



Midterm #1 Review

- Analog vs. Digital signals
- Electrical Quantities
 - Charge, Current (and Current Density), Voltage, Power
- Passive Sign Convention
- Basic Circuit Elements
 - Voltage and Current Sources
 - Independent and Dependent
 - I-V Characteristics (Ideal and non-Ideal)
 - Resistors
 - Conductance
 - I-V Characteristics
 - Capacitors and Inductors
 - I-V relationship
 - Energy Storage, Power Consumed / Delivered



Midterm #1 Review Cont'd

- KCL / KVL
 - Basic Principles
 - Formulation
 - With dependent and independent sources
 - Supernode/supermesh
- Superposition
- Circuit Modeling
 - I-V characteristics
 - Equivalent Circuits
 - Thevenin and Norton Equivalents
 - Series / Parallel combinations of elements (res, cap, ind)
 - Source Transformations
- Max Power Transfer



Midterm #1 Review Cont'd

- 1st Order Circuits
 - RL and RC Circuits
 - Transient vs. Steady State Response
 - Natural / Complementary vs. Forced Response
 - Formulation of Differential Equation
 - Complete Solution
 - Complementary and Forced Response
 - Time Constant
 - Equation
 - Settling Accuracy
- Second Order Circuits
 - The differential equation
 - Particular and complementary solutions
 - The natural frequency and the damping ratio



Midterm #1 Review Cont'd

- Phasors
 - Arithmetic Operation
 - Complex Exponentials
 - Representation of Circuit Elements (res, cap, ind)
- Complex Impedence
 - 1st and 2nd Order Filters (LPF, HPF)
- Bode Plots
 - 1st and 2nd Order Filters