**(1) ω⃗ and α⃗ are vectors associated with the rotating table. In what direction(s) does(do) ω⃗ and α⃗ point? Do they point in the same direction? Always? Sometimes? Never? Think about it and give a clear answer to the whole question.**

The ω⃗ vector is the vector of the angular velocity and its direction is constantly changing and is always perpendicular to the radius vector. The α⃗ is the vector of the angular acceleration and is always parallel to the vector of the string to which the mass is attached to. In every revolution, the angular velocity vector points In the same direction as the acceleration for exactly 1 point.

**(2) You also need a value for the absolute uncertainty Δr for the radius r? Decide how to choose it and justify your choice.**

We assumed the absolute value of r for the radius is r to be equal to 0.25mm. This is because the vernier calipers we used to measure the diameter of the disk give us an error of 0.5 mm and then when we calculate the radius by dividing by 2. Hence the error in radius is 0.25

**(3) Is your “computational-tool” determination of these quantities consistent with your “graphical analysis” determination of them? You must show a quantitative comparison to answer this question properly.**

The computational tool gives the range of the slope to be a ϵ [0.101305, 0.105095] and the graphical analysis gives a ϵ [0.1037,0.1209]. Both these values are consistent with each other.

**(4) The slope of this line should be positive this time. Explain carefully why it is positive.**

The slope of this line should be positive this time as the slope gives us acceleration and the disk is now experiencing positive acceleration. In the earlier graph the disk was being retarded by the friction force but this time it is being accelerated by the force of the attached mass.

**(5) Why is this contribution “small”? Small compared to what? Justify the neglect of this contribution.**

The moment of Inertia is calculated as mass multiplied with the distance of the point mass to the axis of rotation. Since the handle located right at the axis of rotation, its contribution to the moment of inertia is very small compared to the rest of the disk. As a result we can neglect the contribution of the handle to the moment of inertia of the disk.

**(6) Justify your estimate**

For R, you first measure the Diameter of the handle and then you use a ruler to calculate the distance from the handle to the end and add it up. Since for both measurements, the error is 0.5mm, when adding them you add the uncertainty and hence the uncertainty becomes 1mm.

**(9) determine if *L* and *L*′ are consistent, i.e., do they agree within experimental uncertainty? From this conclude whether or not angular momentum was conserved in your experiment. If it was not conserved, give possible reasons – each of which you must justify – why it was not conserved?**

The range for the initial momentum is L ϵ [0.6898, 0.7422] and the range for the final momentum is L ϵ [0.641, 0.675]. These values are not exactly consistent with each other however they are very close. This is because we possibly lost momentum if the disk didn’t fall exactly at the center of the axis of rotation. Another possible source of loss is the loss of energy in the form of sound when the falling disk impacts with the rotating platform.

**(10) As only one example, if you don't drop the disk so that its center coincides with the rotation axis (center) of the rotating platform, will this make a significant difference? Which way will such an off-center drop tend to make the discrepancy go? Will it tend to increase or decrease the apparent value of** *L*′**compared to the value it should have for an on-center drop?**

If the center of the dropped disk does not coincide with the axis of rotation of the rotating platform then it could possibly make a difference to the measurement of final momentum. This is because it will change the value of the Moment of inertia of the final momentum and hence increase the value of the final momentum.