

# Projectile Motion Simulator

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## Description:

This Python script simulates projectile motion using *NumPy*, accepts command-line inputs for velocity (`--velocity`), angle (`--angle`), and time increments (`--timeplots`), plots the trajectory with *Matplotlib*, and logs steps to `projectile_motion.log`

## Kinematic Equations:

This simulation uses the following equations:

$$x(t) = v_0 \cos(\theta)t \tag{1}$$

$$y(t) = v_0 \sin(\theta)t - \frac{1}{2}gt^2 \tag{2}$$

where  $v_0$  is initial velocity (m/s),  $\theta$  is launch angle (degrees),  $g = 9.81 \text{ m/s}^2$  is gravity, and  $t$  is time (s).

## Usage:

Run with defaults: `python(3) projectile.py --velocity 15 --angle 30 --timeplots 100`.