

Drag coefficient

Itamar & Ofer

Theoretical information

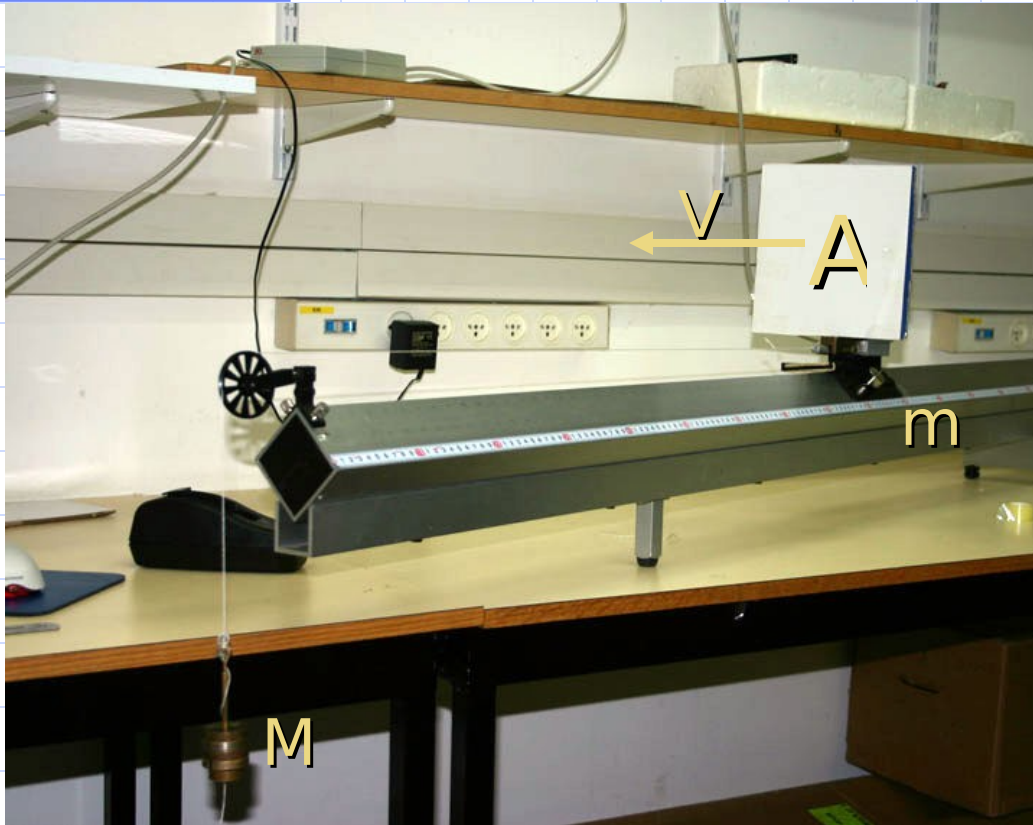
◆ Drag is a force derived by the fluid environment.

◆ It can be described using the following equation:

$$D = \frac{c_p A v^2}{2}$$

◆ The drag is proportional to the projected size of the surface of the body (in the direction of the flow)

The experiment apparatus



$$a = - \left[\frac{k}{(M+m)} V^2 \right] + \left[\frac{Mg}{M+m} \right]$$

$$k = \frac{c\rho}{2} A$$

◆ Surface Sizes
4+1(Control)

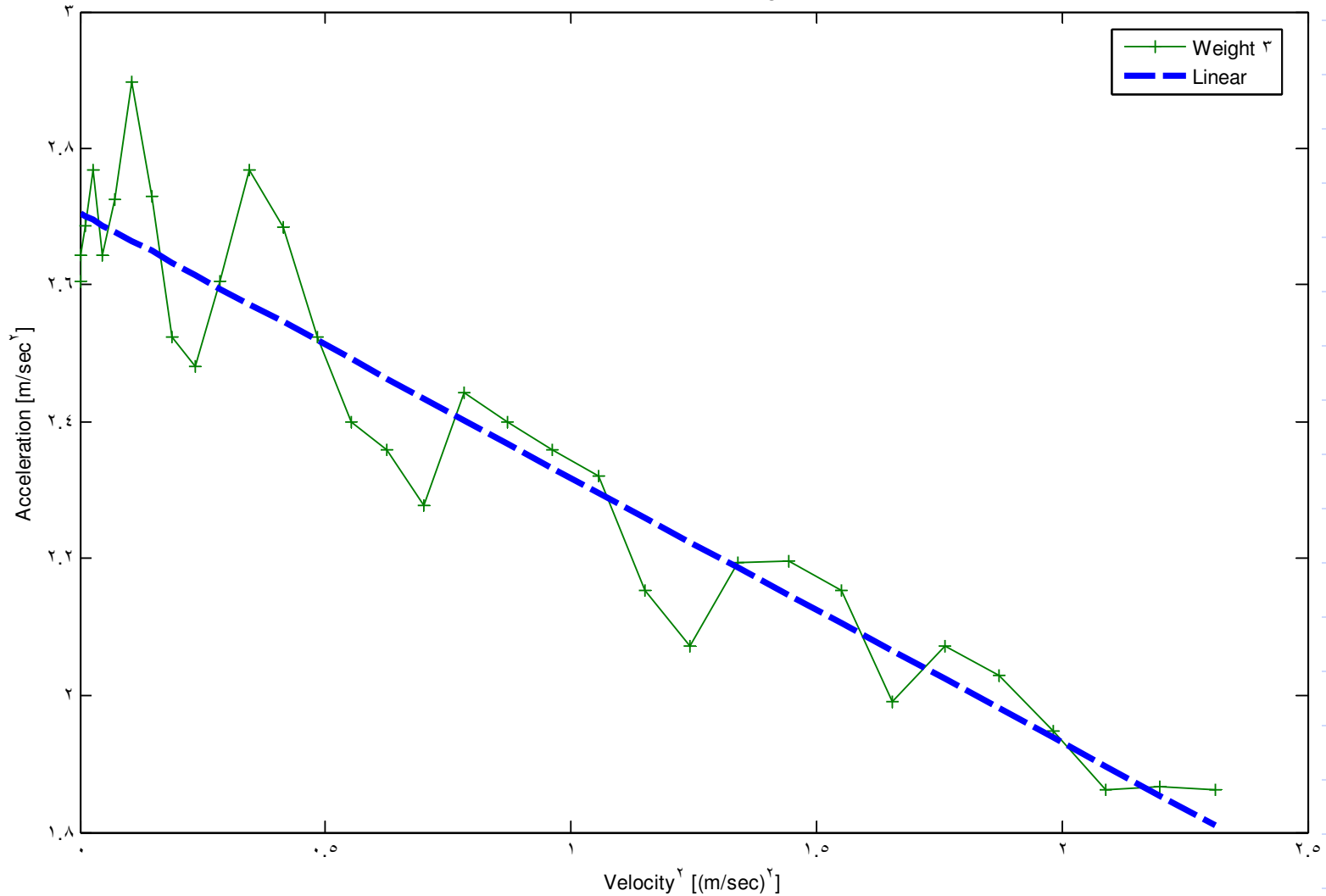
◆ Repets 3

◆ Weights 4

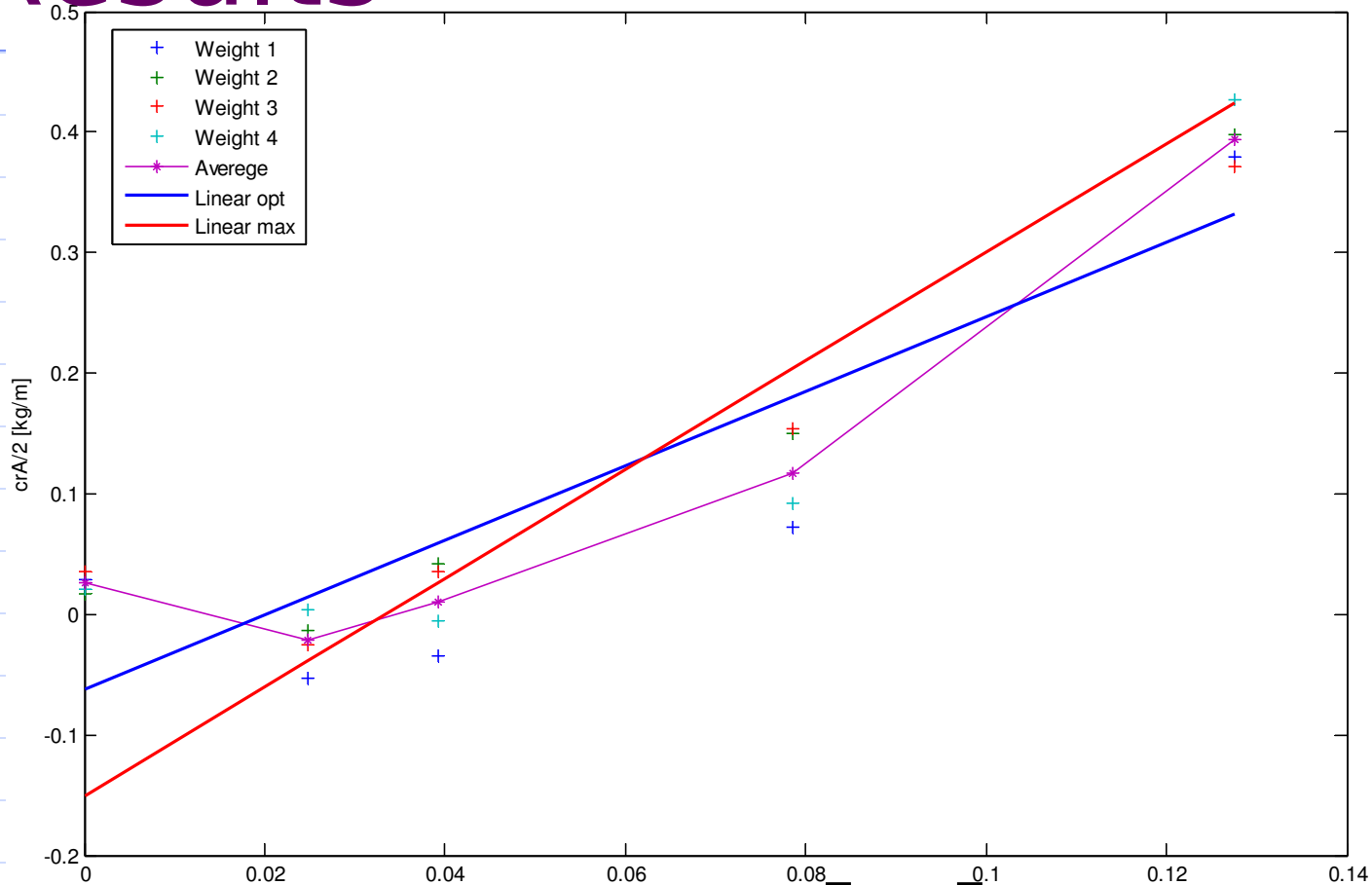
◆ Total 60

The Experiment

Experiment ξ Weight τ



Results



$$\frac{c\rho}{2} = 3.09 \pm 1.4 \left[\frac{\text{kg}}{\text{m}^3} \right]$$

Results vs. known values

- ◆ The coefficient received is composed of the drag coefficient for a flat plate and the air density (from www.engineeringtoolbox.com):

$$\frac{1.98 \times 1.29}{2} = 1.2771 \left[\frac{\text{kg}}{\text{m}^3} \right]$$

- ◆ Therefore our error is: 141.9% + -9.6%
- ◆ The main cause for the errors are instabilities of the wagon resulting in inaccurate acceleration measurement

FIN