

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

NPTEL Video Course - Mathematics - Linear Algebra

Subject Co-ordinator - Dr. K.C. Sivakumar

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction to the Course Contents
Lecture 2 - Linear Equations
Lecture 3a - Equivalent Systems of Linear Equations I
Lecture 3b - Equivalent Systems of Linear Equations II
Lecture 4 - Row-reduced Echelon Matrices
Lecture 5 - Row-reduced Echelon Matrices and Non-homogeneous Equations
Lecture 6 - Elementary Matrices, Homogeneous Equations and Non-homogeneous Equations
Lecture 7 - Invertible matrices, Homogeneous Equations Non-homogeneous Equations
Lecture 8 - Vector spaces
Lecture 9 - Elementary Properties in Vector Spaces. Subspaces
Lecture 10 - Subspaces (Continued...), Spanning Sets, Linear Independence, Dependence
Lecture 11 - Basis for a vector space
Lecture 12 - Dimension of a vector space
Lecture 13 - Dimensions of Sums of Subspaces
Lecture 14 - Linear Transformations
Lecture 15 - The Null Space and the Range Space of a Linear Transformation
Lecture 16 - The Rank-Nullity-Dimension Theorem. Isomorphisms Between Vector Spaces
Lecture 17 - Isomorphic Vector Spaces, Equality of the Row-rank and the Column-rank - I
Lecture 18 - Equality of the Row-rank and the Column-rank - II
Lecture 19 - The Matrix of a Linear Transformation
Lecture 20 - Matrix for the Composition and the Inverse. Similarity Transformation
Lecture 21 - Linear Functionals. The Dual Space. Dual Basis - I
Lecture 22 - Dual Basis II. Subspace Annihilators - I
Lecture 23 - Subspace Annihilators - II
Lecture 24 - The Double Dual. The Double Annihilator
Lecture 25 - The Transpose of a Linear Transformation. Matrices of a Linear Transformation and its Transpose
Lecture 26 - Eigenvalues and Eigenvectors of Linear Operators
Lecture 27 - Diagonalization of Linear Operators. A Characterization
Lecture 28 - The Minimal Polynomial

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- Lecture 29 - The Cayley-Hamilton Theorem
- Lecture 30 - Invariant Subspaces
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- Lecture 34 - Direct Sum Decompositions and Projection Operators - II
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- Lecture 37 - The Cyclic Decomposition Theorem - I
- Lecture 38 - The Cyclic Decomposition Theorem - II. The Rational Form
- Lecture 39 - Inner Product Spaces
- Lecture 40 - Norms on Vector spaces. The Gram-Schmidt Procedure I
- Lecture 41 - The Gram-Schmidt Procedure II. The QR Decomposition
- Lecture 42 - Bessel's Inequality, Parseval's Identity, Best Approximation
- Lecture 43 - Best Approximation
- Lecture 44 - Orthogonal Complementary Subspaces, Orthogonal Projections
- Lecture 45 - Projection Theorem. Linear Functionals
- Lecture 46 - The Adjoint Operator
- Lecture 47 - Properties of the Adjoint Operation. Inner Product Space Isomorphism
- Lecture 48 - Unitary Operators
- Lecture 49 - Unitary operators - II. Self-Adjoint Operators - I.
- Lecture 50 - Self-Adjoint Operators - II - Spectral Theorem
- Lecture 51 - Normal Operators - Spectral Theorem