

Physical Pendulum Lab

Procedure

Briefly, but completely, describe the procedure for this lab – and include a labeled sketch.

Data

r_{top}	r_{bot}	r	d	ω	T

Graphs

Using appropriate scales, labels and units, graph a linear graph with T^2 on the y-axis. Draw the best fits line of your graph.

Questions

- 1) Assume each of the sliding masses has a mass M . Let the radius, r , be the distance from the center of mass to either sliding mass. Let the d be the distance from the center of mass to the pivot point. Find the moment of inertia for the pendulum with reference to the center of rotation in terms of these variables. Show your work or state which physics principle(s) you used to find this result.
- 2) Derive a formula for the period of the pendulum in terms of r , d , and fundamental constants. Draw a labeled sketch of the pendulum and show your work.
- 3) Use your answer above to develop a linear relationship between T^2 and r & d . Use your values for r_{top} and r_{bot} to find r and d . Then use ω to find T . Complete your data table and show one example of each of your calculations. Utilize these values to make your linear graph.
- 4) Find the equation of your best-fits line. Show your work.
- 5) Use your answer to (3) to find the accepted value for the slope of your graph. Find the percent error between this value and the actual slope of your best-fits line.

Error Analysis

Thoroughly explain what the main sources of error are for this lab, and how you would correct them.

