EE557

Prof. Nicholas Nagel

Dynamics of Controlled Systems

Course Syllabus

Lec	***Topic***	***Assignment***
1	Course Overview, Background Material, State Space Representation of Systems, Goals of Control Systems, Modeling and Block Diagram Representation of Physical Systems	Software tools review
2	Disturbance Response, Calculation of Dynamic Stiffness Functions, Nonlinear System Block Diagrams, Operating Point Analysis of Nonlinear Systems, Operating Point Dynamic Stiffness, HW#1 Handout	Hand out HW #1
3	State Feedback Augmentation for Disturbance Rejection, Modification of System State Feedback Gains – DC Motor Example, Null Regulators, Disturbance Input Decoupling	
4	Input Cross Coupling Decoupling, DC Motor Torque Regulator, Full State Command Vectors, Classical Industrial Motion Controller vs. State Feedback Controller	Hand in HW #1, Hand out HW #2
5	Introduction of the Resonant Load Problem, Resonant Frequencies, Dynamic Stiffness of Resonant Load System, Relative Active Feedback, Gain Calculation for Required System Eigenvalues	Hand in HW #2, Hand out Midterm (take home)
6	Review of HW#2, Midterm Discussion	
7	System Energy States, Command Feedforward, Nonlinear Command Feedforward, Command Tracking	Hand in Midterm, Hand out HW#3
8	State Filters, Observers, Estimation Error, Phase Lag Properties of Filters, Multi-zone Temperature Controller Example	
9	Review of Midterm, State Feedback Partitioning, Controller Design, Nonlinear Decoupling State Feedback	Hand in HW #3 Hand out Final Exam (take home)
10	Course Review, Discussion of Take Home Final	