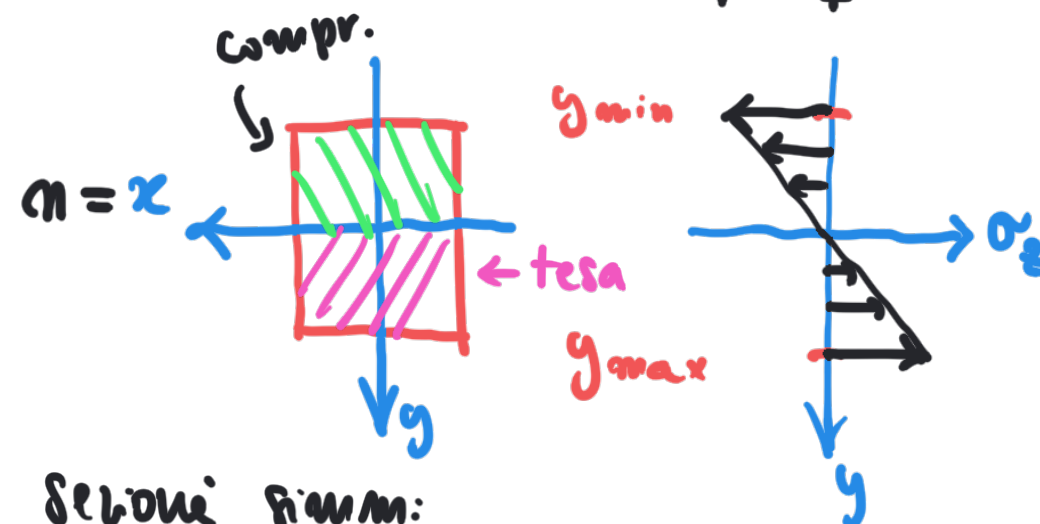
Formula di Navier.

$$\sigma_z^{\min} = \frac{M_x}{I_y} y_{\min} < 0$$

$$W_x = \frac{I_x}{y_{\max}}$$

modulo di resistenza

$$\sigma_z^{\max} = \frac{M_x}{W_x}$$



Sezione rettangolare:

$$y_{\max} = |y_{\min}|$$

$$\sigma_z^{\max} = |\sigma_z^{\min}|$$

$$\sigma_z^{\max} = \frac{M_x}{I_y} y_{\max} > 0$$