

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

NPTEL Video Course - Electrical Engineering - NOC:Principles of Communication Systems - Part II

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

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

- Lecture 1 - Introduction to Digital Communication Systems
- Lecture 2 - Spectrum of Transmitted Digital Communication Signal and Wide Sense Stationarity
- Lecture 3 - Spectrum of Transmitted Digital Communication Signal, Autocorrelation Function and Power Spectral Density
- Lecture 4 - Spectrum of Transmitted Digital Communication Signal, Relation to Energy Spectral Density and Intensity
- Lecture 5 - Additive White Gaussian Noise (AWGN) Properties, Gaussian Noise and White Noise
- Lecture 6 - Structure of Digital Communication Receiver, Receiver Filter and Signal-to-Noise Power Ratio (SNR)
- Lecture 7 - Digital Communication Receiver, Noise Properties and Output Noise Power
- Lecture 8 - Digital Communication Receiver, Optimal SNR and Matched Filter
- Lecture 9 - Probability of Error in Digital Communication and Probability Density Functions of Output
- Lecture 10 - Probability of Error in Digital Communication, Optimal Decision Rule and Gaussian Q function
- Lecture 11 - Introduction to Binary Phase Shift Keying (BPSK) Modulation, Optimal Decision Rule and Probability of Error
- Lecture 12 - Introduction to Amplitude Shift Keying (ASK) Modulation
- Lecture 13 - Optimal Decision Rule for Amplitude Shift Keying (ASK), Bit Error Rate (BER) and Comparison with BPSK
- Lecture 14 - Introduction to Signal Space Concept and Orthonormal Basis Signals
- Lecture 15 - Introduction to Frequency Shift Keying (FSK)
- Lecture 16 - Optimal Decision Rule for FSK, Bit Error Rate (BER) and Comparison with BPSK, ASK
- Lecture 17 - Introduction to Quadrature Phase Shift Keying (QPSK)
- Lecture 18 - Waveforms of Quadrature Phase Shift Keying (QPSK)
- Lecture 19 - Matched Filtering, Bit Error Rate and Symbol Error Rate for Quadrature Phase Shift Keying (QPSK)
- Lecture 20 - Introduction to M-ary PAM (Pulse Amplitude Modulation), Average Symbol Power and Decision rules
- Lecture 21 - M-ary PAM (Pulse Amplitude Modulation) -Part-II, Optimal Decision Rule and Probability of Error
- Lecture 22 - M-ary QAM (Quadrature Amplitude Modulation) Part-I, Introduction, Transmitted Waveform and Average Symbol Power
- Lecture 23 - M-ary QAM (Quadrature Amplitude Modulation) - Part-II, Optimal Decision Rule, Probability of Error
- Lecture 24 - M-ary PSK (Phase Shift Keying) Part-I, Introduction , Transmitted Waveform and Constellation Diagram
- Lecture 25 - M-ary PSK (Phase Shift Keying) - Part-II, Optimal Decision Rule, Nearest Neighbor Criterion and Probability of Error
- Lecture 26 - Introduction to Information Theory, Relevance of Information Theory and Characterization of Information
- Lecture 27 - Definition of Entropy, Average of Information / Uncertainty of source and Properties of Entropy
- Lecture 28 - Entropy Example- Binary Source Maximum and Minimum Entropy of Binary Source
- Lecture 29 - Maximum Entropy of Source with M-ary Alphabet, Concave/Convex Functions and Jensens Inequality

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- Lecture 30 - Joint Entropy , Definition of Joint Entropy of Two Sources and Simple Examples for Joint Entropy
- Lecture 31 - Properties of Joint Entropy and Relation between Joint Entropy and Marginal Entropies
- Lecture 32 - Conditional Entropy, Example of Conditional Entropy and Properties of Conditional Entropy
- Lecture 33 - Mutual Information, Diagrammatic Representation and Properties of Mutual Information
- Lecture 34 - Simple Example of Mutual Information and Practical Example of Mutual Information-Binary Symmetric
- Lecture 35 - Channel Capacity, Implications of Channel Capacity, Claude E. Shannon- Father of Information Theory
- Lecture 36 - Differential Entropy and Example for Uniform Probability Density function
- Lecture 37 - Differential Entropy of Gaussian Source and Insights
- Lecture 38 - Joint Conditional/ Differential Entropies and Mutual Information
- Lecture 39 - Capacity of Gaussian channel - Part I
- Lecture 40 - Capacity of Gaussian Channel - Part-II, Practical Implications and Maximum rate in bits/sec
- Lecture 41 - Introduction to Source Coding and Data Compression, Variable Length codes and Unique Decodability
- Lecture 42 - Uniquely Decodable Codes, Prefix-free code, Instantaneous Code and Average Code length
- Lecture 43 - Binary Tree Representation of Code, Example and Kraft Inequality
- Lecture 44 - Lower Bound on Average Code Length and Kullback-Leibler Divergence
- Lecture 45 - Optimal Code length, Constrained Optimization and Morse Code Example
- Lecture 46 - Approaching Lower Bound on Average code length and Block Coding
- Lecture 47 - Huffman Code, Algorithm, Example and Average Code Length
- Lecture 48 - Introduction to channel coding, Rate of Code, Repetition Code and Hamming Distance
- Lecture 49 - Introduction to Convolutional Codes, Binary Field Arithmetic and Linear Codes
- Lecture 50 - Example of Convolutional Code Output and Convolution Operation for Code generation
- Lecture 51 - Matrix Representation of Convolutional Codes, Generator Matrix, Transform Domain Representation
- Lecture 52 - State Diagram Representation of Convolutional Code, State transitions and Example of Code Generation
- Lecture 53 - Trellis Representation of Convolutional Code and Valid Code Words
- Lecture 54 - Decoding of the Convolutional Code, Minimum Hamming distance and Maximum Likelihood Codeword Estimation
- Lecture 55 - Principle of Decoding of Convolutional code
- Lecture 56 - Viterbi Decoder for Maximum Likelihood Decoding of Convolutional Code Using Trellis Representation