Python H.w.4

(Due day: 12/16)

Suppose one end of a uniform rod with length L = 0.3 m is pivoted against a wall and the other end is suspended by a rope from the ceiling, as shown in the figure below. Note that you could ignore the air drag, friction, etc.

(a) How long does it take for the rod to hit the wall, i.e. for the rod to rotate 90°?

(b) A ball is released from the height equal to the length of the rod L at the same time. Compare the time needed for the ball to reach the ground with your previous answer in (a), will the ball or the end of the rod hit the ground first? What is the ratio between them? Here, we also assume the rod is pivoted above the ground with height L.

(c) Following the above question, does the rod of the length L affect the ratio?

(d) Plot a figure to show the vertical trajectories of the ball and the end of the rod as a function of time, respectively. You should be able to compare their trajectories to give you a better understanding of their motions.