Lab 4

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Who am I

- Yakushevich Artyom Yurievich, Since 2018, I have been studying at RUDN University in the specialty Mathematics and Computer Science.

Why do Lab 4?

- The most important fact about harmonic oscillation is that it is the most natural way to oscillate for almost any system, especially if the amplitude of the oscillation is small.
- Any periodic oscillation can be represented as the sum of harmonic oscillations with corresponding amplitudes, frequencies and initial phases. Among the terms of this sum, there is a harmonic vibration with the lowest frequency, which is called the fundamental frequency, and this vibration itself is the first harmonic or fundamental tone, the frequencies of all other terms, harmonic vibrations, are multiples of the fundamental frequency, and these vibrations are called higher harmonics or overtones - the first , second, etc.
- For a wide class of systems, the response to a harmonic impact is a harmonic vibration, while the relationship between the

The purpose of the laboratory work

Consider a model of 3 cases of oscillations of a harmonic oscillator.

Laboratory tasks

1. Construct a solution to the harmonic oscillator equation without damping.
2. Write down the equation of free oscillations of a harmonic oscillator with damping, construct its solution. Build a phase portrait of damped harmonic oscillations.
3. Write down the equation of oscillations 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.

Results of the laboratory work

As a result of the execution, I learned:

- Build a solution to the harmonic oscillator equation without damping.
- Build a solution to the equation of free oscillations of a harmonic oscillator with damping. Build a phase portrait of harmonic oscillations with damping.
- Build a solution to the equation of oscillations of a harmonic oscillator if an external force acts on the system. Build a phase portrait of oscillations with the action of an external force.

findings

As a result of the third laboratory work, I considered a linear harmonic oscillator model.