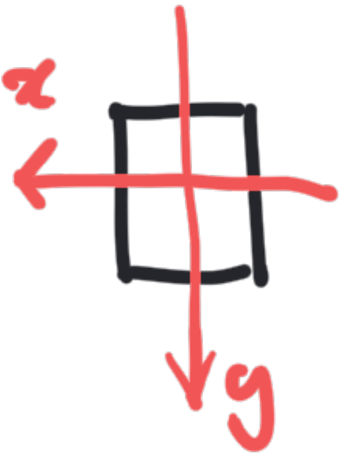
Forza normale centrata



sezione di forma arbitraria.

Ipotesi:

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

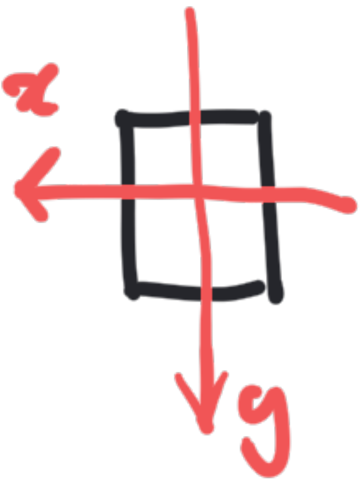
$\sigma_z = c$ costante

$$T_x = \int_A \tau_{zx}\, dA = 0 \qquad T_y = 0 \qquad M_z = 0$$

$$S_x = S_y = 0 \Rightarrow M_x = \int_A \sigma_z\, y\, dA = c\, S_x = 0$$

$$M_y = -\int_A \sigma_z\, x\, dA = -c\, S_y = 0$$

$$N = \int_A \sigma_z\, dA = cA \Rightarrow \sigma_z = \frac{N}{A} \qquad \underline{T} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & N/A \end{bmatrix}$$



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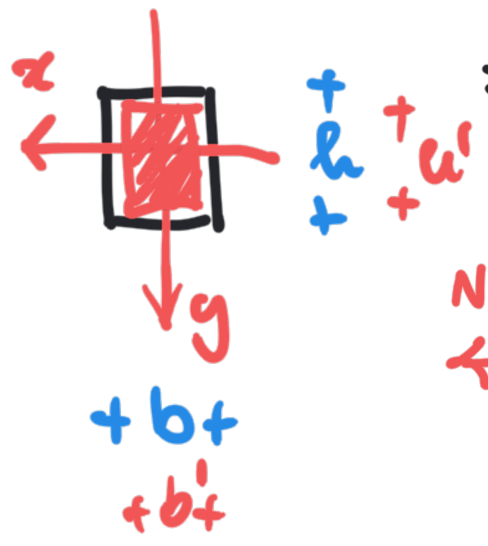
Deformazioni.



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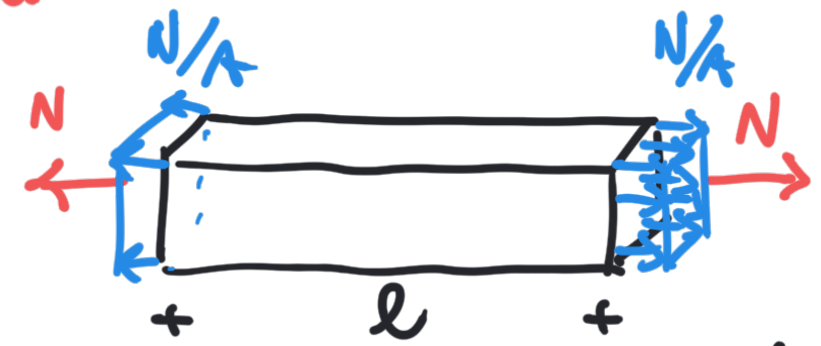

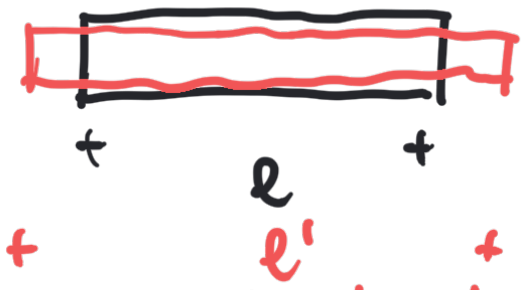

$$\Delta l / l = \frac{l - l'}{l} = \frac{N}{EA}$$

(15.16)

$$\left.\sigma_y = \sigma_z = 0\right\} \Rightarrow \quad \varepsilon_x = \frac{1}{E}\frac{N}{A} \qquad \varepsilon_y = \varepsilon_z = -\nu \frac{N}{A}$$

$$\gamma_{xy} = \gamma_{zx} = \gamma_{zy} = 0$$

$$\frac{\Delta b}{b} = -\nu \frac{N}{EA}$$

$$\frac{\Delta h}{h} = -\nu \frac{N}{EA}$$

$$u(x,y,z) = -\nu \frac{N}{EA} x$$

$$v(x,y,z) = -\nu \frac{N}{EA} y$$

$$w(x,y,z) = \frac{N}{EA} z$$

$\Rightarrow$ si verifica che

$$\frac{1}{2}\left(\nabla \underline{u} + \nabla \underline{u}^T\right) = \underline{E}$$

$$\sigma_z = \frac{N}{A} \qquad \underline{T} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & N/A \end{bmatrix}$$