

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

NPTEL Video Course - Mathematics - NOC:Matrix Computation and its applications

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Co-ordinating Institute - IIT - Delhi

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

Lecture 1 - Binary Operation and Groups

Lecture 2 - Vector Spaces

Lecture 3 - Some Examples of Vector Spaces

Lecture 4 - Some Examples of Vector Spaces (Continued...)

Lecture 5 - Subspace of a Vector Space

Lecture 6 - Spanning Set

Lecture 7 - Properties of Subspaces

Lecture 8 - Properties of Subspaces (Continued...)

Lecture 9 - Linearly Independent and Dependent Vectors

Lecture 10 - Linearly Independent and Dependent Vectors (Continued...)

Lecture 11 - Properties of Linearly Independent and Dependent Vectors

Lecture 12 - Properties of Linearly Independent and Dependent Vectors (Continued...)

Lecture 13 - Basis and Dimension of a Vector Space

Lecture 14 - Example of Basis and Standard Basis of a Vector Space

Lecture 15 - Linear Functions

Lecture 16 - Range Space of a Matrix and Row Reduced Echelon Form

Lecture 17 - Row Equivalent Matrices

Lecture 18 - Row Equivalent Matrices (Continued...)

Lecture 19 - Null Space of a Matrix

Lecture 20 - Four Subspaces Associated with a Given Matrix

Lecture 21 - Four Subspaces Associated with a Given Matrix (Continued...)

Lecture 22 - Linear Independence of the rows and columns of a Matrix

Lecture 23 - Application of Diagonal Dominant Matrices

Lecture 24 - Application of Zero Null Space: Interpolating Polynomial and Wronskian Matrix

Lecture 25 - Characterization of basis of a Vector Space and its Subspaces

Lecture 26 - Coordinate of a Vector with respect to Ordered Basis

Lecture 27 - Examples of different subspaces of a vector space of polynomials having degree less than or equal to

Lecture 28 - Linear Transformation

Lecture 29 - Properties of Linear Transformation

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- Lecture 30 - Determining Linear Transformation on a Vector Space by its value on the basis element
- Lecture 31 - Range space and null space of a Linear Transformation
- Lecture 32 - Rank and Nullity of a Linear Transformation
- Lecture 33 - Rank Nullity Theorem
- Lecture 34 - Application of Rank Nullity Theorem and Inverse of a Linear Transformation
- Lecture 35 - Matrix Associated with Linear Transformation
- Lecture 36 - Matrix Representation of a Linear Transformation Relative to Ordered Bases
- Lecture 37 - Matrix Representation of a Linear Transformation Relative to Ordered Bases (Continued...)
- Lecture 38 - Linear Map Associated with a Matrix
- Lecture 39 - Similar Matrices and Diagonalisation of Matrix
- Lecture 40 - Orthonormal bases of a Vector Space
- Lecture 41 - Gram-Schmidt Orthogonalisation Process
- Lecture 42 - QR Factorisation
- Lecture 43 - Inner Product Spaces
- Lecture 44 - Inner Product of different real vector spaces and basics of complex vector space
- Lecture 45 - Inner Product on complex vector spaces and Cauchy-Schwarz inequality
- Lecture 46 - Norm of a Vector
- Lecture 47 - Matrix Norm
- Lecture 48 - Sensitivity Analysis of a System of Linear Equations
- Lecture 49 - Orthogonality of the four subspaces associated with a matrix
- Lecture 50 - Best Approximation: Least Square Method
- Lecture 51 - Best Approximation: Least Square Method (Continued...)
- Lecture 52 - Jordan-Canonical Form
- Lecture 53 - Some examples on the Jordan form of a given matrix and generalised eigen vectors
- Lecture 54 - Singular value decomposition (SVD) theorem
- Lecture 55 - Matlab/Octave code for Solving SVD
- Lecture 56 - Pseudo-Inverse/Moore-Penrose Inverse
- Lecture 57 - Householder Transformation
- Lecture 58 - Matlab/Octave code for Householder Transformation