System Dynamic Analysis - I

Fundamentals of Structural Dynamics

Course Instructor: F. Necati Catbas, Ph.D.
Drexel Intelligent Infrastructure and Transportation Safety Institute (DI3)

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
System Dynamic Analysis
Course Instructor: F. Necati Catbas, Ph.D.
Drexel Intelligent Infrastructure and Transportation Safety Institute (DI3)
(fncatbas@drexel.edu; 215-895-5947 or 6133; 1 Drexel Plaza Mezzanine Level)

- 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