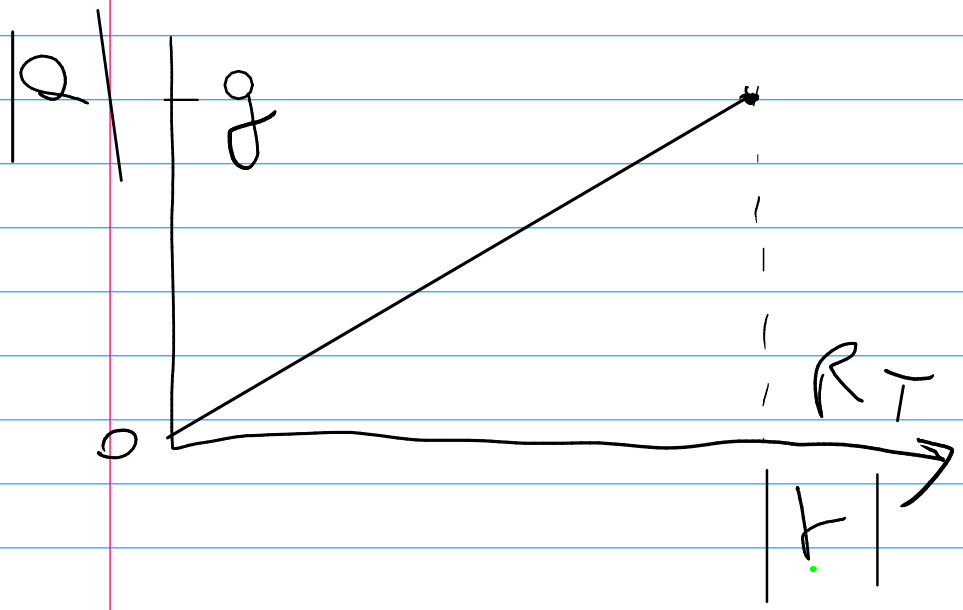
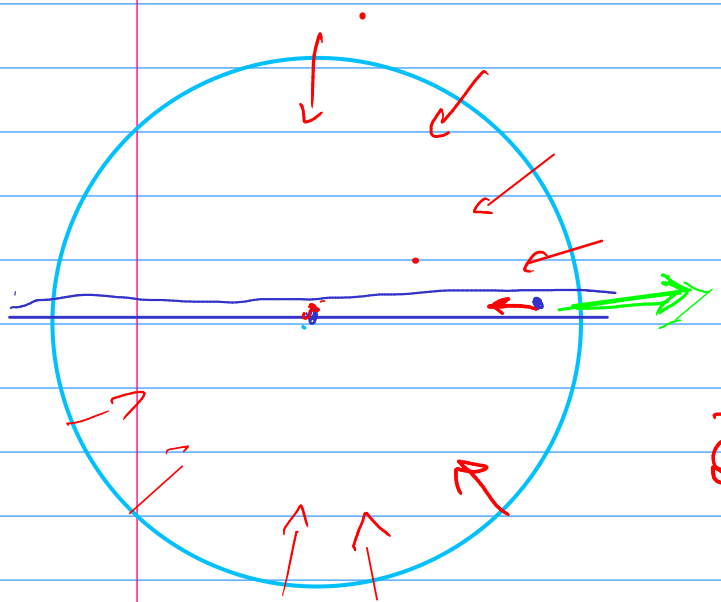
$$a = -\left(\begin{array}{c} ? \\ \circ \end{array}\right) r = -\frac{g}{R_T} r$$

$$0 \leq r \leq R_T$$

$$|a| \propto |r|$$





$$F(R_T) = -mg$$

$$\vec{a} = \frac{\vec{F}}{m}$$

$$a(R_T) = -g$$

$$9.8 \frac{m/s}{s}$$

2

$$\frac{d^2r}{dt^2} = -\omega^2 r \Rightarrow r = X\cos(\omega t + \varphi)$$

$t=0 \rightarrow r = R_T$

$\rightarrow v = 0 \Rightarrow$ si lascia cadere!

$t=0$

$$r(0) = R_T = X\cos(\varphi)$$

$$v = \frac{d}{dt} X\cdot\cos(\omega t + \varphi) = -\omega X \sin\varphi = 0$$

$\rightarrow \varphi = 0$

$\hookrightarrow R_T = X\cdot\cos(0)$

$X = R_T$

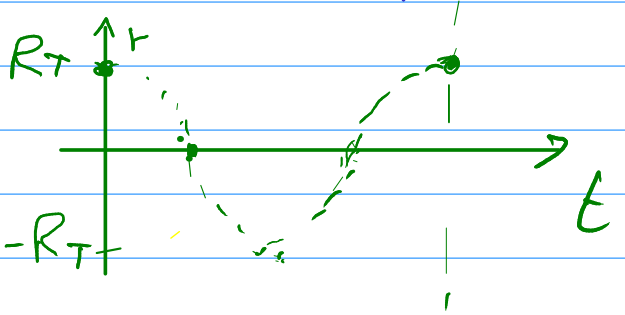
$$\boxed{r(t) = R_T\cos(\omega t)}$$

$t = 0 \rightarrow R_T$

$\omega t = \pi/2 \rightarrow 0$

$\omega t = \pi \rightarrow -R_T$

$\omega t = 3/2\pi \rightarrow 0$



$\omega \cdot t = 2\pi$

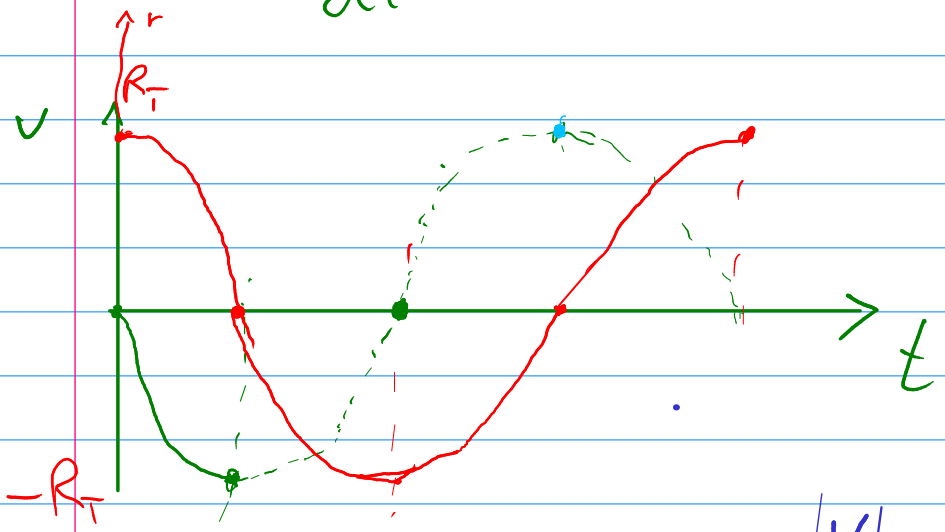
$$\omega \cdot T = 2\pi$$

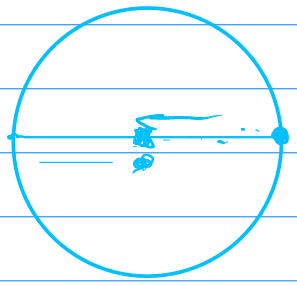
$$\omega = \sqrt{g/R_T}$$

$$T = \frac{2\pi}{\omega}$$

$$v(t) = \frac{dr}{dt} = -\omega R_T \sin(\omega t)$$

$$a(t) = \frac{dv}{dt} = -\omega^2 R_T \cos(\omega t)$$





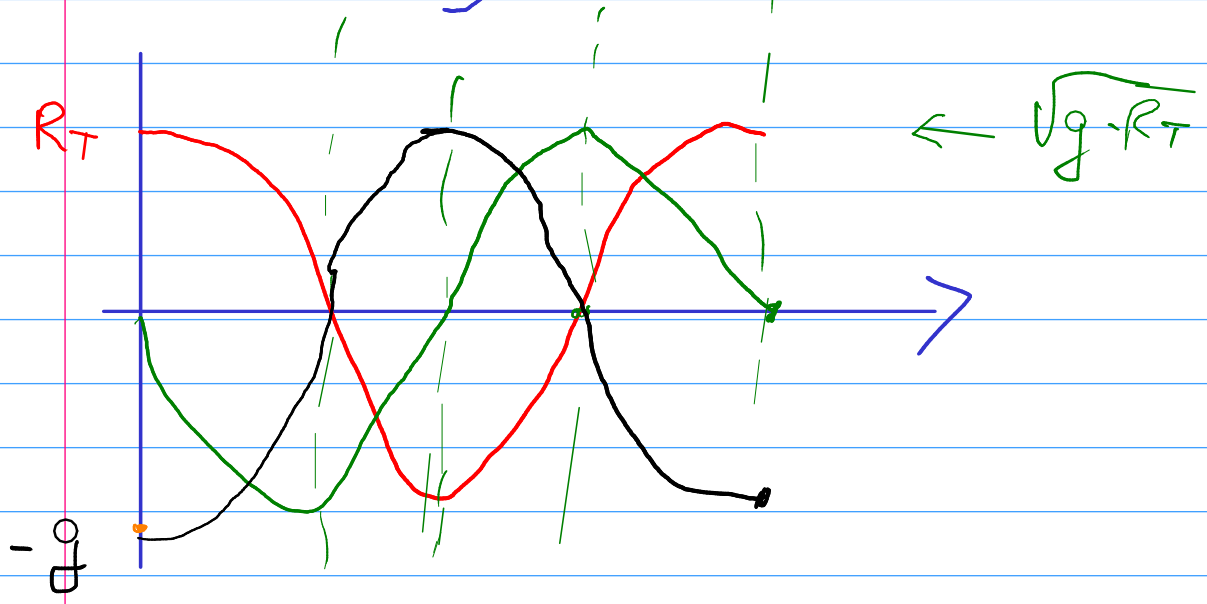
$$\omega t = \pi/2 \rightarrow t = \frac{\pi}{2\omega}$$

$$|v|_{max} = \omega R_T = \sqrt{g/R_T} \cdot R_T = \sqrt{\frac{g}{R_T} R_T^2} = \sqrt{g \cdot R_T}$$

6.37.2 6.4

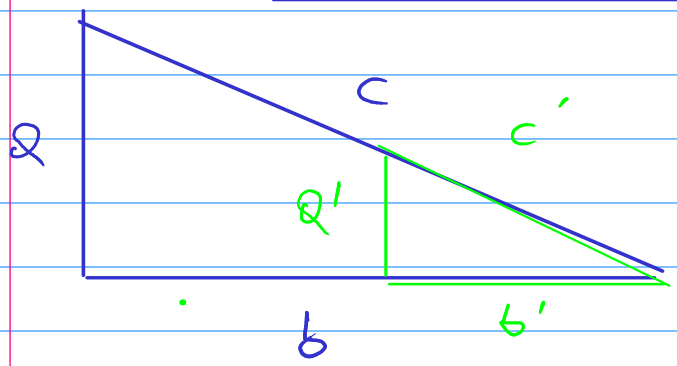
$$\sqrt{9.8 \frac{m}{s^2} \times 6.4 \times 10^3 \times 10^3 \, m}$$

$8 \times 10^3 \frac{m}{s} \rightarrow \approx 8000 \frac{m}{s}$ 8 km/s

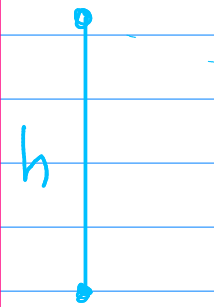


$\Rightarrow$ Oscillazione armonica

$\rightarrow$ oscillatore armonico



$$\frac{Q'}{Q} = \frac{b'}{b} = \frac{c'}{c}$$



$$\frac{h}{h'} = \frac{d}{d'}$$

$\leftarrow$ d

$$h = \frac{d}{d'} \cdot h'$$

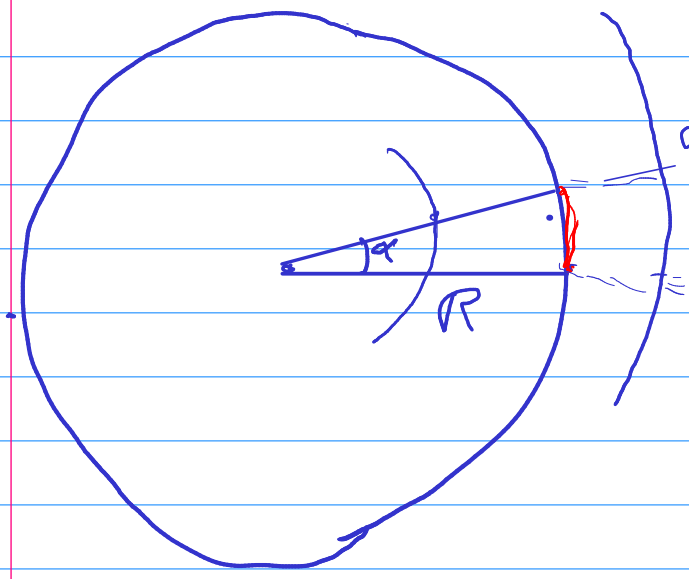
- $\sin\alpha = \frac{\text{cateto oposto}}{\text{hipotenusa}}$

- $\cos\alpha = \frac{\text{cateto adjacente}}{\text{hipotenusa}}$

- $\operatorname{tg}\alpha = \frac{\text{cateto oposto}}{\text{cateto adjacente}}$

$= \left(\frac{h'}{d'}\right) - d$

$\operatorname{tg}\alpha$

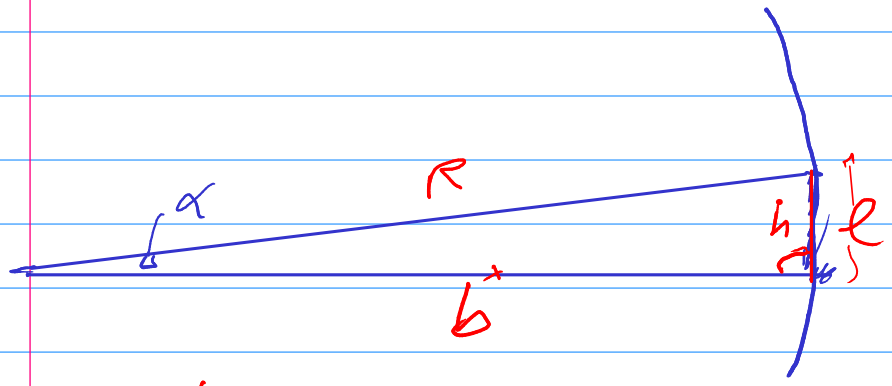


$\alpha = \frac{\text{arco}}{R}$ (radianos)

→ adimensional

→ ângulo giro: $\frac{2\pi R}{R}$

$= 2\pi$ ✓



- $\sin\alpha = \frac{h}{R}$
- $\cos\alpha = \frac{b}{R}$
- $\operatorname{tg}\alpha = \frac{h}{b}$

$\alpha = \ell/R$

$\alpha \ll 1$ (rad)

$h \approx \ell$

$\alpha << 1$ $\quad \sin\alpha \simeq \tan\alpha \simeq \alpha$

$\alpha_r = \alpha_g \times \frac{\pi}{180}$

$\alpha_g = \alpha_r \times \frac{180}{\pi}$

$\sim 150\,10^6$ km

Sole $\quad d_\alpha = \frac{D}{d_{T-S}} \simeq \frac{1}{2}^\circ \simeq 0{,}5^\circ$

Lune $\quad d_\alpha = \frac{D_L}{d_{T-L}} \simeq$

$d_\alpha^{(sole)} \simeq d_\alpha^{(lune)} \simeq 0{,}5^\circ$

$\simeq 30'$