TEE 307: NETWORK ANALYSIS & SYNTHESIS (ECE)

Unit I Introduction to continuous time signals and systems: Basic continuous time signals, unit step, unit ramp, unit impulse and periodic signals with their mathematical representation and characteristics. Waveform synthesis, Analogous System: Linear mechanical elements, force-voltage and force-current analogy, modeling of mechanical and electro- mechanical systems

Unit 2 Graph Theory: Graph of a Network, definitions, tree, co tree , link, basic loop and basic cut set, Incidence matrix, cut set matrix, Tie set matrix Duality, Loop and Node methods of analysis. Analysis of first and second order linear systems by classical method.

Unit 3 Network Theorems (Applications to ac networks): Super- position theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem. Network Functions : Concept of Complex frequency, Transform Impedances Network functions of one port and two port networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot.

Unit 4 Two Port Networks: Characterization of LTI two port networks ZY, ABCD, h and g-parameters, reciprocity and symmetry, Inter- relationships between the parameters, inter-connections of two port networks, Ladder and Lattice networks. T & ∏ Representation.

Unit 5 Network Synthesis : Positive real function; definition and properties; properties of LC, RC and RL driving point functions, synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms. Introduction to active network synthesis.

Reference Books:

1. Kuo, Network Analysis & Synthesis, Wiley India
2. Jagan, Network Analysis, B S Publication
3. ME Van-Valkenberg; "Network Analysis", Prentice Hall of India
4. Choudhary D.Roy, "Network & Systems", Wiley Eastern Ltd.
5. Donald E.Scott, "Introduction to circuit Analysis" Mc. Graw Hill
6. B.P. Lathi, "Linear Systems & Signals" Oxford University Press, 2008.

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