Objective: To develop a theoretical model and compare it to the physical system

Text Reference: APP H.1, p 468-469

Measurements:

In the procedure outlined in the text, it’s necessary to launch the ball a number of times for different release angles. For this version of the lab instead of launching the ball to some arbitrary position, it will be necessary to get the ball inside one of three holes. A diagram of the experimental setup is provided below. Three holes are present, each with decreasing inlet diameter and farther from the pendulum itself. There is a point system associated with these holes, with the farthest hole being worth one point (with a diameter of 2”, height=6.75”), middle being 2 (D=3”, H=7”) the closest 3 (D=4.25”, H=7”) and missing the holes all together being worth 4. **TO BE ABLE TO CONDUCT THIS LAB YOU MUST HAVE A PLOT OF HORIZONTAL DISTANCE VS. LAUNCH ANGLE GENERATED PRIOR TO COMING TO THE LAB. BRING IT WITH YOU TO LAB.** Each team will get 9 attempts, and the team with the overall lowest score will receive 5 extra bonus points for the assignment. The horizontal distance for each team will be different depending on the number of teams which choose to do this lab and will be assigned to each team the day before they are to run their lab.

![Figure 1. Experimental Setup](image-url)
Point Breakdown

Horizontal Distance (x) vs. Launch angle plot (20 pts.): Although this is only 20 pts on the overall grade, each team must submit a plot before running the experiment or that team will not be allowed to run. If a team comes to lab not prepared, 10 pts. will be deducted from their overall grade and they will have to reschedule another time.

Analysis (35 pts.): The objective of this lab is to compare the theoretical data (Horizontal Distance vs Launch angle plot) vs. the actual data taken during experimentation. Analyze the uncertainty of your model using your experiences from your previous schooling. You can use the uncertainty ideas presented in Chapter 9, but it is not necessary for this experiment. Does your model accurately model the physical system? Why or why not? You must provide a plausible, scientifically based idea backed up by some estimates.

Data (30 pts): An ORGANIZED presentation of the distance data which you took during the experimentation. A printout of an excel spreadsheet is encouraged with data accurately titled with headings.

Bonus points (5 pts): The team with the lowest score will receive 5 extra bonus points added to whatever grade they receive.

Honor System: I will not be present for every single run. Any false reporting of data will be considered cheating and subject to the course and University honesty policy.