

DIGITAL CONTROL OF DYNAMIC SYSTEMS
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1. Introduction
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 1. Dynamic Response
 2. Basic Properties of Feedback
 3. Root Locus
 4. Frequency Response Design
 5. Compensation
 6. State-Space Design
3. Introductory Digital Control
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 2. Effect of Sampling
 3. PID Control
4. Discrete Systems Analysis
 1. Linear Difference Equations
 2. The Discrete Transfer Function
 3. Discrete Models of Sampled-Data Systems
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 5. Frequency Response
 6. Properties of the z-Transform
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6. Discrete Equivalents
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7. Design Using Transform Techniques
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 2. Design by Emulation
 3. Direct Design by Root Locus in the z-Plane
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5. Direct Design Method of Ragazzini
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 1. Control Law Design
 2. Estimator Design
 3. Regulator Design: Control + Estimator
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 5. Integral Control and Disturbance Estimation
 6. Effects of Delays
 7. Controllability and Observability
9. Multivariable and Optimal Control
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 2. Time-varying Optimal Control
 3. LQR Steady-State Optimal Control
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 5. Multivariable Control Design – with Examples
10. Quantization Effects
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 3. Limit Cycles and Dither
11. Sample Rate Selection
 1. The Sampling Theorem's Limit
 2. Time Response and Smoothness
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 4. Sensitivity to Parameter Variations
 5. Measurement Noise and Antialiasing Filters
 6. Multirate Sampling
12. System Identification (ID)
 1. Defining the Model
 2. ID of Nonparametric Models
 3. Models and Criteria for ID
 4. Deterministic Estimation
 5. Stochastic Least Squares
 6. Maximum Likelihood
 7. Numerical Search for Max Likelihood
 8. Subspace ID Methods
13. Nonlinear Control
 1. Analysis Techniques
 2. Nonlinear Control Structures: Design
 3. Design with Nonlinear Cost Functions

14. Design of a Disk Drive Servo: A Case Study
 1. Overview of Disk Drives
 2. Components and Models
 3. Design Specifications
 4. Disk Servo Design

There is a Summary at the end of each chapter and Problems for the students to work out. There are also Appendices that review basic material, contain a table of z-transforms, and a list of pertinent Matlab Functions.