NOC:Error Control Coding: An Introduction to Convolutional Codes - Video course

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Electronics & Communication Engineering
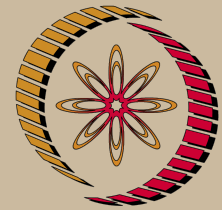
COURSE OUTLINE

Error control coding is an indispensible part of any digital communication system. In this introductory course, we will discuss theory of convolutional codes, their encoding and decoding techniques as well as their applications in real world scenarios. We will also study how from simple codes by concatenation we can build more powerful error correcting codes. In particular, we will study in details, one such capacity approaching codes called turbo codes.

COURSE DETAIL

Week .No	Topic
1	Lecture 1: Introduction to error control coding Lecture 2: Introduction to convolutional codes-I: state diagram, trellis diagram Lecture 3: Introduction to convolutional codes-II: classification, realization, distance properties
2	Lecture 4: Decoding of convolutional codes-I: Viterbi algorithm Lecture 5: Decoding of convolutional codes-II: BCJR algorithm
3	Lecture 6: Introduction to concatenated codes: parallel, serial Lecture 7: Turbo codes: encoding, and properties
4	Lecture 8: Turbo decoding Lecture 9: Convergence of turbo decoding algorithm Lecture 10: Applications of convolutional codes

Pre-requisites:

Basic knowledge of probability theory and digital communications

Coordinators:

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References:

1. "Error Control Coding", by Shu Lin and Daniel J. Costello, Jr., second edition, Prentice Hall, 2004.
2. Todd K. Moon, "Error Correction Coding", 1st Edition, Wiley-Interscience, 2006.
3. Rolf Johannesson and Kamil Sh. Zigangirov, ``Fundamentals of Convolutional Coding'', IEEE Press, 1999.
4. Ajay Dholakia, ``Introduction to Convolutional Codes with Applications'', Springer, 1994.