

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

NPTEL Video Course - Mathematics - NOC:Matrix Solver

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Co-ordinating Institute - IIT - Kharagpur

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

- Lecture 1 - Introduction to Matrix Algebra - I
- Lecture 2 - Introduction to Matrix Algebra - II
- Lecture 3 - System of Linear Equations
- Lecture 4 - Determinant of a Matrix
- Lecture 5 - Determinant of a Matrix (Continued...)
- Lecture 6 - Gauss Elimination
- Lecture 7 - Gauss Elimination (Continued...)
- Lecture 8 - LU Decomposition
- Lecture 9 - Gauss-Jordan Method
- Lecture 10 - Representation of Physical Systems as Matrix Equations
- Lecture 11 - Tridiagonal Matrix Algorithm
- Lecture 12 - Equations with Singular Matrices
- Lecture 13 - Introduction to Vector Space
- Lecture 14 - Vector Subspace
- Lecture 15 - Column Space and Nullspace of a Matrix
- Lecture 16 - Finding Null Space of a Matrix
- Lecture 17 - Solving $Ax=b$ when A is Singular
- Lecture 18 - Linear Independence and Spanning of a Subspace
- Lecture 19 - Basis and Dimension of a Vector Space
- Lecture 20 - Four Fundamental Subspaces of a Matrix
- Lecture 21 - Left and right inverse of a matrix
- Lecture 22 - Orthogonality between the subspaces
- Lecture 23 - Best estimate
- Lecture 24 - Projection operation and linear transformation
- Lecture 25 - Creating orthogonal basis vectors
- Lecture 26 - Gram-Schmidt and modified Gram-Schmidt algorithms
- Lecture 27 - Comparing GS and modified GS
- Lecture 28 - Introduction to eigenvalues and eigenvectors
- Lecture 29 - Eigenvalues and eigenvectors for real symmetric matrix

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- Lecture 30 - Positive definiteness of a matrix
- Lecture 31 - Positive definiteness of a matrix (Continued...)
- Lecture 32 - Basic Iterative Methods
- Lecture 33 - Basic Iterative Methods
- Lecture 34 - Convergence Rate and Convergence Factor for Iterative Methods
- Lecture 35 - Numerical Experiments on Convergence
- Lecture 36 - Steepest Descent Method
- Lecture 37 - Steepest Descent Method
- Lecture 38 - Steepest Descent Method
- Lecture 39 - Introduction to General Projection Methods
- Lecture 40 - Residue Norm and Minimum Residual Algorithm
- Lecture 41 - Developing computer programs for basic iterative methods
- Lecture 42 - Developing computer programs for projection based methods
- Lecture 43 - Introduction to Krylov subspace methods
- Lecture 44 - Krylov subspace methods for linear systems
- Lecture 45 - Iterative methods for solving linear systems using Krylov subspace methods
- Lecture 46 - Conjugate gradient methods
- Lecture 47 - Conjugate gradient methods (Continued...)
- Lecture 48 - Conjugate gradient methods (Continued...) and Introduction to GMRES
- Lecture 49 - GMRES (Continued...)
- Lecture 50 - Lanczos Biorthogonalization and BCG Algorithm
- Lecture 51 - Numerical issues in BICG and polynomial based formulation
- Lecture 52 - Conjugate gradient squared and Biconjugate gradient stabilized
- Lecture 53 - Line relaxation method
- Lecture 54 - Block relaxation method
- Lecture 55 - Domain Decomposition and Parallel Computing
- Lecture 56 - Preconditioners
- Lecture 57 - Preconditioned conjugate gradient
- Lecture 58 - Preconditioned GMRES
- Lecture 59 - Multigrid methods - I
- Lecture 60 - Multigrid methods - II