NPTEL Video Course - Chemistry and Biochemistry - NOC:Mathematics for Chemistry

Subject Co-ordinator - Dr. Madhav Ranganathan

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Errors, precision and accuracy
Lecture 2 - Probability and distributions
Lecture 3 - Gaussian distribution and integrals
Lecture 4 - Gaussian distribution, integrals, averages
Lecture 5 - Practice problems 1
Lecture 6 - Vectors and Vector Spaces
Lecture 7 - Linear Independence
Lecture 8 - Scalar and vector fields
Lecture 9 - Gradient, divergence and curl
Lecture 10 - Practice problems 2
Lecture 11 - Line integrals, Potential Theory
Lecture 12 - Surface and Volume Integrals
Lecture 13 - Matrices
Lecture 14 - Linear Systems, Cramer's Rule
Lecture 15 - Practice Problems 3
Lecture 16 - Rank and Inverse of a Matrix
Lecture 17 - Eigenvalues and Eigenvectors
Lecture 18 - Special matrices
Lecture 19 - Spectral decomposition and Normal modes
Lecture 20 - Practice Problems 4
Lecture 21 - Differential equations, Order
Lecture 22 - Exact and Inexact differentials
Lecture 23 - Integrating Factors
Lecture 24 - System of 1st order ODEs, matrix methods
Lecture 25 - Practice Problems 5
Lecture 26 - Types of 2nd order ODEs, nature of solutions
Lecture 27 - Homogeneous 2nd order ODEs
Lecture 28 - Homogeneous and nonhomogeneous equations
Lecture 29 - Nonhomogeneous equations Â Variation of parameters

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Lecture 30 - Practice Problems 6
Lecture 31 - Power series method for solving Legendre DE
Lecture 32 - Properties of Legendre Polynomials
Lecture 33 - Associated Legendre Polynomials, Spherical Harmonics
Lecture 34 - Hermite Polynomials, Solution of Quantum Harmonic Oscillator
Lecture 35 - Practice Problems 7
Lecture 36 - Conditions for power series solution
Lecture 37 - Frobenius Method, Bessel Functions
Lecture 38 - Properties of Bessel Functions, circular boundary problems
Lecture 39 - Leguerre Polynomials, solution to radial part of H-atom
Lecture 40 - Practice Problems 8
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