Lab 2 (Projectile motion)
Simulation and Modeling (CSCI 3010U)

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Introduction

The goal of this lab is to simulate a 2D projectile simulation. You are asked to use these simulations to determine the angle at which the ball must be thrown to achieve the largest distance r.
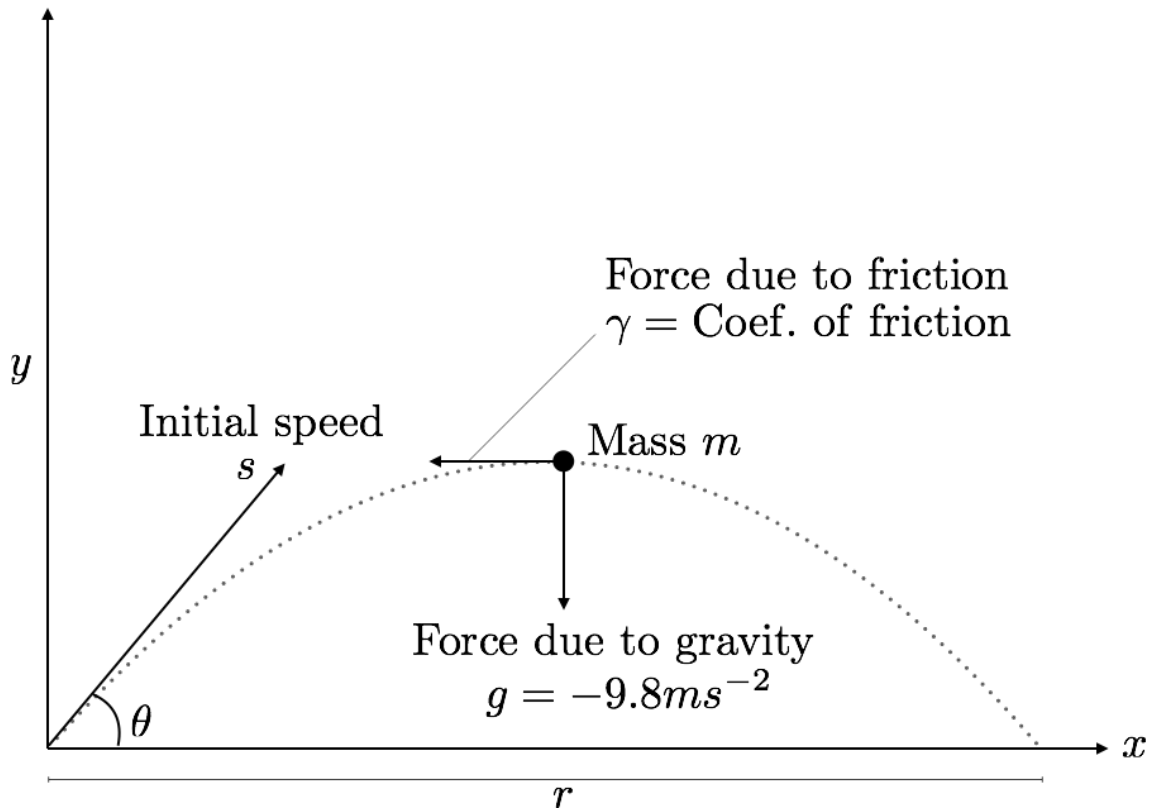

Figure 1: 2D projectile

Projectile of mass m is thrown with an initial speed s at an angle θ. Mass m moves in a 2D plane under the influence of gravity (along the negative y-axis) and friction which is proportional to the current speed and acts against the direction of motion. The constant of proportionality is given by the *coefficient of friction*.

Task

Complete the following table:

Angle	Initial Velocity: 50	Initial Speed: 60	Initial Speed: 70
15 Degree			
30 Degree			
45 Degree			
60 Degree			
75 Degreee			
90 Degree			
Write down angle corresponding to the largest r			

For these experiments, we assume the following:

- Initial position of the ball is $(0, 0)$
- Coefficient of friction is 0.0001
- Mass is 1.0

Submission

Via Blackboard.

- File `2d-projectile-simulation.py`
- Table `2d-projectile-table.pdf`