

1. Record Nr.	UNINA9910830411403321
Autore	Smith Carlos A. <1943->
Titolo	Automated continuous process control [[electronic resource] /] / Carlos A. Smith
Pubbl/distr/stampa	New York, : J. Wiley, c2002
ISBN	1-280-36639-7 9786610366392 0-470-34956-5 0-471-45926-7 0-471-21883-9
Descrizione fisica	1 online resource (232 p.)
Disciplina	660.2815 660/.2815
Soggetti	Chemical process control - Automation Process control - Automation
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	AUTOMATED CONTINUOUS PROCESS CONTROL; CONTENTS; PREFACE; 1 INTRODUCTION; 1-1 Process Control System; 1-2 Important Terms and Objective of Automatic Process Control; 1-3 Regulatory and Servo Control; 1-4 Transmission Signals, Control Systems, and Other Terms; 1-5 Control Strategies; 1-5.1 Feedback Control; 1-5.2 Feedforward Control; 1-6 Summary; 2 PROCESS CHARACTERISTICS; 2-1 Process and Importance of Process Characteristics; 2-2 Types of Processes; 2-3 Self-Regulating Processes; 2-3.1 Single-Capacitance Processes; 2-3.2 Multicapacitance Processes; 2-4 Transmitters and Other Accessories 2-5 Obtaining Process Characteristics from Process Data2-6 Questions When Performing Process Testing; 2-7 Summary; Reference; Problems; 3 FEEDBACK CONTROLLERS; 3-1 Action of Controllers; 3-2 Types of Feedback Controllers; 3-2.1 Proportional Controller; 3-2.2 Proportional-Integral Controller; 3-2.3 Proportional-Integral-Derivative Controller; 3-2.4 Proportional-Derivative Controller; 3-3 Reset Windup; 3-4 Tuning Feedback Controllers; 3-4.1 Online Tuning: Ziegler-Nichols Technique; 3-4.2 Offline Tuning; 3-5 Summary; References; Problems;

4 CASCADE CONTROL; 4-1 Process Example
4-2 Implementation and Tuning of Controllers
4-2.1 Two-Level Cascade Systems; 4-2.2 Three-Level Cascade Systems; 4-3 Other Process Examples; 4-4 Closing Comments; 4-5 Summary; References; 5 RATIO, OVERRIDE, AND SELECTIVE CONTROL; 5-1 Signals and Computing Algorithms; 5-1.1 Signals; 5-1.2 Programming; 5-1.3 Scaling Computing Algorithms; 5-1.4 Significance of Signals; 5-2 Ratio Control; 5-3 Override, or Constraint, Control; 5-4 Selective Control; 5-5 Designing Control Systems; 5-6 Summary; References; Problems; 6 BLOCK DIAGRAMS AND STABILITY; 6-1 Block Diagrams; 6-2 Control Loop Stability
6-2.1 Effect of Gains
6-2.2 Effect of Time Constants; 6-2.3 Effect of Dead Time; 6-2.4 Effect of Integral Action in the Controller; 6-2.5 Effect of Derivative Action in the Controller; 6-3 Summary; Reference; 7 FEEDFORWARD CONTROL; 7-1 Feedforward Concept; 7-2 Block Diagram Design of Linear Feedforward Controllers; 7-3 Lead/Lag Term; 7-4 Extension of Linear Feedforward Controller Design; 7-5 Design of Nonlinear Feedforward Controllers from Basic Process Principles; 7-6 Closing Comments on Feedforward Controller Design; 7-7 Additional Design Examples; 7-8 Summary; References; Problem
8 DEAD-TIME COMPENSATION
8-1 Smith Predictor Dead-Time Compensation Technique; 8-2 Dahlin Controller; 8-3 Summary; References; 9 MULTIVARIABLE PROCESS CONTROL; 9-1 Pairing Controlled and Manipulated Variables; 9-1.1 Obtaining Process Gains and Relative Gains; 9-1.2 Positive and Negative Interactions; 9-2 Interaction and Stability; 9-3 Tuning Feedback Controllers for Interacting Systems; 9-4 Decoupling; 9-4.1 Decoupler Design from Block Diagrams; 9-4.2 Decoupler Design from Basic Principles; 9-5 Summary; References; Problem; Appendix A CASE STUDIES
Case 1: Ammonium Nitrate Prilling Plant Control System

Sommario/riassunto

Automated Continuous Process Control pulls together-in one compact and practical volume-the essentials for understanding, designing, and operating process control systems. This comprehensive guide covers the major elements of process control in a well-defined and ordered framework. Concepts are clearly presented, with minimal reliance on mathematical equations and strong emphasis on practical, real-life examples. Beginning with the very basics of process control, Automated Continuous Process Control builds upon each chapter to help the reader understand and efficiently practice industrial pr
