

# OUTLINE OF COURSE IN NETWORK ANALYSIS

F. H. Branin, Dept. 545  
IBM Product Development Laboratory  
Poughkeepsie, New York

- I. Introduction and Prospectus
- II. Matrix Formulation of the Linear Steady State Network Problem
  1. Topological preliminaries
  2. Ohm's law, generalized
  3. Kirchhoff's laws
  4. Formal statement of the network problem
  5. Mesh and node methods of solution
  6. Existence theorem
- III. Kron's Method of Piecewise Analysis
  1. Derivation from mesh and node methods
  2. Interconnecting nodal solutions
  3. Interconnecting mesh solutions
  4. Generalization of Kron's method
  5. Computational uses of Kron's method
- IV. IBM 704 Computer Programs for D-C and A-C Analysis
- V. Nonlinear D-C Network Problems
- VI. Matrix Formulation of the Linear Transient Network Problem
  1. D-C initialization problem
  2. Solution of transient problem by numerical integration
  3. Solution of transient problem by eigenfunction expansion
- VII. Nonlinear Transient Network Problems
- VIII. IBM 704 Computer Programs for Transient Analysis
- IX. Applications of Network Analysis
  1. Electrical network problems
  2. Network models for nonlinear electrical devices
  3. Network models for physical phenomena
- X. Abstract Topological Approach to Network Theory

2/10/59