NPTEL Video Course - Electrical Engineering - NOC:Applied Linear Algebra

Subject Co-ordinator - Prof. Andrew Thangaraj

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction to the Course
Lecture 2 - Vector Spaces
Lecture 3 - Linear Combinations and Span
Lecture 4 - Subspaces, Linear Dependence and Independence
Lecture 5 - Basis and Dimension
Lecture 6 - Sums, Direct Sums and Gaussian Elimination
Lecture 7 - Linear Maps and Matrices
Lecture 8 - Null space, Range, Fundamental theorem of linear maps
Lecture 9 - Column space, null space and rank of a matrix
Lecture 10 - Algebraic operations on linear maps
Lecture 11 - Invertible maps, Isomorphism, Operators
Lecture 12 - Solving Linear Equations
Lecture 13 - Elementary Row Operations
Lecture 14 - Translates of a subspace, Quotient Spaces
Lecture 15 - Row space and rank of a matrix
Lecture 16 - Determinants
Lecture 17 - Coordinates and linear maps under a change of basis
Lecture 18 - Simplifying matrices of linear maps by choice of basis
Lecture 19 - Polynomials and Roots
Lecture 20 - Invariant subspaces, Eigenvalues, Eigenvectors
Lecture 21 - More on Eigenvalues, Eigenvectors, Diagonalization
Lecture 22 - Eigenvalues, Eigenvectors and Upper Triangularization
Lecture 23 - Properties of Eigenvalues
Lecture 24 - Linear state space equations and system stability
Lecture 25 - Discrete-time Linear Systems and Discrete Fourier Transforms
Lecture 26 - Sequences and counting paths in graphs
Lecture 27 - PageRank Algorithm
Lecture 28 - Dot product and length in Cn, Inner product and norm in V over F
Lecture 29 - Orthonormal basis and Gram-Schmidt orthogonalisation

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Lecture 30 - Linear Functionals, Orthogonal Complements
Lecture 31 - Orthogonal Projection
Lecture 32 - Projection and distance from a subspace
Lecture 33 - Linear equations, Least squares solutions and Linear regression
Lecture 34 - Minimum Mean Squared Error Estimation
Lecture 35 - Adjoint of a linear map
Lecture 36 - Properties of Adjoint of a Linear Map
Lecture 37 - Adjoint of an Operator and Operator-Adjoint Product
Lecture 38 - Self-adjoint Operator
Lecture 39 - Normal Operators
Lecture 40 - Complex Spectral Theorem
Lecture 41 - Real Spectral Theorem
Lecture 42 - Positive Operators
Lecture 43 - Quadratic Forms, Matrix Norms and Optimization
Lecture 44 - Isometries
Lecture 45 - Classification of Operators
Lecture 46 - Singular Values and Vectors of a Linear Map
Lecture 47 - Singular Value Decomposition
Lecture 48 - Polar decomposition and some applications of SVD
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