Oscillation of a spring pendulum – recording path, velocity and acceleration with CASSY (P 1.5.2.1)

P 1.5.2

Harmonic oscillations

P 1.5.2.1 CASSY-S Oscillation of a spring pendulum – recording path, velocity and acceleration with CASSY

P 1.5.2.2 CASSY-S Dependency of the oscillation period of a spring pendulum on the oscillating mass

Cat. No.	Description	P 1.5.2.1-2
352 10	Helical spring, 2 N, 0.03 N/cm	1
342 61	Set of 12 weights, 50 g each	1
336 21	Holding magnet with clamp	1
337 462	Combination light barrier	1
524 074	Timer S	1
501 16	Multicore cable, 6-pole, 1.5 m long	1
524 010USB	Sensor CASSY	1
524 200	CASSY Lab	1
300 01	Stand base, V-shape, 28 cm	1
300 41	Stand rod, 25 cm	1
300 46	Stand rod, 150 cm	1
301 01	Leybold multiclamp	2
301 08	Clamp with hook	1
309 48	Cord, 10 m	1
501 46	Pair of cables, 1 m, red and blue	1
	additionally required: 1 PC with Windows 95/NT or higher	1
337 464	Combination spoked wheel	1

When a system is deflected from a stable equilibrium position, oscillations can occur. An oscillation is considered harmonic when the restoring force F is proportional to the deflection x from the equilibrium position.

$$F = D \cdot x$$

D: directional constant

The oscillations of a spring pendulum are often used as a classic example of this.

In the first experiment, the harmonic oscillations of a spring pendulum are recorded as a function of time using the motion transducer and the computer-assisted measured value recording system CASSY. In the evaluation, the oscillation quantities path x, velocity v and acceleration a are compared on the screen. These can be displayed either as functions of the time t or as a phase diagram.

The second experiment records and evaluates the oscillations of a spring pendulum for various suspended masses m. The relationship

$$T = 2\pi \cdot \sqrt{\frac{D}{m}}$$

for the oscillation period is verified.