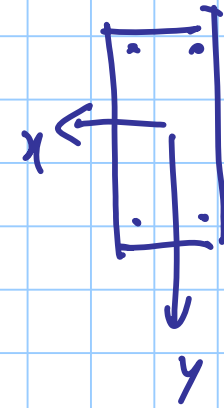
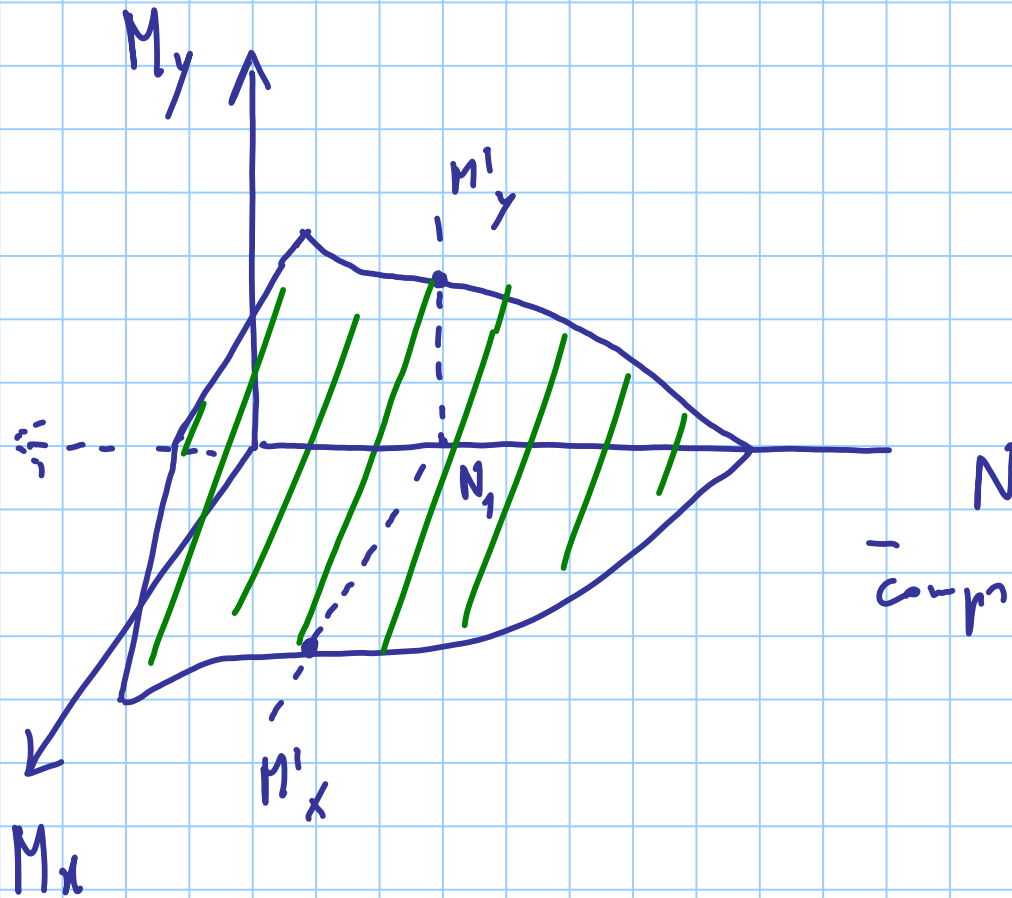


$$N = \int \sigma dA$$

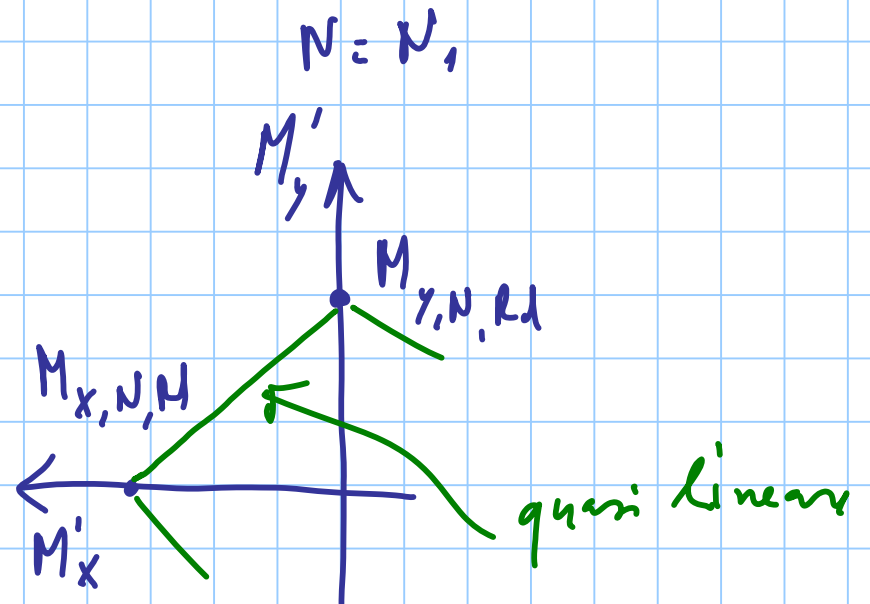
$$M_x = \int \sigma y dA$$

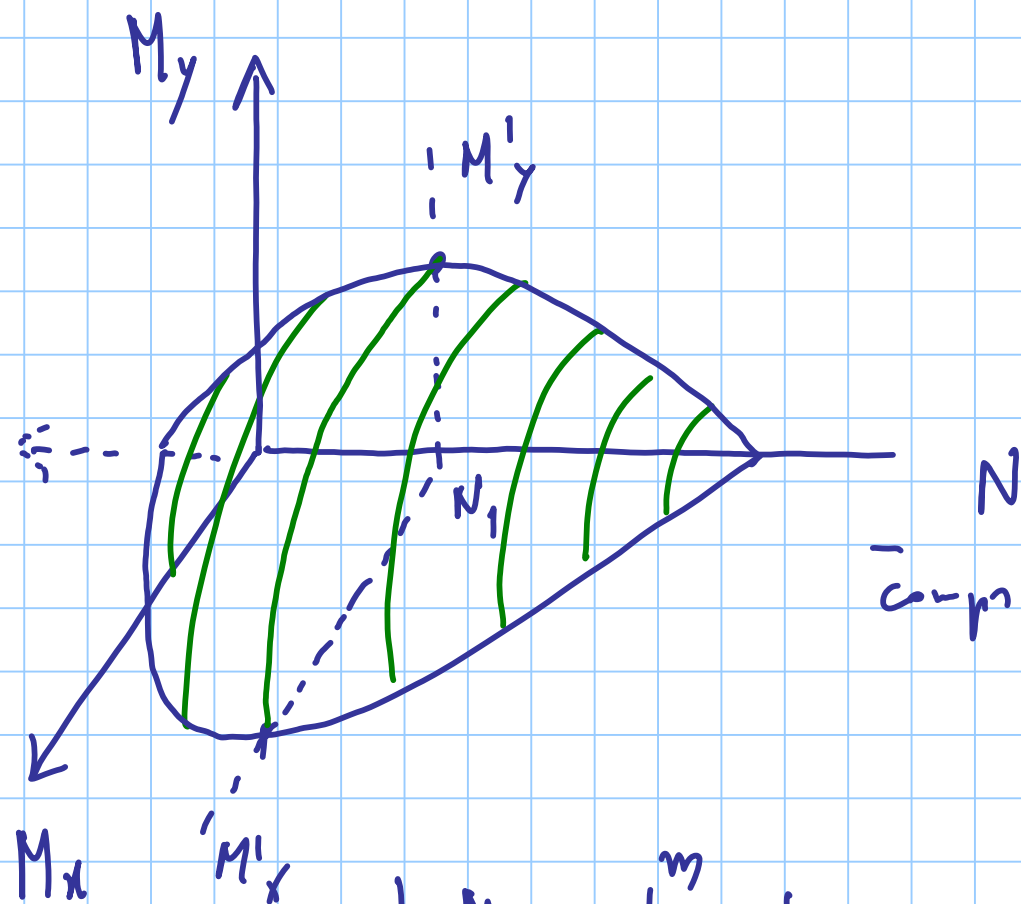
$$M_y = - \int \sigma x dA$$

2<sup>o</sup> mod. comp.

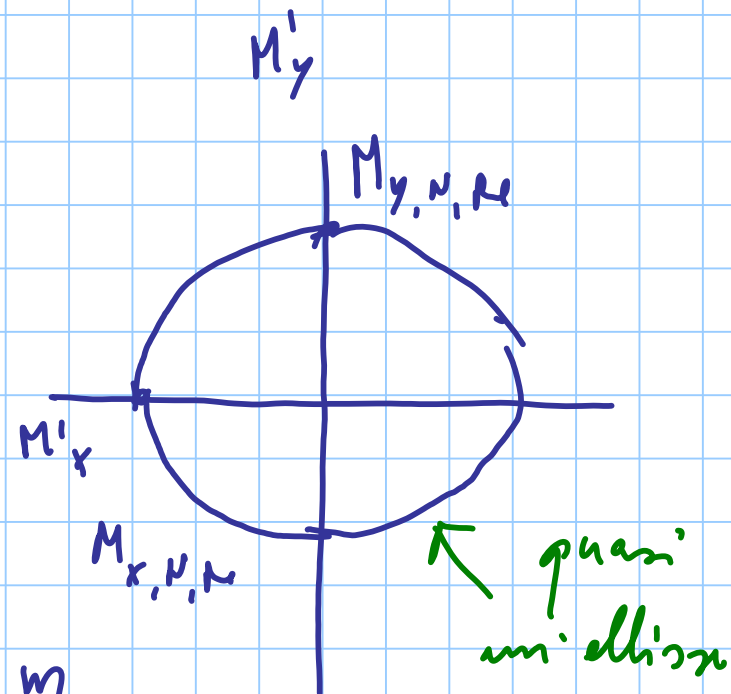


$$\left| \frac{M_{x,Ed}}{M_{x,N,Rd}} \right| + \left| \frac{M_{y,Ed}}{M_{y,N,Rd}} \right| \leq 1$$





3° m.d. comp.



$$\left| \frac{M_{x,E1}}{M_{x,N,R1}} \right|^m + \left| \frac{M_{y,E1}}{M_{y,N,R1}} \right|^m \leq 1$$

$m = 2$   
ellips

$m = 1.5$

crusigli

pu

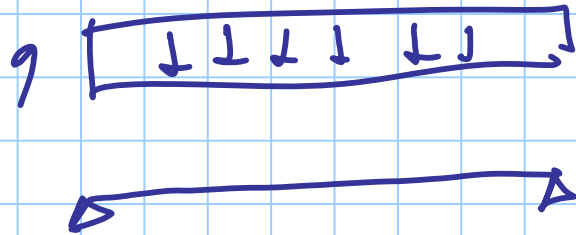
$$N \simeq 0.5 N_{c, \max}$$

$$m = 1.5$$

$$N \simeq 0 \cdot pp. N_{c, \max} \quad m = 2$$

FINE FLESSIONE COMPOSITA

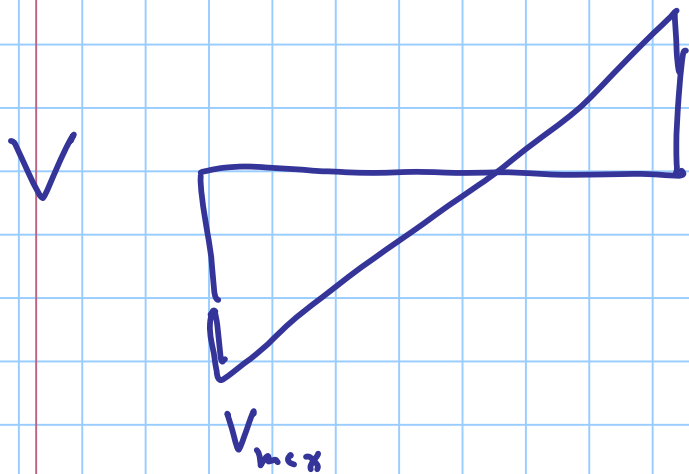
# TAGLIO

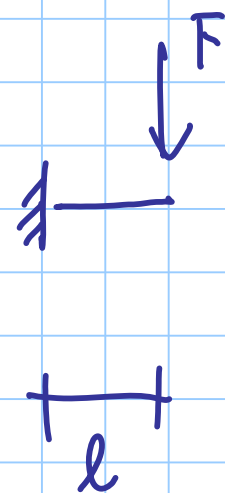
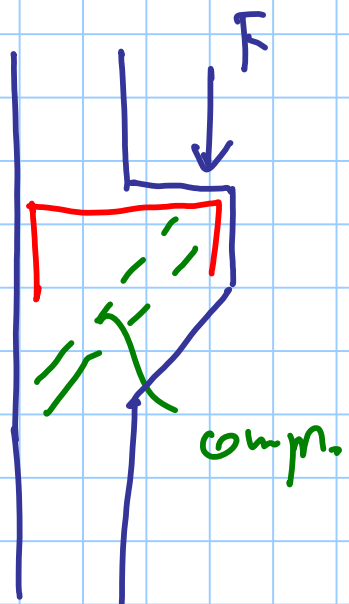


la Teoria di D.S.V.

non vale agli appoggi

dove  $V$  è massima



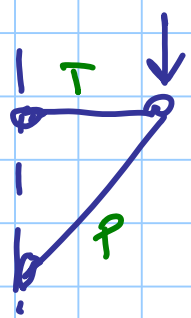


$$V = F$$

$$M = Fl$$

$$A_s = \frac{M}{0.9 d f_{yt}}$$

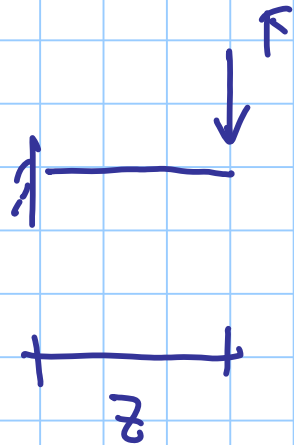
scheme alternative



TIRANTE E PUNTONE  
STRUT AND TIE

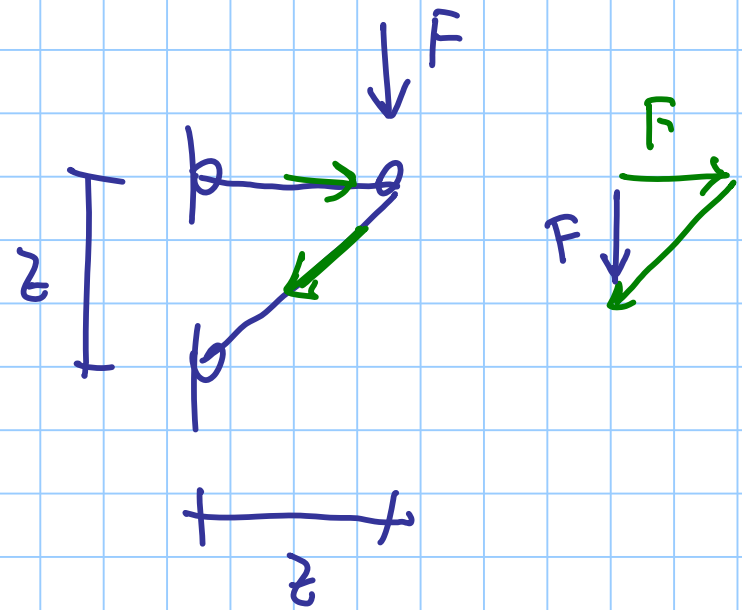
il modello di D.S.V. non solo

CFR. D.S.V.  $\longleftrightarrow$  TIRANTE-PUNTO NE



$$M = Fz$$

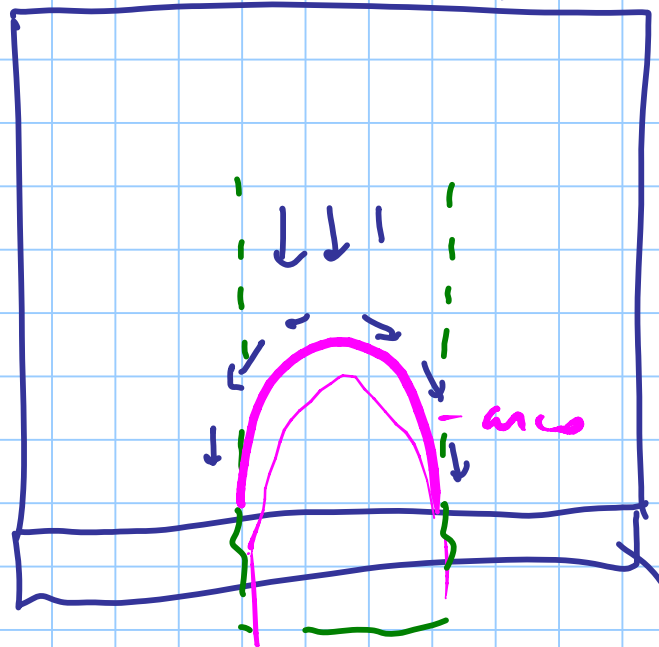
$$A_s = \frac{M}{z f_{yd}} = \frac{F}{f_{yd}}$$



nel Tirante  $N = F$

$$A_s = \frac{F}{f_{yd}}$$

ponte in muratura



si crea un arco  
compressione

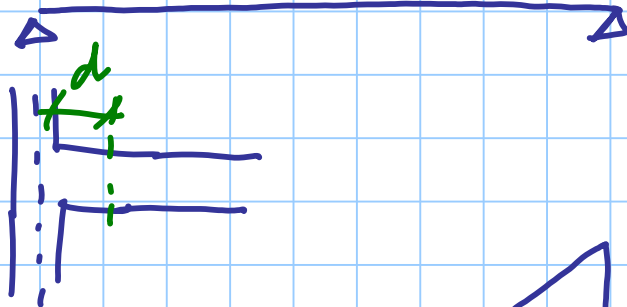
fondazioni  
in muratura

meccanismo  
ad arco



# INDICAZIONI OPERATIVE

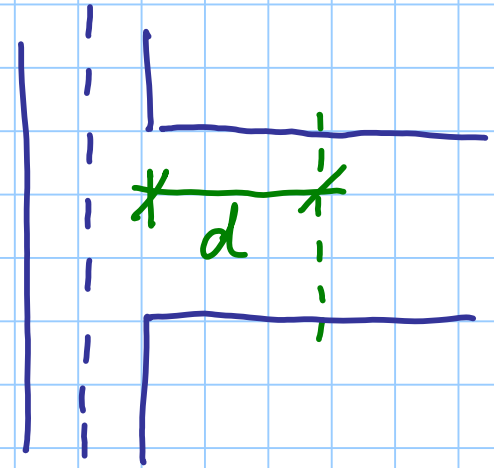
$$d = h - c$$



V



$V_1$  da usare nelle verifiche a taglio



... ma bisogna armare e tagliare anche l'estremità

TAGLIO - effetto sulla sezione in c.a.  
↓  
asta

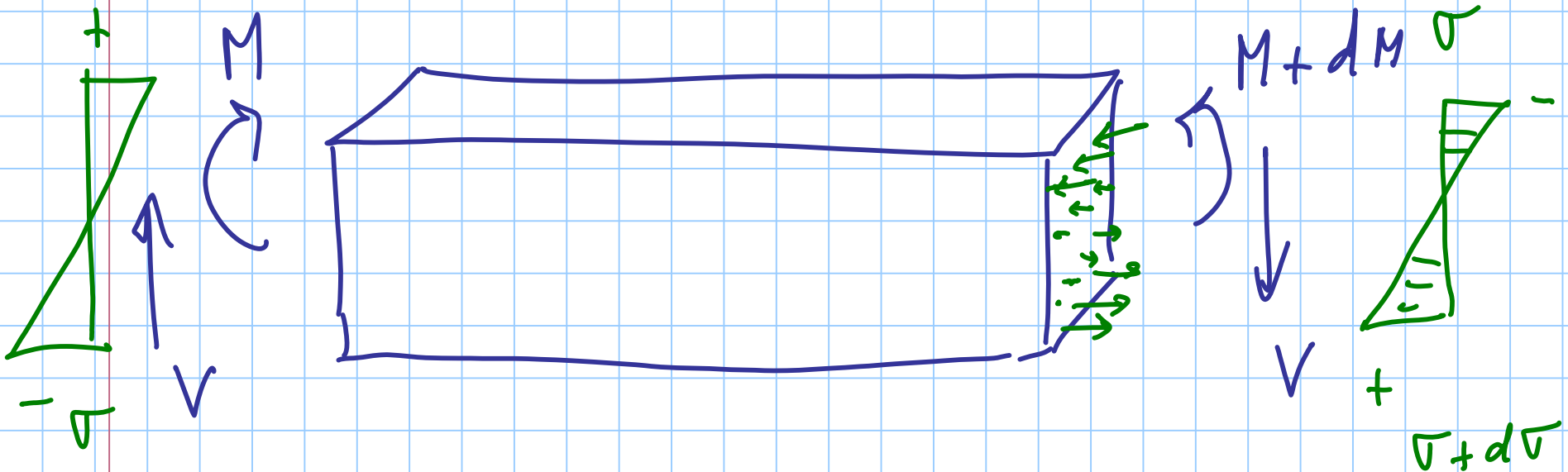
possiamo usare per il c.a. la teoria

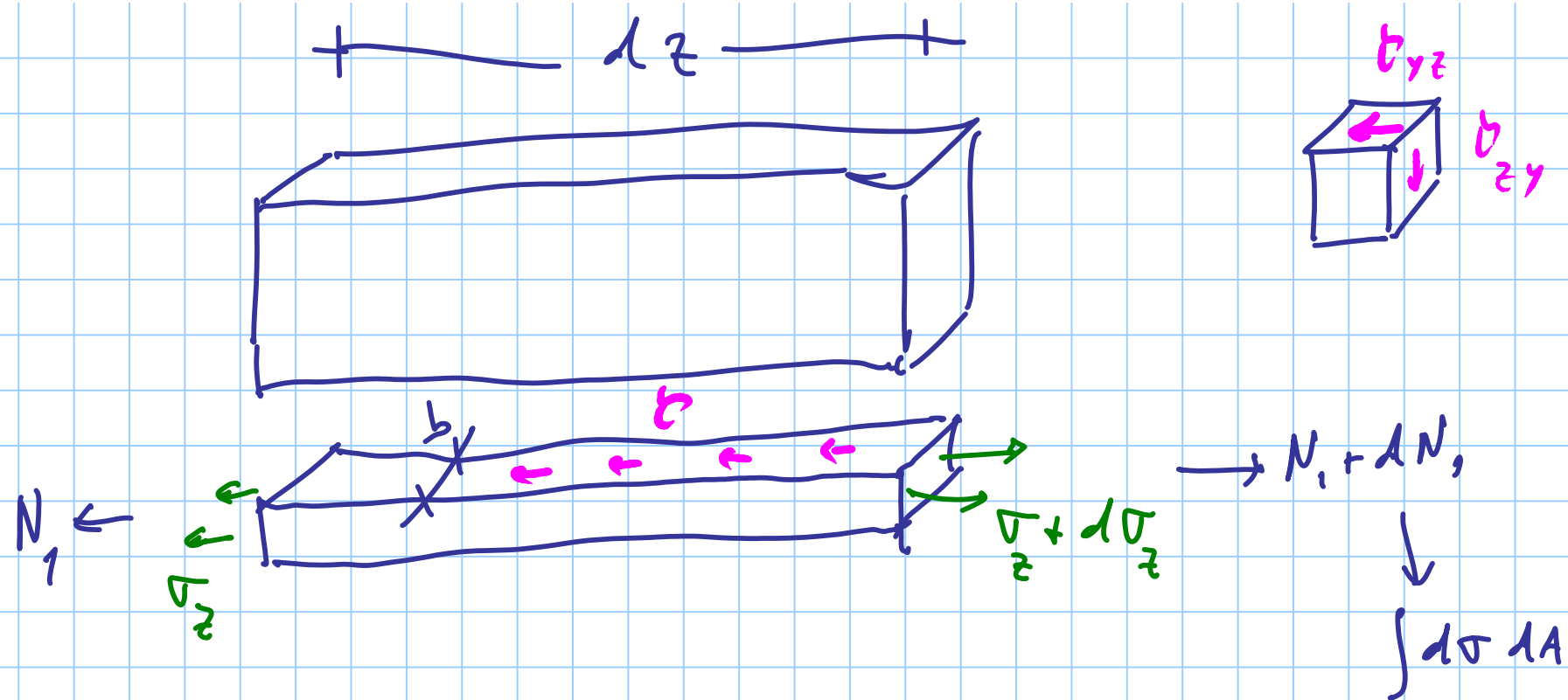
dell'elasticità lineare (D.S.V. - Jourawski) ?

e come ?

1° modell. di comportamento,

teoria elasticità lineare ~ SEZIONE OMogeneizzata





$$\sigma = \frac{M}{I} y$$

$$\sigma + d\sigma = \frac{M + dM}{I} y$$

$$d\sigma = \frac{dM}{I} y = \frac{V dz}{I} y$$

equilibrio, trazione orizzontale

$$\int y b dz = \int x b dy$$

$$\bar{y}_{md} b dz = \int \frac{V dz}{I} y b dy$$

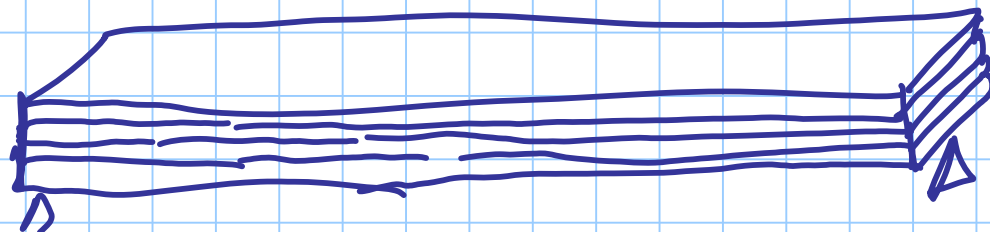
dist. dal baricentro.

$$= \frac{V dz}{I} \underbrace{\int y b dy}_S$$

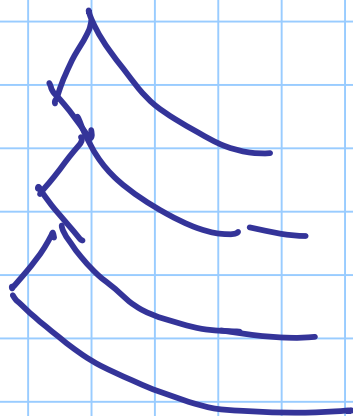
$$\bar{y}_{md} b \cancel{dz} = \frac{V \cancel{dz} S}{I}$$

$$\bar{y}_m = \frac{V S}{I b}$$

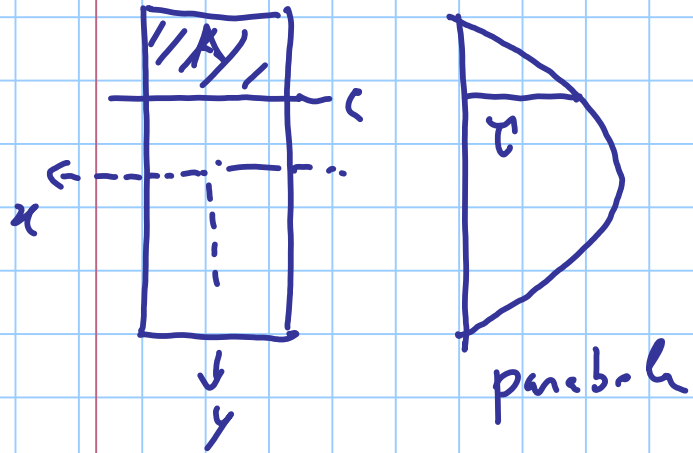
momento statico  
dell'area al di sotto della sezione,  
rispetto all'asse baricentrico



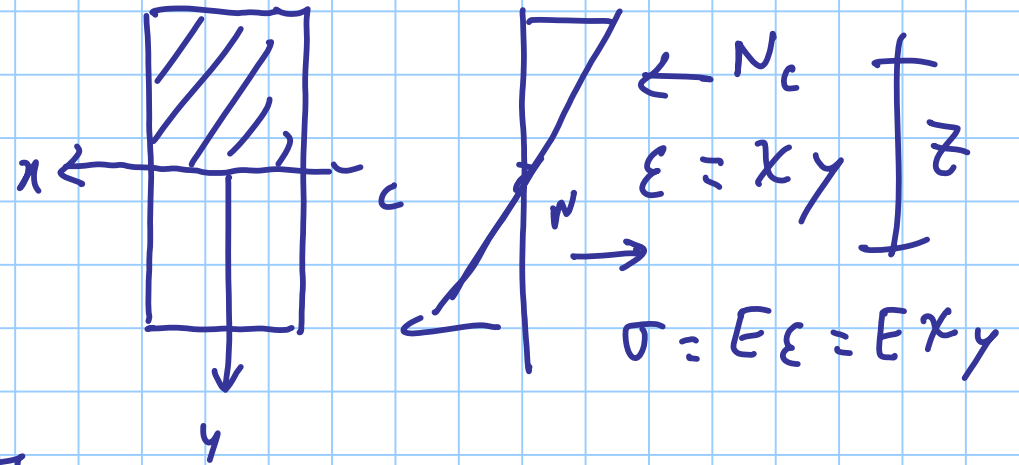
FORZA  
DI  
SCORRIMENTI,  $\int \tau b dx$



le vari scorrono



$$\bar{u} = \frac{V S_x^*}{I_x b}$$



$(\bar{u} b)_{\max}$  si ha in corrispondenza  
del baricentro

per  $c \equiv x$   $S_x = \int b y dy$

$$\begin{aligned} N_c &= \int \sigma b dy = \\ &= \int E x y b dy = \\ &= E x S_c \end{aligned}$$

$$M = \int \sigma y b dy = \int E \chi y y b dy = E \chi I_x$$

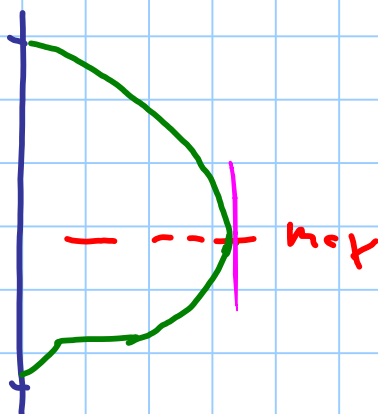
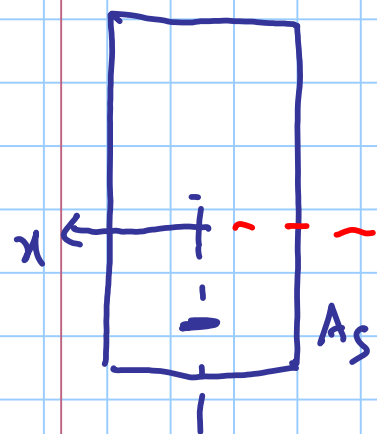
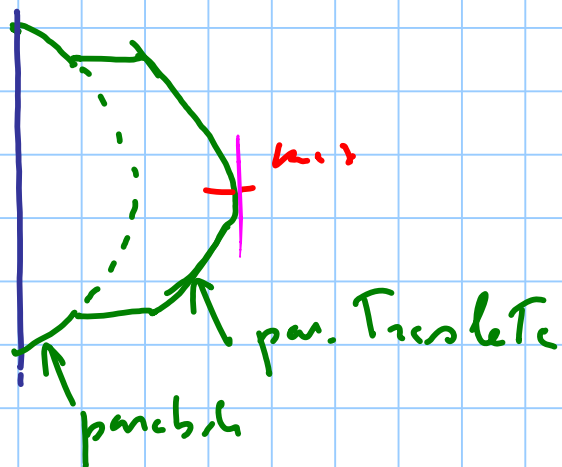
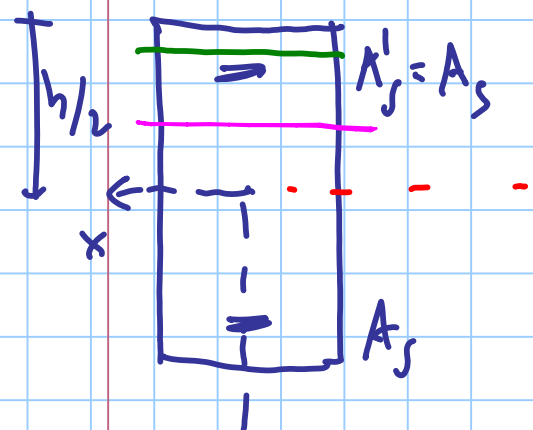
$$\frac{N_c}{M} = \frac{\cancel{E \chi} S_G}{\cancel{E \chi} I_x} \rightarrow \frac{S_G}{I_x} = \frac{N_c}{N_c \cdot z} = \frac{1}{z}$$

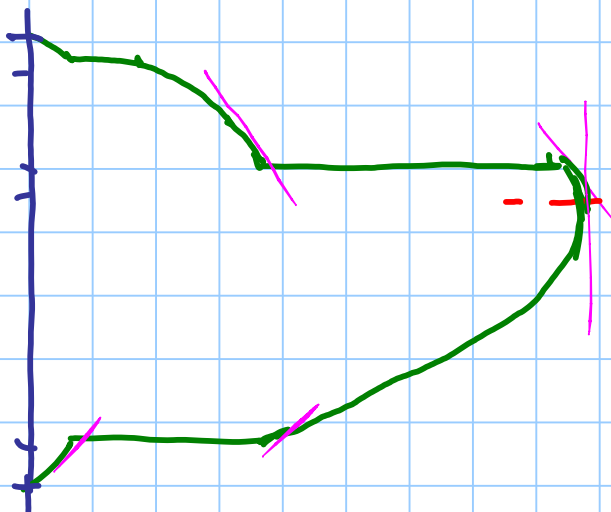
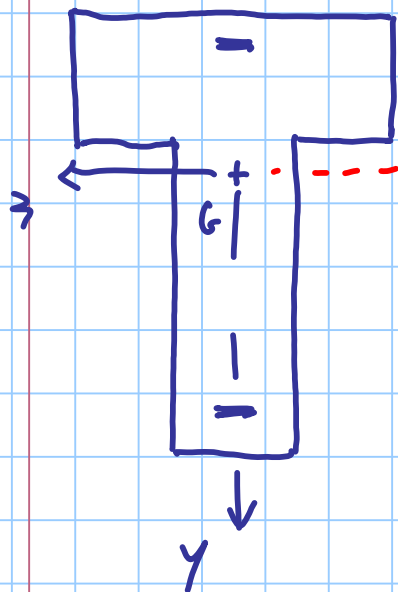
$$M = N_c \cdot z$$

$$z = \frac{V}{b z} \quad \text{in corrisp. del baricentro}$$



1° modello di comp.





## 2° Modell di comportamento

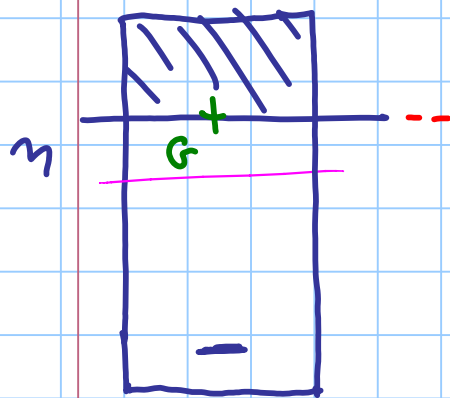
formule elasticità lineare x ser. REAGENTE OMOGEN.

- dobbiamo sapere dov'è l'asse neutro

- dipende da geometria (CLS + ACC)

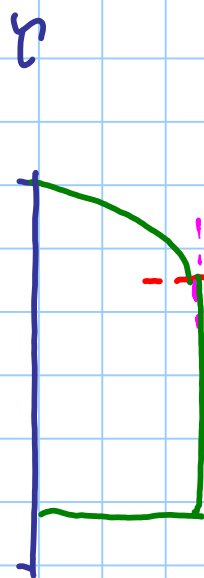
- dipende da  $M, N$  (meglio da  $\frac{M}{N}$ )

$2^{\circ}, \tau_{ad}$

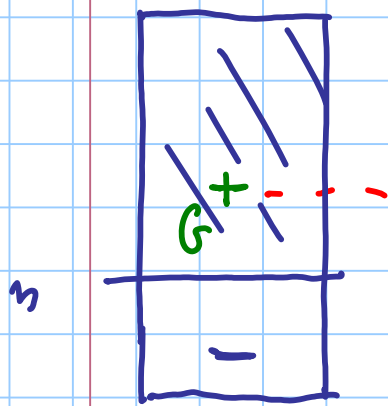


$$N = 0$$

$$M > 0$$



$$\tau = \frac{V S}{I b}$$



$$N < 0 \quad M > 0$$

