

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

NPTEL Video Course - Mechanical Engineering - NOC:Finite Element Method: Variational Methods to Computer Prog

Subject Co-ordinator - Prof. Arup Nandy, Prof. Atanu Banerjee

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Functional, First variation, Euler Lagrange equation; Several Dependent variables
Lecture 2 - Functional with higher order derivatives; Variational statement
Lecture 3 - Differential equation, Variational statement and Minimization problem; Rayleigh-Ritz method
Lecture 4 - FEM steps
Lecture 5 - Solving one Ordinary Differential Equation using Linear Finite Element
Lecture 6 - Solving one Ordinary Differential Equation using Quadratic Finite Element
Lecture 7 - Bar Element
Lecture 8 - Bar Element
Lecture 9 - Truss Element
Lecture 10 - Beam Element
Lecture 11 - Beam Element
Lecture 12 - Beam Element
Lecture 13 - Frame Element
Lecture 14 - Frame Element
Lecture 15 - Generalization of Geometry data; Stiffness matrix, Load vector formation at element level
Lecture 16 - Generalization of Assembly, Imposition of Boundary condition and Load information
Lecture 17 - Indicial Notation
Lecture 18 - Second order tensor; Gradient, Divergence, Curl and Laplacian in Indicial notation
Lecture 19 - Gauss Divergence theorem and its application in Heat transfer and Structural analysis
Lecture 20 - Derivation of weak form of 2D steady-state heat conduction problem
Lecture 21 - Triangular element, calculating element stiffness and element force vector
Lecture 22 - Numerical example, assembly, mapping
Lecture 23 - Numerical integration, Neumann boundary, and higher order shape functions
Lecture 24 - Quadrilateral element, Lagrange shape functions, Serendipity elements
Lecture 25 - Development of a MATLAB code for solving 2D steady-state heat conduction problem
Lecture 26 - Demonstration of the MATLAB code
Lecture 27 - Elasticity problems in two dimension and obtaining the weak form
Lecture 28 - Deriving element stiffness matrix and element force vector, numerical example
Lecture 29 - Development of a MATLAB code for solving planar elasticity problems

Get Digi-MAT (Digital Media Access Terminal) For High-Speed Video Streaming of NPTEL and Educational Video Courses in LAN

www.digimat.in

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

- Lecture 30 - Superconvergent Patch Recovery, error estimator, adaptive refinement
- Lecture 31 - Solving eigenvalue problem in bar and beam, writing FEM code in MATLAB
- Lecture 32 - Solving eigenvalue problem of membrane, writing FEM code in MATLAB
- Lecture 33 - Solving transient problems (parabolic type)
- Lecture 34 - Solving transient problems (hyperbolic type)
- Lecture 35 - Solving elasticity problems in 3D using FEM, Solvers