

Duration – 10 days (Estimate)

01. Introduction

- Signals, Systems, and Signal Processing
- Classification of Signals
- Frequency
- Analog-to-Digital and Digital-to-Analog Conversion

02. Discrete Time Signals and Systems

- Signals
- Systems
- Analysis
- Difference Equations
- Implementation
- Correlation

03. The z-Transform

- Properties
- Rational z-Transform
- Inversion of the z-Transform
- Analysis in the z-Domain
- One-Sided z-Transform

04. Frequency Analysis of Signals

- Continuous Time Signals
- Discrete Time Signals
- Signal Properties
- Properties of the Fourier Transform

05. Frequency Domain Analysis

- Frequency Domain Characteristics
- Frequency Response
- Correlation Functions
- Frequency Selective Filters
- Deconvolution

06. Sampling and Reconstruction of Signals

- Continuous Time Signals
- Discrete Time Processing
- Extensible Authentication Protocol
- Analog-to-Digital and Digital-to-Analog Converters
- Continuous-Time Bandpass Signals

- Sampling of Discrete Time Signals
- Oversampling A/D and D/A Converters

07. The Discrete Fourier Transform

- Frequency Domain Sampling
- Properties
- Linear Filtering Methods
- Frequency Analysis
- Discrete Cosine Transform

08. The Fast Fourier Transform

- FFT Algorithms
- Applications
- A Linear Filtering Approach
- Quantisation Effects

09. Digital Filters

- Fundamentals
- FIR Filters
- IIR Filters
- Frequency Transformations

10. Multirate Digital Signal Processing

- Fundamentals
- Decimation
- Interpolation
- Sampling Rate Conversion
- Multistage Implementation
- Bandpass Signals
- Applications
- Digital Filter Banks

11. Linear Prediction and Linear Filters

- Random Signals
- Correlation Functions
- Power Spectra
- Forward and Backward Linear Prediction
- Properties
- Lattice / Ladder Filters
- Wiener Filters

12. Adaptive Filters

- Applications
Adaptive Direct Form Filters

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