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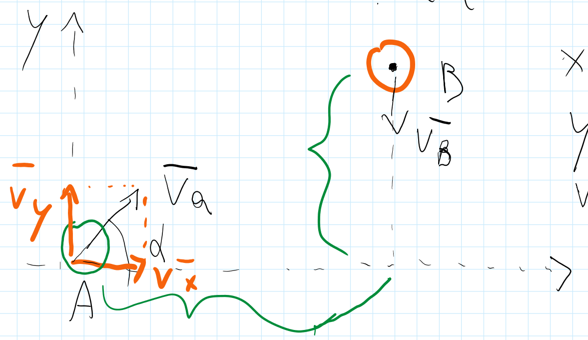


$x_B = 3\,m \qquad x_A = 0\,m$

$y_B = 2\,m \qquad y_A = 0\,m$

$V_a = 8\,m/s$

$$\tan(\alpha) = \frac{y_B}{x_B} \rightsquigarrow \alpha = \mathrm{atan}\left(\frac{y_B}{x_B}\right) = 33{,}69°$$

$\bar{V}_{A0x} = \bar{V}_a \cos\alpha = 6{,}66\,m/s \rightsquigarrow (6{,}6576)$

$\bar{V}_{A0y} = \bar{V}_a \sin\alpha = 4{,}44\,m/s \rightsquigarrow (4{,}4900)$

$\bar{V}_{B0x} = 0\,m/s$

$\bar{V}_{B0y} = 0\,m/s$

$$\left(\bar{v} = \frac{d\bar{r}}{dt} = \frac{d\theta}{dt} \ldots\ldots\right)$$

$x_B(t) = x_{0B} \qquad x_A(t) = V_{0x} \cdot t + \cancel{x_{0A}}$

$y_B(t) = y_{0B} + \frac{1}{2} a t^2 \qquad y_A(t) = \cancel{y_{0A}} + V_{A0y} \cdot t + \frac{1}{2} a \cdot t^2$

$a = -9{,}81\,m/s^2$

$\bar{g} = -9{,}81\,m/s^2$

$$\left(y_A(t) = V_{A0y} \cdot t - \frac{1}{2} g t^2\right)$$

SI TOCCANO $\rightsquigarrow x_A(t_0) = x_B(t_0)$ I)

$\rightsquigarrow y_A(t_0) = y_B(t_0)$ II)

I) $\underbrace{\cancel{x_{0A}} + V_{0Ax} \cdot t_0}_{x_A(t_0)} = \underbrace{x_B}_{x_B(t_0) = x_B(t)\ \forall t}$

$6.66 \cdot t_0 = 3 \rightsquigarrow t_0 = 0{,}45\,s \rightsquigarrow x_A(t_0) = x_B(t_0) = 3\,m$

II) $y_{0A} + V_{0Ay} \cdot t + \frac{1}{2} a t_0^2 = y_{0B} + \frac{1}{2} a t_0^2$

II) $$\underbrace{y_{0A} + v_{0Ay}(t + \frac{1}{2} a t_0}_{y_A(t_0)} = \underbrace{y_{0B} + \frac{1}{2} a t_0}_{y_B(t_0)}$$

$$\left(0 + 4,44 \cdot t_0 - \frac{1}{2} \cdot 9,81 \cdot t_0^2 = 2 - \frac{1}{2} \cdot 9,81 \cdot t_0^2\right)$$

Poichè ho già trovato t_0

$$y_A(t_0) = 4,44 \cdot 0,45 - \frac{1}{2} 9,81 \cdot 0,45^2 = 1 \, m$$

MA SI TOCCANO VERAMENTE? $\rightsquigarrow$ (ovvero per $t = t_0$ I) e II) sono verificate contemporaneamente)

II) è verificata per $t = t_0$ se si toccano

$$1 = 2 - \frac{1}{2} g t_0^2 \rightsquigarrow 1 = 1$$ ✓ VERIFICATO

$$\left(4,44 \cdot t_0 - \frac{1}{2} \cdot 9,81 \cdot t_0^2\right)$$

Si incontrano in $\boxed{y = 1 \, m \quad x = 3 \, m}$

Moto circolare

$R = 0,15 \, m$ $\quad \bar{v}(t_0) = 0 \, m/s$

$t_0 = 0 \, s$

$$a_n = 0,38 \cdot t^2 \; m/s^2$$

$$\left(\bar{a}_n = 0,38 \cdot t^2 \cdot \bar{u}_n \; m/s^2\right)$$

$$\bar{a}_n = \frac{(\bar{v})^2}{R} = \bar{\omega}^2 R \qquad \boxed{\bar{a}_T = \bar{\alpha} \cdot R = ?}$$

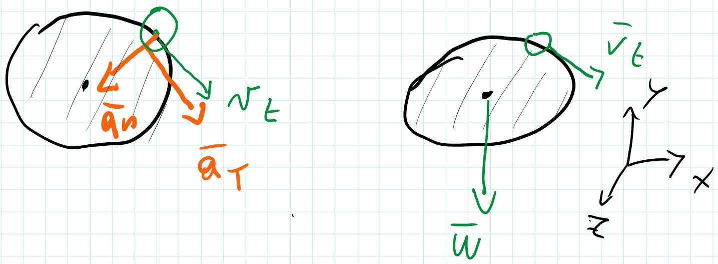
$$\rightarrow |\omega| = \sqrt{\frac{a_n}{R}} = \left(\frac{0,38 \, t^2}{0,15}\right)^{1/2} = 1,59 \cdot t \; \frac{rad}{s}$$

moto unif. acc.

$$\left(\bar{\alpha} = \frac{d\bar{\omega}}{dt}\right) \rightsquigarrow |\alpha| = 1,59 \; rad/s^2$$

$\left(\alpha = \frac{d\omega}{dt}\right) \rightsquigarrow |\alpha| = 1{,}59\ rad/s^2$

$a_T = \alpha \cdot R = 1{,}59 \cdot 0{,}15 = 0{,}24\ m/s^2$



V o F

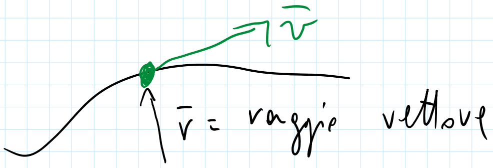
Moto circolare uniforme:

- velocità è costante F
- velocità angolare è costante V
- accelerazione SEMPRE nulla F

$\left(|a| = \sqrt{a_n^2 + a_T^2}\right)$

La velocità in un moto curvilineo è:

- $\perp$ alla traiettoria F



- si può scomporre in 2 comp:

I) comp. radiale $\perp$ $\bar{r}$ F
II) comp. trasversa // $\bar{r}$ F

$\left(\bar{r} \times \frac{d\bar{\theta}}{dt} = \bar{r} \times \bar{\omega} = \bar{v}_T \text{ // traiettoria} \quad \bar{v}_T \perp \bar{r}\right)$