# Lab 7 (Moment of Inertia)

## Discussion

Compare your experimental and theoretical values and discuss.

* Experimental value: **0.00190 ± 0.00004 kg m^2**
* Theoretical value: **0.001548 ± 0.000002 kg m^2**

The experimental value of the moment of inertia of the system was 0.00190 ± 0.00004 kg m^2, while the theoretical value was 0.001548 ± 0.000002 kg m^2. The difference between the two values was 0.000352 kg m^2, which was larger than the combined uncertainty of 0.000042 kg m^2. Therefore, the two values **did not agree** within the experimental uncertainty.

Some possible sources of error and uncertainty in this experiment are:

* Wrong/inaccurate measurement.
* Worn string, therefore increased friction.

## Conclusions

We are unsure that we can use the law of conservation of energy be used to determine the moment of inertia of a rotating system since the values both methods don’t agree.

In this experiment, we examined the rotational motion of a wheel that was suspended by two strings and attached to a spring. We used the conservation of energy principle to calculate the experimental moment of inertia of the wheel from the kinematic quantities and compared it with the theoretical value. We found that the experimental value was **0.00190 ± 0.00004 kg m^2**, which was NOT close to the theoretical value of **0.001548 ± 0.000002 kg m^2**. This suggests that the energy loss due to friction and air resistance was NOT negligible. The main sources of uncertainty in our experiment were the measurement of the diameter of the wheel, the time of fall, and the distance of fall. The possible source of error is worn string. We used the worn string as equipment in the lab. We could improve our results by using more precise instruments and repeating the measurements several times.