

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mechanical Engineering - NOC:Nonlinear Vibration

Subject Co-ordinator - Prof. S. K. Dwivedy

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Introduction to mechanical systems
- Lecture 2 - Superposition rule, Commonly used nonlinear equations
- Lecture 3 - Equilibrium points: potential function
- Lecture 4 - Force and moment based Approach, Lagrange Principle
- Lecture 5 - Extended Hamilton's principle
- Lecture 6 - Use of scaling and book-keeping parameter for ordering
- Lecture 7 - Numerical solution, Analytical solutions: Harmonic Balance method
- Lecture 8 - Straight forward expansion
- Lecture 9 - Lindsted-Poincaré method
- Lecture 10 - Method of Averaging
- Lecture 11 - Method of multiple scales
- Lecture 12 - Method of generalized Harmonic Balance method
- Lecture 13 - Free vibration of undamped and damped SDOF systems with quadratic and cubic nonlinearity
- Lecture 14 - Super and sub harmonic resonance conditions
- Lecture 15 - Bifurcation analysis of fixed-point response
- Lecture 16 - Nonlinear system with hard excitations
- Lecture 17 - Super and sub harmonic resonance conditions
- Lecture 18 - Bifurcation analysis of fixed-point response
- Lecture 19 - Floquet theory, Hill's infinite determinant, Resonance in parametrically excited systems
- Lecture 20 - Parametrically excited pneumatic artificial muscle
- Lecture 21 - Parametric instability of sandwich plate
- Lecture 22 - Analysis of periodic, quasi-periodic and chaotic systems
- Lecture 23 - Stability and bifurcation analysis of periodic and quasi-periodic response
- Lecture 24 - Analysis of chaotic system
- Lecture 25 - Numerical methods for finding roots and solutions of ODE
- Lecture 26 - Time response, phase portraits, frequency response
- Lecture 27 - Poincaré section, FFT, Lyapunov exponent
- Lecture 28 - Passive and active vibration absorber with displacement and acceleration feedback
- Lecture 29 - Active vibration absorber with time delay acceleration feedback by HBM

---

Get DIGIMAT For High-Speed Video Streaming of NPTEL and Educational Video Courses in LAN

<http://www.digimat.in>

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

---

- Lecture 30 - Application of Active vibration absorber with combination feedback
- Lecture 31 - Cantilever beam with tip mass for principal parametric resonance
- Lecture 32 - Cantilever beam with tip mass for combination resonance
- Lecture 33 - Cantilever beam based piezoelectric based energy harvester
- Lecture 34 - Nonlinear dynamics of turning operation with delay and internal resonance
- Lecture 35 - Chatter in rolling mills and dynamic analysis of artificial pneumatic muscle
- Lecture 36 - Chaotic systems and control of chaos