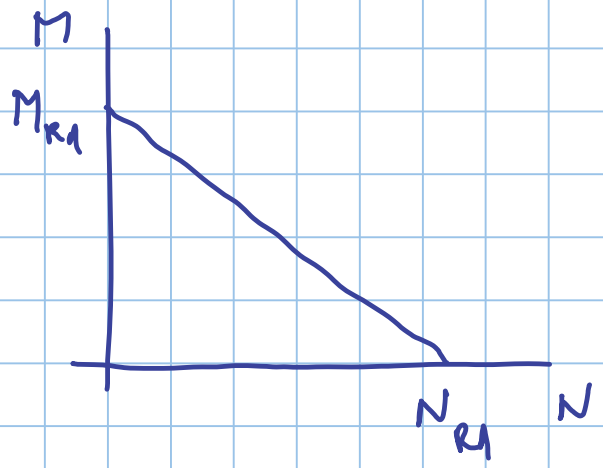
Titolo nota

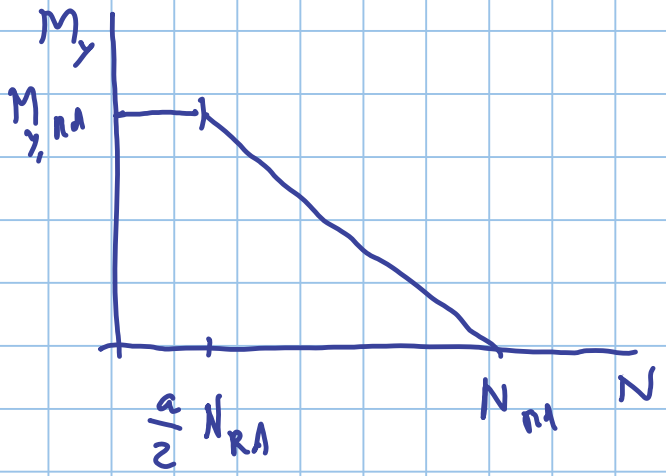
05/12/2018

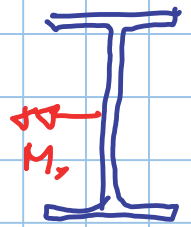
lineare (classe 3)



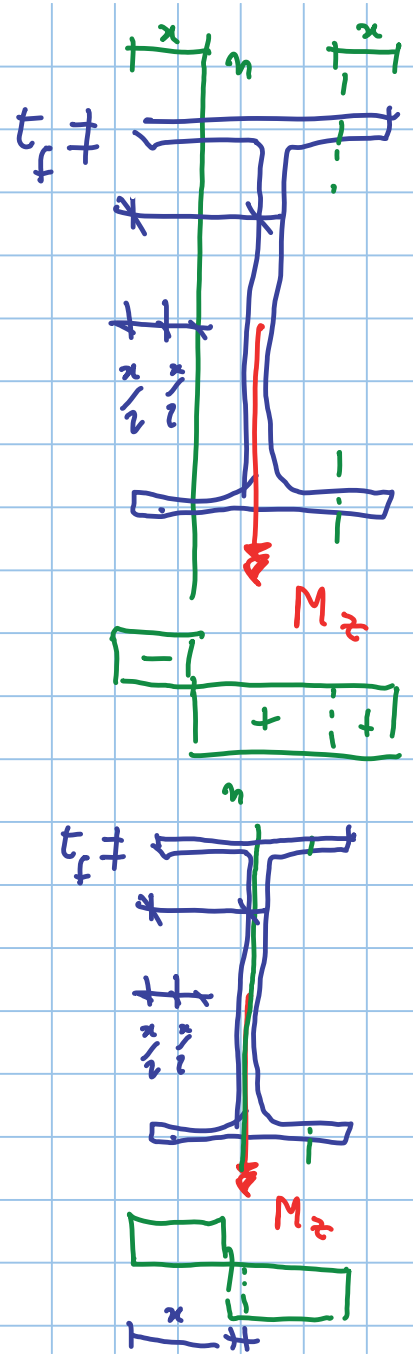
per qualunque sezione

piena plasticizzata (classi 1 e 2)





$$a = \frac{A - 2bt_f}{A}$$



$$N = \left(A - 4\,x\,t_f\right)\frac{f_y}{\gamma_{m_0}} \qquad \text{per } x \le \frac{b - t_w}{2}$$

$$M = 2\,x\,t_f\,(b-x)\,\frac{f_y}{\gamma_{m_0}}$$

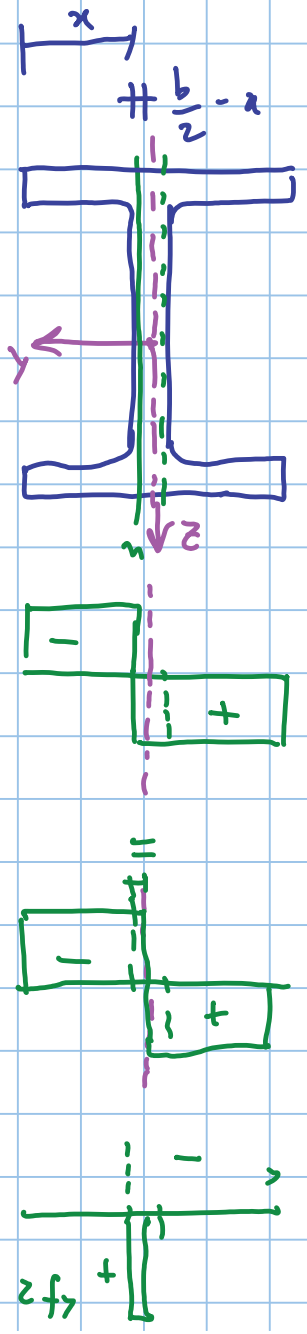
per $x = \dfrac{b - t_w}{2} \rightarrow$ $\quad N = \left(A - 2(b - t_w)t_f\right)\dfrac{f_y}{\gamma_{m_0}}$

$$\simeq \left(A - 2\,b\,t_f\right)\frac{f_y}{\gamma_{m_0}}$$

$$N = (b - 2x)\,t_w\,\frac{f_y}{\gamma_{m_0}}$$

$$M = M_{RN} - \left(\frac{b}{2} - x\right)^2 h\,\frac{f_y}{\gamma_{m_0}}$$

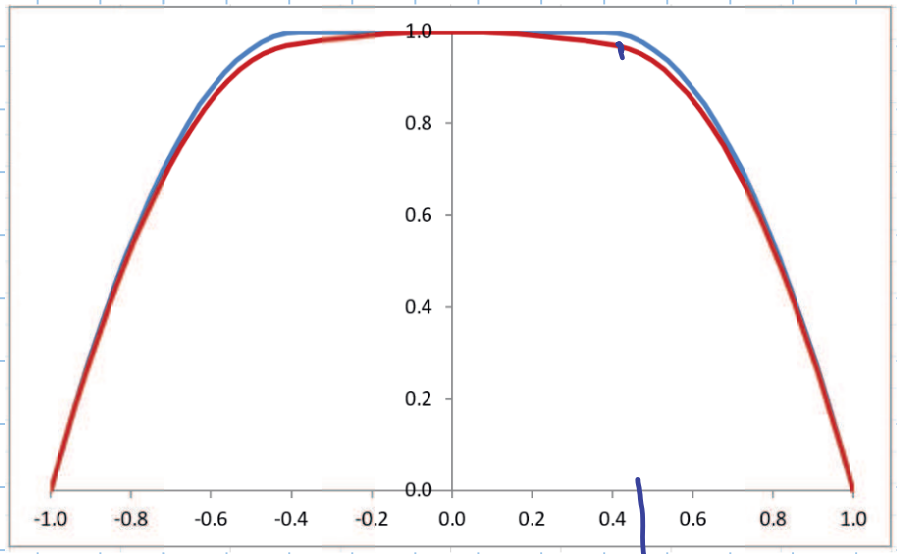
per $\dfrac{b - t_w}{2} \le x < \dfrac{b}{2}$



$$M = M_{Rd} - \left(\frac{b}{2} - x\right)^2 h \frac{f_y}{\gamma_{M0}}$$

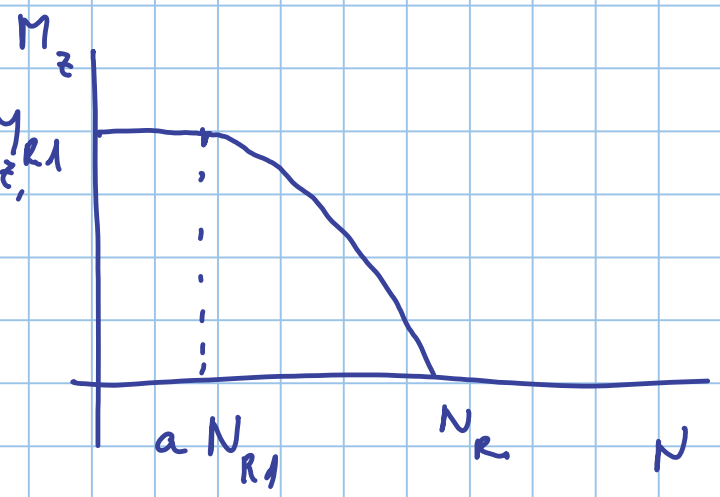
M_{Rd}

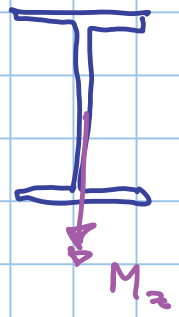
$$\frac{1}{2}\left(\frac{b}{2} - x\right)^2 h \frac{2 f_y}{\gamma_{M0}}$$



$$N \simeq (A - 2bt_f)\frac{f_y}{\gamma_{M0}} =$$

$$= a\, N_{Rd}$$



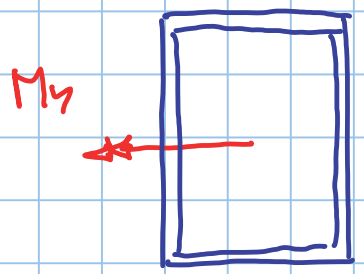


$$n = \frac{N_{Ed}}{N_{Rd}}$$

$$M_{N,z,Rd} = M_{z,Rd} \qquad n \leq a \qquad N_{Ed} \leq a\,N_{Rd}$$

$$M_{N,z,Rd} = M_{z,Rd}\left[1 - \left(\frac{n-a}{1-a}\right)^2\right] \qquad a \leq n \leq 1$$

$$a\,N_{Rd} \leq N_{Ed} \leq N_{Rd}$$



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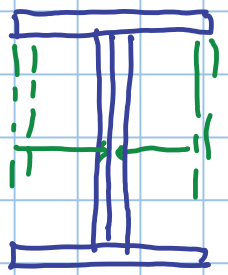
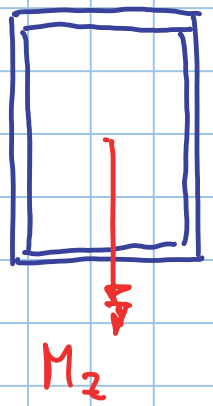
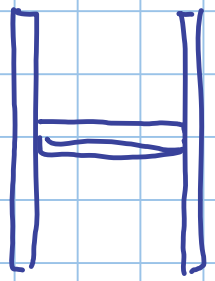
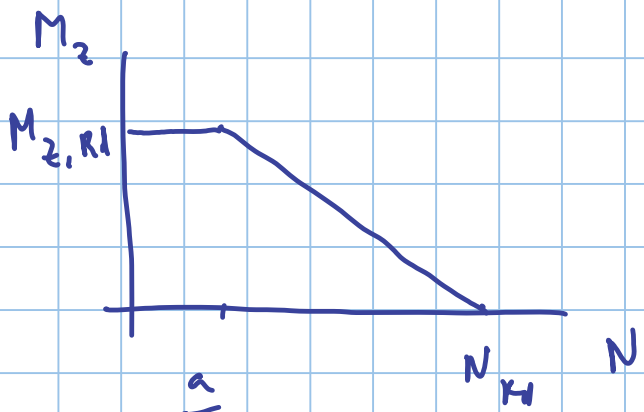


NORMA $a \leq 0.5$





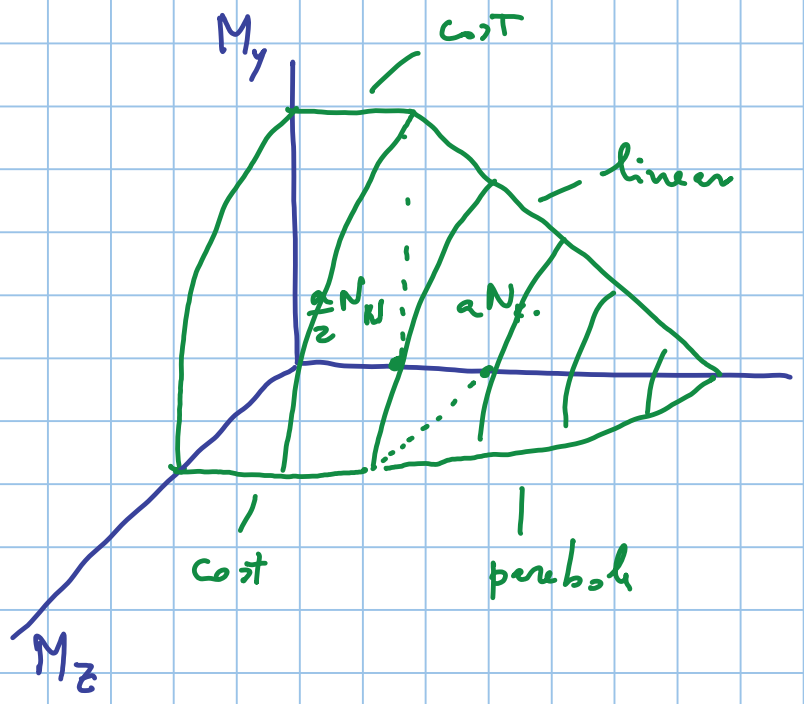
a piacere di 0.5

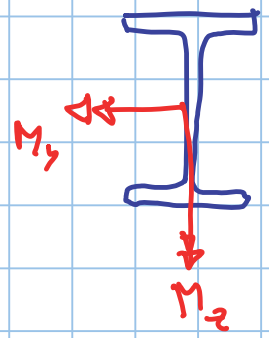


quasi 0.25

FLESSIONE COMPOSTA DEVIATA

M_y M_z N





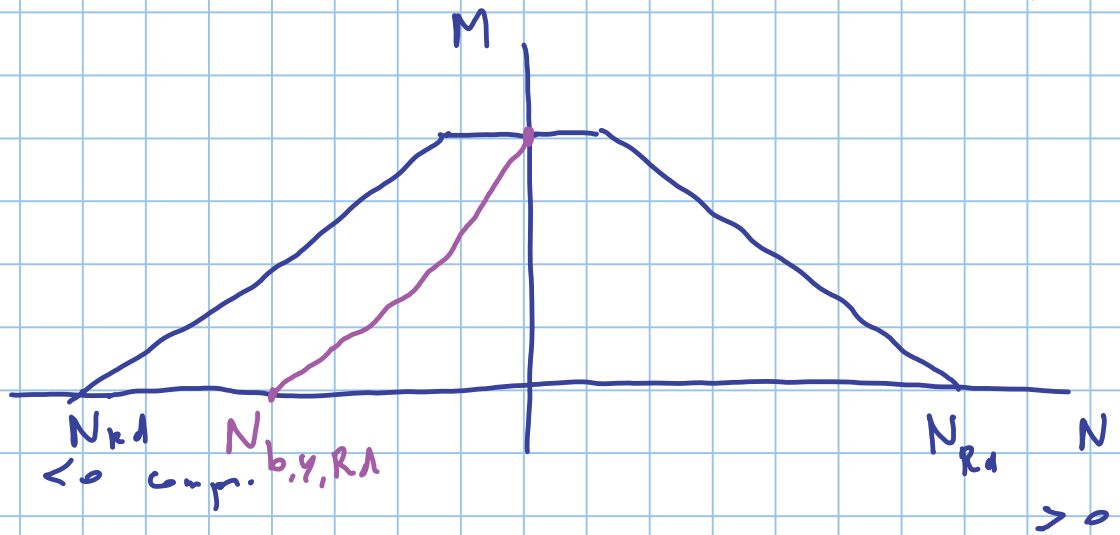
assegnato N_{Ed}

$M_{N,Y,Rd}$ $M_{N,Z,Rd}$

$$\left(\frac{M_{y,Ed}}{M_{N,y,Rd}}\right)^{2} + \left|\frac{M_{z,Ed}}{M_{N,z,Rd}}\right|^{5n} \leq 1$$

$$n = MAX\left(\frac{N_{Ed}}{N_{Rd}}\,;\,0.2\right)$$

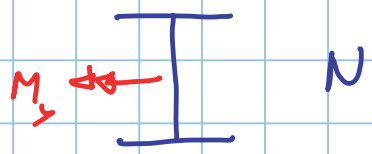
PRESSO FLESSIONE



come sezione, il dominio è simmetrico

come asta: possibilità di instabilità con sbandamento
- nel piano x y
- " " x z

ASTA



prime considerazioni:

- sbandamento in x z (notaz. intern. x y)

$N_{b,y,Rd}$

NTC metodo A

$$\frac{N_{Ed}}{\chi_{min} A f_y/\gamma_{M1}} + \frac{M_{y,Ed}}{\chi_{LT} W_{y,pl} \frac{f_y}{\gamma_{M1}} \left(1 - \frac{N_{Ed}}{N_{cr,y}}\right)} \leq 1$$

$\chi_{LT} \rightarrow 1$

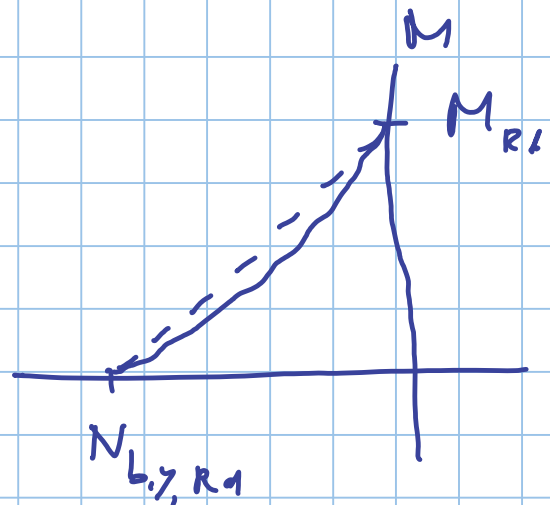
$\downarrow$

min. χ_y funz. di $\lambda_y = \frac{l_0}{i_y}$

perché più grande instabilità inf. y

$$N_{cr,y} = \frac{\pi^2 E I_y}{l_0^2}$$

$$\frac{N_{Ed}}{N_{b,y,Rd}} + \frac{M_{y,Ed}}{M_{y,Rd}\left(1 - \frac{N_{Ed}}{N_{cr,y}}\right)} \leq 1$$



NTC mat. n. B

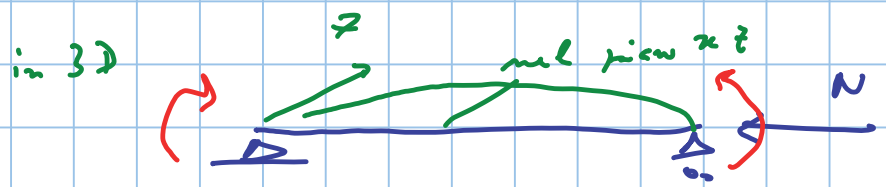
EC3

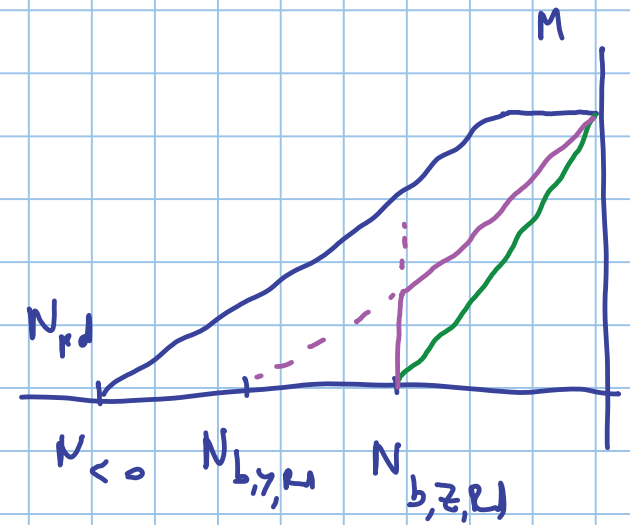
$$\frac{N_{Ed}}{\chi_y A \frac{f_y}{\gamma_{M1}}} + k_{yy} \frac{M_{y,Ed}}{W_y \frac{f_y}{\gamma_{M1}}} \leq 1$$

$$\frac{N_{Ed}}{N_{b,y,Rd}} + k_{yy} \frac{M_{y,Ed}}{M_{y,Rd}} \leq 1$$

$$k_{yy} = 1 + \min\left(\bar{\lambda}_y - 0.2 ; 0.8\right) \frac{N_{Ed}}{N_{b,y,Rd}}$$

momento M_y sbandamento intorno a z





comp.

$N_{b,y,Rd}$ λ_y

$N_{b,z,Rd}$ λ_z

$N_{b,z,Rd} < N_{b,y,Rd}$

NTC metodo A

$$\frac{N_{Ed}}{\chi_{min} A f_y/\gamma_{M1}} + \frac{M_{y,Ed}}{\chi_{LT} W_{y,pl} \frac{f_y}{\gamma_{M1}} \left(1 - \frac{N_{Ed}}{N_{cr,y}}\right)} \leq 1$$

eq

$\chi_{LT} \downarrow 1$

$\downarrow$

$\chi_{min} = \chi_z$

$$\frac{N_{Ed}}{N_{b,RA}} + \frac{M_{y,Ed}}{M_{y,Rd}\left(1 - \frac{N_{Ed}}{N_{cr,y}}\right)} \leq 1$$

$\downarrow$

$N_{b,z,RA}$

$$\begin{cases} \dfrac{N_{Ed}}{\chi_y A \dfrac{f_y}{\gamma_{M1}}} + k_{yy} \dfrac{M_{y,Ed}}{W_y \dfrac{f_y}{\gamma_{M1}}} \leq 1 \\ \dfrac{N_{Ed}}{\underbrace{\chi_z A \dfrac{f_y}{\gamma_{M1}}}_{N_{b,z,Rd}}} \leq 1 \end{cases}$$

NTC muratura B

EC3

nel caso considerato