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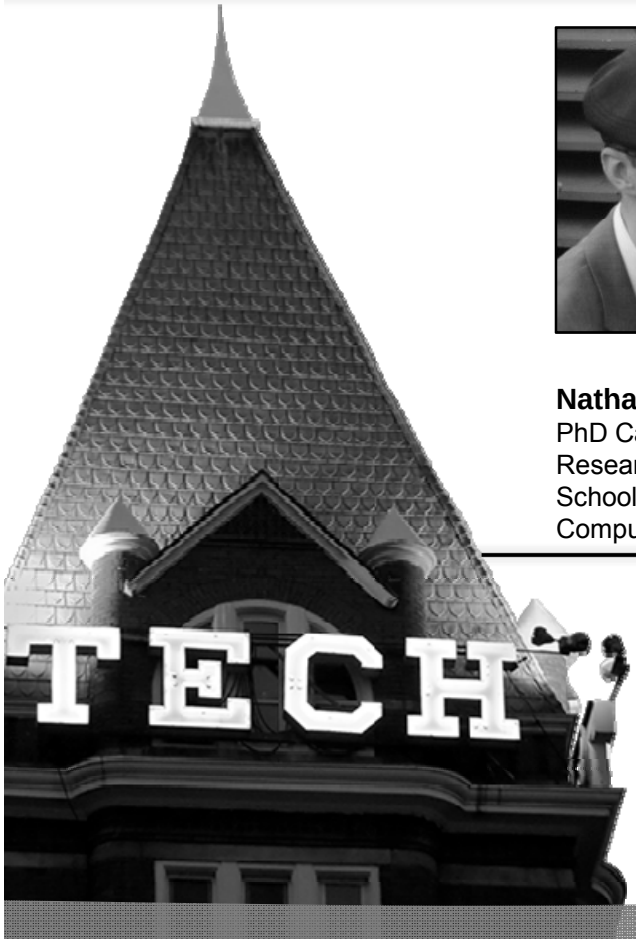

Linear Circuits

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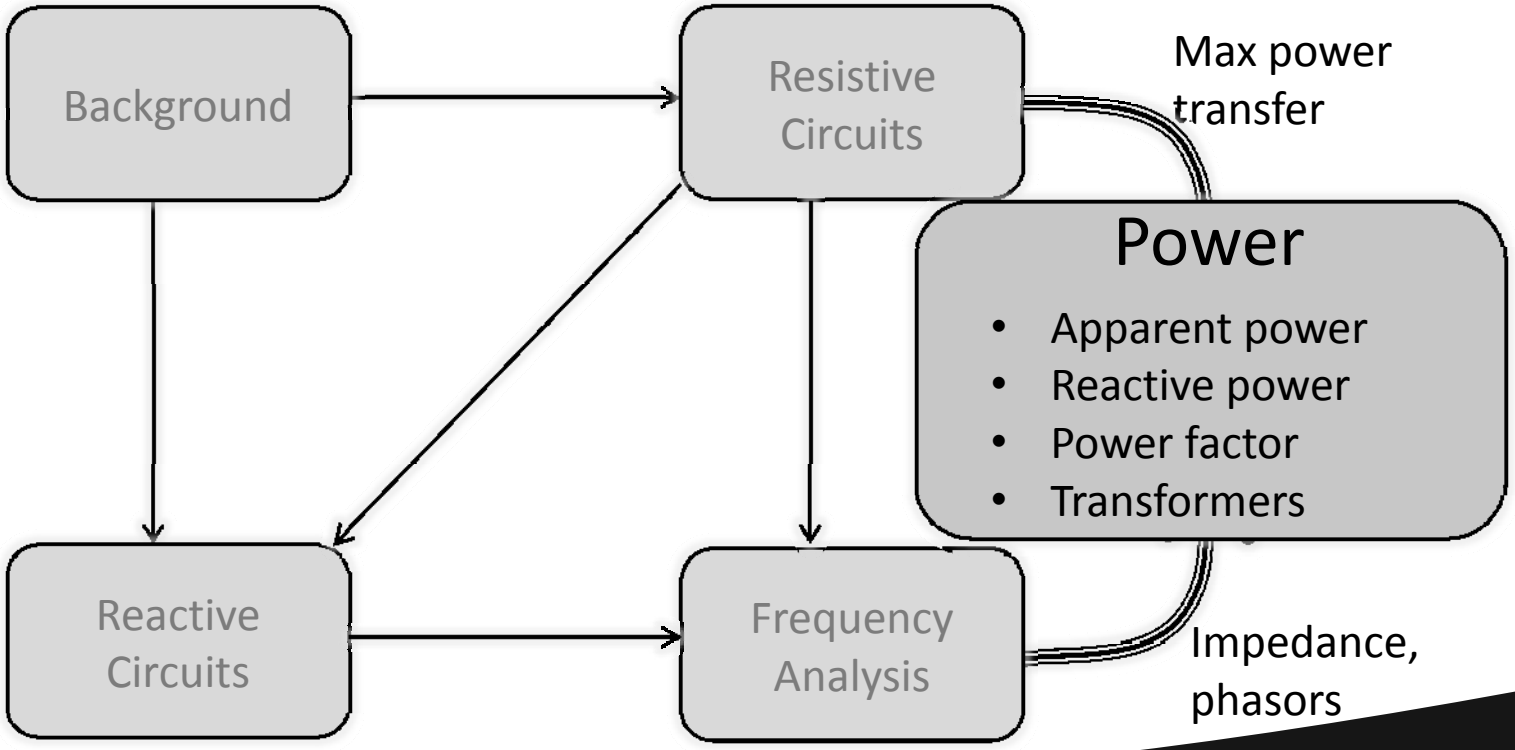
An introduction to linear electric components and a study of circuits containing such devices.

Concept Map: Power



Important Concepts and Skills

ROOT MEAN SQUARE

- Be able to calculate the root-mean square of a periodic function
- Recognize that RMS is invariant to frequency
- Use known RMS value equations to find RMS values given peak values
- Use known RMS value equations to find peak value given RMS values

Important Concepts and Skills

- **POWER FACTOR AND POWER TRIANGLES**
  - Calculate the complex power from either equations or phasors
  - Generate power triangles
  - Using power triangles, be able to find
    - Apparent power, |S|
    - Real (or average) power, P
    - Reactive power, Q
    - Power factor
    - Power angle

Important Concepts and Skills

- **POWER FACTOR AND POWER TRIANGLES**
  - Using the phase angle, identify if a load is resistive, capacitive, or inductive
  - From equations, identify if a load is resistive, capacitive, or inductive
  - From a plot of current and voltage, identify if a load is reactive, capacitive, or inductive
  - Recognize if a system is “leading” or “lagging”

Important Concepts and Skills

- **MAXIMUM POWER TRANSFER IN AC**
  - Calculate the impedance which gives maximal power transfer
  - Calculate the average power consumed when the load gives maximal power transfer
  - Find the optimal purely resistive load for constrained maximal power transfer
  - Calculate average power for purely resistive load

Important Concepts and Skills

- **TRANSFORMERS**
  - Describe the physical effects which make transformers work
  - Use the linear model to analyze a circuit with a transformer
  - Use the ideal model to analyze a circuit with a transformer
  - Identify circumstances when a transformer is an appropriate device to be used in a system
  - Explain how the use of transformers allow long-distance power distribution
  - Describe why transformers do not typically function for direct current systems
  - Identify, from amplitude and phase, the relative displacement for an LVDT transformer