

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

NPTEL Video Course - Mechanical Engineering - NOC:Finite Element Modeling of Welding Processes

Subject Co-ordinator - Prof. Swarup bag

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Properties, Modelling approaches, Process modelling and Optimization
Lecture 2 - Fusion welding - 1
Lecture 3 - Fusion welding - 2
Lecture 4 - Soldering, Brazing, Solid-state welding processes
Lecture 5 - Advanced welding processes
Lecture 6 - Advances in laser microwelding
Lecture 7 - Additive manufacturing processes
Lecture 8 - Elastic stress analysis - I
Lecture 9 - Elastic stress analysis - II and Potential energy method
Lecture 10 - Three-Dimensional element
Lecture 11 - Weighted residual method
Lecture 12 - Material nonlinearity - I
Lecture 13 - Material nonlinearity - II
Lecture 14 - Fluid flow and Natural coordinate system - I
Lecture 15 - Natural coordinate system in 3D and XFEM
Lecture 16 - Introduction to heat source model
Lecture 17 - Heat source models in welding - I
Lecture 18 - Heat source models in welding - II
Lecture 19 - Heat source model for Keyhole mode and solid state welding
Lecture 20 - Implementation of FEM in fusion welding processes
Lecture 21 - Implementation of FEM for fluid flow in fusion welding processes
Lecture 22 - FEM modeling of EBW and RSW
Lecture 23 - FEM modeling of FSW and hybrid FSW
Lecture 24 - Demonstration of thermal model development using commercial software
Lecture 25 - Fluid flow modeling in welding processes
Lecture 26 - Heat transfer and fluid flow analysis in quasi-steady state
Lecture 27 - Prediction of free surface profile
Lecture 28 - Principle stress, Hydrostatic and Deviatoric Components of Stress
Lecture 29 - Yield Function, Von Mises Yield Surface and Hardening rule

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- Lecture 30 - Material models, Residual stress and distortion
- Lecture 31 - Phase transformation effect on Residual stress and distortion
- Lecture 32 - Demonstration of thermo-mechanical model development using commercial software
- Lecture 33 - Fundamentals of metal transfer in arc welding
- Lecture 34 - FE-based modelling approaches
- Lecture 35 - Theoretical development of heat transfer model
- Lecture 36 - Heating of nano-film
- Lecture 37 - Theoretical development of stress analysis model
- Lecture 38 - Fundamentals of wire arc additive manufacturing processes - I
- Lecture 39 - Fundamentals of wire arc additive manufacturing processes - II
- Lecture 40 - Modelling approaches of additive manufacturing