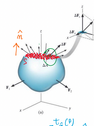
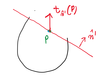
trasformazione delle tensioni roma TRASF. TENSIONI

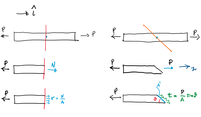
!



$$\vec{t}(P) = \lim_{\Delta A \to 0} \frac{\Delta \vec{F}}{\Delta A}$$

$$\vec{F}_R = \int_S \vec{t}\, dA$$





$A = A'\sin\vartheta \Rightarrow A' = \frac{A}{\sin\vartheta}$

$t \cdot A' = N \Rightarrow t = \frac{N}{A'} = \frac{N}{A}\sin\vartheta$

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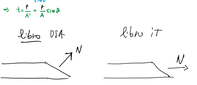
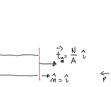
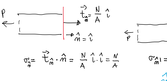




$(\tau = \frac{P}{A}\cos\vartheta \quad (\tau = \frac{N}{A})$

!

Problema 5.7



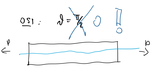
$\sigma_n = \vec{t}_n \cdot \hat{n} = \frac{N}{A}\hat{n} \cdot \hat{n} = \frac{N}{A}$

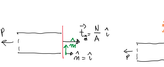
$\sigma_{\vartheta 1} = \vec{t}_{\vartheta 1} \cdot \hat{n}' = \frac{N}{A}\sin\vartheta\,\hat{\tau} \cdot \hat{n}' = \frac{N}{A}\sin\vartheta\,\hat{\tau} \cdot \hat{n}'$

$\hat{\tau} \cdot \hat{n}' = \cos(\frac{\pi}{2} - \vartheta) = \sin\vartheta$

$\sigma_{\vartheta 1} = \vec{t}_{\vartheta 1} \cdot \hat{n}' = \frac{N}{A}\sin\vartheta\,\hat{\tau} \cdot \hat{n}' = \frac{N}{A}\sin^2\vartheta$

OSS: $\vartheta = \cancel{\frac{\pi}{2}}\ 0$!



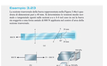


$\sigma_n = \vec{t}_n \cdot \hat{n} = \frac{N}{A}\hat{\tau} \cdot \hat{n} = \frac{N}{A}$

$\tau_{\vartheta n} = \vec{t}_n \cdot \hat{m} = 0$

$\sigma_{\vartheta 1} = \vec{t}_{\vartheta 1} \cdot \hat{n}' = \frac{N}{A}\sin\vartheta\,\hat{\tau} \cdot \hat{n}' = \frac{N}{A}\sin^2\vartheta$

$\tau_{\vartheta n 1} = \vec{t}_{\vartheta 1} \cdot \hat{m} = -\frac{N}{A}\sin\vartheta\cos\vartheta$



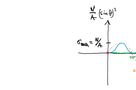
3.28. Nella figura è rappresentata un'asta prismatica avente sezione quadrata di lato a e lunghezza L vincolata ad estremi rigidi e sottoposta alla sola forza assiale applicata nel punto di B. Si determinino le tensioni σ_n e $\tau_{\vartheta n}$ in funzione della sezione di media ugualmente ed si calcoli l'angolo che individua la sezione nella quale esse agiscono.

Problema 3.28

$\sigma_{\vartheta 1} = \frac{N}{A}\sin^2\vartheta =: \sigma$

$\tau_{\vartheta n 1} = -\frac{N}{A}\sin\vartheta\cos\vartheta =: \tau_{max}$

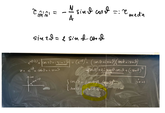
$(\sin^2(\vartheta+\pi/2))^2 = (\sin\vartheta)^2$



$\tau_{\vartheta n 1} = -\frac{N}{A}\sin\vartheta\cos\vartheta$

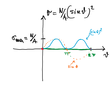
$-\frac{1}{2}\frac{N}{A}\sin(2\vartheta)$

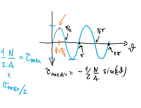
$\sin\pi\vartheta = 2\sin\vartheta\cdot\cos\vartheta$



$\frac{1}{2}\frac{N}{A} = \tau_{max}$

$\sigma_{max}/2$





$\frac{1}{2}\frac{N}{A} = \tau_{max}$

$\sigma_{max}/2$

Figura 4.3

4.2 Equazioni generali di equilibrio in termini di stati piani di tensione

Il metodo presentato nel paragrafo precedente permette di tracciare il cerchio di Mohr per ogni piano passante per un punto assegnato, conoscendo le tensioni di attrazione. Lo stato tensionale attorno ad un punto può essere descritto, in maniera più generale, mediante il tetraedro generale e formulando relazioni tra sforzo di equilibrio di traslazione delle forze.

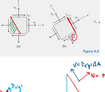


Figura 4.4