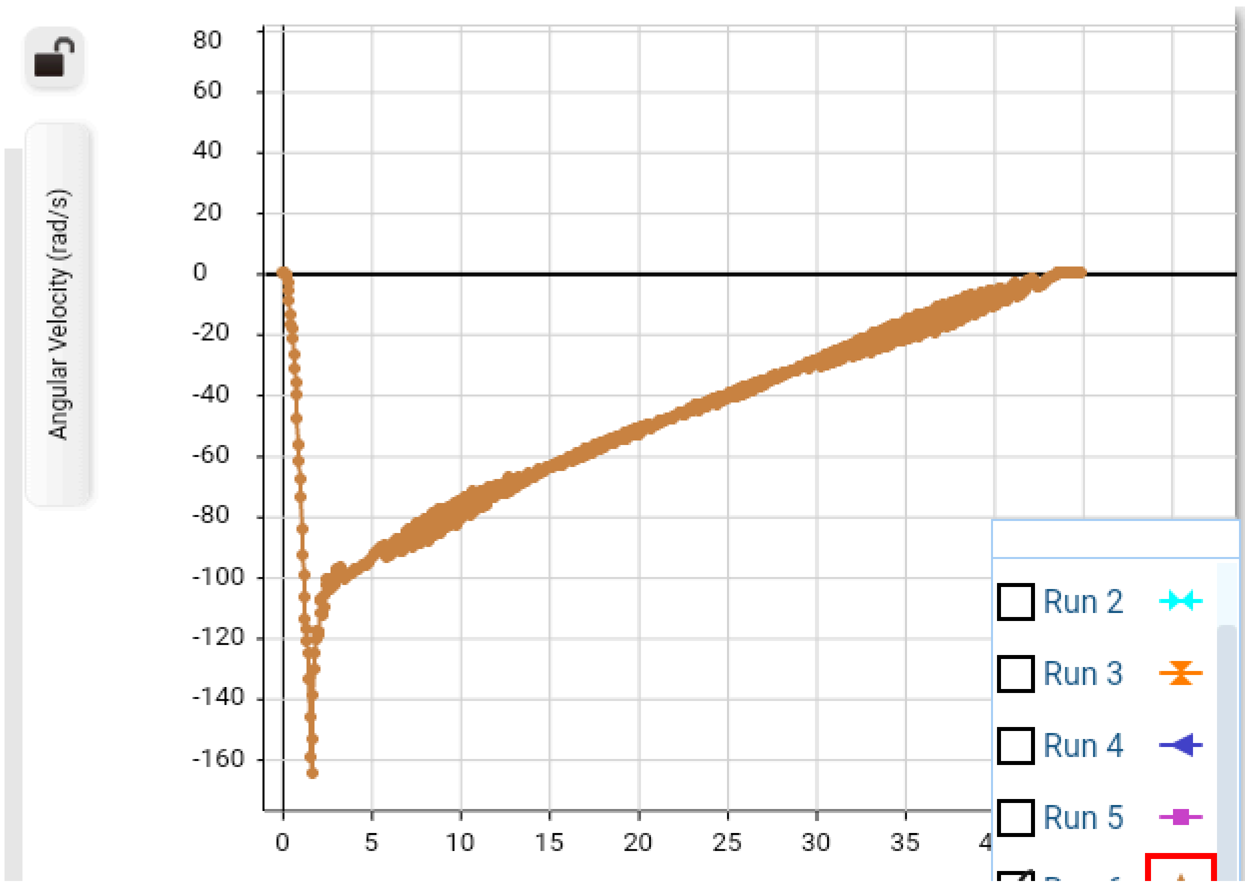
Metal Mass: 120.46 Grams
Radius of Metal Mass: 5 cm

1.8 cm radius of medium pulley
Mass of pulley 120.64
Radius of the metal (pulley) : 5 cm

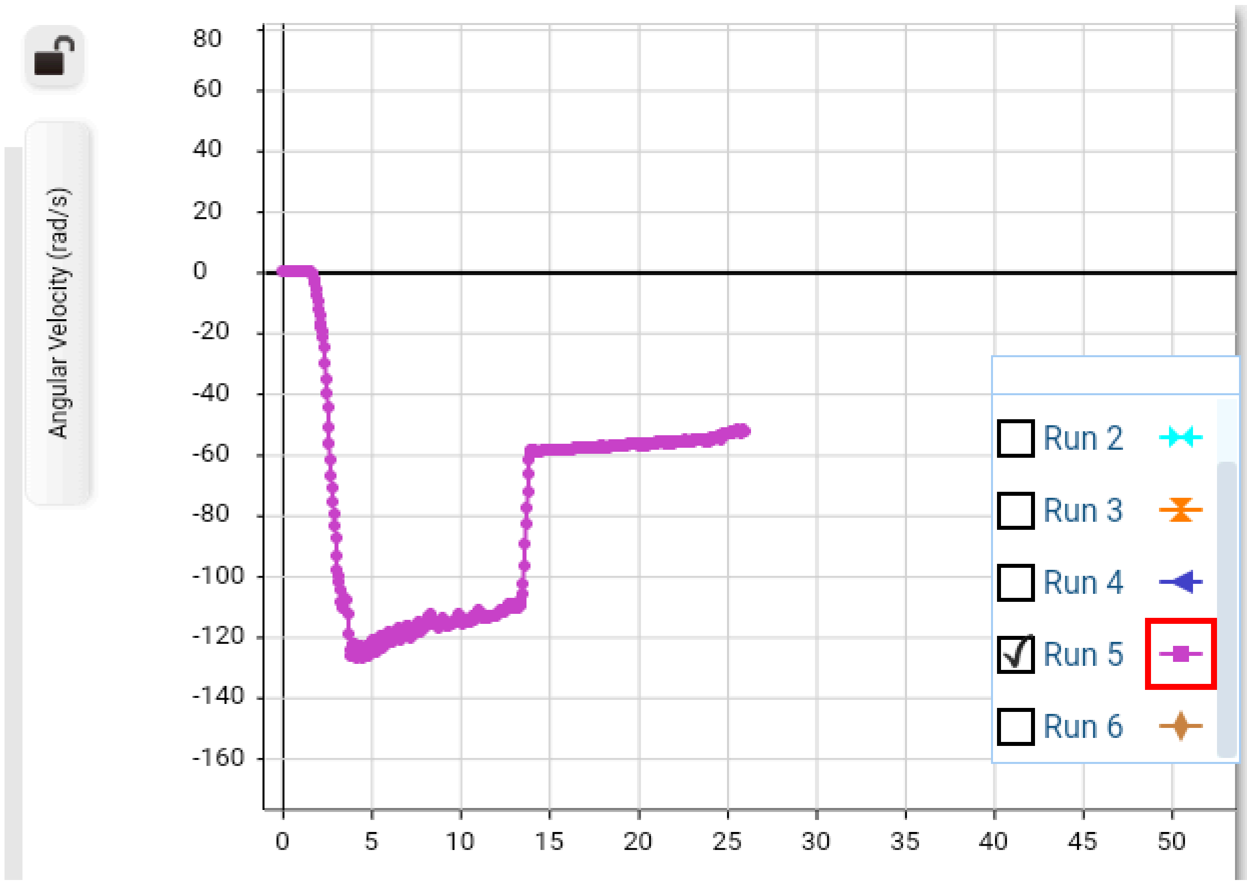


1. The line could be spiking due to a change in angular velocity which means that the object's rotational speed or angular velocity is decreasing very quickly.
   The line is flat as the pulley is no longer in motion and the angular velocity is zero rad/sec.
   The spinning disk does not stay at a constant velocity. The graph shows this as it isn't a constant value rather it's linear. The line is dropping because as time goes on and the string is pulled at gently, the angular velocity decreases.

2. To find the Average Force, you need to find the change in angular momentum over time.
   I = ½ m * r ^ 2 for the disk →0.00030115 kg m^2
   Wf = 100 rad/sec Wi = 0 rad/sec t =40 seconds
   I * W = Angular Momentum
   0.0030115 * 100 = 0.30115
   0.30115/40 = 0.008 N

Part 2

1. I = ½ m * r ^ 2 for the disk →0.00030115 kg m^2



Evaluation for Data Table 1

1. I = ½ m * r ^ 2 for the disk →0.00030115 kg m^2
2. The pi of a particle on the edge of the disk and Li of the system before spinning the pulley by pulling the string was zero as the linear and angular velocity were zero.
3. P = mRw
   P = m (0.05) (115) = 5.75 m

   L = Iw + mR^2w
   L = 0.00030115 (115) + m (0.05)^2 (115)
   L = 0.03453225 + m (0.0025) (115)
   L total = 0.0346 + 0.2875 m

4. The delta p was caused by the disk moving with a tangential velocity due to its rotation. This causes the particle to move in a circular path.
5. The angular momentum exists because the disk is rotating causing the particle to rotate as well. As the disk has a moment of inertia, and the particle moves in a circular path, it has a change in the angular momentum.

Evaluation for Trial #2

1.
   I * W = Angular Momentum
   0.0030115 * 60 = 0.18069 kg m^2 /s

2.
   I * W = Angular Momentum
   0.0030115 * 55 = 0.1656 kg m^2 /s

3. Angular moment was almost fully conserved. The percent difference between the actual and theoretical L value was 11.2%

Evaluation of Data For Trial #3

4.
   I * W = Angular Momentum
   0.0030115 * 57 = 0.1546 kg m^2 /s

5.
   I * W = Angular Momentum
   0.0030115 * 53 = 0.1435 kg m^2 /s

6. Angular moment was almost fully conserved. The percent difference between the actual and theoretical L value was 5.4%

Evaluation of Data For Trials #2 and #3

This type of collision is perfectly inelastic as the objects stick together after colliding.
KE Rot = ½ I W^2

Change KE Rot = ½ 0.0030115 (0) ^2 - ½ 0.0030115 (60) ^2

5.42 Joules

Because we lost all energy after the collision, this proves that the collision was perfectly inelastic.