Mechanics

Translational motions of a mass point

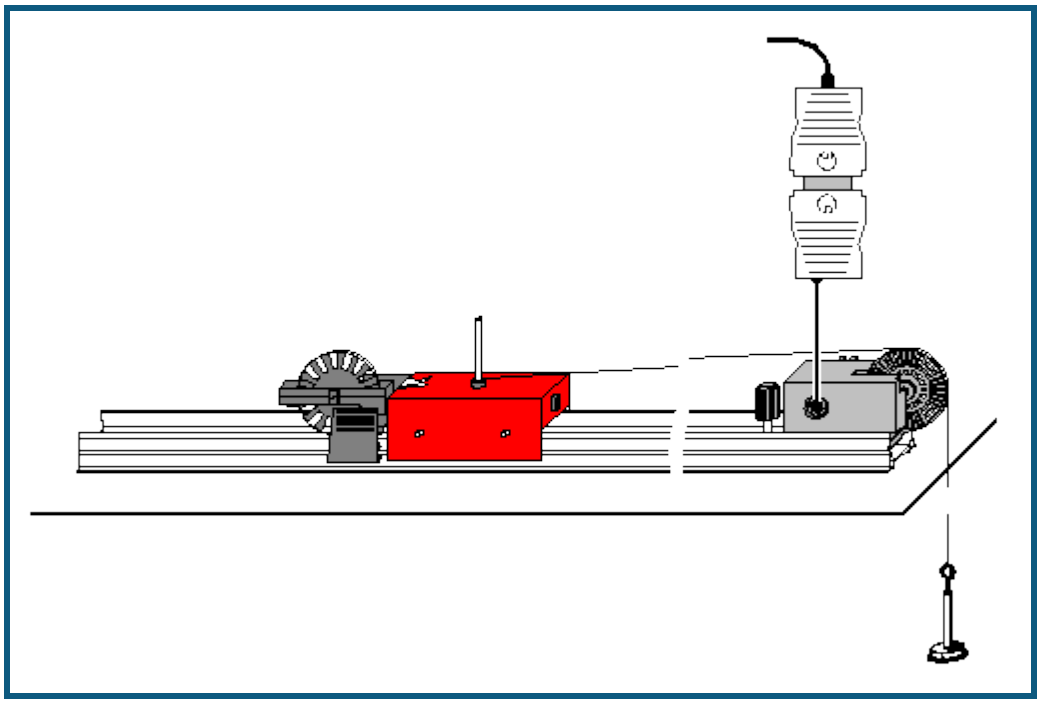
One-dimensional motions on the track for students´ experiments

Recording path-time diagrams of linear motion - recording with a motion transducer

Description from CASSY Lab 2

For loading examples and settings, please use the CASSY Lab 2 help.

Uniformly accelerated motion - path-time diagram



Task

Investigate the motion of a trolley driven by a weight which is suspended from a piece of cord that runs over a pulley.

Equipment list

1	Pocket-CASSY	524 006
1	CASSY Lab 2	524 220
1	Timer S	524 074
1	Combination light barrier	337 462
1	Combination spoked wheel	337 464
1	Adapter combination light barrier for student's track	337 465
1	Multi-core cable, 6-pole	501 16
1	Precision metal rail, 1 m	460 81
1	Trolley, 85 g	337 00
1	Set of driving weights	337 04
1	Cord	from 686 51ET2
1	Single pulley on clamp rider	337 14
	alternatively: 1 clamp rider	460 95
1	PC with Windows XP/Vista/7/8	

Experiment setup (see drawing)

- Cut an approx. 80 cm long piece of cord, and tie loops at the ends. The length of the cord should be chosen so that the suspended weight is just over the bottom when the trolley stands at the end of the track.
- Move the trolley on the track until the suspended weight is just before the pulley without touching it. Now attach the single pulley on clamp rider (or a clamp rider) to the precision metal rail as the starting point for the trolley.
- At the beginning, only suspend the hanger (5.2 g) from the cord.

Carrying out the experiment

- Load settings
- Move the trolley to its starting point, keep it there, and define the zero in the window Settings Path s1 with → **0** ←. Start the measurement by clicking the ⏱ button and release the trolley.
- Lay additional weights on the hanger (each time 5 g), and repeat the experiment.

Evaluation

- What was measured in the experiment (see table or diagram)?

- What is displayed in the diagram?

- How do the path differences covered in equal time intervals behave?

- What kind of curve is described by the measured values? Suggestion:

- Confirm the suggestion by fitting to a corresponding curve with Fit Function.
- What is your conclusion regarding the relation between the path *s* and the time *t*?

- Display the axes correspondingly in the **Check** sheet by clicking with the right mouse button. Then determine the factor of proportionality by Line through origin. The results for the three motions are:

- What is your conclusion regarding the general mathematical description of the motion (equation of motion)?