

Lab 4

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Why do Lab 4?

Studying harmonic motion is important because:

1. The movement of a weight on a spring, a pendulum, a charge in an electric circuit, as well as the evolution in time of many systems in physics, chemistry, biology and other sciences, under certain assumptions, can be described by the same differential equation.
2. Any periodic motion can be represented as a sum of harmonic motion with corresponding amplitudes, frequencies and initial phases.
3. For a wide class of systems, the response to a harmonic impact is a harmonic motion, while the relationship between the impact and the response is a stable characteristic of the system.

Goal of the work

Consider the model of a linear harmonic motion.

1. Construct a solution to the harmonic oscillator equation without damping
2. Write down the equation of free motion of a harmonic oscillator with damping, construct its solution. Build a phase portrait of damped harmonic oscillations.
3. Write down the equation of motion of a harmonic oscillator, if an external force acts on the system, construct its solution. Build a phase portrait of oscillations with the action of an external force.

In the course of doing the work, I learned:

1. Build a solution to the harmonic motion equation without damping.
2. Build the solution of the equation and the phase portrait of free motion of a harmonic oscillator with damping.
3. Build the solution of the equation and the phase portrait of free motion of a harmonic oscillator with damping, with the action of an external force.

Thank you for the attention.