

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

NPTEL Video Course - Electrical Engineering - NOC:LDPC and Polar Codes in 5G Standard

Subject Co-ordinator - Dr. Andrew Thangaraj

Co-ordinating Institute - IIT - Madras

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

- Lecture 1 - Additive White Gaussian Noise (AWGN) Channel and BPSK
- Lecture 2 - Bit Error Rate (BER) and Signal to Noise Ratio (SNR)
- Lecture 3 - Error Correction Coding in a Digital Communication System
- Lecture 4 - Complementary Error Function
- Lecture 5 - Simulation of Uncoded BPSK and BER v/s E_b/N_0 plot Generation in MATLAB/Octave
- Lecture 6 - $n = 3$ Repetition Code
- Lecture 7 - Implementation of $n = 3$ Repetition Code in MATLAB
- Lecture 8 - (7,4) Hamming Code
- Lecture 9 - A Brief Introduction to Linear Block Codes
- Lecture 10 - Simulation of (7,4) Hamming Code in MATLAB
- Lecture 11 - Low Density Parity Check Codes
- Lecture 12 - LDPC Codes in 5G
- Lecture 13 - Encoding LDPC codes in 5G
- Lecture 14 - MATLAB programs for encoding LDPC codes
- Lecture 15 - Log-Likelihood Ratio and Soft Input and Soft Output (SISO) Decoder for the Repetition Code
- Lecture 16 - Soft Input and Soft Output (SISO) Decoder for the Single Parity Check (SPC) Code
- Lecture 17 - Illustration of SISO decoder for (3,2) SPC code and min-sum approximation
- Lecture 18 - SISO decoder for a general $(n,n-1)$ SPC code
- Lecture 19 - Soft-Input Soft-Output Iterative Message Passing Decoder for LDPC Codes
- Lecture 20 - A Toy Example Illustration of the SISO Minsum Iterative Message Passing Decoder
- Lecture 21 - Modifications to the Decoder
- Lecture 22 - Implementation of SISO Layered Minsum Iterative Message Passing Decoder in MATLAB
- Lecture 23 - Debugging and Improvements to the MATLAB Implementation
- Lecture 24 - Rate Matching in LDPC Codes using Puncturing and Shortening
- Lecture 25 - Implementation of Fixed Point Quantization and Offset Minsum in the Decoder
- Lecture 26 - Introduction to Polar Codes
- Lecture 27 - Channel Polarization, Definition of (N,K) Polar Code and Encoding
- Lecture 28 - MATLAB Implementation for Encoding Polar Codes
- Lecture 29 - Successive Cancellation (SC) Decoder for Polar Codes

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- Lecture 30 - Successive Cancellation (SC) Decoder for a General (N,K) Polar Code
- Lecture 31 - MATLAB Implementation of Successive Cancellation Decoder - Part 1
- Lecture 32 - MATLAB Implementation of Successive Cancellation Decoder - Part 2
- Lecture 33 - Successive Cancellation List Decoding
- Lecture 34 - Fixed Point Quantization for SC Decoder and LDPC Decoder
- Lecture 35 - MATLAB Implementation of Successive Cancellation List Decoding
- Lecture 36 - Rate Matching for LDPC codes
- Lecture 37 - Performance Comparison of LDPC codes and Polar Codes in 5G