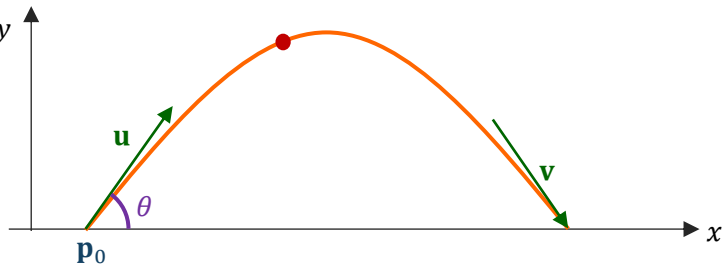
COMP270
Mathematics for 3D Worlds and Simulations

Week 4 Seminar: Newtonian Mechanics

For the following exercises, unless otherwise stated, assume that the acceleration due to gravity is 9.81m/s^2 acting in the negative y direction (with the y-axis pointing upwards), and there is no air resistance or other force acting on the objects.

Diagram of a general projectile motion set-up



1. A ball is thrown from ground level so that it just clears a wall that is 3m high. If the initial speed of the ball is 20m/s, find the angle of projection.
2. A ball is thrown vertically upwards with a speed of 21m/s.
    a. In which direction is the ball travelling after 3 seconds?
    b. What is the total distance it has travelled in this time?
3. A stone is thrown vertically upwards with a speed of 7m/s, and one second later, a second stone is thrown vertically upwards from the same point with the same speed.
   Find the height at which the two stones collide.