

## Automatic Control Systems 8th Edition

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Automatic Control Systems 8th Edition

**Design of Nonlinear Control Systems with the Highest Derivative in Feedback** Valery D. Yurkevich 2004 This unique book presents an analytical uniform design methodology of continuous-time or discrete-time nonlinear control system design which guarantees desired transient performances in the presence of plant parameter variations and unknown external disturbances. All results are illustrated with numerical simulations, their practical importance is highlighted, and they may be used for real-time control system design in robotics, mechatronics, chemical reactors, electrical and electro-mechanical systems as well as aircraft control systems. The book is easy reading and is suitable for teaching.

**Vibration with Control** Daniel J. Inman 2006-11-02 Engineers are becoming increasingly aware of the problems caused by vibration in engineering design, particularly in the areas of structural health monitoring and smart structures. Vibration is a constant problem as it can impair performance and lead to fatigue, damage and the failure of a structure. Control of vibration is a key factor in preventing such detrimental results. This book presents a homogenous treatment of vibration by including those factors from control that are relevant to modern vibration analysis, design and measurement. Vibration and control are established on a firm mathematical basis and the disciplines of vibration, control, linear algebra, matrix computations, and applied functional analysis are connected. Key Features: Assimilates the discipline of contemporary structural vibration with active control Introduces the use of Matlab into the solution of vibration and vibration control problems Provides a unique blend of practical and theoretical developments Contains examples and problems along with a solutions manual and power point presentations Vibration with Control is an essential text for practitioners, researchers, and graduate students as it can be used as a reference text for its complex chapters and topics, or in a tutorial setting for those improving their knowledge of vibration and learning about control for the first time. Whether or not you are familiar with vibration and control, this book is an excellent introduction to this emerging and increasingly important engineering discipline.

**Classical Control System** Kunal Chakraborty 2016-04-15 The Temperature measurement of liquid in a tank can be controlled by classical and advance control algorithms applying PID, FUZZY LOGIC , SFB, LQR. Here, we consider a three tank noninteracting system. We observed that tank1 affects the dynamic behavior of tank2. Similarly, tank2 affects the dynamic behavior of tank3 and vice versa, because the flow rate F1 depends on the difference between liquid levels h1and h2. Thus, a change in the inlet flowrate affects the liquid level in the tank, which in turn affects the temperature of the liquid. Basically, it is a thermal process. Various types of temperature sensors include RTD, T/C, and Thermistor. In this particular project the author used a mercury thermometer as sensor. Mathematical models of the three tank method give a third order equation. Each tank gives a transfer function of the first order system. They make it easy to check whether a particular algorithm is giving the requisite results. A lot of work has been carried out on the temperature control in terms of its stabilization. Many attempts have been made to control the response of temperature measuring systems. **Model Rules of Professional Conduct** American Bar Association. House of Delegates 2007 The Model Rules of Professional Conduct provides an up-to-date resource for information on legal ethics. Federal, state and local courts in all jurisdictions look to the Rules for guidance in solving lawyer malpractice cases, disciplinary actions, disqualification issues, sanctions questions and much more. In this volume, black-letter Rules of Professional Conduct are followed by numbered Comments that explain each Rule's purpose and provide suggestions for its practical application. The Rules will help you identify proper conduct in a variety of given situations, review those instances where discretionary action is possible, and define the nature of the relationship between you and your clients, colleagues and the courts.

**Friction-Induced Vibration in Lead Screw Drives** Orang Vahid-Araghi 2010-10-14 Friction-Induced Vibration in Lead Screw Drives covers the dynamics of lead screw drives with an emphasis on the role of friction. Friction-induced vibration in lead screws can be the cause of unacceptably high levels of audible noise as well as loss of operation accuracy and shortened life. Although lead screw drives have a long history and their mechanical design and manufacturing aspects are very well understood, the role of friction in their dynamical behavior has not been comprehensively treated. The book draws on the vast body of work on the subject of dynamical systems with friction (such as disk brake systems) and offers said treatment, along with: · Unique coverage of modeling of multi-DOF lead screw systems with friction · Detailed analysis of negative damping, mode coupling, and kinematic constraint instability mechanisms in lead screws drives · A practical parameter identification approach for the velocity dependent coefficient of friction in lead screw drives Friction-Induced Vibration in Lead Screw Drives serves as the definitive text on the friction-induced vibration of lead screws, and includes a practical case study where the developed methods are used to study the excessive noise problem of a lead screw drive system and to put forward design modifications that eliminate the friction-induced vibrations.

**Mechanical Engineers' Handbook, Design, Instrumentation, and Controls** Myer Kutz 2015-02-02 The engineer's ready reference for mechanical power and heat Mechanical Engineer's Handbook provides the most comprehensive coverage of the entire discipline, with a focus on explanation and analysis. Packaged as a modular approach, these books are designed to be used either individually or as a set, providing engineers with a thorough, detailed, ready reference on topics that may fall outside their scope of expertise. Each book provides discussion and examples as opposed to straight data and calculations, giving readers the immediate background they need while pointing them toward more in-depth information as necessary. Volume 4: Energy and Power covers the essentials of fluids, thermodynamics, entropy, and heat, with chapters dedicated to individual applications such as air heating, cryogenic engineering, indoor environmental control, and more. Readers will find detailed guidance toward fuel sources and their technologies, as well as a general overview of the mechanics of combustion. No single engineer can be a specialist in all areas that they are called on to work in the diverse industries and job functions they occupy. This book gives them a resource for finding the information they need, with a focus on topics related to the productions, transmission, and use of mechanical power and heat. Understand the nature of energy and its proper measurement and analysis Learn how the mechanics of energy apply to furnaces, refrigeration, thermal systems, and more Examine the and pros and cons of petroleum, coal, biofuel, solar, wind, and geothermal power Review the mechanical parts that generate, transmit, and store different types of power, and the applicable guidelines Engineers must frequently refer to data tables, standards, and other list-type references, but this book is different; instead of just providing the answer, it explains why the answer is what it is. Engineers will appreciate this approach, and come to find Volume 4: Energy and Power an invaluable reference.

**Optical Fiber Communication Systems with MATLAB® and Simulink® Models, Second Edition** Le Nguyen Binh 2014-12-01 Carefully structured to instill practical knowledge of fundamental issues, Optical Fiber Communication Systems with MATLAB® and Simulink® Models describes the modeling of optically amplified fiber communications systems using MATLAB® and Simulink®. This lecture-based book focuses on concepts and interpretation, mathematical procedures, and engineering applications, shedding light on device behavior and dynamics through computer modeling. Supplying a deeper understanding of the current and future state of optical systems and networks, this Second Edition: Reflects the latest developments in optical fiber communications technology Includes new and updated case studies, examples, end-of-chapter problems, and MATLAB® and Simulink® models Emphasizes DSP-based coherent reception techniques essential to advancement in short- and long-term optical transmission networks Optical Fiber Communication Systems with MATLAB® and Simulink® Models, Second Edition is intended for use in university and professional training courses in the specialized field of optical communications. This text should also appeal to students of engineering and science who have already taken courses in electromagnctic theory, signal processing, and digital communications, as well as to optical engineers, designers, and practitioners in industry.

**Dynamic Modeling and Control of Engineering Systems** Bohdan T. Kulakowski 2007-07-02 This textbook is ideal for a course in engineering systems dynamics and controls. The work is a comprehensive treatment of the analysis of lumped parameter physical systems. Starting with a discussion of mathematical models in general, and ordinary differential equations, the book covers input/output and state space models, computer simulation and modeling methods and techniques in mechanical, electrical, thermal and fluid domains. Frequency domain methods, transfer functions and frequency response are covered in detail. The book concludes with a treatment of stability, feedback control (PID, lead-lag, root locus) and an introduction to discrete time systems. This new edition features many new and expanded sections on such topics as: solving stiff systems, operational amplifiers, electrohydraulic servovalves, using Matlab with transfer functions, using Matlab with frequency response, Matlab tutorial and an expanded Simulink tutorial. The work has 40% more end-of-chapter exercises and 30% more examples.

**Modern Control Engineering** Katsuhiko Ogata 1990 Text for a first course in control systems, revised (1st ed. was 1970) to include new subjects such as the pole placement approach to the design of control systems, design of observers, and computer simulation of control systems. For senior engineering students. Annotation copyright Book News, Inc.

**Synchronous Programming of Reactive Systems** Nicolas Halbwachs 1992-12-31 This book will attempt to give a first synthesis of recent works on cerning reactive system design. The term "reactive system" has been introduced in order to at'oid the ambiguities often associated with by the term "real-time system," which, although best known and more sugges tive, has been given so many different meanings that it is almost in evitably misunderstood. Industrial process control systems, transporta tion control and supervision systems, signal-processing systems, are ex amples of the systems we have in mind. Although these systems are more and more computerized, it is sur prising to notice that the problem of time in computer science has been studied only recently by "pure" computer scientists. Until the early 1980s, time problems were regarded as the concern of performance evalu ation, or of some (unjustly scorned) "industrial computer engineering," or, at best, of operating systems. A second surprising fact, in contrast, is the growth of research on cerning timed systems during the last decade. The handling of time has suddenly become a fundamental goal for most models of concurrency. In particular, Robin Alilner 's pioneering works about synchronous process algebras gave rise to a school of thought adopting the following abstract point of view: As soon as one admits that a system can instantaneously react to events, i. e.

**Linear Control Systems Engineering** Morris R. Driels 1996

**Automatic Control Systems** Benjamin C. Kuo 1995

**Feedback Systems** Karl Johan Åström 2021-02-02 The essential introduction to the principles and applications of feedback systems—now fully revised and expanded This textbook covers the mathematics needed to model, analyze, and design feedback systems. Now more user-friendly than ever, this revised and expanded edition of Feedback Systems is a one-volume resource for students and researchers in mathematics and engineering. It has applications across a range of disciplines that utilize feedback in physical, biological, information, and economic systems. Karl Åström and Richard Murray use techniques from physics, computer science, and operations research to introduce control-oriented modeling. They begin with state space tools for analysis and design, including stability of solutions, Lyapunov functions, reachability, state feedback observability, and estimators. The matrix exponential plays a central role in the analysis of linear control systems, allowing a concise development of many of the key concepts for this class of models. Åström and Murray then develop and explain tools in the frequency domain, including transfer functions, Nyquist analysis, PID control, frequency domain design, and robustness. Features a new chapter on design principles and tools, illustrating the types of problems that can be solved using feedback Includes a new chapter on fundamental limits and new material on the Routh-Hurwitz criterion and root locus plots Provides exercises at the end of every chapter Comes with an electronic solutions manual An ideal textbook for undergraduate and graduate students Indispensable for researchers seeking a self-contained resource on control theory **Control System Design** B. S. Manke 2017-11-20 This book covers the theory and mathematics needed to understand the concepts in control system design. Chapter 1 deals with compensation network design. Nonlinear control systems, including phase-plane analysis and the Delta method are presented in chapter 2. The analysis and design aspects based on the state variable approach are presented in Chapter 3. The discrete time control systems form the basis for the study of digital control systems in Chapter 4, covering the frequency response, root locus analysis, and stability considerations for discrete-time control systems. The stability analysis based on the Lyapunov method is given in chapter 5. The appendices include two US government articles on industrial control systems (NIST) and the control system design for a solar energy storage system (U.S. Dept. of Energy). Concepts in the text are supported by numerical examples. Features: • Covers the theory and mathematics needed to understand the concepts in control system design • Includes two U.S. government articles on industrial control systems (NIST) and the control system design for a solar energy storage system (U.S. Department of Energy)

**Identification of Continuous-Time Systems** N.K. Sinha 1991-07-31 In view of the importance of system identification, the International Federation of Automatic Control (IFAC) and the International Federation of Operational Research Societies (IFORS) hold symposia on this topic every three years. Interest in continuous time approaches to system identification has been growing in recent years. This is evident from the fact that the of invited sessions on continuous time systems has increased from one in the 8th number Symposium that was held in Beijing in 1988 to three in the 9th Symposium in Budapest in 1991. It was during the 8th Symposium in August 1988 that the idea of bringing together important results on the topic of Identification of continuous time systems was conceived. Several distinguished colleagues, who were with us in Beijing at that time, encouraged us by promising on the spot to contribute to a comprehensive volume of collective work. Subsequently, we contacted colleagues all over the world, known for their work in this area, with a formal request to contribute to the proposed volume. The response was prompt and overwhelmingly encouraging. We sincerely thank all the authors for their valuable contributions covering various aspects of identification of continuous time systems.

**Modern Control Systems Analysis and Design Using MATLAB** Robert H. Bishop 1993 Designed to help learn how to use MATLAB and Simulink for the analysis and design of automatic control systems.

**Cooperative Localization and Navigation** Chao Gao 2019-08-21 This book captures the latest results and techniques for cooperative localization and navigation drawn from a broad array of disciplines. It provides the reader with a generic and comprehensive view of modeling, strategies, and state estimation methodologies in that fields. It discusses the most recent research and novel advances in that direction, exploring the design of algorithms and architectures, benefits, and challenging aspects, as well as a potential broad array of disciplines, including wireless communication, indoor localization, robotics, emergency rescue, motion analysis, etc.

**Principles of Avionics** Albert Helfrick 2007

**Reliability, Maintainability and Risk** David J. Smith 2011-06-29 Reliability, Maintainability and Risk: Practical Methods for Engineers, Eighth Edition, discusses tools and techniques for reliable and safe engineering, and for optimizing maintenance strategies. It emphasizes the importance of using reliability techniques to identify and eliminate potential failures early in the design cycle. The focus is on techniques known as RAMS (reliability, availability, maintainability, and safety-integrity). The book is organized into five parts. Part 1 on reliability parameters and costs traces the history of reliability and safety technology and presents a cost-effective approach to quality, reliability, and safety. Part 2 deals with the interpretation of failure rates, while Part 3 focuses on the prediction of reliability and risk. Part 4 discusses design and assurance techniques; review and testing techniques; reliability growth modeling; field data collection and feedback; predicting and demonstrating repair times; quantified reliability maintenance; and systematic failures. Part 5 deals with legal, management and safety issues, such as project management, product liability, and safety legislation. 8th edition of this core reference for engineers who deal with the design or operation of any safety critical systems, processes or operations Answers the question: how can a defect that costs less than \$1000 dollars to identify at the process design stage be prevented from escalating to a \$100,000 field defect, or a \$1m+ catastrophe Revised throughout, with new examples, and standards, including must have material on the new edition of global functional safety standard IEC 61508, which launches in 2010

**Modern Control Systems** Richard C. Dorf 1980

**Automatic Control in Space** Charles Walter Munday 1980 Automatic Control in Space is a compendium of papers presented on the Eighth IFAC Symposium that took place in Oxford, England in July 1979.

**Project Management** Harold Kerzner 2009-04-03 The landmark project management reference, now in a new edition Now in a Tenth Edition, this industry-leading project management "bible" aligns its streamlined approach to the latest release of the Project Management Institute's Project Management Body of Knowledge (PMI®'s PMBOK® Guide), the new mandatory source of training for the Project Management Professional (PMP®) Certificat-ion Exam. This outstanding edition gives students and professionals a profound understanding of project management with insights from one of the best-known and respected authorities on the subject. From the intricate framework of organizational behavior and structure that can determine project success to the planning, scheduling, and controlling processes vital to effective project management, the new edition thoroughly covers every key component of the subject. This Tenth Edition features: New sections on scope changes, exiting a project, collective belief, and managing virtual teams More than twenty-five case studies, including a new case on the Iridium Project covering all aspects of project management 400 discussion questions More than 125 multiple-choice questions (PMI, PMBOK, PMP, and Project Management Professional are registered marks of the Project Management Institute, Inc.)

**Nise's Control Systems Engineering** Norman S. Nise 2018

**Solutions Manual for Kuo's Automatic Control Systems, 8th Ed** Benjamin C. Kuo 2003

**Mechatronics and Automatic Control Systems** Wego Wang 2013-11-18 This book examines mechatronics and automatic control systems. The book covers important emerging topics in signal processing, control theory, sensors, mechanic manufacturing systems and automation. The book presents papers from the 2013 International Conference on Mechatronics and Automatic Control Systems in Hangzhou, held in China during August 10-11, 2013.

**AUTOMATIC CONTROL SYSTEMS, 8TH ED (With CD )** Kuo 2007-09 Special Features: · Real-world applications · Examples and problems - Includes an abundance of illustrative examples and problems · Marginal notes throughout the text highlight important points About The Book: This best-selling introduction to automatic control systems has been updated to reflect the increasing use of computer-aided learning and design, and revised to feature a more accessible approach without sacrificing depth.

**Automatic Control Systems** Benjamin C. Kuo 2003 With a new, innovative "virtual laboratory" chapter and software tools to help students simulate and analyze control systems, the Eighth Edition of this best-selling introduction to automatic control systems helps students understand the practical, real-world uses of control. The book's sound theoretical content is balanced by numerous examples, a rich problem set, and well-integrated technology. The Eighth Edition introduces a new co-author, Farid Golnaraghi of the University of Waterloo.

**Automatic Control Engineering** Francis Harvey Raven 1987 In recent years, automatic control systems have been rapidly increasing in importance in all fields of engineering. The applications of control systems cover a very wide range, from the design of precision control devices such as delicate electronic equipment to the design of massive equipment such as that used for the manufacture of steel or other industrial processes. Microprocessors have added a new dimension to the capability of control systems. New applications for automatic controls are continually being discovered. This book offers coverage of control engineering beginning with discussions of how typical control systems may be represented by block diagrams. This is accomplished by first demonstrating how to represent each component or part of a system as a simple block diagram, then explaining how these individual diagrams may be connected to form the overall block diagram, just as the actual components are connected to form the complete control system. Because actual control systems frequently contain nonlinear components, considerable emphasis is given to such components. The book goes on to show that important information concerning the basic or inherent operating characteristics of a system may be obtained from knowledge of the steady-state behavior. Continuing on in the book's coverage, readers will find information involving: how the linear differential equations that describe the operation of control systems may be solved algebraically by the use of Laplace transforms; general characteristics of transient behavior; the application of the root-locus method to the design of control systems; the use of the analog computer to simulate control systems; state-space methods;digital control systems; frequency-response methods; and system compensation.

**Multivariable Control Systems** Pedro Albertos 2006-04-18 This book focuses on control design with continual references to the practical aspects of implementation. While the concepts of multivariable control are justified, the book emphasizes the need to maintain student interest and motivation over exhaustively rigorous mathematical proof.

**Modern Control Systems** Richard C. Dorf 2011 Modern Control Systems, 12e, is ideal for an introductory undergraduate course in control systems for engineering students. Written to be equally useful for all engineering disciplines, this text is organized around the concept of control systems theory as it has been developed in the frequency and time domains. It provides coverage of classical control, employing root locus design, frequency and response design using Bode and Nyquist plots. It also covers modern control methods based on state variable models including pole placement design techniques with full-state feedback controllers and full-state observers. Many examples throughout give students ample opportunity to apply the theory to the design and analysis of control systems. Incorporates computer-aided design and analysis using MATLAB and LabVIEW MathScript.

**Hybrid Systems: Computation and Control** Manfred Morari 2005-02-25 This book constitutes the refereed proceedings of the 8th International Workshop on Hybrid Systems: Computation and Control, HSCC 2005, held in Zurich, Switzerland in March 2005. The 40 revised full papers presented together with 2 invited papers and the abstract of an invited talk were carefully reviewed and selected from 91 submissions. The papers focus on modeling, analysis, and implementation of dynamic and reactive systems involving both discrete and continuous behaviors. Among the topics addressed are tools for analysis and verification, control and optimization, modeling, engineering applications, and emerging directions in programming language support and implementation.

**Automatic Control Systems, Tenth Edition** Farid Golnaraghi 2017-03-10 A complete toolkit for teaching, learning, and understanding the essential concepts of automatic control systems Edition after acclaimed edition, Automatic Control Systems has delivered up-to-date, real-world coverage designed to introduce students to the fundamentals of control systems. More than a comprehensive text, Automatic Control Systems includes innovative virtual labs that replicate physical systems and sharpen readers' problem-solving skills. The Tenth Edition introduces the concept of Control Lab, which includes two classes of experiments: SIMLab (model-based simulation) and LEGOLab (physical experiments using LEGO® robots). These experiments are intended to supplement, or replace, the experimental exposure of the students in a traditional undergraduate control course and will allow these students to do their work within the MATLAB® and Simulink® environment—even at home. This cost-effective approach may allow educational institutions to equip their labs with a number of LEGO test beds and maximize student access to the equipment at a fraction of the cost of currently available control system experiments. Alternatively, as a supplemental learning tool, students can take the equipment home and learn at their own pace. This new edition continues a tradition of excellence with: • A greater number of solved examples • Online labs using both LEGO MINDSTORMS® and MATLAB/SIMLab • Enhancements to the easy-to-use MATLAB GUI software (ACSYS) to allow interface with LEGO MINDSTORMS • A valuable introduction to the concept of Control Lab • A logical organization, with Chapters 1 to 3 covering all background material and Chapters 4 to 11 presenting material directly related to the subject of control • 10 online appendices, including Elementary Matrix Theory and Algebra, Control Lab, Difference Equations, and Mathematical Foundation • A full-set of PowerPoint® slides and solutions available to instructors Adopted by hundreds of universities and translated into at least nine languages, Automatic Control Systems remains the single-best resource for students to gain a practical understanding of the subject and to prepare them for the challenges they will one day face. For practicing engineers, it represents a clear, thorough, and current self-study resource that they will turn to again and again throughout their career. LEGO and MINDSTORMS are registered trademarks of the LEGO Group MATLAB and Simulink are registered trademarks of The MathWorks, Inc.

**Automatic Control System** S. Hasan Saeed 2008

**Feedback Control of Dynamic Systems** Gene F. Franklin 2011-11-21 This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. For senior-level or first-year graduate-level courses in control analysis and design, and related courses within engineering, science, and management. Feedback Control of Dynamic Systems, Sixth Edition is perfect for practicing control engineers who wish to maintain their skills. This revision of a top-selling textbook on feedback control with the associated web site, FPE6e.com, provides greater instructor flexibility and student readability. Chapter 4 on a First Analysis of Feedback has been substantially rewritten to present the material in a more logical and effective manner. A new case study on biological control introduces an important new area to the students, and each chapter now includes a historical perspective to illustrate the origins of the field. As in earlier editions, the book has been updated so that solutions are based on the latest versions of MATLAB and SIMULINK. Finally, some of the more exotic topics have been moved to the web site.

**Automation in Textile Machinery** L. Ashok Kumar 2018-03-20 Automation is the use of various control systems for operating equipment such as machinery and processes. In line,

this book deals with comprehensive analysis of the trends and technologies in automation and control systems used in textile engineering. The control systems described in all chapters is to dissect the important components of an integrated control system in spinning, weaving, knitting, chemical processing and garment industries, and then to determine if and how the components are converging to provide manageable and reliable systems throughout the chain from fiber to the ultimate customer. Key Features: • Describes the design features of machinery for operating various textile machineries in product manufacturing • Covers the fundamentals of the instrumentation and control engineering used in textile machineries • Illustrates sensors and basic elements for textile automation • Highlights the need of robotics in textile engineering • Reviews the overall idea and scope of research in designing textile machineries

**Discrete-data Control Systems** Benjamin C. Kuo 1974

**Control System Design** Graham Clifford Goodwin 2001 For both undergraduate and graduate courses in Control System Design. Using a "how to do it" approach with a strong emphasis on real-world design, this text provides comprehensive, single-source coverage of the full spectrum of control system design. Each of the text's 8 parts covers an area in control--ranging from signals and systems (Bode Diagrams, Root Locus, etc.), to SISO control (including PID and Fundamental Design Trade-Offs) and MIMO systems (including Constraints, MPC, Decoupling, etc.).

**Digital Control Systems** Benjamin C. Kuo 2007

**Control Systems for Heating, Ventilating, and Air Conditioning** Roger W. Haines 2006-06-01 Control Systems for Heating, Ventilating and Air Conditioning, Sixth Edition is complete and covers both hardware control systems and modern control technology. The material is presented without bias and without prejudice toward particular hardware or software. Readers with an engineering degree will be reminded of the psychrometric processes associated with heating and air conditioning as they learn of the various controls schemes used in the variety of heating and air conditioning system types they will encounter in the field. Maintenance technicians will also find the book useful because it describes various control hardware and control strategies that were used in the past and are prevalent in most existing heating and air conditioning systems. Designers of new systems will find the fundamentals described in this book to be a useful starting point, and they will also benefit from descriptions of new digital technologies and energy management systems. This technology is found in modern building HVAC system designs.

**Electric Motors and Control Systems** Frank Petruzella 2009-05-08 "This book will introduce the reader to a broad range of motor types and control systems. It provides an overview of electric motor operation, selection, installation, control and maintenance. The text covers Electrical Code references applicable to the installation of new control systems and motors, as well as information on maintenance and troubleshooting techniques. It includes coverage of how motors operate in conjunction with their associated control circuitry. Both older and newer motor technologies are examined. Topics covered range from motor types and controls to installing and maintaining conventional controllers, electronic motor drives and programmable logic controllers." -- Publisher's description.