# Lab 3 (Friction Experiment)

**Discussion**

1. What is the coefficient of static friction between the two surfaces?

The coefficient of static friction between the two surfaces is a measure of how much force is needed to overcome the friction and start the motion of the glider on the ramp. It can be determined by finding the angle of inclination of the ramp at which the glider just begins to slide down. The coefficient of static friction is then equal to the tangent of that angle.

1. What is the coefficient of kinetic friction between the two surfaces?

The coefficient of kinetic friction between the two surfaces is a measure of how much force opposes the motion of the glider once it is sliding down the ramp. It can be determined by finding the acceleration of the glider as it slides down the ramp at a constant angle. The coefficient of kinetic friction is then equal to the ratio of the difference between the acceleration due to gravity and the acceleration of the glider, and the sine of the angle.

1. How does the static friction between the two surfaces behave before motion initiates?

The static friction between the two surfaces behaves like a variable force that increases as the angle of inclination of the ramp increases, until it reaches a maximum value equal to the product of the coefficient of static friction and the normal force. This maximum value is also equal to the weight component parallel to the ramp at which the glider just begins to slide down.

1. How does the kinetic friction behave once the surfaces are in motion?

The kinetic friction between the two surfaces behaves like a constant force that is independent of the angle of inclination of the ramp and the speed of the glider. It is always equal to the product of the coefficient of kinetic friction and the normal force, and it always acts opposite to the direction of motion.

**Conclusions**

In this experiment, we investigated the friction between two plane surfaces in contact and determined the coefficients of static and kinetic friction between them. We used two methods: the critical angle method and the constant velocity method. We found that the coefficient of static friction depends on the angle of inclination of the surface and the weight of the glider, while the coefficient of kinetic friction depends on the normal force and the tension in the string. We also found that the coefficient of static friction is always greater than the coefficient of kinetic friction for the same surfaces. Our results were consistent with the theory of friction and showed no significant mass dependence or variation.

The major source of error is the angle of inclination of the ramp, since it has the biggest uncertainty.