System Dynamic Analysis - I

Fundamentals of Structural Dynamics

Course Instructor: F. Necati Catbas, Ph.D.
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Refs: Books by Clough and Penzien, Rubinstein, Humar, Chopra, Notes

Introduction

- Introduction to Structural Dynamics Problem
- Review of Related Matrix Algebra
- Numerical Solution of Dynamics Problems Using MATHCAD and MATLAB

Single Degree of Freedom (SDOF) Systems

- Equation Of Motion (EOM): Vectorial Approach
- EOM: Work and Energy Formulation
- Solution Techniques for EOM

Multi Degree of Freedom (MDOF) Systems

- EOM By Vectorial Approach
- EOM By Work and Energy Approach
- Eigenproblem and Frequency, Damping, Modal Vector Extraction
- Numerical Solution of EOM

Analytical/Experimental Relationships

- Frequency Response Function (FRF) Concept

Modeling of Simple Structures for Dynamic Analysis

- Finite Element Modeling
- Numerical Modeling
- Correlation and Comparison of Modeling Methods

Term Project:

- Simulation of a Physical System

MEM 800 - Section 566/567/568

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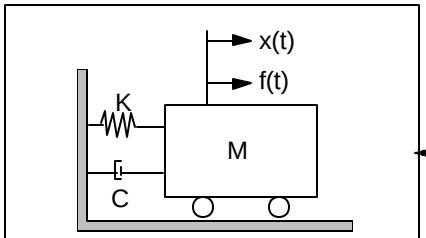
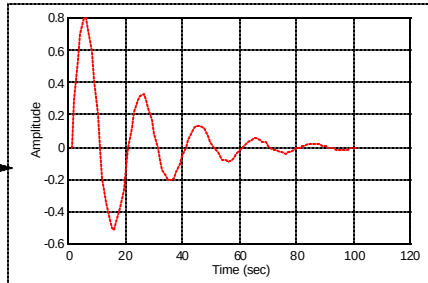
- Structural Dynamics/Vibrations Theory
- Single and Multi Degree of Freedom Systems
- Analytical/Experimental Relationships
- Data Acquisition, Digital Signal Processing Concepts
- Measurement, Structural Testing and Transducer Concepts
- Modal Parameter Estimation Techniques
- Modal Data Presentation/Validation Techniques
- Modeling Techniques, Model and Test Correlation, Model Updating



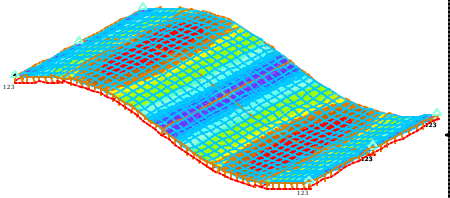
Theory of Structural Dynamics



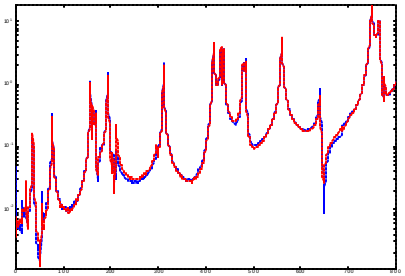
Analysis of Dynamic Systems

Analysis and Testing of a Physical Model

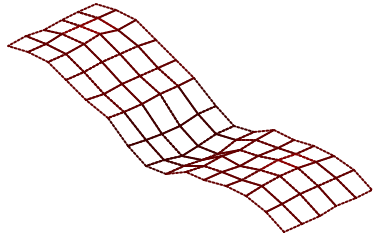
Data Acquisition



Analytical Modeling



Data Analysis and Processing



Experimental Modal Analysis