NPTEL Video Course - Chemical Engineering - Computational Fluid Dynamics

Subject Co-ordinator - Prof. Sreenivas Jayanti

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Illustration of the Multigrid method for the Laplace equation
Lecture 31 - Overview of the approach of numerical solution of NS equations for simple domains; Introduction
Lecture 32 - Derivation of the energy conservation equation
Lecture 33 - Derivation of the species conservation equation; dealing with chemical reactions
Lecture 34 - Turbulence; Characteri stics of turbulent flow; Dealing with fluctuations and the concept of tim
Lecture 35 - Derivation of the Reynolds -averaged Navier -Stokes equations; identification of the closure pro
Lecture 36 - Reynol ds stresses in turbulent flow; Time and length scales of turbulence; Energy cascade; Mixi
Lecture 37 - One-equation model for turbulent flow
Lecture 38 - Two -equation model for turbulent flow; Numerical calculation of turbulent reacting flows
Lecture 39 - Calculation of near-wall region in turbulent flow; wall function approach; near-wall turbulence
Lecture 40 - Need for special methods for dealing with irregular flow geometry; Outline of the Body-fitted gr
Lecture 41 - Transformation of the governing equations; Illustration for the Laplace equation; Appearance and
Lecture 42 - Finite vol ume method for complicated flow domain; Illustration for the case of flow through a c
Lecture 43 - Finite volume method for the general case
Lecture 44 - Generation of a structured grid for irregular flow domain; Algebraic methods; Elliptic grid gene
Lecture 45 - Unstructured grid generation; Domain nodalization; Advancing front method for triangulation
Lecture 46 - Delaunay triangulation method for unstructured grid generation
Lecture 47 - Co -located grid approach for irregular geometries; Pressure correction equation for a co -locat