



Vibration Fundamentals and Simulation

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What is it?

Vibration fundamentals and simulation is software designed to teach basic concepts of vibration using a new interactive and visual simulation technique.

Each concept is explained theoretically and simulated to expedite learning.



Highlights

- ◆ Basic concepts simulated in user selected input parameters
- ◆ Vivid visualization to enhance learning and clarification
- ◆ Full math details available
- ◆ Understand effects of stiffness, mass and damping
- ◆ Learn vibration and force transmission issues
- ◆ Free forced and combined responses simulated for variety of user selectable condition
- ◆ Input condition controllable by user



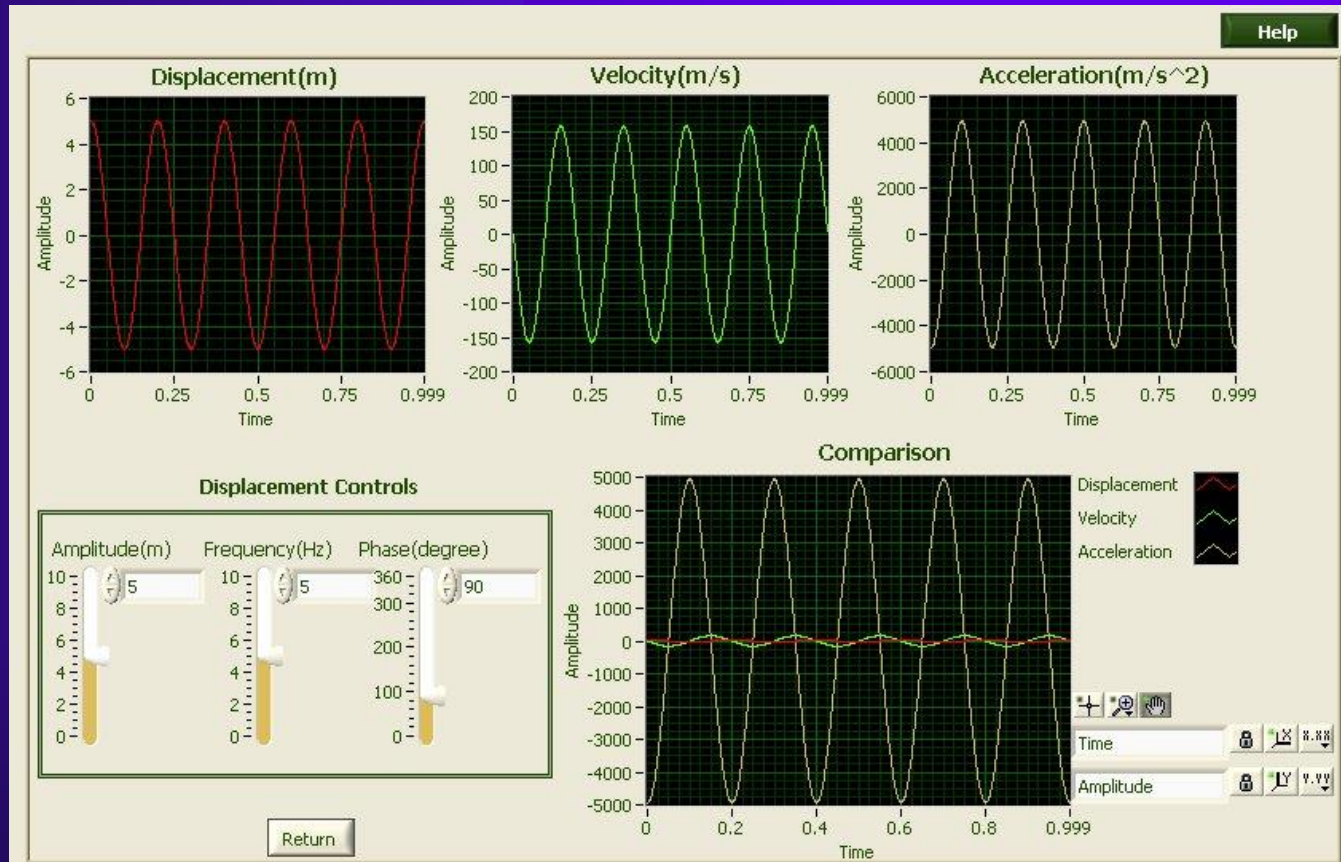
Topics Included!

1. Vibration kinematics concepts
2. Mathematical Modeling using Equivalent Mass and Spring
3. Free Vibration of Undamped, Underdamped and Overdamped Systems
4. Logarithmic Decrement
5. Harmonic Excitation of Undamped, Underdamped Systems
6. Transient Response of Underdamped Systems--Step Input and Impulse Input
7. Combined Vibration--Harmonic Excitation with Initial Displacement and Velocity
8. General Forced Response
9. Base Excitation
10. Frequency Response Function
11. Vibration Terminology

Sinusoidal Relations

What you will learn?

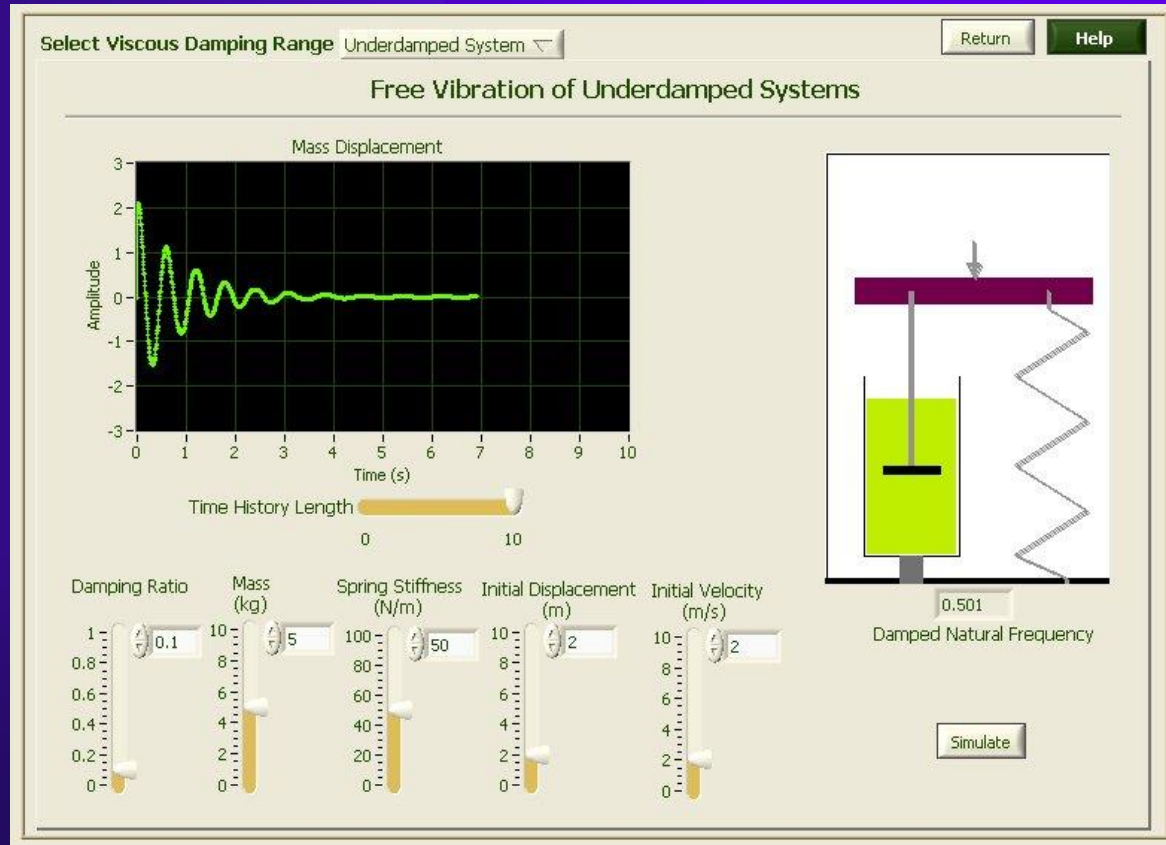
1. Harmonic motion represented by displacement, velocity and acceleration
2. Phase and magnitude relationship among displacement, velocity and acceleration
3. Converting among displacement, velocity and acceleration



Free Vibration Simulation

What you will learn?

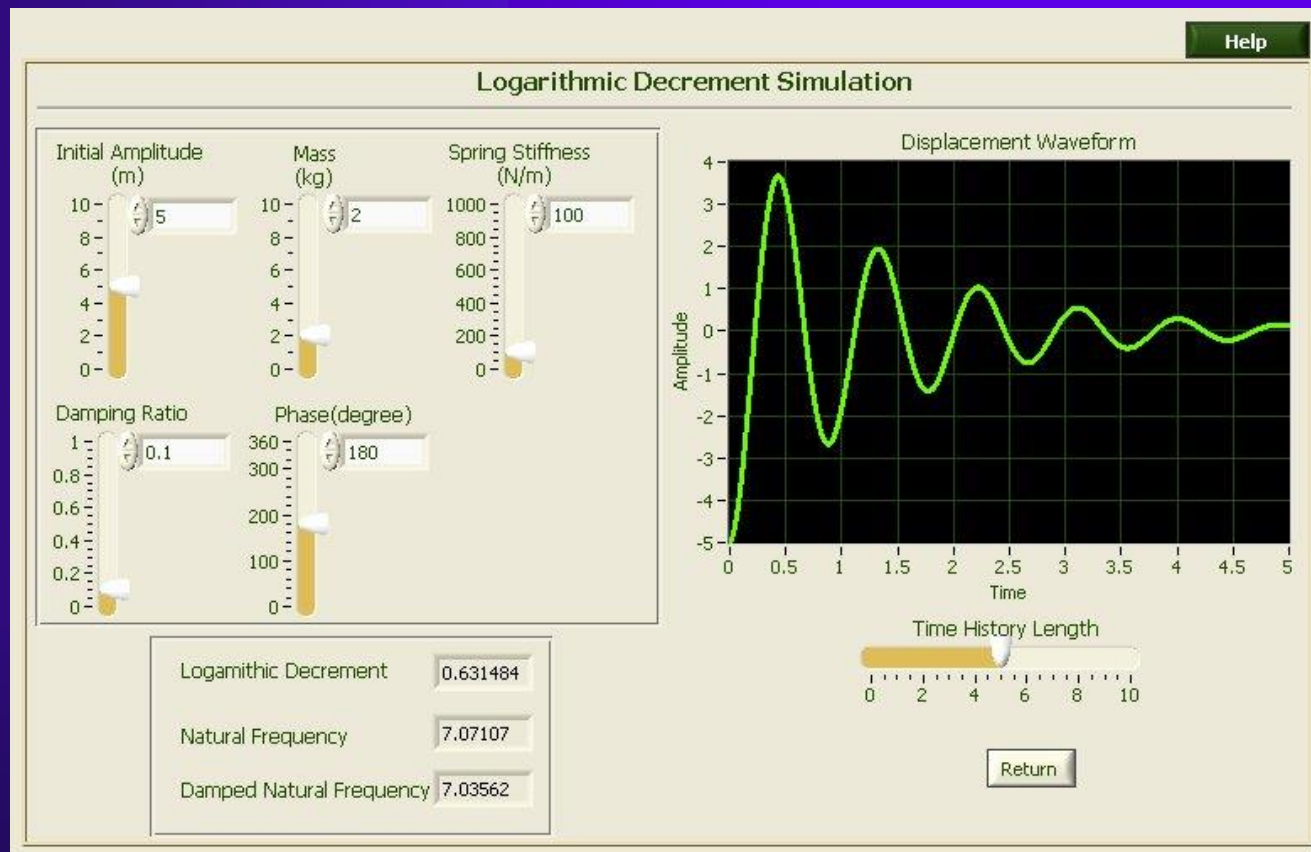
1. Ideal mass, ideal spring and ideal damping
2. Free vibration properties of undamped system
3. Free vibration properties of underdamped system
4. Free vibration properties of critical damped system
5. Free vibration properties of overdamped system



Logarithmic Decrement Simulation

What you will learn?

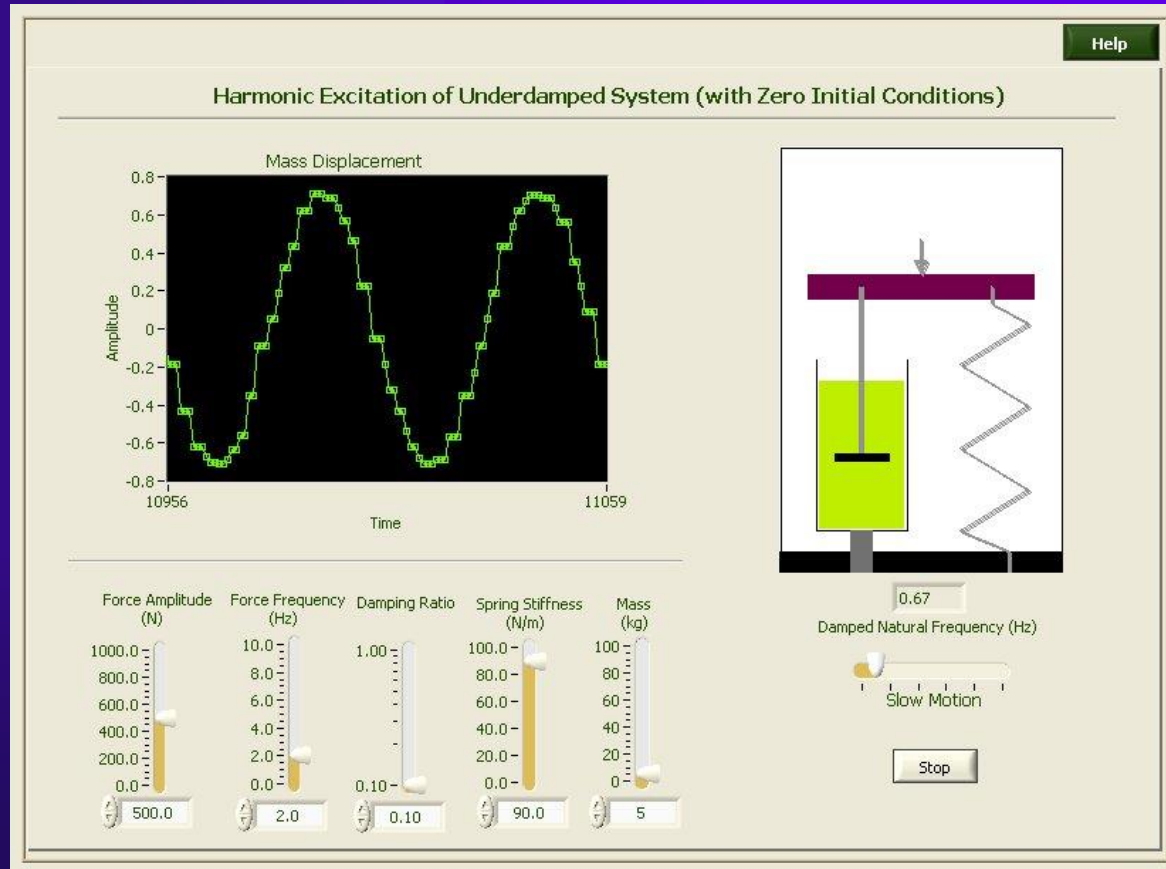
1. Concepts of logarithmic decrement
2. Calculation of logarithmic decrement
2. Relationship between logarithmic decrement and damping ratio



Harmonic Excitation of Undamped and Underdamped System

What you will learn?

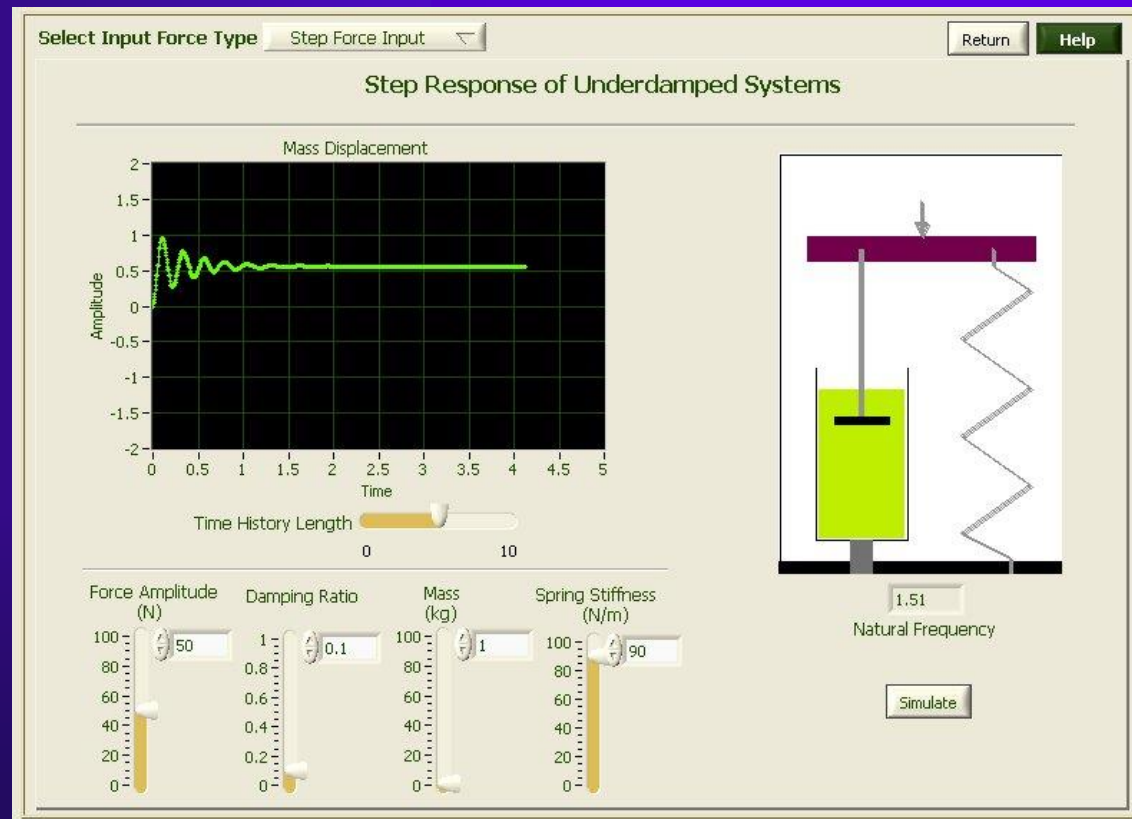
1. Vibration properties of harmonic excitation of undamped system
2. Vibration properties of harmonic excitation of underdamped system



Transient Excitation of Single Degree of Freedom

What you will learn?

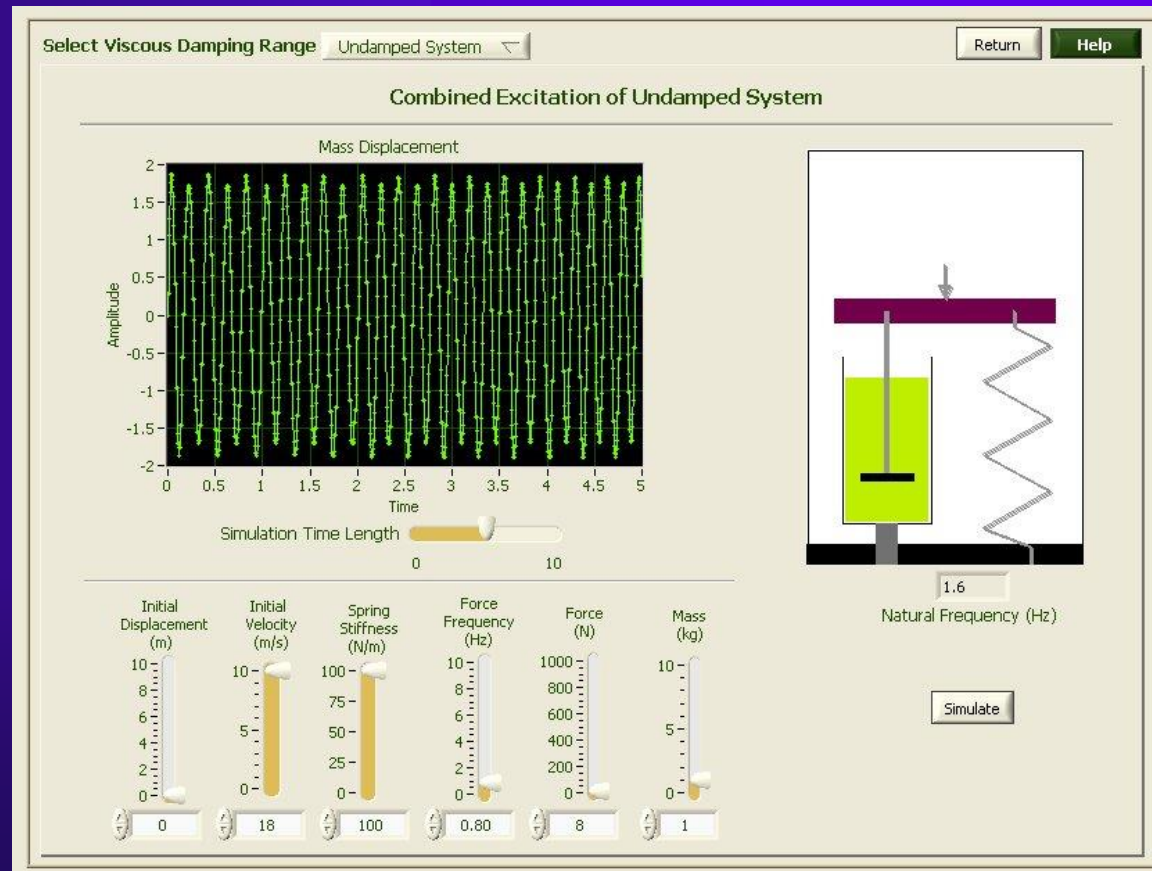
1. Vibration properties of impulse response for underdamped system
2. Vibration properties of step response for underdamped system



Combined Vibration

What you will learn?

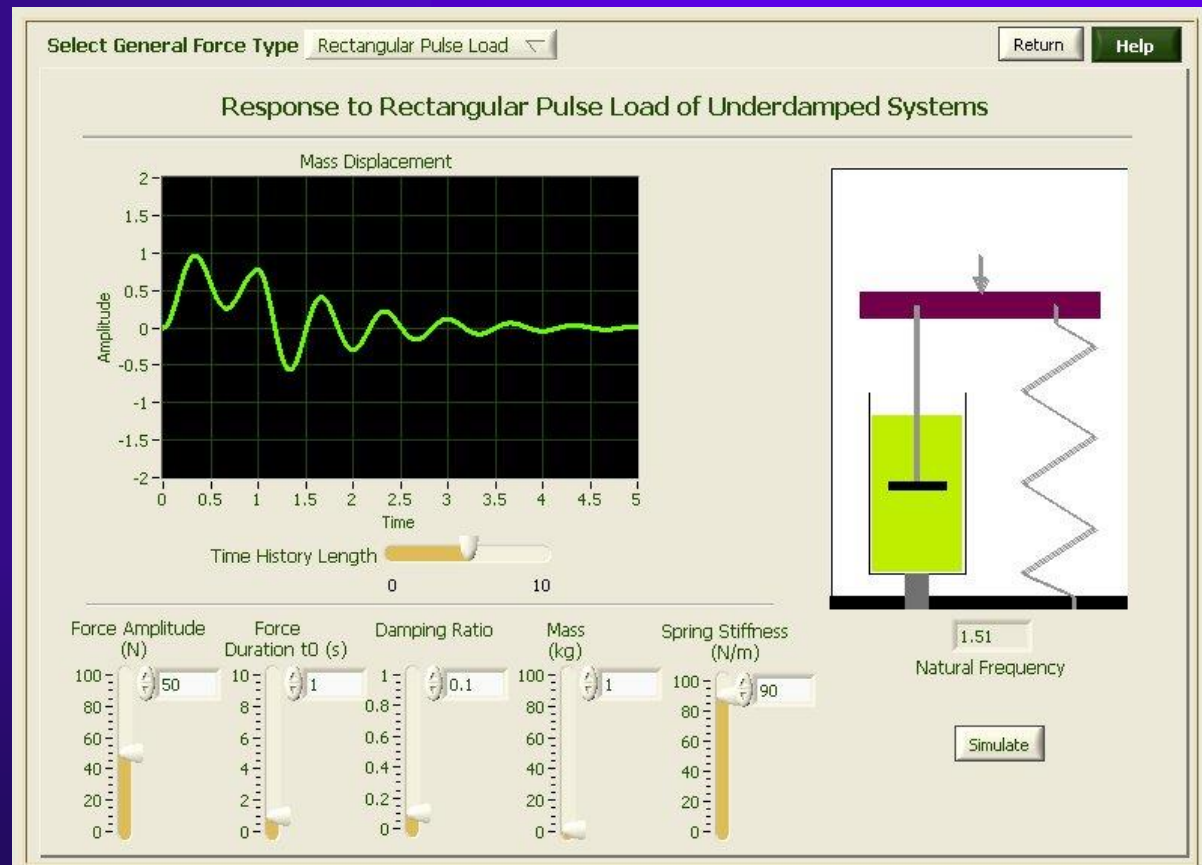
1. Complete response as sum of two frequencies
2. Principle of superposition
3. Vibration response for different initial and force frequency conditions.



General Forced Response

What you will learn?

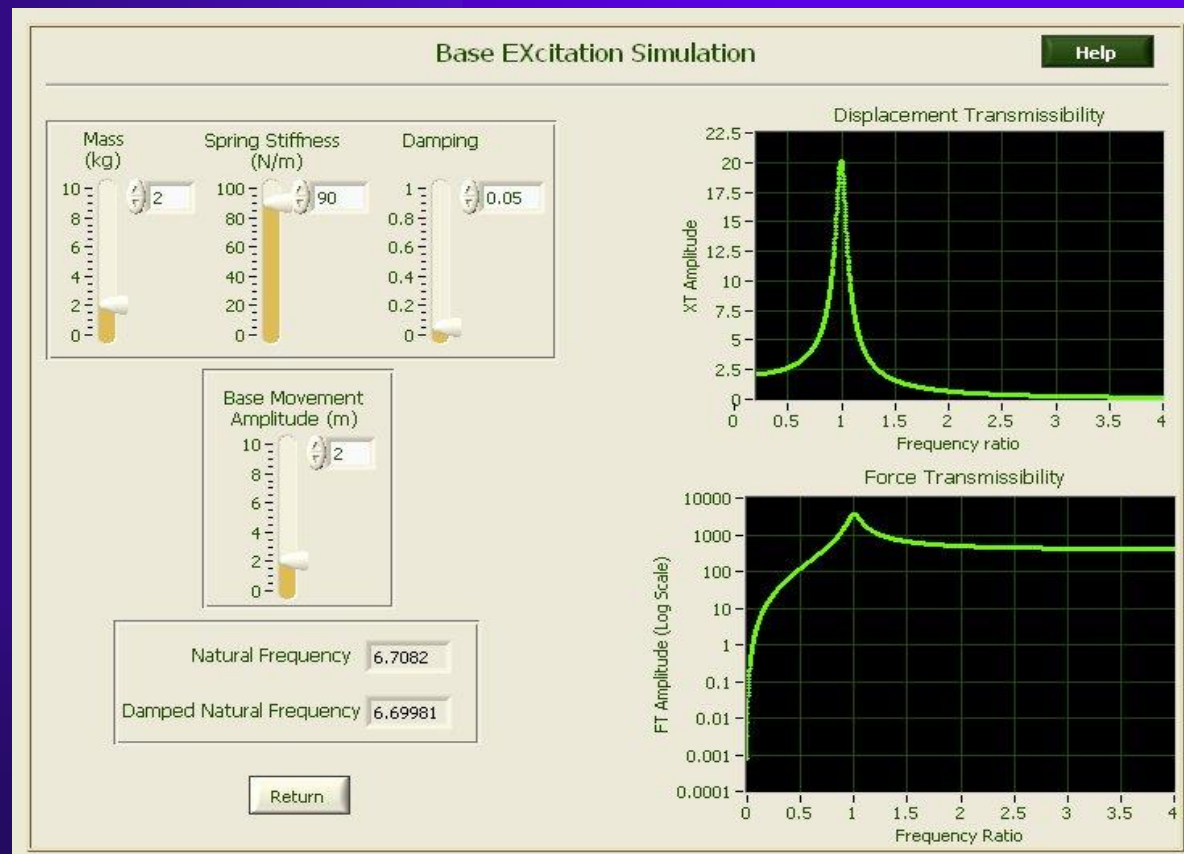
1. Impulse response
2. Application of Convolution Integral in general forced response calculation



Base Excitation

What you will learn?

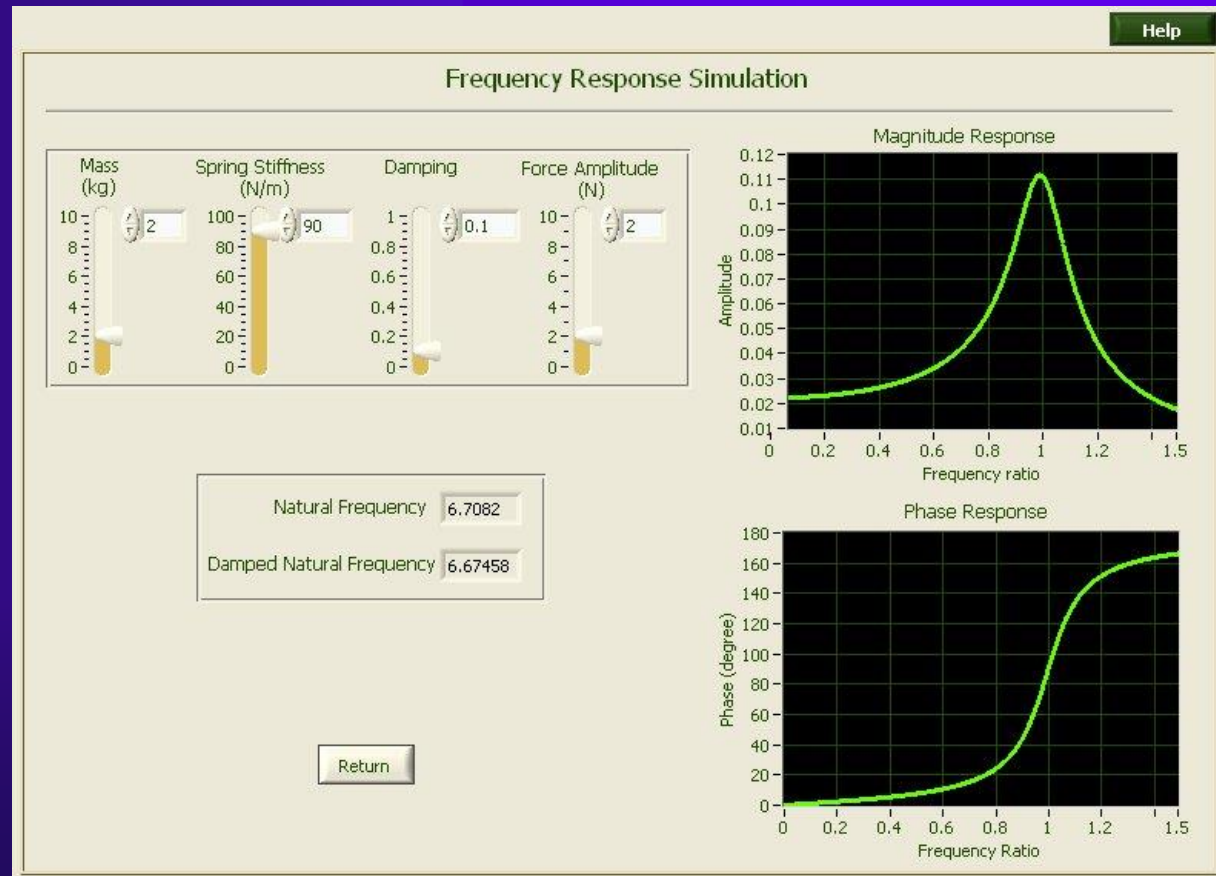
1. Concepts of Base Excitation
2. Mathematical Modeling of Base Excitation problem
3. Concepts of Displacement Transmissibility and Force Transmissibility
4. Relationship between Transmissibility and Frequency Ratio



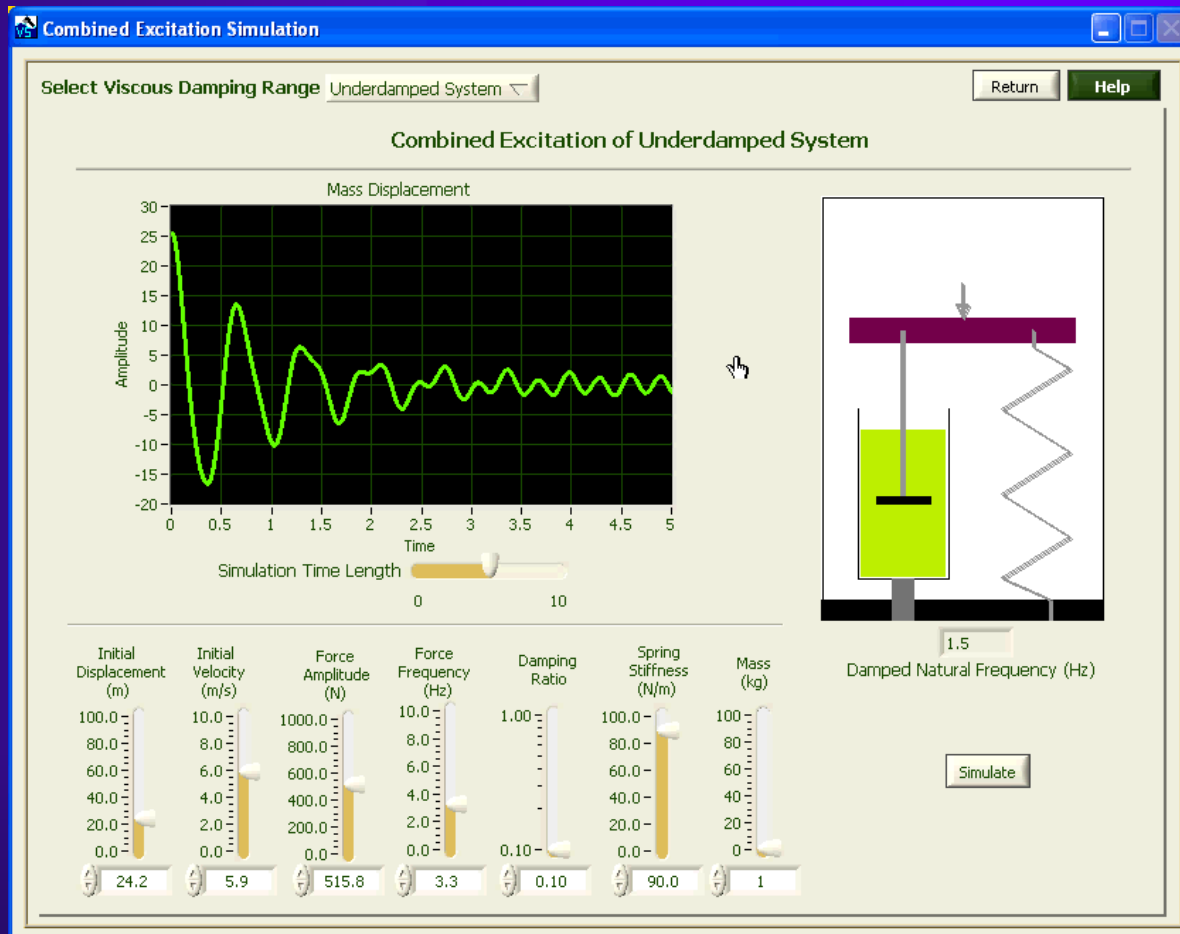
Frequency Response Function

What you will learn?

1. Frequency response function of a Mass-Spring-Damping system
2. Magnitude response
3. Phase Response
4. Relationship of frequency response function to damping ratio



Panel Example Animation



*Please allow some time to download the movie!



Any Questions?

Contact!

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