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Autore	Ellis George (George H.)
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Nota di contenuto	Cover; Front matter; Half Title Page; Title Page; Copyright; Dedication Page; Contents; Preface; Section I: Applied Principles of Controls; Important Safety Guidelines for Readers; 1. Introduction to Controls; 1.1 Visual Model Q Simulation Environment; 1.2 The Control System; 1.3 The Controls Engineer; 2. The Frequency Domain; 2.1 The Laplace Transform; 2.2 Transfer Functions; 2.3 Examples of Transfer Functions; 2.4 Block Diagrams; 2.5 Phase and Gain; 2.6 Measuring Performance; 2.7 Questions; 3. Tuning a Control System; 3.1 Closing Loops; 3.2 A Detailed Review of the Model 3.3 The Open-Loop Method 3.4 Margins of Stability; 3.5 A Zone-Based Tuning Procedure; 3.6 Variation in Plant Gain; 3.7 Multiple (Cascaded) Loops; 3.8 Saturation and Synchronization; 3.9 Questions; 4. Delay in Digital Controllers; 4.1 How Sampling Works; 4.2 Sources of Delay in Digital Systems; 4.3 Experiment 4A: Understanding Delay in Digital Control; 4.4 Selecting the Sample Time; 4.5 Questions; 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 Selecting a Processor; 5.9

Quantization; 5.10 Questions; 6. Six 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 PID+ Control; 6.6 PD Control; 6.7 Choosing the Controller; 6.9 Questions; 7. Disturbance Response; 7.1 Disturbances; 7.2 Disturbance Response of a Velocity Controller; 7.3 Disturbance Decoupling; 7.4 Questions; 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; 9. Filters in Control Systems; 9.1 Filters in Control Systems; 9.2 Filter Passband; 9.3 Implementation of Filters; 9.4 Questions; 10. Introduction to Observers in Control Systems; 10.1 Overview of Observers; 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; 11. Introduction to Modeling; 11.1 What Is a Model?; 11.2 Frequency-Domain Modeling
11.3 Time-Domain Modeling 11.4 Questions; 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; 13. Seven Steps to Developing a Model; 13.1 Determine the Purpose of the Model; 13.2 Model in SI Units; 13.3 Identify the System; 13.4 Build the Block Diagram; 13.5 Select Frequency or Time Domain; 13.6 Write the Model Equations; 13.7 Verify the Model; Section III: Motion Control; 14. Encoders and Resolvers; 14.1 Accuracy, Resolution, and Response; 14.2 Encoders
14.3 Resolvers

Sommario/riassunto

Control System Design Guide, 3E will help engineers to apply control theory to practical systems using their PC. This book provides an intuitive approach to controls, avoiding unnecessary mathematics and emphasizing key concepts with more than a dozen control system models. Whether readers are just starting to use controllers or have years of experience, this book will help them improve their machines and processes.* Teaches controls with an intuitive approach, avoiding unnecessary mathematics.* Key topics are demonstrated with realistic models of control systems.* All models w