

AMEE04 BASIC SYSTEM ANALYSIS

UNIT-1 INTRODUCTION TO CONTINUOUS TIME SIGNALS AND SYSTEMS

- 1.1 Basic continuous time signals, unit step, unit ramp,
- 1.2 Unit impulse and periodic signals with their mathematical representation and Characteristics.
- 1.3 Introduction to various types of systems.
- 1.4 Analogous System: Linear mechanical elements,
- 1.5 Force-voltage and force-current analogy,
- 1.6 Modeling of mechanical and electro-mechanical systems:
- 1.7 Analysis of first and second order linear systems by classical method.

UNIT-2 FOURIER TRANSFORM ANALYSIS

- 2.1 Exponential form and Trigonometric form of Fourier series,
- 2.2 Fourier symmetry,
- 2.3 Fourier Integral and Fourier Transform.
- 2.4 Transform of common functions and Periodic wave forms:
- 2.5 Applications of Fourier Transform to network analysis.

UNIT-3 LAPLACE TRANSFORM ANALYSIS

- 3.1 Review of Laplace Transform,
- 3.2 Laplace Transform of periodic functions,
- 3.3 Initial and Final Value Theorems,
- 3.4 Inverse Laplace Transform,
- 3.5 Convolution Theorem,
- 3.6 Superposition Integral,
- 3.7 Application of Laplace Transform to analysis of networks,
- 3.8 Waveform Synthesis and Laplace Transform of complex waveforms.

UNIT-4 STATE VARIABLE ANALYSIS

- 4.1 State Space representation of linear systems,
- 4.2 Transfer Function and state Variables,
- 4.3 State Transition Matrix,
- 4.4 Solution of state equations for homogeneous and non-homogeneous systems,
- 4.5 Applications of State-Variable technique to the analysis of linear systems

UNIT-5 Z-TRANSFORM ANALYSIS

- 5.1 Concept of Z-Transform, Z-Transform of common functions,
- 5.2 Inverse Z-Transform, Initial and Final Value theorems,
- 5.3 Applications to solution of difference equations, Pulse Transfer Function.

Reference Books:

1. Choudhary D. Roy, "Network & Systems", Wiley Eastern Ltd.
2. Donald E. Scott, "Introduction to circuit Analysis" Mc. Graw Hill
3. B.P. Lathi, "Linear Systems & Signals" Oxford University Press, 2008.
4. I.J. Nagrath, S.N. Saran, R. Ranjan and S. Kumar, "Signals and Systems, "Tata Mc. Graw Hill, 2001.