ECE 320: Lecture 44
Notes

Misc Notes:

- I have an ECE faculty meeting during office hours today
- Homework #9 due at 6:00pm instead of 5:00pm
- Hw 9 solutions will be posted this weekend.
- I will try to get missing lecture summaries on the web page, but I doubt that I will be get al them up before tuesday. The material that is missing is all covered in Mohan.

Final Exam

- Tuesday, 10:00am - 12:00pm
- 1 sheet (both side) of 8.5in x 11in paper with notes
- Sample exam solutions will be posted this weekend

Topics

Exam I material:

- Single phase AC circuits (time domain and phasors)
- Complex power, real power, reactive power, and power factor
- Hamonics analysis
  * Fourier series
  * Fundamental component RMS versus true RMS
  * Total Harmonic Distortion
  * Crest Factor
  * True power factor, displacement factor, distortion factor
- Transformers
  * Ideal transformer relationships
  * Transformer equivalent circuit with resistances and inductances
  * Short circuit/open circuit tests
  * Transforming impedances across the transformer
  * Voltage regulation
  * Efficiency
- Magnetic circuit analysis
  * Ampere's Law
  * Faraday's Law
  * Lenz's Law
  * Relationships between H, B, φ, e
  * Reluctance
  * Magnetic saturation
  * Computing inductance
  * Determining leakage and magnetizing inductances of transformers
Exam 2 Material

• Speed Voltage
• Torque production
• Basic DC generator and DC motor operation
• Separately excited machine
• Determine speed if you know \( E_a \) and \( I_f \)
  \[ E_a I_a = \tau \omega \]
• Shunt Field machine
• Series excited
• Compound excited
• Motor starting behavior
• Speed control
• Fundamentals of power electronics
• Buck converter
• Basic relationships
• Determination of boundary of discontinuous conduction

New Material Since Exam 2

The exam will be weighted a little more heavily on this material
• Boost and Buck-Boost Converters
• Input/output relationships for each type of dc-dc converter
• Determine boundary of discontinuous conduction for each
• Determine peak to peak voltage ripple for each dc-dc converter or size the capacitor to accomplish a specific ripple
• Closed loop current regulation-- why useful?
• Single phase diode rectifiers:
  * Basic circuit
  * Typical current waveforms for resistive, R-L and parallel R-C dc loads
  * Commutation overlap and impact on dc voltage in continuous conduction
  * Continuous versus discontinuous conduction
  * For a capacitor filtered converter determine peak dc current and initial conduction angle for the dc current
  * Determine true power factor given the current waveform.