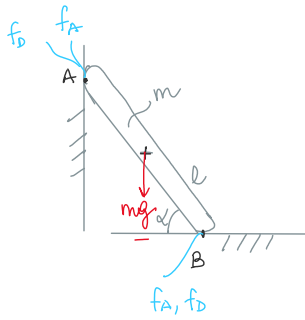


Esercizio con attrito

giovedì 14 novembre 2024 16:39

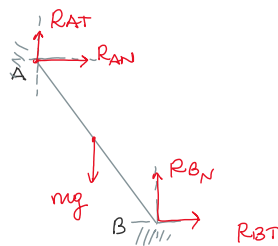


Nota: $m, l, f_A, f_D, \alpha \Rightarrow$

CASO I
Scala fissa
 $f_A \text{ in A}$
 $f_A \text{ in B}$

Valutare: le reazioni vincolari
↓
forze nei due
appoggi in A e B

1) AFV \Rightarrow (A), (B), APPOGGIO CON ATTRITO \Rightarrow ATTRITO ADERENTE



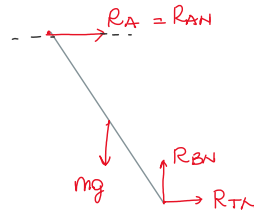
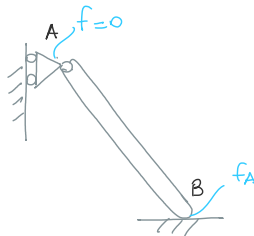
$$|R_{AT}| \leq f_A |R_{AN}| \Rightarrow 2 \text{ INC}$$

$$|R_{BT}| \leq f_A |R_{BN}| \Rightarrow 2 \text{ INC}$$

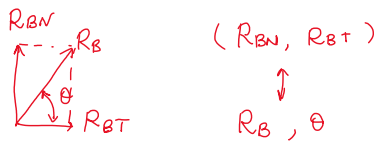
(4) INC

2) SI? 4 INC VS 3 EQNI \Rightarrow PROBLEMA IPERSTATICO

CASO II
 $f_A \approx 0 \text{ in A} \Rightarrow$ APPOGGIO LISCIO
 $f_A, f_D \text{ in B}$

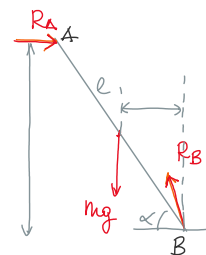
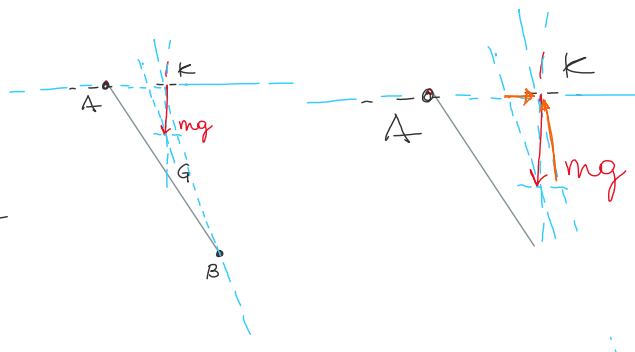


(3) INCOGNITE
 R_A, R_{BN}, R_{BT}
↓
3 EQNI
↓
CORPO ISOSTATICO



SOLLA SCALA:
3 FORZE $\Rightarrow \underline{R_A}, \underline{mg}, \underline{R_B}$

SOLZ.
GRAFICA



SOLZ. ANALITICA

$$x: \int R_A - R_{Bx} = 0$$

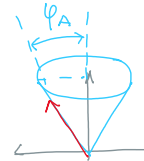
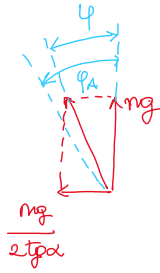
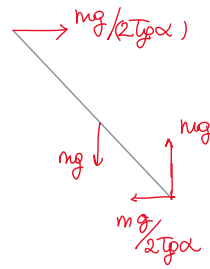
$$\begin{cases} \gamma: R_{By} - mg = 0 \\ B \uparrow - R_A \ell \sin \alpha + mg \frac{\ell}{2} \cos \alpha = 0 \end{cases}$$

$$\begin{cases} R_A = \frac{mg}{2 \tan \alpha} = R_{Bx} \\ R_{By} = mg \end{cases}$$

$$\varphi < \varphi_A \quad f_A$$

$$R_{BT} = \tan \varphi R_{BN}$$

DCL DEF



CASO III

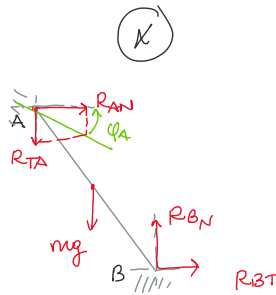
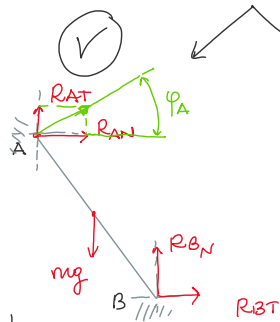
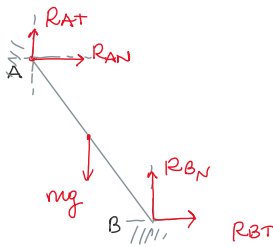
- innesco del moto in A $\Rightarrow |R_{TA}| = f_A |R_{NA}|$
- aderenza in B

$$|R_{TA}| = f_A |R_{NA}| \Rightarrow 1/NC$$

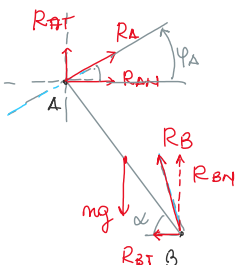
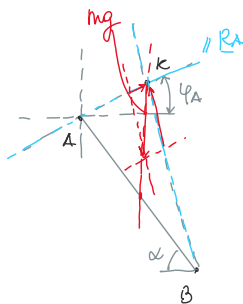
$$|R_{BT}| \leq f_A |R_{BN}| \Rightarrow \frac{2/NC}{(3) NC}$$

$$\updownarrow \\ 3 \leq f_A$$

\Rightarrow CORPO
ROTATION CO



SOLZ.
GRAFICA



SOLZ. ANALIT.

$$\begin{cases} X: R_A \cos \varphi_A - R_{BT} = 0 \\ \gamma: R_A \sin \varphi_A - mg + R_{BN} = 0 \\ B \uparrow: mg \frac{\ell}{2} \cos \alpha - R_{AN} \ell \sin \alpha - R_{AT} \ell \cos \alpha = 0 \\ R_{AT} = f_A R_{AN} \end{cases}$$

$$\begin{cases} R_{AN} = \frac{mg}{(1 + f_A \tan \alpha)^2} \\ R_{BT} = R_{AN} \\ R_{BN} = mg \left(1 - \frac{f_A}{(1 + f_A \tan \alpha)^2} \right) \end{cases}$$

DCL DEF.

