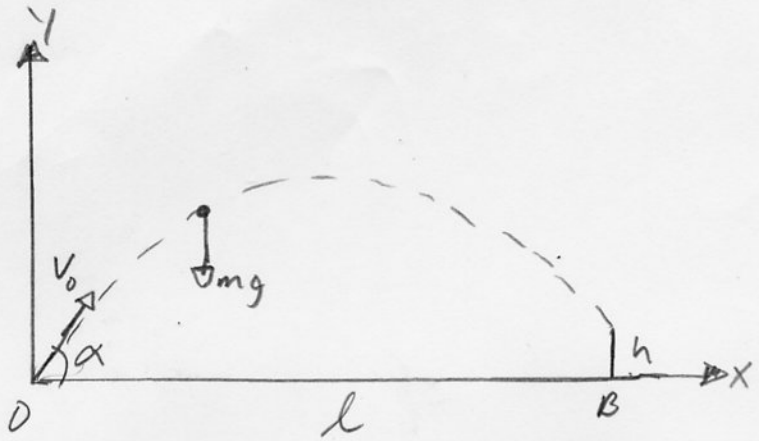
8.20)



$$\bar{F} = m\bar{a}$$

X

$$m\ddot{x} = 0$$

$$\ddot{x} = 0$$

$$\dot{x} = \text{konst} = V_0 \cos\alpha$$

$$x = V_0 t \cos\alpha + \underbrace{\text{konst}}_{=0}$$

$$t_l = \frac{l}{V_0 \cos\alpha} \Longrightarrow$$

Y

$$m\ddot{y} = -mg$$

$$\ddot{y} = -g$$

$$\dot{y} = -gt + \text{konst} = V_0 \sin\alpha - gt$$

$$y = V_0 t \sin\alpha - g\frac{t^2}{2} + \underbrace{\text{konst}}_{=0}$$

$$h = V_0 \frac{l \sin\alpha}{V_0 \cos\alpha} - g\frac{l^2}{2V_0^2 \cos^2\alpha}$$

$$h = l\frac{\sin\alpha}{\cos\alpha} - \frac{gl^2}{2V_0^2}\frac{\sin^2\alpha + \cos^2\alpha}{\cos^2\alpha}$$

$$h = l\frac{\sin\alpha}{\cos\alpha} - \frac{gl^2}{2V_0^2}\frac{\sin^2\alpha}{\cos^2\alpha} - \frac{gl^2}{2V_0^2}$$

$$\frac{gl^2}{2V_0^2}\tan^2\alpha - l\tan\alpha + h + \frac{gl^2}{2V_0^2} = 0$$

$$\tan^2\alpha - \frac{2V_0^2}{gl}\tan\alpha + \frac{2V_0^2}{gl^2}\left(h + \frac{gl^2}{2V_0^2}\right)$$

$$\boxed{\tan\alpha = \frac{V_0^2}{gl} \pm \sqrt{\left(\frac{V_0^2}{gl}\right)^2 - \frac{2V_0^2 h}{gl^2} - 1}}$$

GK