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
  - * Detemining leakage and magnetizing inductances of transformers

Exam 2 Material

- Speed Voltage
- Torque production
- Basic DC generator and DC motor operation
- Seperately excited machine
- Determine speed if you know Ea and If
- $Ea*Ia = \tau*\omega$
- 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 discontinous 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.