

3.PROJECTILE MOTION & VECTORS

Time of flight : $T = \frac{2u \sin \theta}{g}$

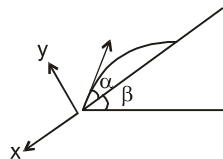
Horizontal range : $R = \frac{u^2 \sin 2\theta}{g}$

Maximum height : $H = \frac{u^2 \sin^2 \theta}{2g}$

Trajectory equation (equation of path) :

$$y = x \tan \theta - \frac{gx^2}{2u^2 \cos^2 \theta} = x \tan \theta \left(1 - \frac{x}{R}\right)$$

Projection on an inclined plane



Range	Up the Incline	Down the Incline
	$\frac{2u^2 \sin \alpha \cos(\alpha + \beta)}{g \cos^2 \beta}$	$\frac{2u^2 \sin \alpha \cos(\alpha - \beta)}{g \cos^2 \beta}$
Time of flight	$\frac{2u \sin \alpha}{g \cos \beta}$	$\frac{2u \sin \alpha}{g \cos \beta}$
Angle of projection with incline plane for maximum range	$\frac{\pi}{4} - \frac{\beta}{2}$	$\frac{\pi}{4} + \frac{\beta}{2}$
Maximum Range	$\frac{u^2}{g(1 + \sin \beta)}$	$\frac{u^2}{g(1 - \sin \beta)}$