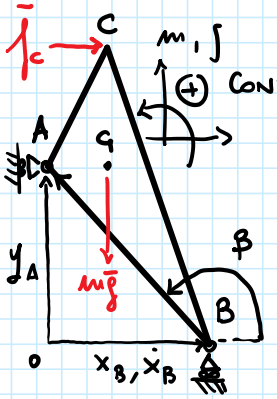


TROVARE $\bar{f}_c$ |
$\frac{d^2x_B}{dt^2} = 0 \ [m/s^2]$
$\bar{\Phi}_A, \bar{\Phi}_B$ REAZ. VINCOLARI

DATI
$(B-0) = x_B \bar{i} = 2{,}7\bar{i} \ [m]$
$(A-0) = y_A \bar{j}$
$|(A-B)| = L = 4 [m]$
$(G-B) = -1{,}7\bar{i} + 2{,}95\bar{j} \ [m]$
$(A-G) = -1\bar{i} \ [m]$
$(C-G) = 2\bar{j} \ [m]$
$\frac{dx_B}{dt} = 5 \ [m/s]$
$\bar{g} = -9{,}81\bar{j} \ [m/s^2]$
$\bar{f}_c = f_c\bar{j} \ [N]$
$J = 2 \ [kg\,m^2]$

CINEMATICA

POSIZIONE

Eq. di CHIUSURA $(A-0) = (B-0) + (A-B)$

TABELLA

	1.1	<
(A-0)	$y_A(t)$	cost.
(B-0)	$x_B(t)$	cost.
(A-B)	cost.	$\beta(t)$

$x_B(t)$ è NOTA
$y_A(t)$ e $\beta(t)$ sono INCOGNITE

$$y_A\bar{j} = x_B\bar{i} + L(\cos\beta\bar{i} + \sin\beta\bar{j})$$

$$\begin{cases} \bar{i}: & 0 = x_B + L\cos\beta \\ \bar{j}: & y_A = L\sin\beta \end{cases}$$

$\beta = \text{Arc}\cos\left(-\frac{x_B}{L}\right) = 2{,}31 \ rad$
$y_A = 2{,}95 \ m$

VELOCITÀ

$$\begin{cases} \bar{i}: & 0 = \dot{x}_B - L\sin\beta\dot{\beta} \\ \bar{j}: & \dot{y}_A = L\cos\beta\dot{\beta} \end{cases}$$

$\Rightarrow \dot{\beta} = \frac{\dot{x}_B}{L\sin\beta} = 1{,}7 \ \frac{rad}{s}$
$\dot{y}_A = -4{,}57 \ m/s$

ACCELERAZIONE

$$\begin{cases} \bar{i}: & 0 = \ddot{x}_B - L\cos\beta\dot{\beta}^2 - L\sin\beta\ddot{\beta} \\ \bar{j}: & \ddot{y}_A = -L\sin\beta\dot{\beta}^2 + L\cos\beta\ddot{\beta} \end{cases}$$

($\ddot{x}_B = 0$)

$\Rightarrow \ddot{\beta} = -\frac{\cos\beta\dot{\beta}^2}{\sin\beta} = 2{,}63 \ \frac{rad}{s^2}$
$\ddot{y}_A = -15{,}6 \ \frac{m}{s^2}$

$\bar{j}\left[\bar{y}_A\right] = -L\sin\beta\dot{\beta} + L\cos\beta\dot{\beta}$ $\quad y_A = -13{,}6\ \frac{m}{s^2}$

CALCOLO ANCHE $\bar{a}_G$ con RIVALS

$\bar{a}_G = \cancel{\bar{a}_B}^{=0} + \dot{\beta}\bar{u}\wedge(G-B) - \dot{\beta}^2(G-B)$

$= -2{,}87\,\bar{i} - 12{,}93\,\bar{j}\ \left[\frac{m}{s^2}\right]$ Provare a svolgerlo

DINAMICA

$\bar{R} = \Sigma_i \bar{f}_i$ ESTERNE

$\bar{M}_O^* = \Sigma_i \bar{M}_{O,i}^{EST} + \Sigma_i (P_i - G)\wedge \bar{f}_i^{EST}$

$\bar{R} + \bar{F}_{IN} = \bar{0}$ con $\bar{F}_{IN} = \Sigma_i \bar{f}_{IN_i}$

$\bar{M}_G + \bar{C}_{IN} = \bar{0}$ con $\bar{C}_{IN} = \Sigma_i (G-P_i)\wedge\bar{f}_{IN_i} + \Sigma_i J_i\bar{\ddot{\theta}}_i$

} EQUILIBRI DINAMICI

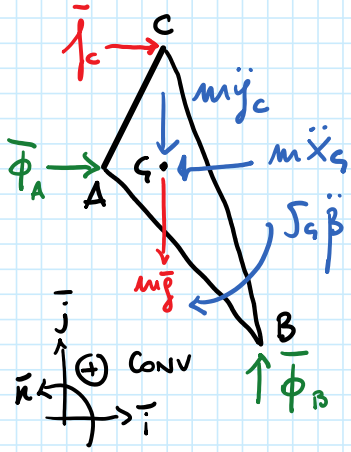
FORZE ESTERNE
- ATTIVE $\bar{f}_C$, $m\bar{g}$
- REATTIVE (VINCOLI CINEMATICI) $\bar{\Phi}_A$, $\bar{\Phi}_B$

FORZE INERZIA $= -m\bar{a}_G$

$-m\ddot{x}_G\bar{i} - m\ddot{y}_G\bar{j}$

COPPIE INERZIA

$-J_G\ddot{\beta}\bar{k}$



EQUILIBRI DINAMICI $\quad \bar{R} + \bar{F}_{IN} = 0 \ ; \ \bar{M}_G + \bar{M}_{IN} = 0$

Lungo $\bar{i}$ $\quad (f_C + \Phi_A - m\ddot{x}_G)\bar{i}$

Lungo $\bar{j}$ $\quad (-mg + \Phi_B - m\ddot{y}_G)\bar{j}$ $\Rightarrow$ $f_C + \Phi_A - m\ddot{x}_G = 0$; $-mg + \Phi_B - m\ddot{y}_G = 0$

Attorno a G

$(C-G)\wedge\bar{f}_C + (B-G)\bar{i}\wedge\bar{\Phi}_B\bar{j} - J_G\ddot{\beta}\bar{k} = 0$

$2\bar{j}\wedge f_C\bar{i} + 1{,}7\,\bar{i}\wedge\Phi_B\bar{j} - J_G\ddot{\beta}\bar{k} = 0$

$-2f_C\bar{k} + 1{,}7\,\Phi_B\bar{k} - J_G\ddot{\beta}\bar{k} = 0$

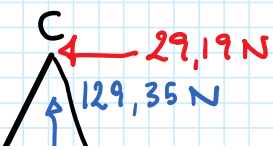
$-2f_C + 1{,}7\,\Phi_B - J_G\ddot{\beta} = 0$

$$\begin{cases} f_C + \Phi_A - m\ddot{x}_G = 0 \\ -mg + \Phi_B - m\ddot{y}_G = 0 \\ -2f_C + 1{,}7\,\Phi_B - J_B\ddot{\beta} = 0 \end{cases}$$

DALLA II $\rightarrow$ $\Phi_B = -31{,}25$ N

DALLA III $\rightarrow$ $f_C = -29{,}19$ N

DALLA I $\rightarrow$ $\Phi_A = 0{,}49$ N



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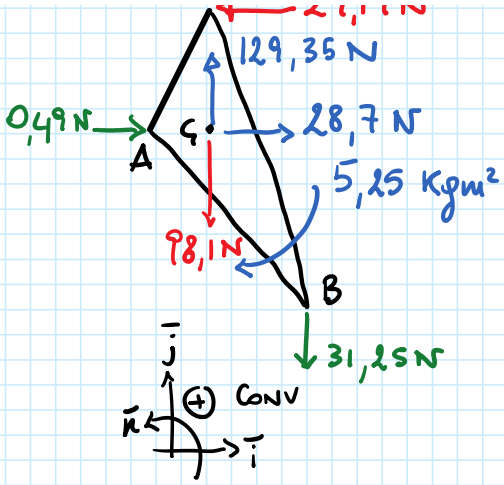
Ridisegno: vettori tenendo conto dei



Ridisegno: vettori tenendo conto dei segni.