

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

NPTEL Video Course - Physics - NOC:Numerical Methods and Simulation Techniques for Scientists and Engineers

Subject Co-ordinator - Dr. Saurabh Basu

Co-ordinating Institute - IIT - Guwahati

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

- Lecture 1 - Error analysis and estimates, significant digits, convergence
- Lecture 2 - Roots of Non-linear equations, Bisection method
- Lecture 3 - Newton Raphson method, Secant method
- Lecture 4 - Newton Raphson Method
- Lecture 5 - Newton Raphson Method (example), Curve fitting and interpolation of data
- Lecture 6 - Newton's interpolation formula, statistical interpolation of data
- Lecture 7 - Linear and Polynomial regression
- Lecture 8 - Numerical differentiation
- Lecture 9 - Numerical differentiation, Error analysis
- Lecture 10 - Numerical integration, Trapezoidal rule
- Lecture 11 - Simpson's 1/3rd rule
- Lecture 12 - Simpson's 1/3rd rule, Gaussian integration
- Lecture 13 - Ordinary Differential equations
- Lecture 14 - Solution of differential equation, Taylor series and Euler method
- Lecture 15 - Heun's method
- Lecture 16 - Runge Kutta method
- Lecture 17 - Examples of differential equation
- Lecture 18 - Introduction to Monte Carlo technique
- Lecture 19 - Details of the Monte Carlo method
- Lecture 20 - Importance sampling
- Lecture 21 - Applications
- Lecture 22 - Introduction to Molecular Dynamics
- Lecture 23 - Verlet algorithm
- Lecture 24 - Applications of Molecular dynamics

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