NPTEL Video Course - Chemical Engineering - NOC:Mathematical Modelling and Simulation of Chemical Engineering

Subject Co-ordinator - Prof. Sourav Mondal

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction
Lecture 2 - Introduction (Continued...)
Lecture 3 - Constitutive relations
Lecture 4 - Constitutive relations - Mass transfer and thermodynamics
Lecture 5 - Process diagrams
Lecture 6 - Special functions
Lecture 7 - Partial differential equations
Lecture 8 - Partial differential equations - Separation of variables
Lecture 9 - PDE - Separation of variables (Continued...)
Lecture 10 - PDE - Integral transforms
Lecture 11 - Numerical techniques of solving PDE - Discretization
Lecture 12 - Stability of finite difference schemes
Lecture 13 - Numerical solution of PDE - Method of lines
Lecture 14 - Numerical solution of implicit formulation - Tridiagonal matrix
Lecture 15 - Numerical solution of PDE - Finite volume method
Lecture 16 - Perturbation methods
Lecture 17 - Asymptotics
Lecture 18 - Matched Asymptotics
Lecture 19 - Stability of dynamical systems
Lecture 20 - Stability of dynamical systems (Continued...)
Lecture 21 - Modelling transport phenomena problems - Part 1
Lecture 22 - Modelling transport phenomena problems - Part 2
Lecture 23 - Modelling transport phenomena problems - Part 3
Lecture 24 - Modelling transport phenomena problems - Part 4
Lecture 25 - Modelling transport phenomena problems - Part 5
Lecture 26 - Modelling reaction systems - Packed bed catalytic reactor
Lecture 27 - Modelling intraparticle transport and catalysis
Lecture 28 - Modelling pore diffusion and reaction
Lecture 29 - Modelling enzymatic reactions

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Lecture 30 - Demonstration of COMSOL Multiphysics
Lecture 31 - Modelling of multistage distillation process
Lecture 32 - FUG method of stage calculations
Lecture 33 - MESH equations and DOF analysis
Lecture 34 - Tearing method
Lecture 35 - Bubble point method stage calculations
Lecture 36 - Simultaneous correction method
Lecture 37 - Block tridiagonal matrix
Lecture 38 - Simple binary batch distillation
Lecture 39 - Multistage batch distillation
Lecture 40 - Heat exchanger network design pinch analysis
Lecture 41 - Pinch point temperature
Lecture 42 - Heat exchanger network synthesis
Lecture 43 - Solving a distillation column using Aspen plus
Lecture 44 - Solving two unit operations using Aspen Plus
Lecture 45 - Solving multiple units using Aspen Plus
Lecture 46 - Dispersed phase modelling - Introduction
Lecture 47 - Population balance equation
Lecture 48 - Dispersed phase modelling - Breakage process
Lecture 49 - Drop size distribution in lean mixtures
Lecture 50 - Mass transfer in lean liquid-liquid dispersion
Lecture 51 - Dispersed phase modelling - Aggregation
Lecture 52 - Dispersed phase modelling - Aerosol dynamics
Lecture 53 - Dispersed phase modelling - Aerosol dynamics (Continued...)
Lecture 54 - Solution of the population balance equation
Lecture 55 - Numerical solution of the population balance equation
Lecture 56 - Kinetic monte carlo simulation
Lecture 57 - Response surface methodology
Lecture 58 - Design of experiments
Lecture 59 - Artificial neural network
Lecture 60 - Supervised training
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