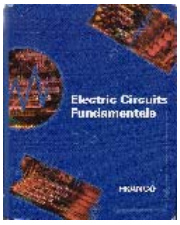

Electric Circuits Fundamentals

Sergio Franco, *San Francisco State University*

Oxford University Press, 1995
ISBN: 0-19-513613-6

Detailed Table of Contents

12 AC POWER AND THREE-PHASE SYSTEMS

- **12.1** **AC Power:** The Power Factor, Power and Impedance, Maximum Power Transfer
- **12.2** **Complex Power:** Real and Reactive Power, Power Factor Correction, Complex Power, Ac Power Measurements
- **12.3** **Three-Phase Systems:** Three-Phase Sources, Three-Phase Loads, Δ-Y and Y Δ Transformations
- **12.4** **Y-Y and Y-Δ Systems:** The Y-Y System, The Y-Δ System
- **12.5** **Power in Three-Phase Systems:** Instantaneous Power, Complex, Real, and Reactive Power, Power Measurements in Three-Phase Systems
- **12.6** **SPICE Analysis of Three-Phase Systems**

Summary
Problems

13 AC RESONANCE

- **13.1** **Series Resonance:** Frequency Response, Phasor Diagrams, Resonance Voltage Rise, Energy at Resonance
- **13.2** **Parallel Resonance:** Practical Resonant Circuits
- **13.3** **Resonant Op Amp Circuits:** A Passive Inductorless Band-Pass Circuit, An Active Inductorless Band-Pass Circuit
- **13.4** **Scaling:** Magnitude Scaling, Frequency Scaling, Magnitude and Frequency Scaling

Summary
Problems

14 NETWORK FUNCTIONS

- **14.1** **Complex Frequency:** Complex Exponential Signals, An Illustrative Example, Generalized Impedance and Admittance, *s*-Domain Circuit Analysis
- **14.2** **Network Functions:** Zeros and Poles, Physical Interpretation of Zeros and Poles, Procedure for Finding Network Functions
- **14.3** **The Natural Response Using *H*(*s*):** Critical Frequencies of Source-Free Circuits, Concluding Remarks
- **14.4** **The Complete Response Using *H*(*s*):** The DC Steady-state Response, The AC Steady-State Response, The Complete Response, The Complete Response of *RC* and *RL* Circuits, DC Passing and AC Blocking, DC Blocking and AC Passing
- **14.5** **The Frequency Response Using *H*(*s*):** Semi-logarithmic Scales, Decibels, An Illustrative Example
- **14.6** **Network Function Building Blocks:** Frequency-Invariant Functions, Functions with a Root at the Origin, Functions with a Real Negative Root, Functions with a Complex Root Pair, Multiple Roots
- **14.7** **Piecewise-Linear Bode Plots:** Plotting Magnitude Directly
- **14.8** **Circuit Responses Using SPICE:** The Sinusoidal Function, Bode Plots Using SPICE

Summary
Problems

15 TWO-PORT NETWORKS AND COUPLED COILS

- **15.1** **Two-Port Parameters:** The T and p Networks, Parameter Conversion, Reciprocal Two-Ports, Non-Existence of Parameters
- **15.2** **he *z*, *y*, *a*, and *h* Parameters:** The *z* Parameters, Models of *z* Parameters, The *y* Parameters, Models of *y* Parameters, The *a* Parameters, The *h* Parameters, Models of *h* Parameters
- **15.3** **Two-Port Interconnections:** Series-Connected Two-Ports, Parallel-Connected Two-Ports, Cascade-Connected Two-Ports
- **15.4** **Magnetically Coupled Coils:** Mutual Inductance, The Dot Convention, Dot Marking, Energy in Coupled Coils, The Coefficient of Coupling, Coupled Coil Measurements
- **15.5** **Transformers:** The Linear Transformer, Reflected Impedance, The Ideal Transformer
- **15.6** **SPICE Analysis of Two-Ports and Coupled Coils:** Two-Ports, Magnetically Coupled Coils

Summary
Problems

16 THE LAPLACE TRANSFORM

- **16.1** **The Step and Impulse Functions:** The Physical Significance of $u(t)$ and $\delta(t)$, Practical Considerations, Scaling, Time-Shifting, The Sifting Property
- **16.2** **The Laplace Transform:** Transform Pairs, Convergence