

Università degli studi di Bergamo

Scuola di Ingegneria (Dolmine)

CCS Ingegneria Edile

L-23 Ingegneria delle Tecnologie per l'Edilizia

Scienza delle Costruzioni

( ICAR/08 - SdC ; 9 CFU )

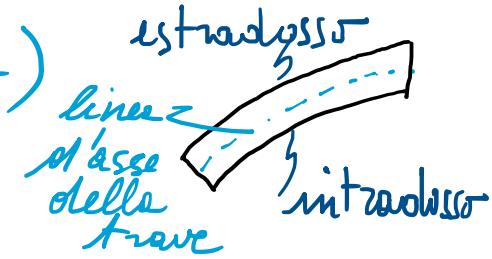
A.A. 2020/2021

prof. Egidio RIZZI

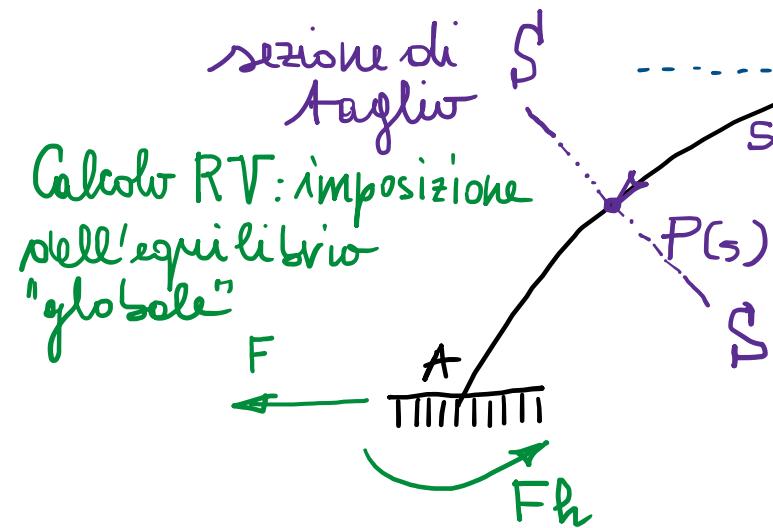
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LEZIONE 06

Azioni Interne: caratteristiche di sollecitazione (interna alla struttura)

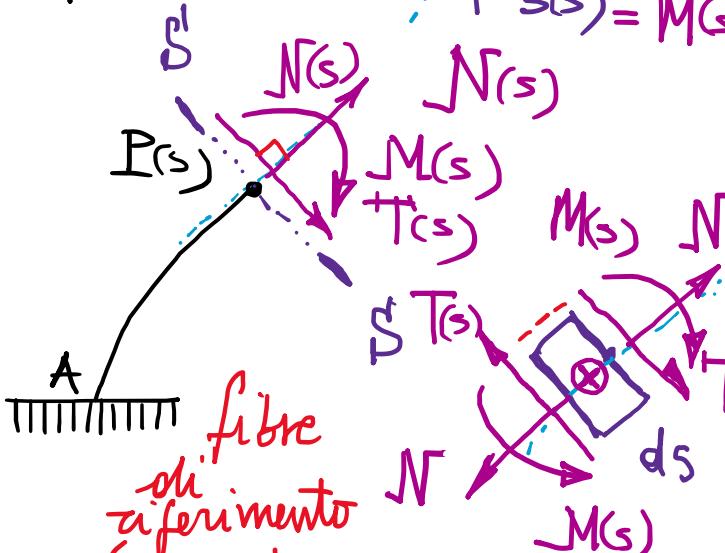
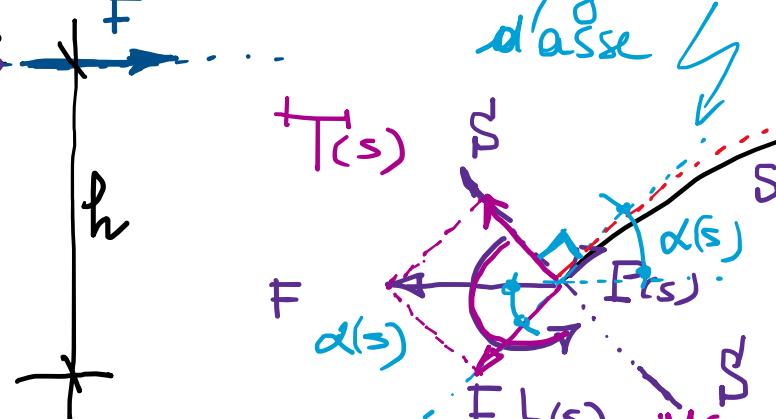


rimozione di  
incastro "mutuo"  
tra le due parti  
divise da S-S



$$\begin{cases} N(s) = F \cos \alpha(s) \\ T(s) = F \sin \alpha(s) \\ M(s) = F b(s) \end{cases}$$

Determinate per equilibrio  
"locale" delle porzione PB -  
(ogni porzione di struttura  
dovrebbe risultare in equilibrio)



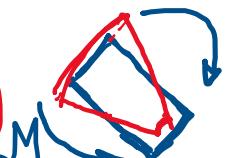
fibre  
di riferimento  
(scelte in  
maniera arbitraria)  
[potenzialmente tese]

Azioni Interne (AI)

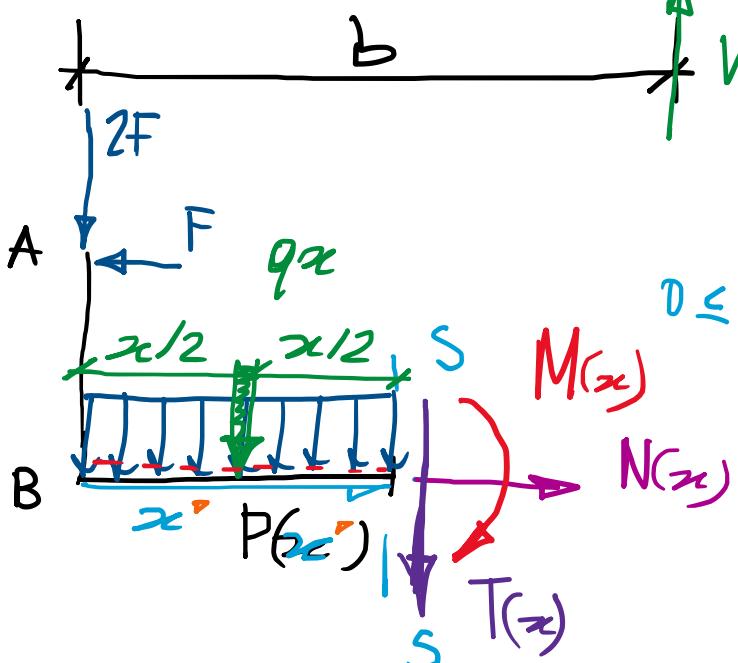
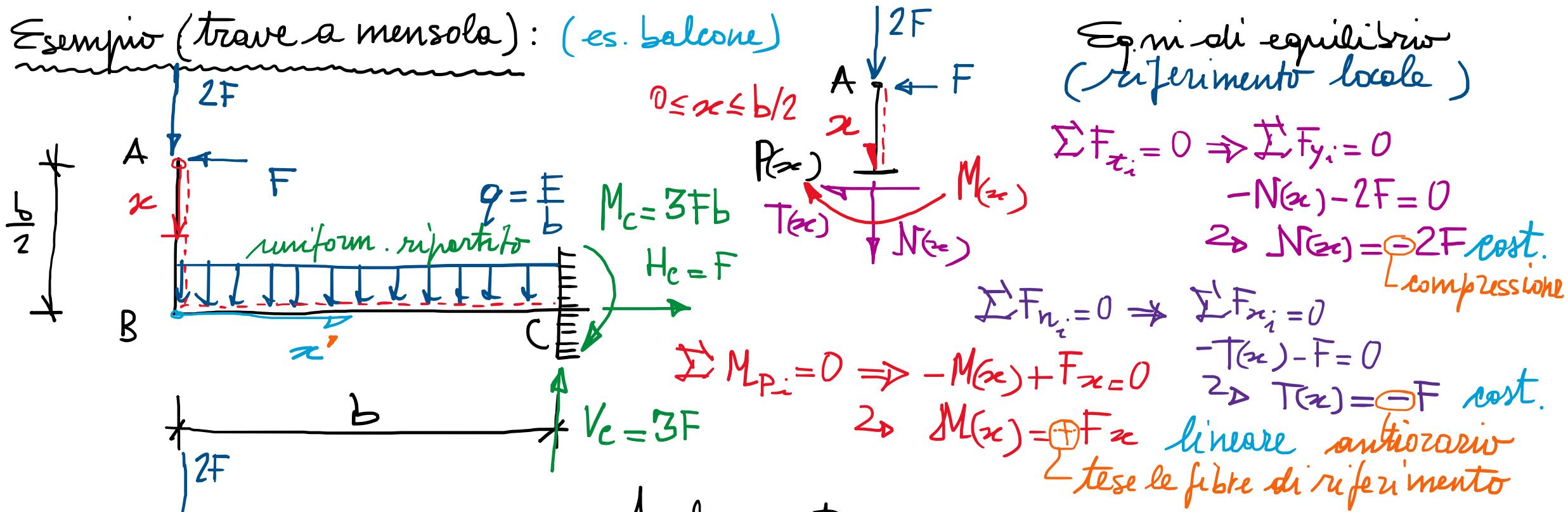
$N(s)$ : azione assiale o normale
$T(s)$ : " tagliente o taglio
$M(s)$ : " flettente o momento (flettente)

Convenzione:

$N$ positiva se tesi
$T$ positiva se "orario"
$M$ positivo se tende le fibre di riferimento (v. flessione)



Esempio (trave a mensola): (es. balcone)

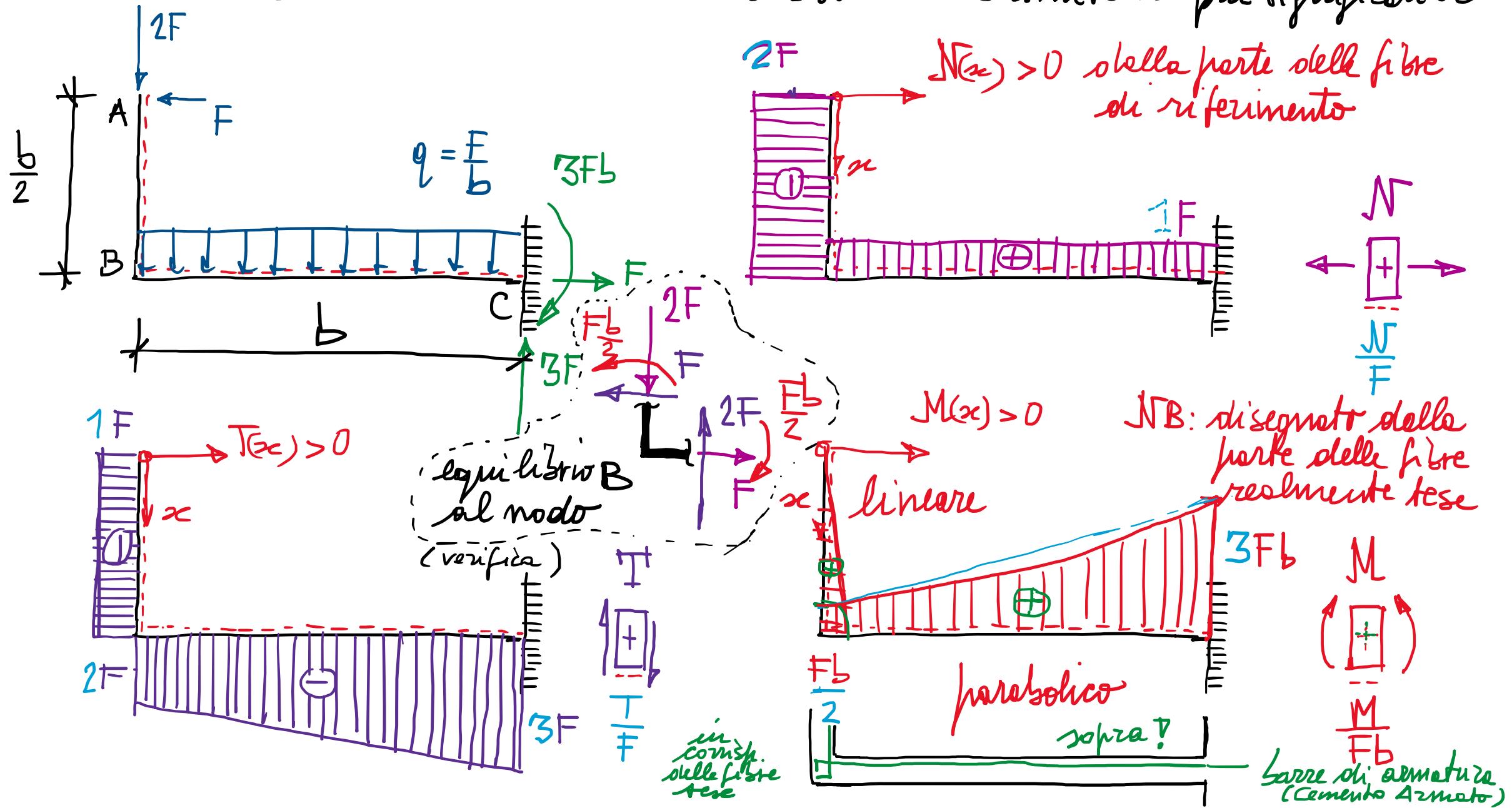


Descrizione analitica delle funzioni di Azione Interna.

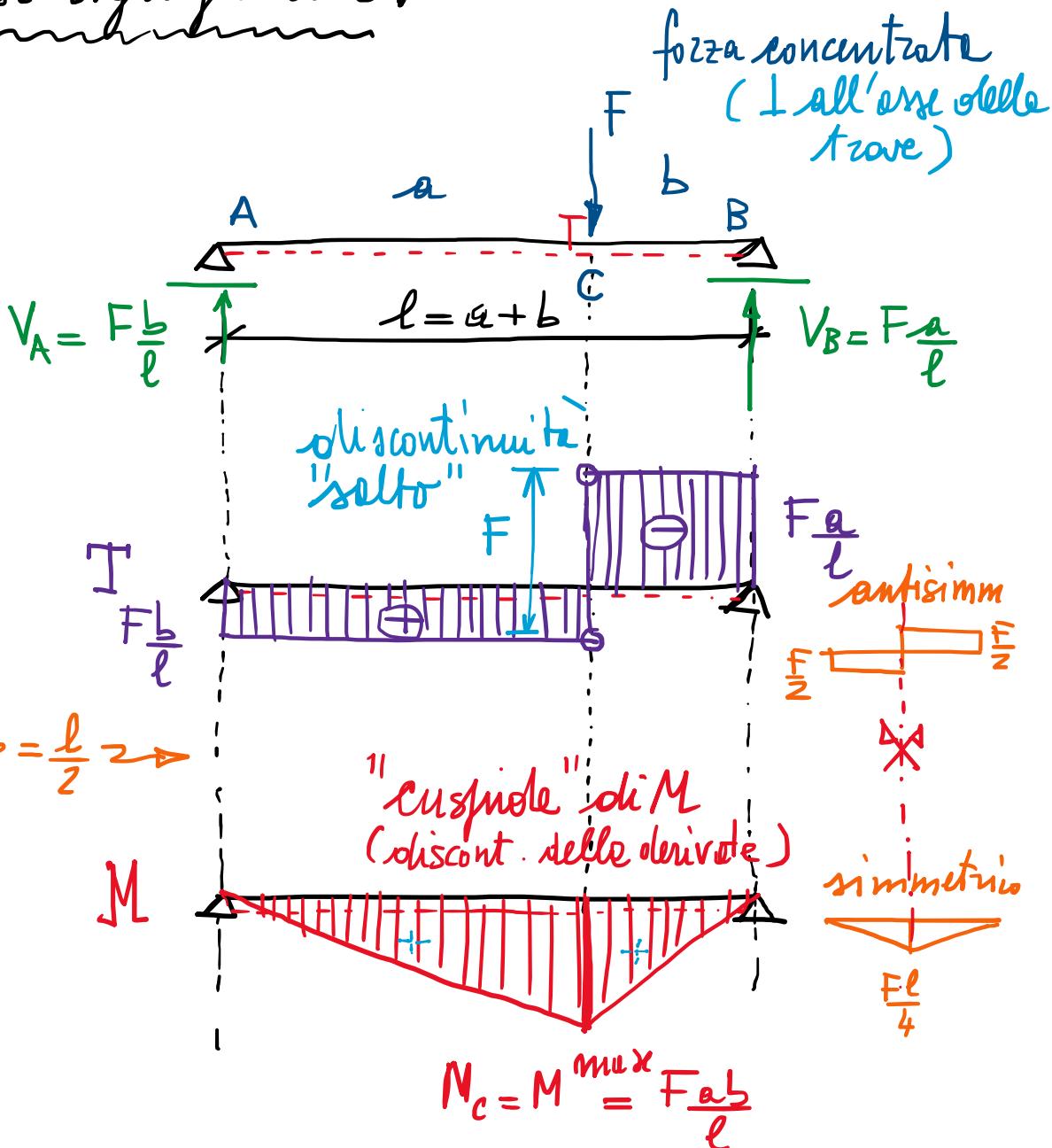
Analogamente:

$$\left\{ \begin{array}{l} N(x) = -F \text{ cost. (frazione)} \\ T(x) = -(2F + \frac{F}{b}x) \text{ lineare (antiorario)} \\ M(x) = \frac{Fb}{2} + 2Fx + \frac{Fx^2}{2} \text{ quadratico (parabolico)} \end{array} \right. \begin{array}{l} \text{tese le fibre sopra} \\ \text{sopra} \end{array}$$

Diagrammi di Azione Interna ( $N, T, M$ ): rappresentazione grafica delle AI utile ad individuare le sezioni caratteristiche con le sollecitazioni interne più significative



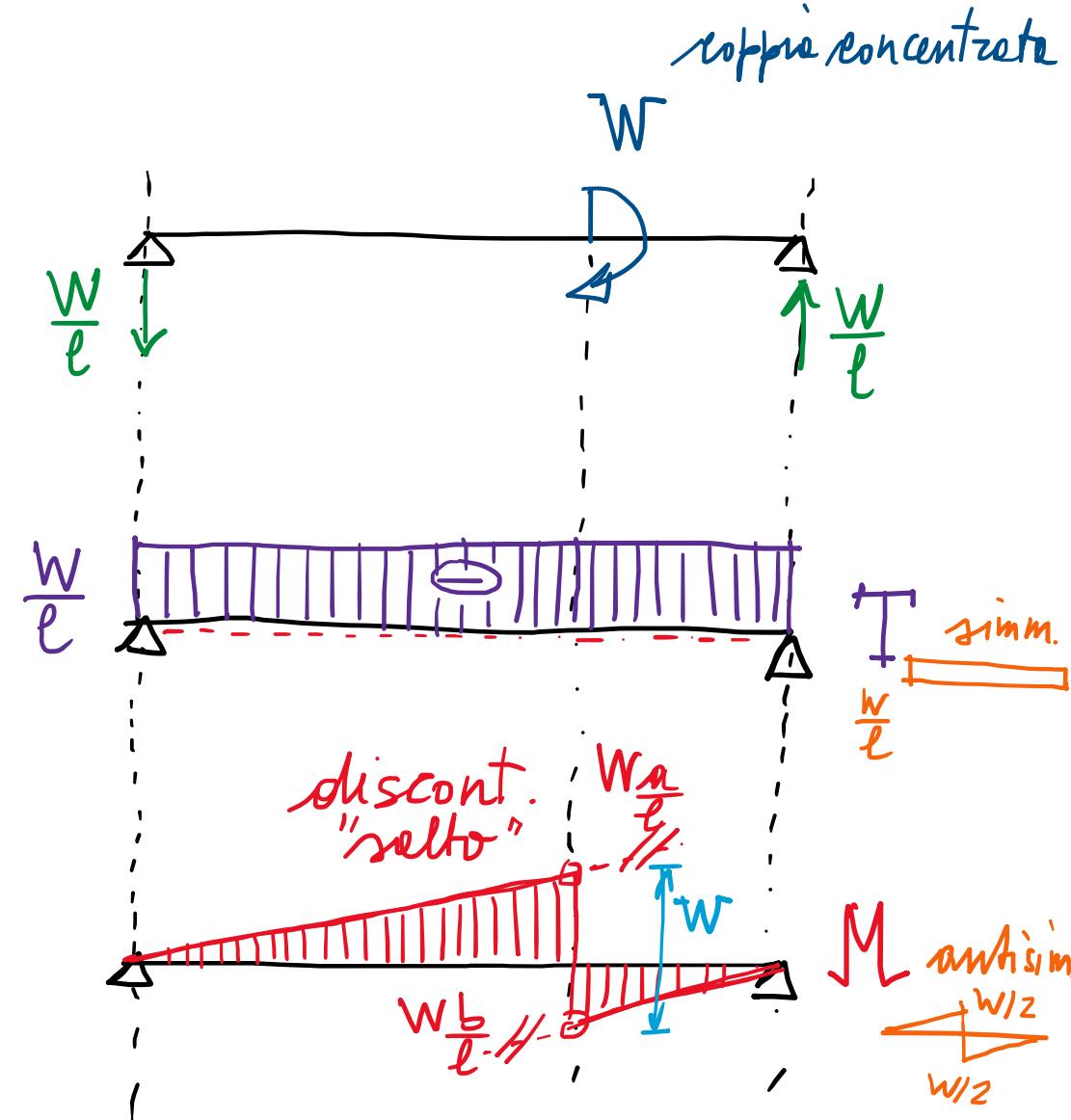
Casi significativi:



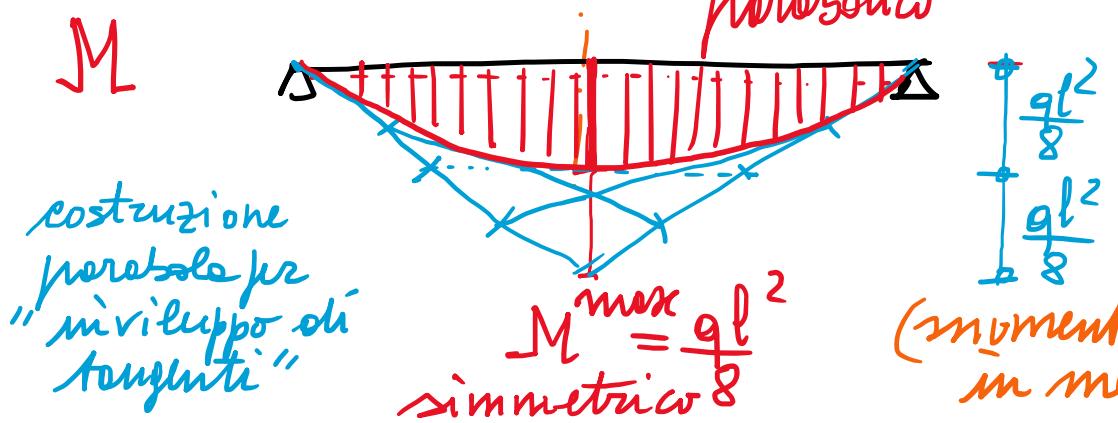
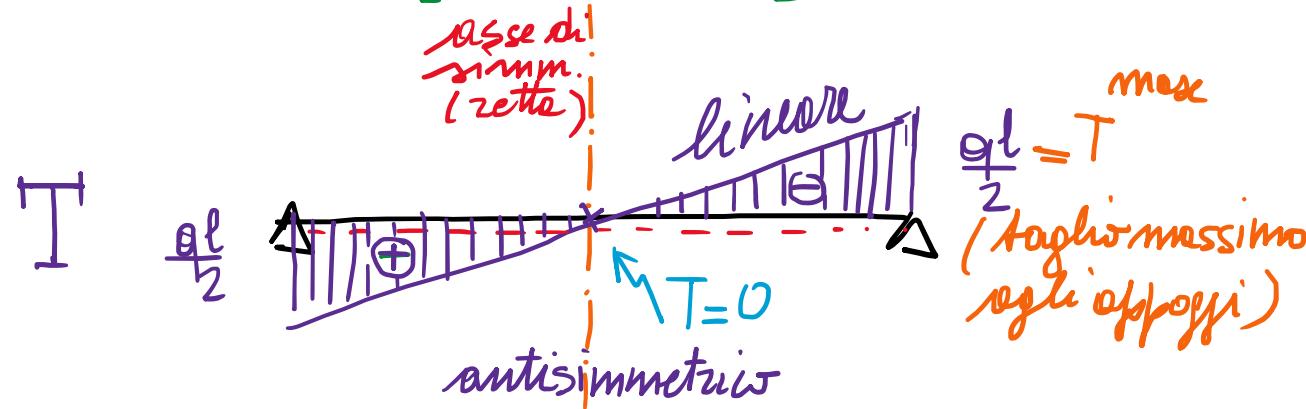
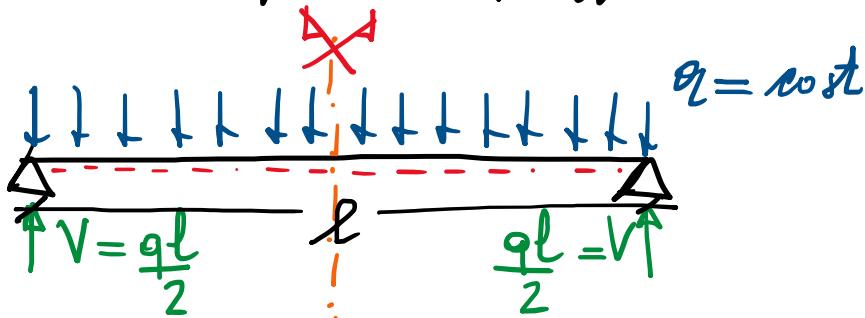
$$\text{se } a=b=\frac{l}{2} \rightarrow$$

$M$

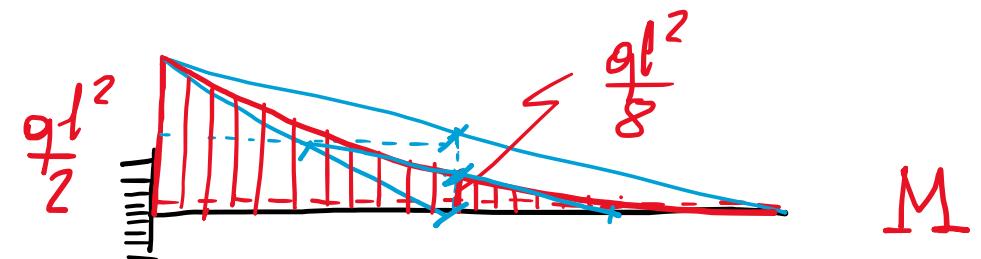
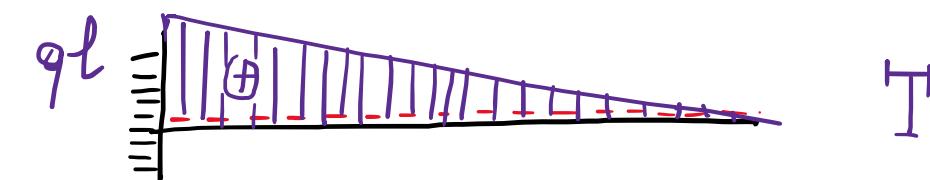
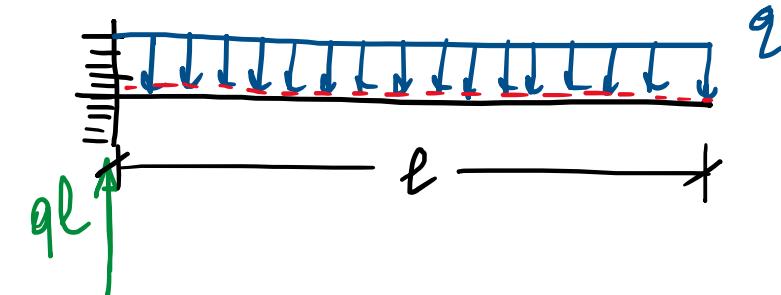
$$N_c = M_{\max} = F a b / l$$



"trave appoggio-appoggio"



"trave a mensola"



NB: Sezione d'incastro più sollecitata  
e taglio e momento