

## 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)
- Max Power Transfer

## Midterm #1 Review Cont'd

- 1<sup>st</sup> 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
  - 1<sup>st</sup> Order Filters (LPF, HPF)