NPTEL Video Course - Electrical Engineering - NOC:Applied Linear Algebra for Signal Processing, Data Analytic

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

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Lecture 30 - SVD Application in MIMO Wireless Technology: Spatial-Multiplexing and High Data Rates
Lecture 31 - SVD for MIMO wireless optimization, water-filling algorithm, optimal power allocation
Lecture 32 - SVD application for Machine Learning: Principal component analysis (PCA)
Lecture 33 - Multiple signal classification (MUSIC) algorithm: system model
Lecture 34 - MUSIC algorithm for Direction of Arrival (DoA) estimation
Lecture 35 - Linear minimum mean square error (LMMSE) principle
Lecture 36 - LMMSE estimate and error covariance matrix
Lecture 37 - LMMSE estimation in linear systems
Lecture 38 - LMMSE application: Wireless channel estimation and example
Lecture 39 - Time-series prediction via auto-regressive (AR) model
Lecture 40 - Recommender system: design and rating prediction
Lecture 41 - Recommender system: Illustration via movie rating prediction example
Lecture 42 - Fast Fourier transform (FFT) and Inverse fast Fourier transform (IFFT)
Lecture 43 - IFFT/ FFT application in Orthogonal Frequency Division Multiplexing (OFDM) wireless technology
Lecture 44 - OFDM system: Circulant matrices and properties
Lecture 45 - OFDM system model: Transmitter and receiver processing
Lecture 46 - Single-carrier frequency division for multiple access (SC-FDMA) technology
Lecture 47 - Linear dynamical systems: definition and solution via matrix exponential
Lecture 48 - Linear dynamical systems: matrix exponential via SVD
Lecture 49 - Machine Learning application: Support Vector Machines (SVM)
Lecture 50 - Support Vector Machines (SVM): Problem formulation via maximum hyperplane separation
Lecture 51 - Sparse regression: problem formulation and relation to Compressive Sensing (CS)
Lecture 52 - Sparse regression: solution via the Orthogonal Matching Pursuit (OMP) algorithm
Lecture 53 - OMP Example for Sparse Regression
Lecture 54 - Machine Learning Application: Clustering
Lecture 55 - K-Means Clustering algorithm
Lecture 56 - Introduction to Stochastic Processes and Markov Chains
Lecture 57 - Discrete Time Markov Chains and Transition Probability Matrix
Lecture 58 - Discrete Time Markov Chain Examples
Lecture 59 - m-STEP Transition Probabilities for Discrete Time Markov Chains
Lecture 60 - Limiting Behavior of Discrete Time Markov Chains
Lecture 61 - Least Squares Revisited: Rank Deficient Matrix
Lecture 62 - Least Squares using SVD
Lecture 63 - Weighted Least Squares
Lecture 64 - Weighted Least Squares Example
Lecture 65 - Woodbury Matrix Identity - Matrix Inversion Lemma
Lecture 66 - Woodbury Matrix Identity - Proof
Lecture 67 - Conditional Gaussian Density - Mean
Lecture 68 - Conditional Gaussian Density - Covariance

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Lecture 69 - Scalar Linear Model for Gaussian Estimation
Lecture 70 - MMSE Estimate and Covariance for the Scalar Linear Model

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