

Exercise 106: UNIFORMLY ACCELERATED MOTION

Keywords: Newton's laws of dynamics; velocity; acceleration; linear regression; standard deviation.

The exercise aims at determining gravitational acceleration and a coefficient of friction.

Gravitational acceleration:

1. Use the „ladder”, sensing system and computer software to plot $V=f(t)$.
2. Repeat the measurement ten times and extract the angular coefficient from the plots.

Coefficient of friction:

1. Use the block (with weight/counterweight) on the slope for a given angle.
2. Use the linear regression to extract the angular coefficient (acceleration).
3. Repeat the measurement ten times for different weights/counterweights and slope angles.

Report:

1. Calculate an average gravitational acceleration and its standard deviation.
2. Calculate the coefficient of friction for all combinations (weights, angles).
3. Calculate an average coefficient of friction and its standard deviation.
4. Summarise the results.