

Es. 9

$$X_H = V_H \cdot t$$

$$X_R = d_{RH} - V_R \cdot t$$

PUNTO D'INCONTRO  $X_I = X_R = X_H$ 

$$X_I = V_H \cdot t \Rightarrow t = \frac{X_I}{V_H}$$

$$X_I = d_{RH} - V_R \cdot \frac{X_I}{V_H} \Rightarrow X_I \left( 1 + \frac{V_R}{V_H} \right) = d_{RH} \Rightarrow$$

$$\Rightarrow X_I = d_{RH} \frac{V_H}{V_H + V_R}$$

Es. 10

$$S = S_0 + V_0 \cdot t + \frac{1}{2} a t^2$$

$$L = v_0 \cdot t + \frac{1}{2} a t^2 \Rightarrow a t^2 + 2v_0 t - 2L = 0$$

$$t = \frac{-2v_0 \pm \sqrt{4v_0^2 + 8L}}{2a} = \frac{-v_0 \pm \sqrt{v_0^2 + 2L}}{a}$$

$$t = \frac{\sqrt{v_0^2 + 2L} - v_0}{a}$$

$$\sqrt{v} = v_0 + a t = \sqrt{v_0^2 + 2L} - v_0 + v_0$$

Es. 11

$$X_C = v_0 \cdot t + d$$

$$X_H = \frac{1}{2} a t^2$$

$$X_C(t_S) = X_H(t_S) = X_S$$

$$\frac{1}{2} a t^2 = v_0 t + d$$

$$e t^2 - 2v_0 t + 2d = 0$$

$$t = \frac{v_0 \pm \sqrt{v_0^2 + 2d \cdot a}}{a}$$

$$t = \frac{v_0 + \sqrt{v_0^2 + 2d \cdot a}}{a}$$

$$t = \frac{v_0 - \sqrt{v_0^2 + 2d \cdot a}}{a} \quad \text{Non AC}$$

Es. 12

$$Y_B = h - \frac{1}{2} g t^2$$

$$Y_A = v_A t - \frac{1}{2} g t^2$$

$$Y_A = Y_B = 0$$

$$t = \sqrt{\frac{2h}{g}}, \quad t = \frac{2v_A}{g}$$

$$\Rightarrow v_A = \frac{g}{2} \sqrt{\frac{2h}{g}} = \sqrt{\frac{gh}{2}}$$

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$$v_A = 0$$

$$v_A = v_{A0} - g \cdot t$$

$$v_A = 0 \quad t = \frac{v_{A0}}{g}$$

$$y_B = h - \frac{1}{2} g \left( \frac{v_{A0}}{g} \right)^2$$

$$y_B = h - \frac{1}{2} g \frac{h}{g} = \frac{3}{4} h$$

$$x = v_{0x} \cdot t$$

$$y = v_{0y} \cdot t - \frac{1}{2} g t^2$$

$$y = 0$$

$$t = \frac{2v_{0y}}{g}$$

$$x_{\text{crit.}} = \frac{2v_{0x} v_{0y}}{g} = \frac{2|v_0|^2 \sin \alpha \cos \alpha}{g} = \frac{|v_0|^2 \sin 2\alpha}{g}$$

$$2\varphi = \pi \quad \varphi = \frac{\pi}{2}$$

$$v_{y \text{ MAX}} \Rightarrow v_y = 0$$

$$v_y = v_{0y} - g \cdot t \quad t = \frac{v_{0y}}{g}$$

$$x_{(y \text{ MAX})} = \frac{v_{0x} v_{0y}}{g} = \frac{|v_0|^2 \sin \alpha \cos \alpha}{g}$$

$$v_x = v_{0x}$$

$$v_y = v_{0y} - g \cdot t$$

$$v_{0x} = |v_0| \cos \alpha$$

$$v_{0y} = |v_0| \sin \alpha$$

$$y_{\text{MAX}} = \frac{v_{0y}^2}{2g} - \frac{1}{2} g \left( \frac{v_{0y}}{g} \right)^2$$

$$= \frac{v_{0y}^2}{2g}$$

$$y_{\text{MAX}} = \frac{|v_0|^2 \sin^2 \alpha}{2g}$$

$$v_y = v_{oy} - \frac{1}{2} v_{oy} = -\frac{1}{2} v_{oy}$$

$$\vec{v}_G = (v_{ox}, -v_{oy})$$

CAVISTRO  
C(L, h)

$$|v_0|^2 = \frac{2h \rho}{\sin^2 \theta}$$

$$|v_0| = \frac{\sqrt{2h \rho}}{\sin \theta}$$

$$L = v_{ox} \cdot t = \frac{L}{v_{ox}}$$

$$h = v_{oy} \cdot \frac{L}{v_{ox}} = \frac{1}{2} \frac{L^2}{v_{ox}^2}$$

$$h = \frac{v_{oy} L}{v_{ox}} = \frac{1}{2} \frac{L^2}{v_{ox}^2}$$

$$v_{oy} = \frac{v_{ox} h}{L} + \frac{1}{2} \frac{L}{v_{ox}}$$

$$v_{oy} = \frac{v_{ox} h}{L} + \frac{1}{2} \frac{L}{v_{ox}}$$

$$|v_0| = |v_{ox}| \frac{h}{L} + \frac{1}{2} \frac{L}{|v_0| \sin \theta}$$

$$t = \frac{L}{v_{ox}}$$

$$h = \frac{v_{oy} L}{v_{ox}} = \frac{1}{2} \frac{L^2}{v_{ox}^2}$$

$$h = \frac{v_{oy} L}{v_{ox}} = \frac{1}{2} \frac{L^2}{v_{ox}^2 \cos^2 \theta}$$

$$\frac{1}{2} \frac{L^2}{v_{ox}^2} \cos^2 \theta = h - \frac{v_{oy} L}{v_{ox}}$$

$$\frac{1}{2} \frac{L^2}{v_{ox}^2} = \frac{2 \cos^2 \theta (h - \frac{v_{oy} L}{v_{ox}})}{L^2} = \frac{2 \cos^2 \theta (h - \frac{v_{oy} L}{v_{ox}})}{L^2}$$

$$\frac{1}{2} \frac{L^2}{v_{ox}^2} = \frac{2 \cos^2 \theta (h - \frac{v_{oy} L}{v_{ox}})}{L^2}$$

$$\frac{1}{2} \left( \frac{2 \cos^2 \theta (h - \frac{v_{oy} L}{v_{ox}})}{L^2} \right) = \frac{1}{2} \frac{L^2}{v_{ox}^2}$$



$$L = v_{ox} t$$

$$h = v_{oy} t - \frac{1}{2} g t^2$$

$$y = \frac{v_{oy}}{v_{ox}} x - \frac{1}{2} g \frac{x^2}{v_{ox}^2}$$

$$h = \frac{v_{oy}}{v_{ox}} L - \frac{1}{2} g \frac{L^2}{v_{ox}^2}$$

$$|v_{01}| = L \sqrt{\frac{g}{2(L \sin \theta - h \cos^2 \theta)}}$$