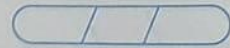


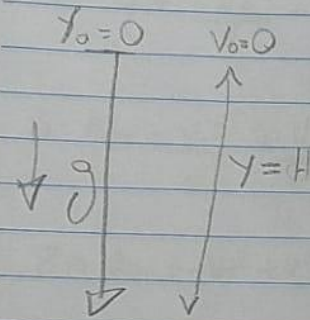
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Aula 21/02/2022 - Tempo de Parada

Queda livre $y = y_0 + v_0 t + \frac{1}{2} a t^2$



$$H = 0 + 0 \cdot t + \frac{1}{2} g \cdot t^2$$

$$H = \frac{1}{2} g t^2 \quad V = 60 \text{ km/h} =$$

$$g = 9,8 \text{ m/s}^2$$

$$t^R = \sqrt{\frac{2H}{g}}$$

$$V = \frac{dR}{dt} = dR = V \cdot t^R$$

$$dR = 60 \cdot 0,17 = 2,822$$

Aula 07/03/2022 - Equações do movimento com cte

$$* a = \frac{dv}{dt} \Rightarrow dv = a \cdot dt \Rightarrow \int dv = \int a \cdot dt$$

$a = \text{constante}$

$$\int dv = a \cdot \int dt \Rightarrow v(t) = a \cdot t + C$$

$$C = v_0 \quad v(t) = v_0 + a \cdot t \quad (1)$$

$$v = \frac{dx}{dt} \Rightarrow \int dx = \int v(t) \cdot dt$$

$$x(t) = \int (v_0 + a \cdot t) dt = \int v_0 dt + \int a \cdot t dt$$

$$x(t) = v_0 \cdot \int dt + a \cdot \int t \cdot dt$$

$$x(t) = v_0 \cdot t + a \cdot \frac{t^2}{2} + C$$

$$\bullet \text{ C.C. : } t=0 \Rightarrow x(t=0) = x=0$$

$$x_0 = v_0 \cdot 0 + a \cdot \frac{0^2}{2} + C \Rightarrow \boxed{C = x_0}$$

$$x(t) = x_0 + v_0 \cdot t + \frac{1}{2} a \cdot t^2 \quad (2)$$

$$\bullet v^2 = v_0^2 + 2a \cdot \Delta x \quad (3)$$

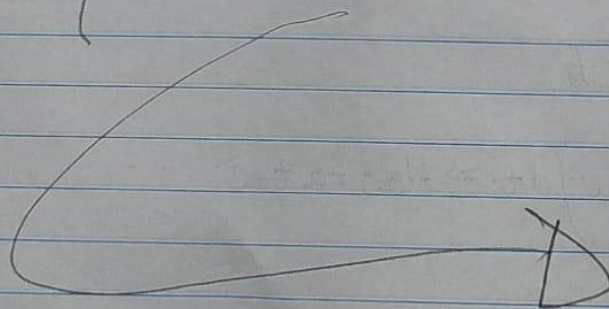
$$(1) \rightarrow (2):$$

$$v - v_0 = a \cdot t$$

$$t = \frac{v - v_0}{a}$$

$$(4) \rightarrow (2): x - x_0 = v_0 \cdot \left(\frac{v - v_0}{a} \right) + \frac{1}{2} a \cdot \left(\frac{v - v_0}{a} \right)^2$$

$$\Delta x = \frac{v \cdot v_0 - v_0^2}{a} + \frac{1}{2} a \cdot \frac{(v^2 - 2v \cdot v_0 + v_0^2)}{a^2}$$



$$\Delta x = \frac{v_0 v_0}{a} - \frac{v_0^2}{a} + \frac{v^2}{2 \cdot a} - \frac{v_0 v_0}{a} + \frac{v_0^2}{2 \cdot a}$$

$$a \cdot \Delta x = \frac{v_0^2}{2} - \frac{v_0^2}{2} + \frac{v^2}{2}$$

$$a \cdot \Delta x = \frac{v_0^2}{2} + \frac{v^2}{2}$$

$$2a \Delta x = -v_0^2 + v^2$$

$$v_0^2 + 2a \Delta x = v^2$$

$$v^2 = v_0^2 + 2 \cdot a \Delta x$$

2ª Lei de Newton

$$\vec{F}_{\text{Res}} = m \cdot \vec{a}$$

$$\vec{F}_{\text{Res}} = \frac{d\vec{P}}{dt} = \frac{d}{dt} (m \cdot \vec{v})$$

$$\vec{F}_{\text{Res}} = m \cdot \left(\frac{d\vec{v}}{dt} \right)^a = m \cdot \vec{a}$$

$$\vec{F}_g = m \vec{g}$$

$$P = m \cdot g$$

Tração, Tensão