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Autore	Ellis George (George H.)
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4A: Understanding Delay in Digital Control; 4.4 Selecting the Sample Time; 4.5 Questions  
Chapter 5 - The z-Domain 5.1 Introduction to the z-Domain; 5.2 z Phasors; 5.3 Aliasing; 5.4 Experiment 5A: Aliasing; 5.5 From Transfer Function to Algorithm; 5.6 Functions for Digital Systems; 5.7 Reducing the Calculation Delay; 5.8 Quantization; 5.9. Questions; Chapter 6 - Four Types of Controllers; 6.1 Tuning in this Chapter; 6.2 Using the Proportional Gain; 6.3 Using the Integral Gain; 6.4 Using the Differential Gain; 6.5 PD Control; 6.6 Choosing the Controller; 6.7 Experiments 6A-6D; 6.8 Questions; Chapter 7 - Disturbance Response; 7.1 Disturbances; 7.2 Disturbance Response of a Velocity Controller 7.3 Disturbance Decoupling 7.4 Questions; Chapter 8 - Feed-Forward; 8.1 Plant-Based Feed-Forward; 8.2 Feed-Forward and the Power Converter; 8.3 Delaying the Command Signal; 8.4 Variation in Plant and Power Converter Operation; 8.5 Feed-Forward for the Double-Integrating Plant; 8.6 Questions; Chapter 9 - Filters in Control Systems; 9.1 Filters in Control Systems; 9.2 Filter Passband; 9.3 Implementation of Filters; 9.4 Questions; Chapter 10 - Introduction to Observers in Control Systems; 10.1 Overview of Observers; 10.2 Experiments 10A-10C: Enhancing Stability with an Observer 10.3 Filter Form of the Luenberger Observer 10.4 Designing a Luenberger Observer; 10.5 Introduction to Tuning an Observer Compensator; 10.6 Questions; Section II - Modeling; Chapter 11 - Introduction to Modeling; 11.1 What is a Model?; 11.2 Frequency-Domain Modeling; 11.3 Time-Domain Modeling; 11.4 Questions; Chapter 12 - Nonlinear Behavior and Time Variation; 12.1 LTI Versus Non-LTI; 12.2 Non-LTI Behavior; 12.3 Dealing with Nonlinear Behavior; 12.4 Ten Examples of Nonlinear Behavior; 12.5 Questions; Chapter 13 - Model Development and Verification; 13.1 Seven-Step Process to Develop a Model 13.2 From Simulation to Deployment: RCP and HIL

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### Sommario/riassunto

Control Systems Design Guide has helped thousands of engineers to improve machine performance. This fourth edition of the practical guide has been updated with cutting-edge control design scenarios, models and simulations enabling apps from battlebots to solar collectors. This useful reference enhances coverage of practical applications via the inclusion of new control system models, troubleshooting tips, and expanded coverage of complex systems requirements, such as increased speed, precision and remote capabilities, bridging the gap between the complex, math-heavy control theory ta

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