Lab 5: Rotational Motion

1   Assignment

At your lab station, you should have three shapes: a circle, a pentagon, and an L. The moment of inertia about the center of mass of the L shape is known to be $I_{L,cm} = (9.7 \pm 0.7) \times 10^{-4} \ kg \cdot m^2$. You also have a mass set at your station. The moment of inertia about the center of mass of the 20 g mass is $(1.32 \pm 0.05) \times 10^{-6} \ kg \cdot m^2$.

Based on this information, your team is tasked with:

1. confirming that angular momentum is conserved. By rotating the L shape and carefully dropping the 20 g mass onto the L shape, the angular momentum *before* the drop can be compared to the angular momentum *after* the drop.

2. finding the moments of inertia about the centers of mass for the circular shape and the pentagonal shape.

2   Deliverables

For your lab report, 10% of the grade will be for following the guidelines in the lab report template. Another 10% will be allocated for the Abstract and Introduction of your report. The remaining percentage will be based on your inclusion of:

1. *[15%]* a description of the procedure your team used to find the center of mass of each object

- for assignment 1:

2. *[20%]* a plot showing the angular momentum of the L shape and 20 g mass as a function of time. This plot should include data before *and* after dropping the mass on the rotating shape.

- for assignment 2:

3. *[15%]* a description of the procedure your team developed to determine the two unknown moments of inertia of the circle and pentagon shapes

4. *[15%]* the value your team determined for moment of inertia about the center of mass of the circle shape, along with the uncertainty associated with this measurement

5. *[15%]* the value your team determined for moment of inertia about the center of mass of the pentagon shape, along with the uncertainty associated with this measurement