Spring 2010
ECE 4633/6633
Power Distribution Systems
Class 2

Review of Fundamentals
Phasors

- Instantaneous sinusoidal voltage and current
- rms phasor representation
Instantaneous Power

- Product of instantaneous voltage and instantaneous current
  
  - Real (active) power, P
  
  - Reactive power, Q
Complex power

- Product of the voltage and the conjugate of the current
- Apparent power
- Absorb or deliver P, Q
- Impedance, Z
- Power triangle
Example

A single-phase load is supplied with a sinusoidal voltage \( v(t) = 200 \cos(377t) \) V, the resulting instantaneous power is \( p(t) = 800 + 1000 \cos(754t - 36.87^\circ) \).

**Hint:** \( \cos(A - B) = \cos A \cos B + \sin A \sin B \)

a. Determine the complex power (\( \tilde{S} \)) supplied to the load
b. Determine the root mean square of the current (\( I_{rms} \)) and the instantaneous current \( i(t) \) supplied to the load.
c. Determine the load impedance \( Z_L \)
Homework

- Reading assignment: 2.1 - 2.3