# EN PHYS 131 - EZ01- Lab 9

## Due Mon. Mar. 14 @ 5 PM

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## Procedure:

1. Setup LoggerPro to work with the Smart-Pulley. Download the template from eClass. Adjust the height of the pulley so the mass can fall about 1 metre.
2. Release the mass starting with 200 g (the hangar is 50 g) while collecting data with LoggerPro. Stop the data collection before the mass hits the floor.
3. Fit a line to the data you collected. Record the slope of the line - this gives you the linear acceleration.
4. Repeat 2 and 3 increasing the mass each time by 50 g, up to 600 g. Record the linear acceleration for each trial.
5. Form a linear equation with Eq. 6. Use your linear acceleration and mass values to determine I and the torque from friction.
6. Use the results from your fit to determine the force of friction on the axle and the mass of the wheel.
7. Measure the radius of the wheel and the hub.

$$rm(g-a) = I\frac{a}{r} + \tau_f$$

$$I = MR^2 \quad \tau_f = F_f r$$

## In report:

- Velocity graph for the first run (with 200 g).
- Show how Eq. 6 can be re-arranged to find I and torque due to friction.
- Fit of the re-arranged Eq. 6 with the acceleration and mass values.
- Value for the mass of the wheel and force of friction, with errors.
- Compare to the mass value given in the manual

# EN PHYS 131 - EZ01- Lab 10

## Due Mon. Mar. 29 @ 5 PM

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## Procedure:

1. Download one of the videos available on eClass. Load this into LoggerPro using the instructions in the lab manual.
2. Weigh the ball on the provided scale to determine its mass.
3. Set the origin at the starting position of the ball. Set the scale using the metre stick shown in the video. Record the position of the ball in each frame until its second impact with the ground.
4. From the data, find 4 values:
   - H - initial height of the ball on the ramp
   - h - height of the ball at the end of the ramp
   - S - distance from the end of the ramp to the first impact with the ground
   - S' - distance from the end of the ramp to the second impact with the ground
5. With these 4 values, the mass of the ball and value of g, answer the 17 questions from the manual.

## In report:

- Answers to the 17 questions. These may be done by-hand, but **MUST** be neat and easy to read.
- Answers must clearly show the equations being used and how you got there. No one word or number answers.
- About a 1/2 page conclusion. Highlight the main results - i.e. what were the energies/momenta before and after the collision? Were either conserved? Why or why not?