Advanced Mechanical Vibration EGME 511, California State University, Fullerton

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Contents

1 Introduction

I took this course in Spring 2009 at CSUF. Not part of a degree program

course description from catalog:

EGME 511 - 02 Advanced Mechanical Vibrations

CSU Fullerton | Spring 2009 | Seminar

RETURN TO RESULTS

CLASS DETAILS

Status	Open	**Career**	Postbaccalaureate
Class Number	20160	**Dates**	1/24/2009 - 5/15/2009
Session	Regular Academic Session	**Grading**	Graduate Option
Units	3 units	**Location**	Fullerton Campus
Instruction Mode	In Person	**Campus**	Fullerton Campus
Class Components	Seminar Required		

Meeting Information

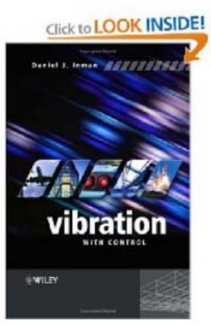
Days & Times	Room	Instructor	Meeting Dates
TuTh 7:00PM - 8:15PM	E 042 - Lecture Room	Sang June Oh	1/24/2009 - 5/15/2009
TuTh 7:00PM - 8:15PM	CS 309 - Special Instruction	Staff	1/24/2009 - 5/15/2009

DESCRIPTION

Prerequisite: EGME 431. Vibrations in rotating and reciprocating machines; noise and vibration in fluid machinery; continuous systems; random vibrations; transient and nonlinear vibration, computer applications.

Figure 1: class info

Textbook



Vibration with Control (Hardcover)

by Daniel J. Inman (Author) "In this chapter the vibration of a single-degree-of-freedom system will be analyzed and reviewed..." (more)

Key Phrases: combined dynamical systems, semidefinite damping, receptance matrix, New York, John Wiley, New Jersey (more...)

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Figure 2: Text book

2 sheetsheet

PDF
HTML

3 HWs

HW	Description of HW
1	1. Solve 2nd order ODE 2. Calculate maximum value of the peak response (magnification factor) for a system with some damping rat (Quadrature peak picking method) 3. Solve for the forced response of a single-degree-of-freedom system to a harmonic excitation 4. Discuss the stability of 2nd order ODE 5. Find range of values for PD controller in feedback for stability 6. Compute a feedback law with full state feedback 7. Find the equilibrium points of the nonlinear pendulum equation
2	1. Find EQM for mass-spring with dynmaic friction on incline (this is nonlinear EQM due to columb friction) 2. Modal analysis problem on 2 by 2 system 3. Find EQM using lagrangian, 2 pendulums attached by one spring between them 4. Another Modal analysis problem on 2 by 2 system 5. 2nd order system, subject to 2 impulses, find response using convolution 6. Convolution problem. Underdamped system, force is half sin
3	1. Find EQM, one mass, 2 springs, different k, springs only attached when hit 2. Find EQM using Lagrangian, pendulum, but string is rubber band with some stiffness. 3. Find exact solution to nonlinear pendulum EQM 4. nonlinear second order ODE. Find equilibrium points and stability at these. 5. nonlinear 2nd order. Find stability around equilibrium 6. similar to above, but find stability conditions based on damping sign 7. columb damping and phase plane 8. Given phase plane equation (i.e. dy/dx), determine stability. i.e. go back from phase plane to the system matrix 9. Solve Van Der Pol using perurbation

4 Projects

1. Impulse response of second order system which is not underdamped
2. Stabilization of an inverted pendulum on moving cart using feedback control
3. Eigen modal analysis notebook PDF

5 some notes

1. possible error in key
2. note on solving wave equation
3. eigenvalue modal analysis