EECS 16B
Designing Information Devices and Systems II

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Module 10: AC Networks and AC Power

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Summary

- AC Circuit Network Theorems
  - Voltage / current dividers
  - Source superposition
  - Thevenin/Norton
- AC Power
  - Average Power
  - Reactive Power
- Maximum power transfer theorem

Review AC Circuits

- Concept of Impedance
- AC equivalent circuit
- Concept of a “system” with AC circuits

AC Voltage Divider

AC Current Divider

AC Source Superposition

AC Thevenin/Norton

AC Power Flow

- Review passive sign convention

Instantaneous Power

Average Power

AC Power in Phasors

Alternate Forms

Inductors/Capacitors Store Energy

- Inductors and capacitors cannot dissipate energy.
- But charging a capacitor requires work, which is stored (not dissipated)
- It seems that we should account for this stored power in AC components

Reactive Power

Example: Real Inductor

- Concept of quality factor

Maximum Power Transfer Theorem

Applications: Solar Panel

Application: Power Matching

- Consider an inductive power link (RFID)