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Nota di contenuto	Cover; Front matter; Half Title Page; Dedication Page; Title Page; Copyright; Contents; Preface; 1. Introduction; 1.1 Objectives; 1.2 Introduction; 1.3 Basic definitions and terms used in process control; 1.4 Process modeling; 1.5 Process dynamics and time constants; 1.6 Types or modes of operation of process control systems; 1.7 Closed loop controller and process gain calculations; 1.8 Proportional, integral and derivative control modes; 1.9 An introduction to cascade control; 2. Process measurement and transducers; 2.1 Objectives; 2.2 The definition of transducers and sensors 2.3 Listing of common measured variables 2.4 The common characteristics of transducers; 2.5 Sensor dynamics; 2.6 Selection of sensing devices; 2.7 Temperature sensors; 2.8 Pressure transmitters; 2.9 Flow meters; 2.10 Level transmitters; 2.11 The spectrum of user models in measuring transducers; 2.12 Instrumentation and transducer considerations; 2.13 Selection criteria and considerations; 2.14 Introduction to the smart transmitter; 3. Basic principles of control

valves and actuators; 3.1 Objectives; 3.2 An overview of eight of the most basic types of control valves
3.3 Control valve gain, characteristics, distortion and rangeability 3.4 Control valve actuators; 3.5 Control valve positioners; 3.6 Valve sizing; 4. Fundamentals of control systems; 4.1 Objectives; 4.3 Modulating control; 4.4 Open loop control; 4.5 Closed loop control; 4.6 Deadtime processes; 4.7 Process responses; 4.8 Dead zone; 5. Stability and control modes of closed loops; 5.1 Objectives; 5.2 The industrial process in practice; 5.3 Dynamic behavior of the feed heater; 5.4 Major disturbances of the feed heater; 5.5 Stability; 5.6 Proportional control; 5.7 Integral control
5.8 Derivative control 5.9 Proportional, integral and derivative modes; 5.10 ISA vs Allen Bradley; 5.11 P, I and D relationships and related interactions; 5.12 Applications of process control modes; 5.13 Typical PID controller outputs; 6. Digital control principles; 6.1 Objectives; 6.2 Digital vs analog: a revision of their definitions; 6.3 Action in digital control loops; 6.4 Identifying functions in the frequency domain; 6.5 The need for digital control; 6.6 Scanned calculations; 6.7 Proportional control; 6.8 Integral control; 6.9 Derivative control; 6.10 Lead function as derivative control
6.11 Example of incremental form (Siemens S5-100 V)7. Real and ideal PID controllers; 7.1 Objectives; 7.2 Comparative descriptions of real and ideal controllers; 7.3 Description of the ideal or the non-interactive PID controller; 7.4 Description of the real (interactive) PID controller; 7.6 Derivative action and effects of noise; 7.7 Example of the KENT K90 controllers PID algorithms; 8. Tuning of PID controllers in both open and closed loop control systems; 8.1 Objectives; 8.2 Objectives of tuning; 8.6 Loop time constant (LTC) method
8.7 Hysteresis problems that may be encountered in open loop tuning

Sommario/riassunto

This book is aimed at engineers and technicians who need to have a clear, practical understanding of the essentials of process control, loop tuning and how to optimize the operation of their particular plant or process. The reader would typically be involved in the design, implementation and upgrading of industrial control systems. Mathematical theory has been kept to a minimum with the emphasis throughout on practical applications and useful information.This book will enable the reader to:* Specify and design the loop requirements for a plant using PID control* Identify and