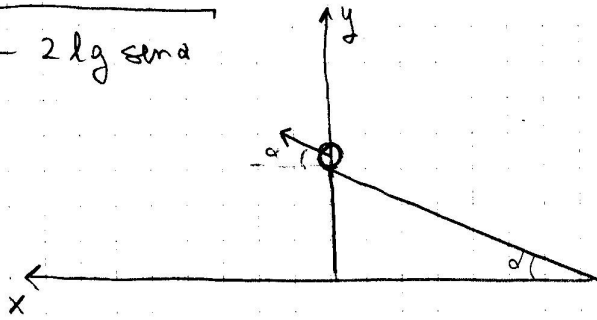


$$v_1 = \sqrt{v_0^2 - 2lg \sin \alpha}$$

Adesso



$$\begin{cases} x(t) = v_1 \cos \alpha \, t \\ y(t) = l \sin \alpha + v_1 \sin \alpha \, t - \frac{1}{2} g t^2 \end{cases}$$

$$y(t) = 0 \Rightarrow l \sin \alpha + v_1 \sin \alpha \, t - \frac{1}{2} g t^2 = 0$$

$$g t^2 - 2 v_1 \sin \alpha \, t - 2l = 0 \quad \text{unico segno possibile, perché } t > 0!$$

$$t = \frac{v_1 \sin \alpha \pm \sqrt{v_1^2 \sin^2 \alpha + 2lg}}{g}$$

$$\Rightarrow x = v_1 \cos \alpha \, \frac{v_1 \sin \alpha}{g} \left(1 + \sqrt{1 + \frac{2lg}{v_1^2 \sin^2 \alpha}} \right)$$

$$x = v_1^2 \frac{\cos \alpha \sin \alpha}{g} \left(1 + \sqrt{1 + \frac{2lg}{v_1^2 \sin^2 \alpha}} \right)$$