

EE 571

Exam II Objectives:

At the time of the 2nd exam in EE571, you should be able to perform the following objectives:

Exam II Objectives

- Do all Exam I objectives!
- Use the controllability matrix to determine the number of uncontrollable modes (eigenvalues) of a multi-input system
- Understand and design feedback regulators and tracking architecture (controllers) for multi-input, multi-output systems
- Use the observability matrix to determine the number of unobservable modes (eigenvalues) of a multi-input system
- Understand and design full-order and improved observers for single- and multi-output systems
- Understand the concepts of stabilizability and detectability
- Understand the separation principle
- Analyze and design 2nd-order systems
- Use the Routh table to determine the stability of a system
- Determine the type number of a system
- Perform steady-state error analysis for a variety of type numbers and inputs
- Understand and construct root loci of systems
- Compensation techniques based on root locus:
 - a) Use specs to determine pair of dominant closed-loop poles
 - b) Understand and perform lead compensation and calculate angle of deficiency
 - c) Understand and perform lag compensation
 - d) Understand and perform proportional-plus-derivative compensation (PD)
 - e) Understand and perform proportional-plus-integral compensation (PI)
 - f) Understand and perform proportional-plus-integral-derivative compensation (PID)
- Realize compensators using op-amps
- Frequency domain techniques:
 - a) Understand and construct asymptotic Bode plots
 - b) Obtain models from experimental data/Bode plots
 - c) Model and understand the effect of quadratic terms on bode plots
 - d) Model and understand the effect of non-minimum phase terms on bode plots