

ECE 2B – Final Exam Review

Diode Circuits

- I-V characteristics
- Load-line analysis
- Approximate DC modeling (constant voltage drop model)
- DC circuit calculations
- Basic circuit applications (rectifiers, limiters, doublers)
- LEDs

Laplace Transform Methods

- 1st and 2nd-order circuit responses (time-constants, under/over/critical damping)
- Basic properties of Laplace transforms
- Circuit elements in the s-domain and initial conditions
- s-domain transfer functions
- Partial fraction expansions, special cases (repeated roots, complex poles)
- Initial/Final value theorems
- Finding time-domain responses of circuits use LT methods

Transistors

- FETs and BJTs
- Symbols and I-V characteristics
- Approximate DC models
- DC circuit calculations, load-line analysis
- Common DC biasing circuits (diode-connected transistor, four-resistor network)
- Use of the transistor as a switch
- Analysis of switching circuits in the s-domain

Frequency Response and Filters

- Finding the frequency response from the s-domain transfer function
- Bode-plots, magnitude and phase, complex poles
- Basic filter building blocks (1st and 2nd-order low/high/bandpass)
- Series/Parallel Resonators – resonant frequency, Q, bandwidth
- Active filters, use of unit-gain buffers for cascading circuits