

EL 202 : NETWORK ANALYSIS I

CREDITS : 5 (L = 4, P = 2)

1. Development of circuit concepts : Charge, energy, power. Circuit parameters. Coupled circuits. Network topography, network graphs and network variables. Trees, links, cut-sets, Kirchoff's laws. Loop and node equations. Methods of solving equilibrium equations. Systematic elimination method. Method using determinants.

2. Step response of simple RL and RC circuits : Time constant and initial conditions. Step response of series and parallel RLC circuits. Solution of homogeneous and non-homogeneous

differential equations. Response of RC, RL and RLC circuits to sinusoidal and exponential driving functions.

3. Laplace transforms. Definition. Laplace transforms of general function such as step, ramp, impulse, exponential and sinusoidal. Basic theorem of Laplace transforms. Inverses of Laplace transforms. Partial fraction expansion. Solution of simple

networks using Laplace transforms.

4. Laplace transforms of special Wave forms. Shifting theorems. Pulse response of RL and RC circuits. Synthesis of waveforms and their Laplace transforms. Initial and final value theorems. Convolution theorem.

5. Network Theorems. Superposition theorem, Thevenin's theorem and Norton's theorem.

6. Concept of complex frequency. Impedance and admittance functions. Poles and zeros of network functions. One-port and two-port networks. Open-circuit impedance and short-circuit admittance parameters. Hybrid parameters.

REFERENCE BOOKS:

1. *M.E. Van Valkenburg*

Network Analysis

Prentice Hall of India

2. *Hayt and Kemmerly*

Engineering Circuit Analysis

McGraw-Hill International