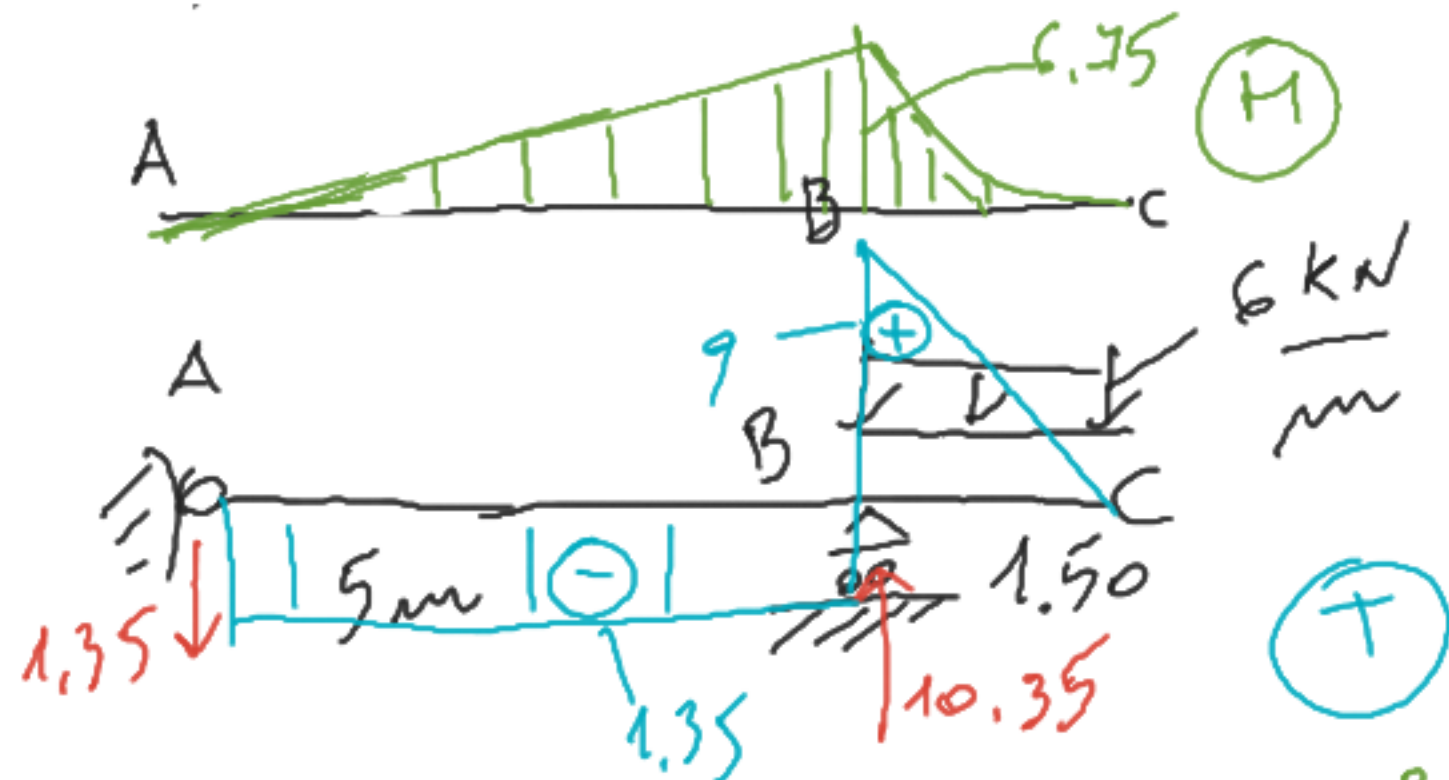
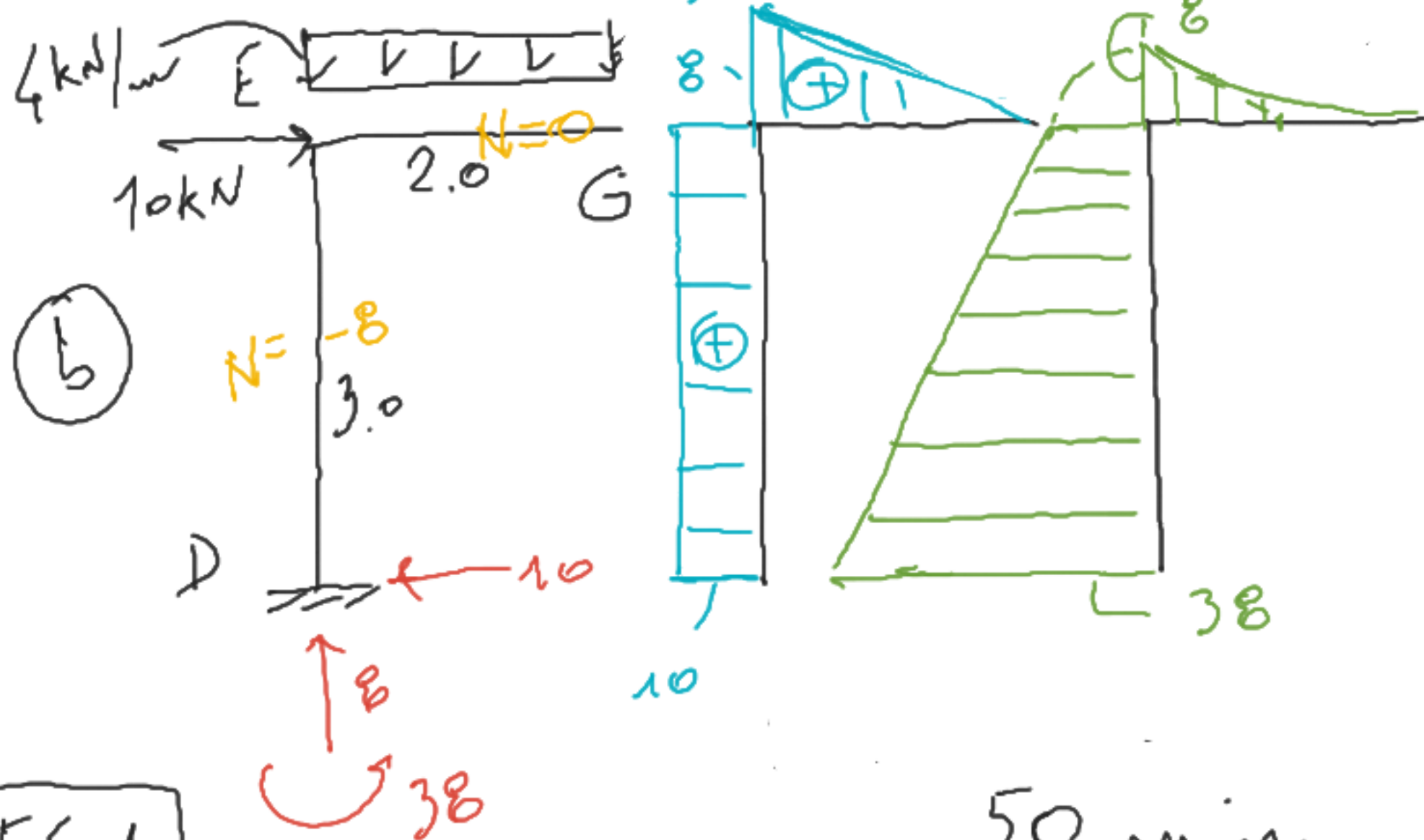


(a)



(b)



- R.V. in (a) e (b) col metodo sintetico

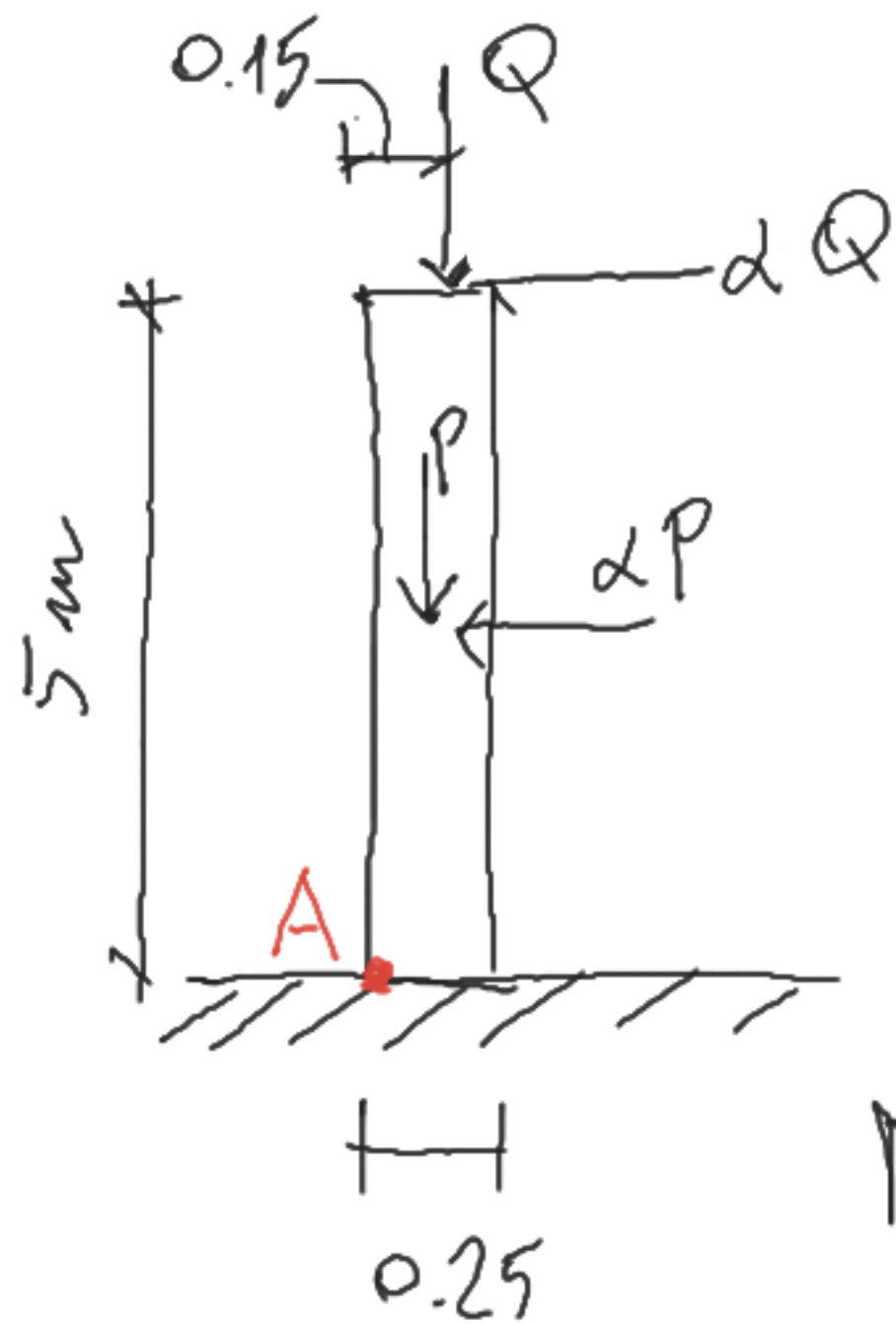
- Diagrammi quotati di T, M su (a) e di N, T, M su (b)

- Rideterminare le R.V. in (a) col procedimento generale

ES.1

50 min

ES.3



$$q_{sol} = 3 \frac{\text{kN}}{\text{m}^2}$$

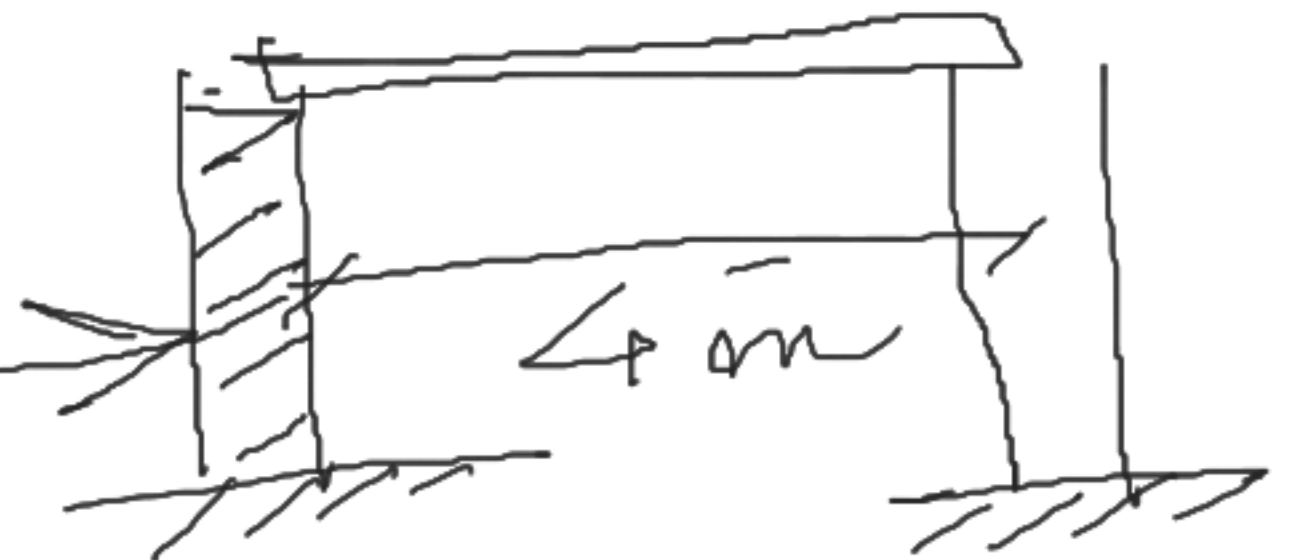
$$l_{sol} = 4 \text{ m}$$

$$\gamma_{muratura} = 18 \frac{\text{kN}}{\text{m}^3}$$

- Determinare P e Q

- Determinare il valore di α in modo che sia rispettato l'equilibrio alle rotazioni intorno ad A

30 min



ES.4

40 mm

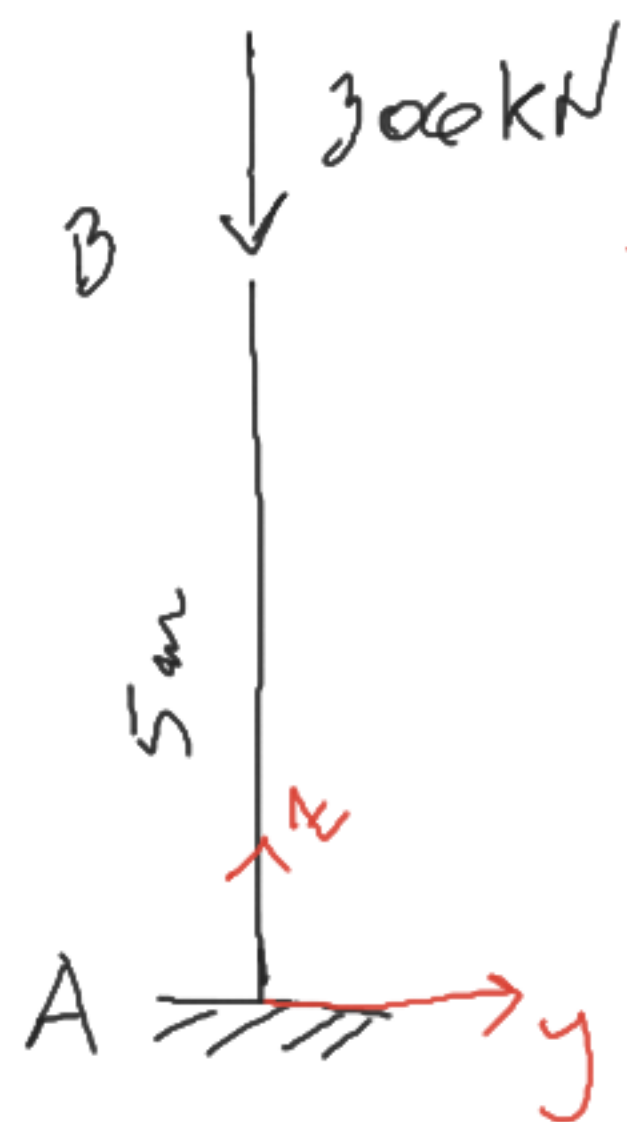
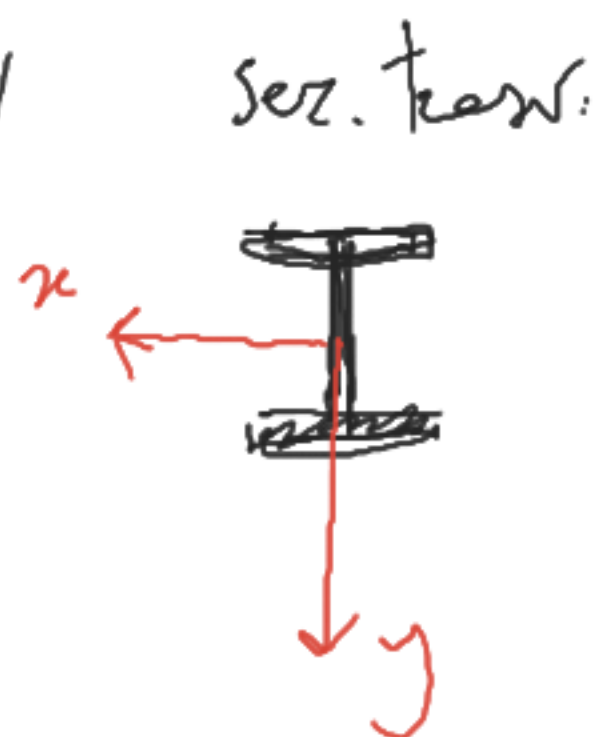


fig. 1



sez. trasv.
HEA 140
 $A_{acc} = 31.42 \text{ cm}^2$
 $I_x = 1033 \text{ cm}^4$
 $E = 210000 \frac{\text{N}}{\text{mm}^2}$

- Diagramme σ_z sulle sezioni in A con F in B (fig. 1)

- Max valore assoluto di σ_z

- Abbassamento sez. B

- Max valore assoluto di σ_z

se F = 300 kN è applicato in C (fig. 2)

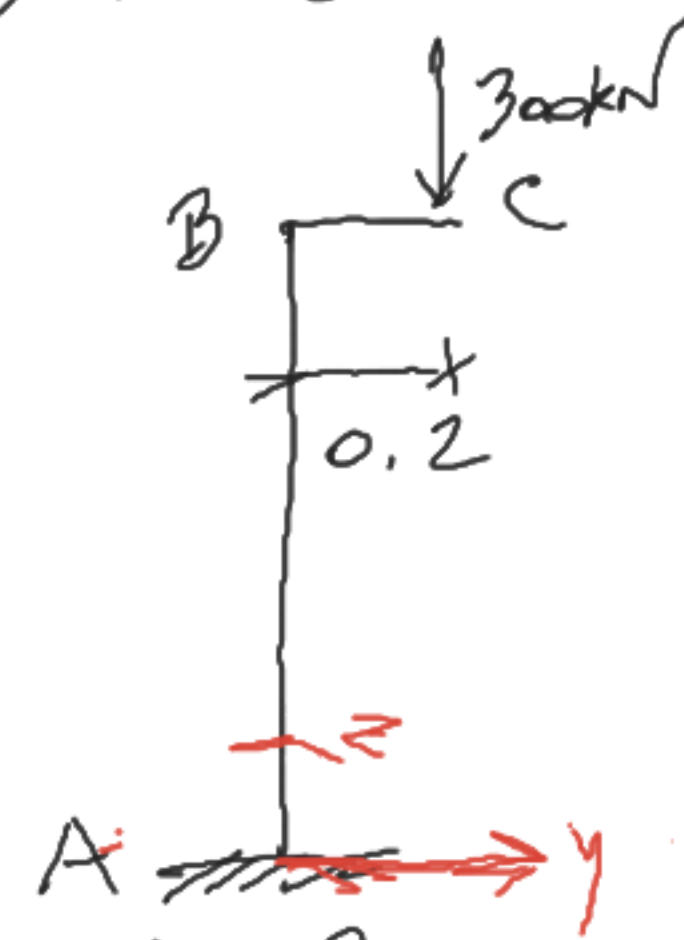
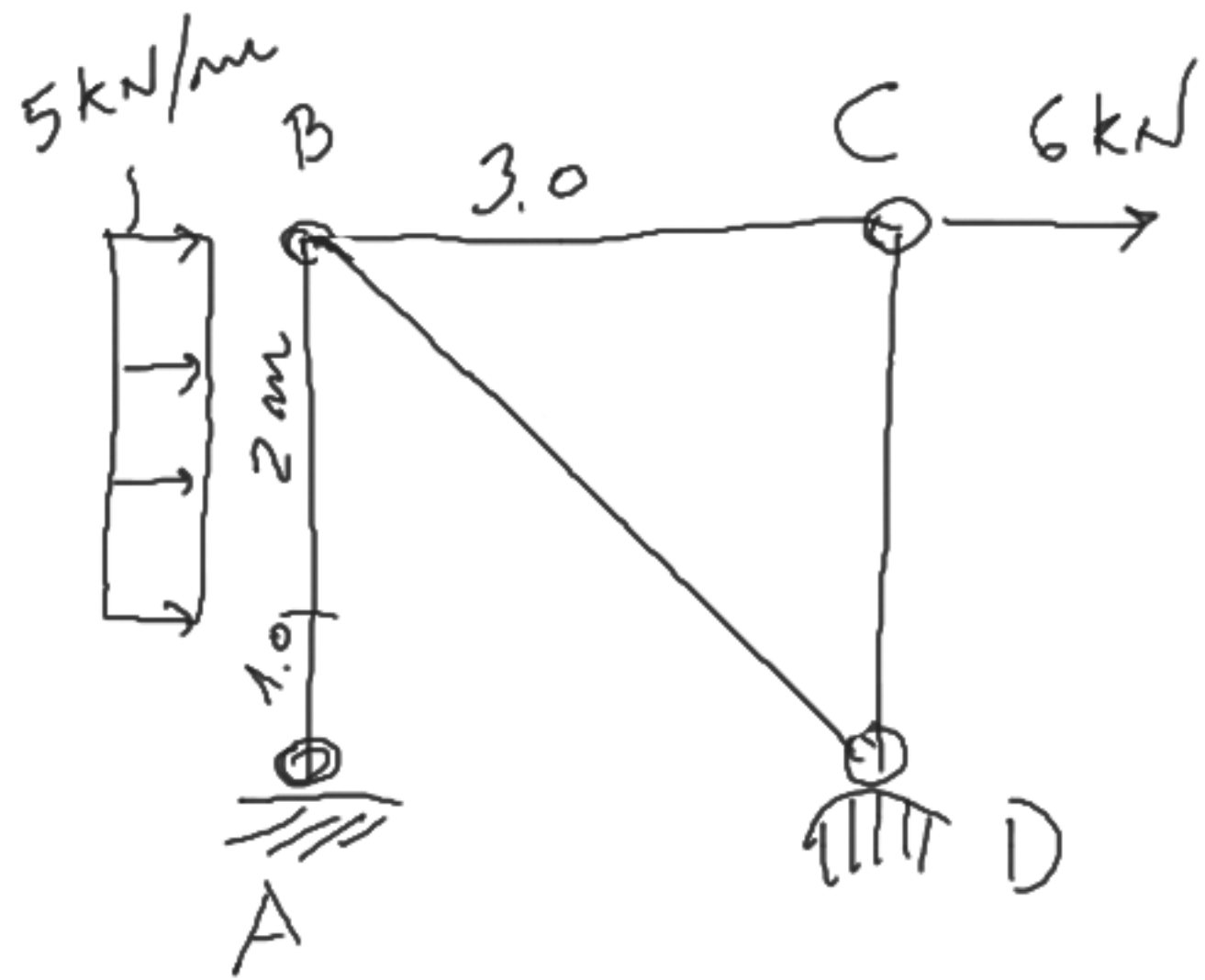


fig. 2

ES.2



- R. V. ext (A, D)

- N in tutte le aste

- Diagrammi T, M dove $\neq 0$

45 min

SOLUTIONS ES. 3

$$P = 18 \times 0,25 \times 5 = 22,5 \text{ kW}$$

$$Q = \frac{3 \times 4}{2} = 6 \text{ kW}$$

$$6 \times 0,15 + 22,5 \times \frac{0,25}{2} = \alpha \left(6 \times 5 + 22,5 \times 2,5 \right) \Rightarrow$$

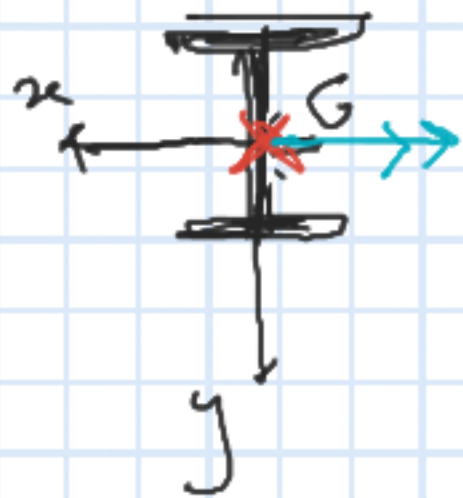
$$\Rightarrow 3,713 = \alpha \cdot 86,25 \quad \Rightarrow \alpha = 0,043$$

SOLUZIONI ES. 4



$$\sigma_z = \frac{N}{A} = \frac{-300000}{3142} = -95,5 \frac{\text{N}}{\text{mm}^2}$$

$$w_B = \frac{300000 \times 5000}{210000 \times 3142} = 2,3 \text{ mm verso il basso}$$



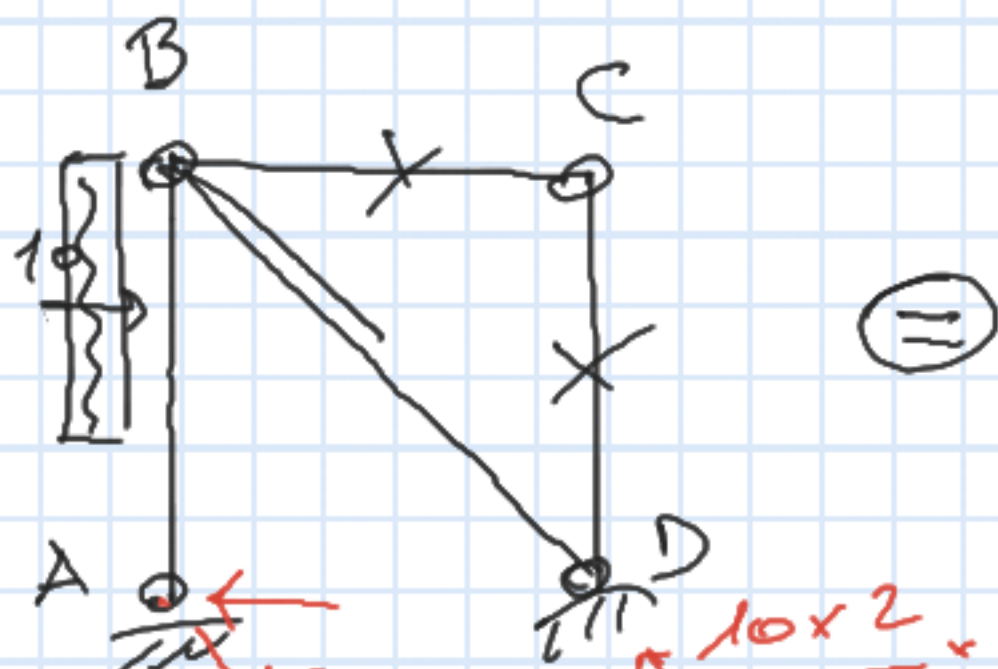
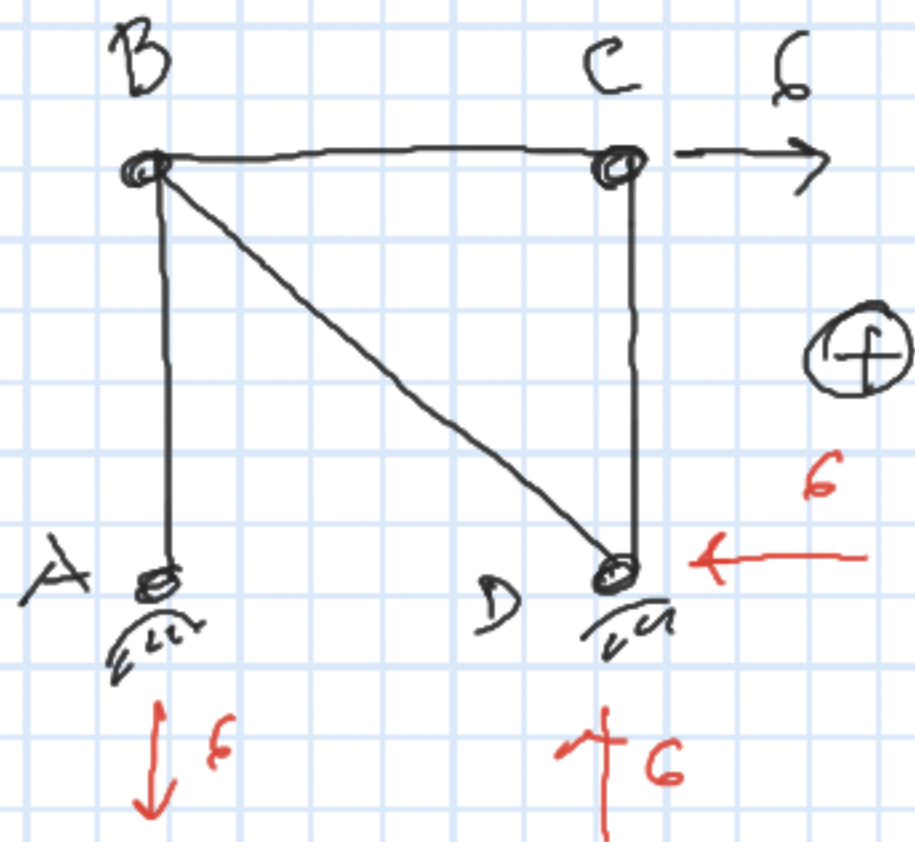
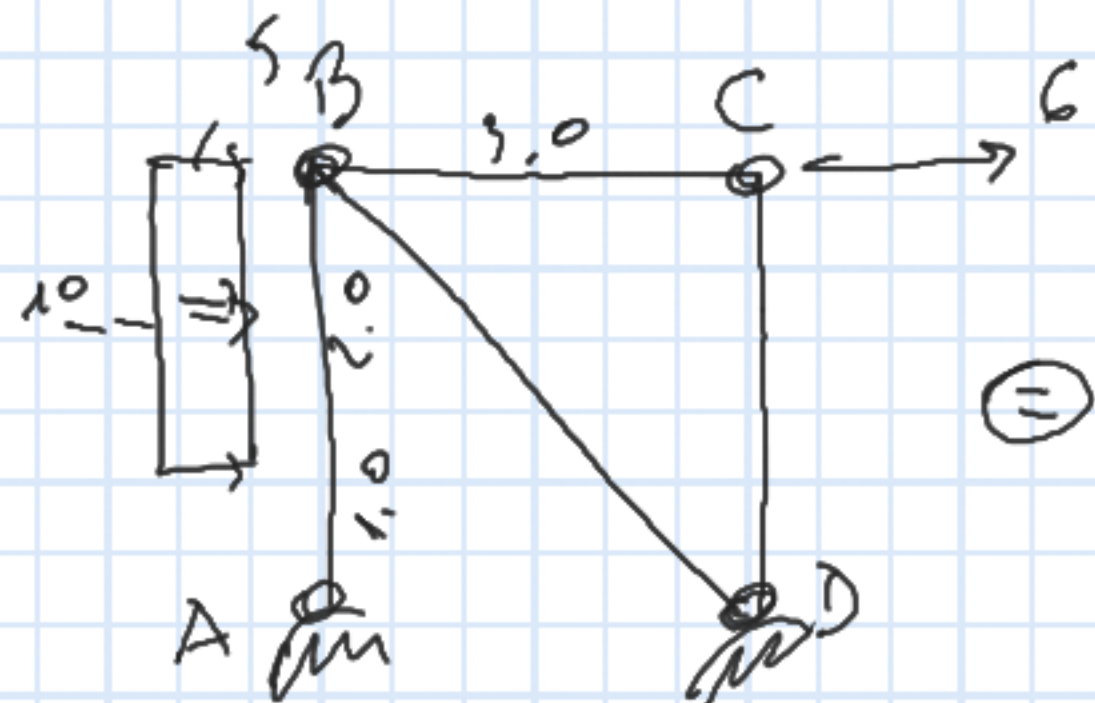
$$N_G = -300 \text{ kN}$$

$$M_x = -60 \text{ kNm}$$

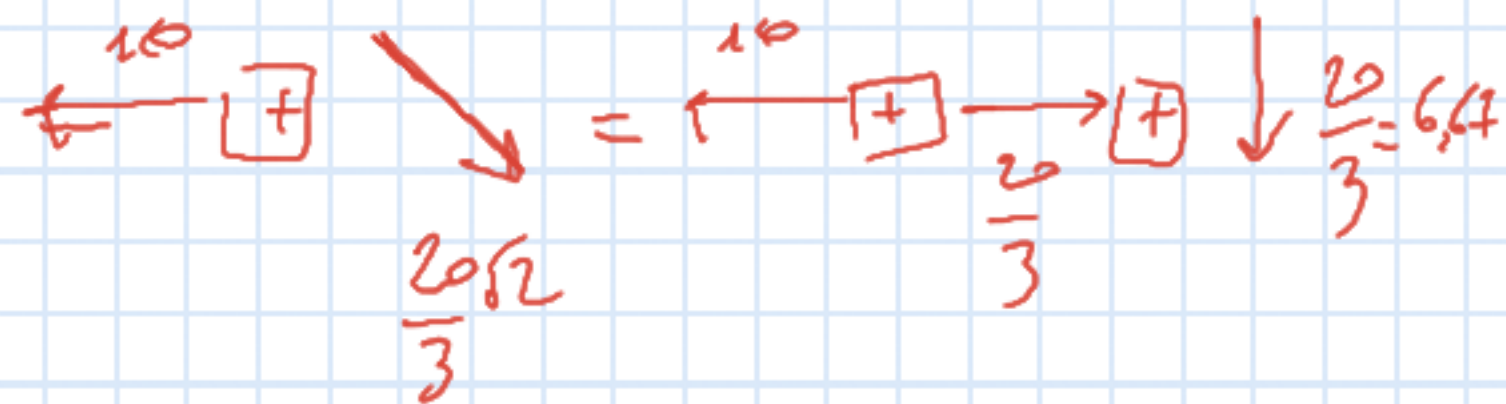
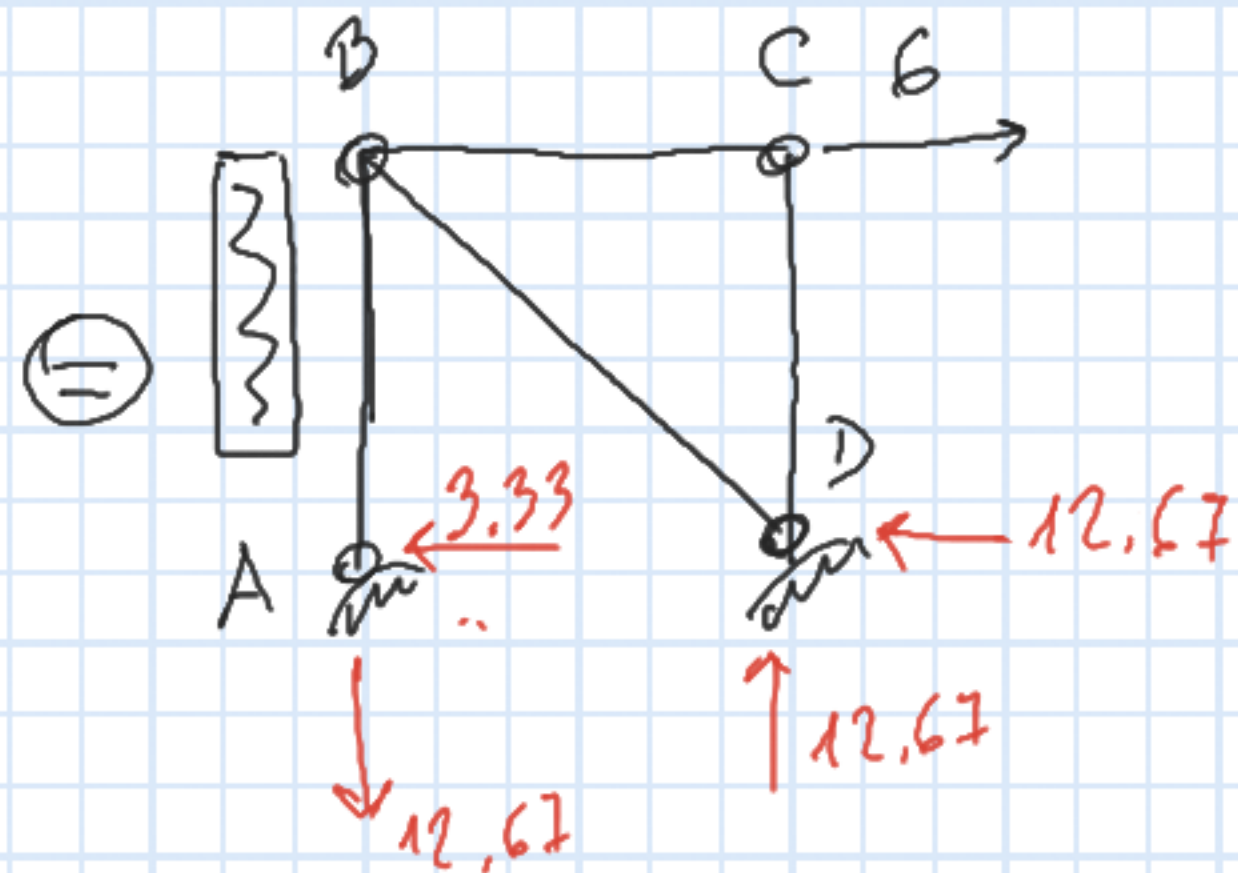
$$\sigma_t = -\frac{300000}{3142} - \frac{60 \times 10^6}{1633 \times 10^4} y = -95,48 - 5,808 y$$

$$|\sigma_t|_{\text{max}} = |-95,48 - 5,808 \times 70| = 502 \frac{\text{N}}{\text{mm}^2}$$

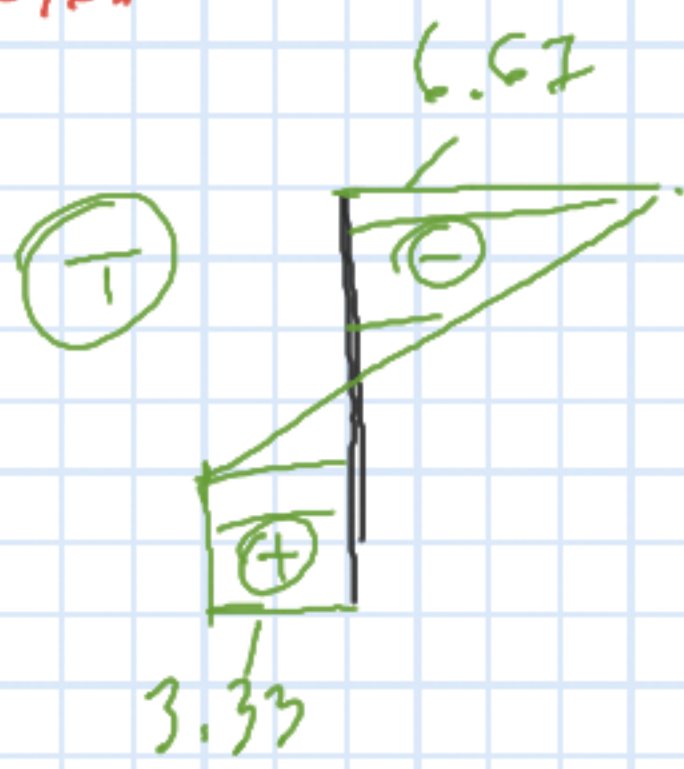
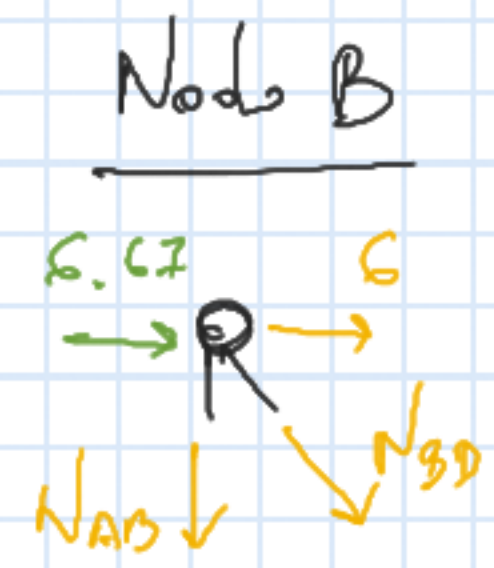
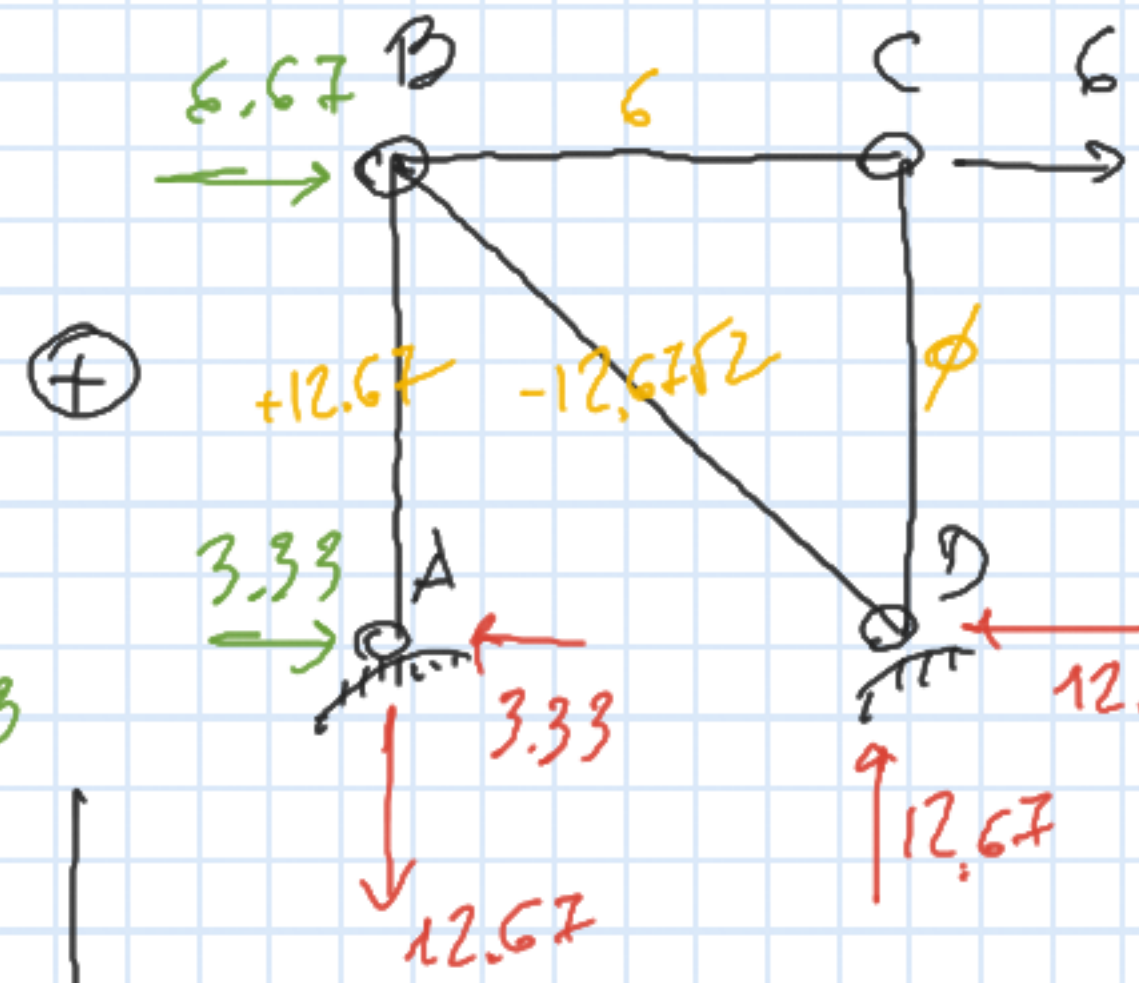
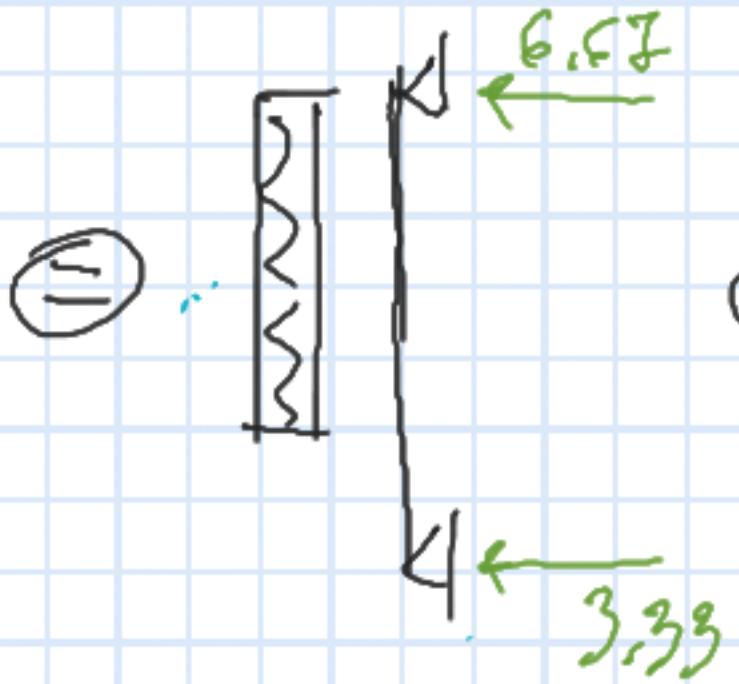
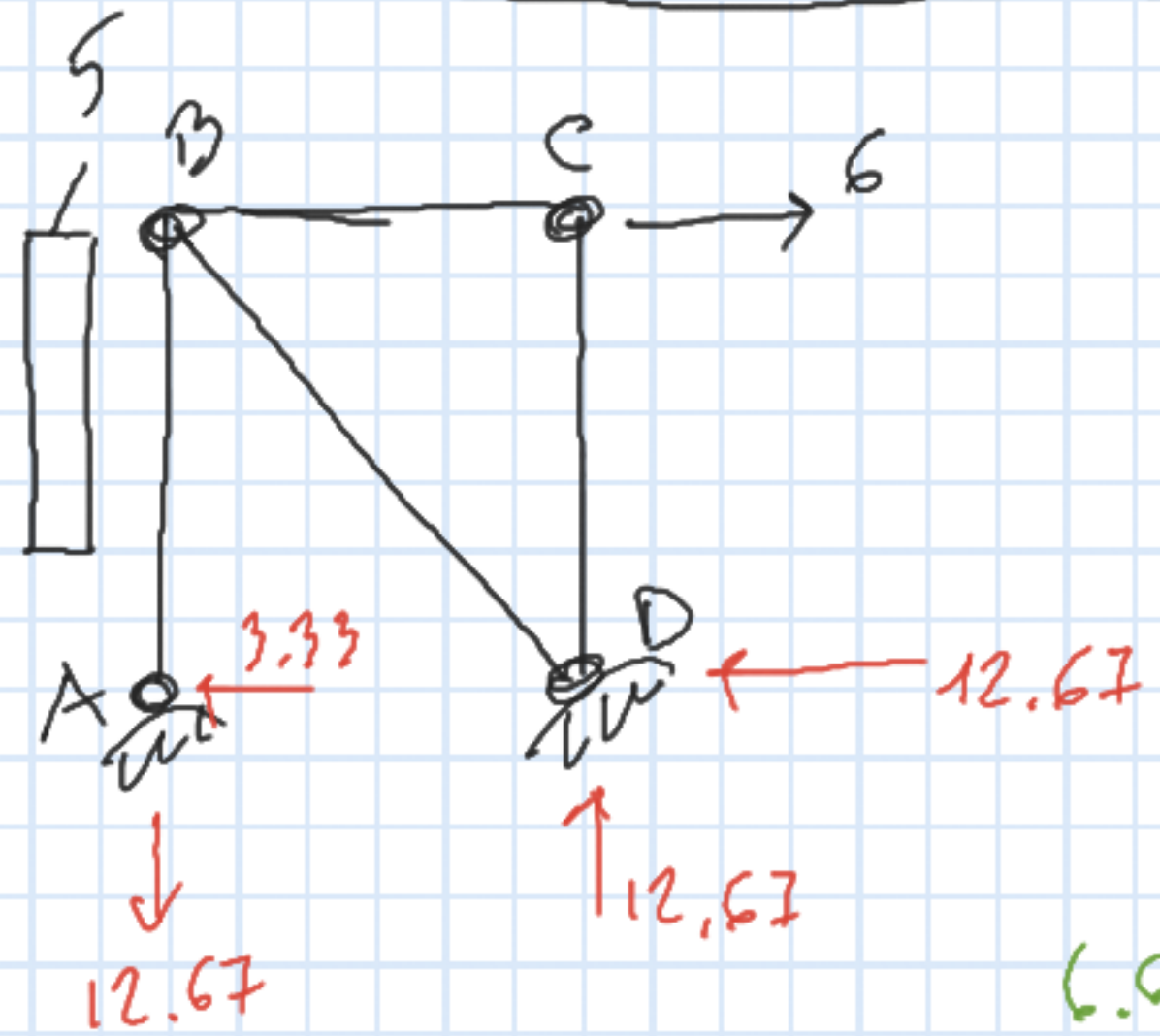
SOLUKIONE ES. 2



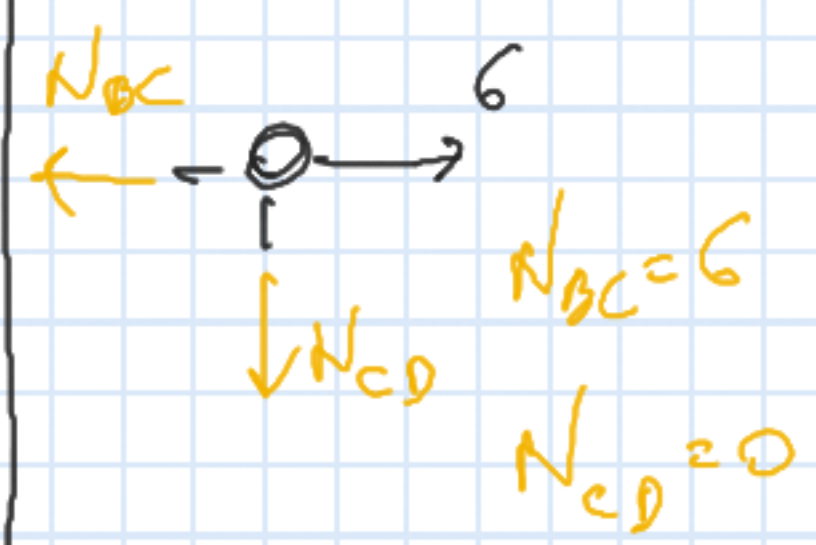
$$10 \times 2 \times 2 = 40 = \frac{20\sqrt{2}}{3\sqrt{2} \cdot 3} = 9.43$$



CONTINUA SOLUZIONI ES. 2



Node C



$$12.67 + N_{BD} \frac{\sqrt{2}}{2} = 0$$

$$\Rightarrow N_{BD} = -12.67\sqrt{2}$$

$$N_{AB} = +12.67$$