

# AMEE08 NETWORK ANALYSIS AND SYNTHESIS

## UNIT-1 INTRODUCTION TO GRAPH THEORY

- 1.1 Definitions- graph, tree, spanning tree, loop,
- 1.2 Co-tree, cut set, tie set, loop and nodal analysis,
- 1.3 Introduction to continuous time signal,
- 1.4 Unit step, ramp, and impulse.

## UNIT-2 NETWORK TRANSIENT AND STEADY STATE ANALYSIS

- 2.1 Transient response of simple RL,RC, series and parallel circuits,
- 2.2 Transient response of RLC series and parallel circuits for sinusoidal and step input excitation using Laplace transform method.
- 2.3 Differential equation formation of linear time invariant continuous systems,
- 2.4 Block diagram representation of LTI continuous networks and systems, time domain analysis of LTI network using laplace transform.
- 2.5 Relation between impulse response and system functions, concepts of transform impedance and synthesis.

## UNIT-3 NETWORK FUNCTIONS

- 1.1 Concept of Complex Frequency,
- 1.2 Transform Impedances,
- 1.3 Network function of one port and two port networks,
- 1.4 Concept of poles and zeros,
- 1.5 Relation between locations of poles. Time response and stability.
- 1.6 Frequency response and bode plots.
- 1.7 Interrelation between frequency response and convolution integral.

## UNIT-4 TWO PORT NETWORKS

- 4.1 Two port parameters,
- 4.2 Inter-conversion of 2 port parameter, network function-
- 4.3 Driving point and transfer function, Inter-connections of 2 port networks,
- 4.4 Reciprocity ladder networks, Image impedance,
- 4.5 Characteristic impedance, T-Pi transformation and analysis.

## UNIT-5 POSITIVE REAL FUNCTIONS AND PROPERTIES

- 5.1 Synthesis of LC,
- 5.2 RL and RC using Cauer and Fosters first and second form.

### Reference Books:

1. Narsingh Deo: Graph theory
2. A.Chakrabarti,"Circuit Theory" Dhanpat Rai & Co.
3. W.H. Hayt & Jack E-Kemmerly, Engineering Circuit analysis" Tata McGrawHill.
4. Soni, Gupta,"Circuit Analysis", Dhanpat Rai & Sons.