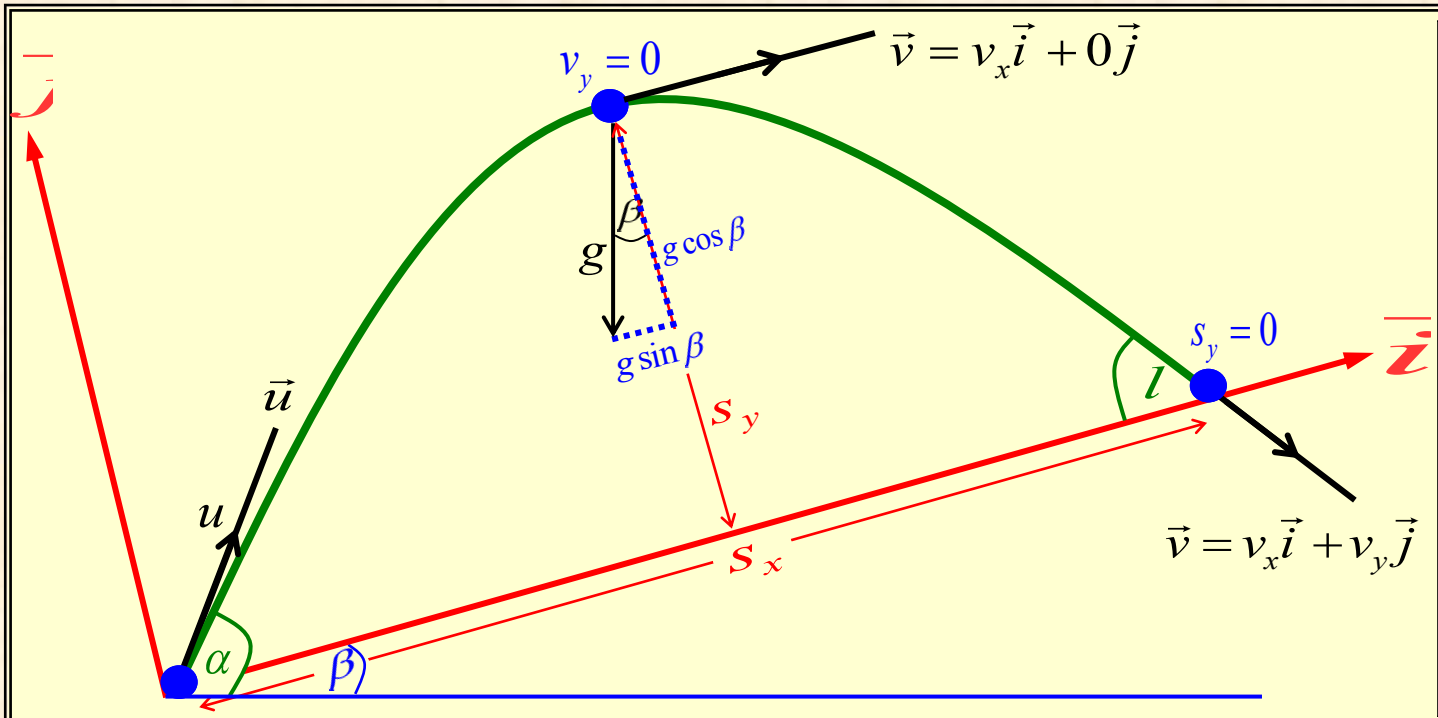
PROJECTILES UP/DOWN AN INCLINED PLANE



Equations ↑ an inclined plane :

$u_x = u\cos\ \alpha - \beta$ $\quad u_y = u\sin\ \alpha - \beta$

$v_x = u_x - g(\sin\beta)t$ $\quad v_y = u_y - g(\cos\beta)t$

$s_x = u_x t - \frac{1}{2}g(\sin\beta)t^2$ $\quad s_y = u_y t - \frac{1}{2}g(\cos\beta)t^2$

Equations ↓ an inclined plane :

$u_x = u\cos\ \alpha - \beta$ $\quad u_y = u\sin\ \alpha - \beta$

$v_x = u_x + g(\sin\beta)t$ $\quad v_y = u_y - g(\cos\beta)t$

$s_x = u_x t + \frac{1}{2}g(\sin\beta)t^2$ $\quad s_y = u_y t - \frac{1}{2}g(\cos\beta)t^2$

Initial velocity vector : $\vec{u} = u\cos\ \alpha - \beta\ \vec{i} + u\sin\ \alpha - \beta\ \vec{j}$

Note : Range, maximum height, position vector and the velocity vector are calculated using the same conditions as with projectiles on a horizontal plane.

Landing angle, l : $\tan l = \left|\frac{v_y}{v_x}\right| = -\frac{v_y}{v_x}$ when $s_y = 0$

- If the projectile lands **perpendicular** to the inclined plane $\Rightarrow$ $v_x = 0$ when $s_y = 0$
- If the projectile lands **horizontally** to the inclined plane $\Rightarrow$ $\tan l = \tan\beta$