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Modeling and Control of Engines and Drivelines Process Dynamics and Control, 4th Edition Reactive Distillation Design and Control Process Control Process Control Design for Industrial Applications Power System Modeling, Computation, and Control Integrated Vehicle Dynamics and Control An Introduction to System Modeling and Control The Wiley Handbook of Cognitive Control Motion Control Systems Fundamental Spacecraft Dynamics and Control Microgrid Dynamics and Control Industrial Crystallization Process Monitoring and Control A Real-Time Approach to Process Control Handbook of Chaos Control Adaptive Control Design and Analysis System Dynamics System Safety Engineering and Management Control Systems Engineering Introduction to Statistical Process Control Control in Bioprocessing Real-Time Optimization by Extremum-Seeking Control Power System Monitoring and Control Chemical Reactor Design and Control Vibration with Control Linear State-Space Control Systems Process Dynamics and Control PID Passivity-Based Control of Nonlinear Systems with Applications DIGITAL CONTROL (With CD) Infection Prevention and Control at a Glance Stable Adaptive Control and Estimation for Nonlinear Systems Ventilation for Control of the Work Environment Frequency Variations in Power Systems Industrial Motion Control Handbook of Marine Craft Hydrodynamics and Motion Control Advanced Process Control Distillation Design and Control Using Aspen Simulation Power System Dynamics Dynamics and Control of Robotic Systems The Wiley Guide to Project Control

Motion Control Systems is concerned with design methods that support the never-ending requirements for faster and more accurate control of mechanical motion. The book presents material that is fundamental, yet at the same time discusses the solution of complex problems in motion control systems. Methods presented in the book are based on the authors' original research results. Mathematical complexities are kept to a required minimum so that practicing engineers as well as students with a limited background in control may use the book. It is unique in presenting know-how accumulated through work on very diverse problems into a comprehensive unified approach suitable for application in high demanding, high-tech products. Major issues covered include motion control ranging from simple trajectory tracking and force control, to topics related to haptics, bilateral control with and without delay in measurement and control channels, as well as control of nonredundant and redundant multibody systems. Provides a consistent unified theoretical framework for motion control design Offers graduated increase in complexity and reinforcement throughout the book Gives detailed explanation of underlying similarities and specifics in motion control Unified treatment of single degree-of-freedom and multibody systems Explains the fundamentals through implementation examples Based on classroom-tested materials and the authors' original research work Written by the leading researchers in sliding mode control (SMC) and disturbance observer (DOB) Accompanying lecture notes for instructors Simulink and MATLAB® codes available for readers to download Motion Control Systems is an ideal textbook for a course on motion control or as a reference for post-graduates and researchers in robotics and mechatronics. Researchers and practicing engineers will also find the techniques helpful in designing mechanical motion systems. This long-awaited revised second edition of the standard reference on the subject has been considerably expanded to include such recent developments as novel control schemes, control of chaotic space-time patterns, control of noisy nonlinear systems, and communication with chaos, as well as promising new directions in research. The contributions from leading international scientists active in the field provide a comprehensive overview of our current level of knowledge on chaos control and its applications in physics, chemistry, biology, medicine, and engineering. In addition, they show the overlap with the traditional field of control theory in the engineering community. An interdisciplinary approach of interest to scientists and engineers working in a number of areas. Explore the foundational and advanced subjects associated with proportional-integral-derivative controllers from leading authors in the field In PID Passivity-Based Control of Nonlinear Systems with Applications, expert researchers and authors Drs. Romeo Ortega, Jose Guadalupe Romero, Pablo Borja, and Alejandro Donaire deliver a comprehensive and detailed discussion of the most crucial and relevant concepts in the analysis and design of proportional-integral-derivative controllers using passivity techniques. The accomplished authors present a formal treatment of the recent research in the area and offer readers practical applications of the developed methods to physical systems, including electrical, mechanical, electromechanical, power electronics, and process control. The

book offers the material with minimal mathematical background, making it relevant to a wide audience. Familiarity with the theoretical tools reported in the control systems literature is not necessary to understand the concepts contained within. You'll learn about a wide range of concepts, including disturbance rejection via PID control, PID control of mechanical systems, and Lyapunov stability of PID controllers. Readers will also benefit from the inclusion of: A thorough introduction to a class of physical systems described in the port-Hamiltonian form and a presentation of the systematic procedures to design PID-PBC for them An exploration of the applications to electrical, electromechanical, and process control systems of Lyapunov stability of PID controllers Practical discussions of the regulation and tracking of bilinear systems via PID control and their application to power electronics and thermal process control A concise treatment of the characterization of passive outputs, incremental models, and Port Hamiltonian and Euler-Lagrange systems Perfect for senior undergraduate and graduate students studying control systems, PID Passivity-Based Control will also earn a place in the libraries of engineers who practice in this area and seek a one-stop and fully updated reference on the subject. Market_Desc: " Engineering and postgraduate students in control engineering and electronic engineering." Practicing control systems engineers and researchers in this field." Engineers needing to learn digital control Special Features: " Developed from three existing lecture courses on digital control, systems identification and intermediate process control" Includes numerous examples, problems, solutions and Matlab code." Highlights the advantages of the polynomial approach." Assumes little or no prior knowledge of analogue control." Offers a very thorough treatment of the z-transform and frequency-domain analysis." Includes a thorough treatment of identification." Attempts the tuning of PID controllers using model-based control techniques." Concludes each chapter with a 2018 problems' section. The distinguishing feature of the Indian edition of this book is the accompanying CD which contains:- A ten minute video introduction to the book, using slides- Set of chapter wise presentation slides for teachers with animation- Set of slides for students, with four slides on one page- Matlab code, in zip format and also as individual files, arranged in a directory structure- Scilab code in the same format as the Matlab code- Scilab software, using which one can install Scilab- Spoken tutorial on Scilab that explains how to install Scilab About The Book: This book is about the design of digital controllers. An attempt has been made to present digital control from scratch. The book is organized into five parts. The first deals with modeling, the second concerned with the topic of signal processing, the third devoted to identification of plants from measurements, fourth section looks at the transfer function approach to control design and the last section is devoted to state space techniques for control design. The topics of observers, Kalman filter and combined controller and observer have also been included. This expanded new edition is specifically designed to meet the needs of the process industry, and closes the gap between theory and practice. Back-to-basics approach, with a focus on techniques that have an immediate practical application, and heavy maths relegated to the end of the book Written by an experienced practitioner, highly regarded by major corporations, with 25 years of teaching industry courses Supports the increasing expectations for Universities to teach more practical process control (supported by IChemE) An expanded new edition of the bestselling system dynamics book using the bond graph approach A major revision of the go-to resource for engineers facing the increasingly complex job of dynamic systems design, System Dynamics, Fifth Edition adds a completely new section on the control of mechatronic systems, while revising and clarifying material on modeling and computer simulation for a wide variety of physical systems. This new edition continues to offer comprehensive, up-to-date coverage of bond graphs, using these important design tools to help readers better understand the various components of dynamic systems. Covering all topics from the ground up, the book provides step-by-step guidance on how to leverage the power of bond graphs to model the flow of information and energy in all types of engineering systems. It begins with simple bond graph models of mechanical, electrical, and hydraulic systems, then goes on to explain in detail how to model more complex systems using computer simulations. Readers will find: New material and practical advice on the design of control systems using mathematical models New chapters on methods that go beyond predicting system behavior, including automatic control, observers, parameter studies for system design, and concept testing Coverage of electromechanical transducers and mechanical systems in plane motion Formulas for computing hydraulic compliances and modeling acoustic systems A discussion of state-of-the-art simulation tools such as MATLAB and bond graph software Complete with numerous figures and examples, System Dynamics, Fifth Edition is a must-have resource for anyone designing systems and components in the automotive, aerospace, and defense industries. It is also an excellent hands-on guide on the latest bond graph methods for readers unfamiliar with physical system modeling. POWER SYSTEM MONITORING AND CONTROL An invaluable resource for addressing the myriad critical technical engineering considerations in modern electric power system design and operation Power System Monitoring and Control (PSMC) is becoming increasingly significant in the design, planning, and operation of modern electric power systems. In response to the existing challenge of integrating advanced metering, computation, communication, and control into appropriate levels of PSMC, Power System Monitoring and Control presents a comprehensive overview of the basic principles and key technologies for the monitoring, protection, and control of contemporary wide-area power systems. A variety of topical issues are addressed, including renewable energy

sources, smart grids, wide area stabilizing, coordinated voltage regulation and angle oscillation damping—as well as the advantages of phasor measurement units (PMUs) and global positioning system (GPS) time signal. Analysis and synthesis examples, along with case studies, add depth and clarity to all topics. Provides an up-to-date and comprehensive reference for researchers and engineers working on wide-area PSMC Links fundamental concepts of PSMC, advanced metering and control theory/techniques, and practical engineering considerations Covers PSMC problem understanding, design, practical aspects, and topics such as smart grid and coordinated angle oscillation damping and voltage regulation Incorporates the authors' experiences teaching and researching in international locales including Japan, Singapore, Malaysia, and Australia Power System Monitoring and Control is ideally suited for a graduate course on this topic. It is also a practical reference for researchers and professional engineers working in power system monitoring, dynamic stability and control. Timely and accessible content on the traditional project management activities of control, risk, time and cost, and quality and value The Wiley Guides to the Management of Projects address critical, need-to-know information that will help professionals successfully manage projects in most businesses and help students learn the best practices of the industry. They contain not only well-known and widely used basic project management practices but also the newest and most cutting-edge concepts in the broader theory and practice of managing projects. This second book in the series explains the "traditional" project management activities of control, risk, time, cost, and quality. The expert contributors show that project control represents more than the simple evaluation of project performance. They detail the principles of project time and cost control and offer a detailed review of critical chain project management. In addition, they provide a framework for project performance measurement, show how to make risk management more effective, and tell how to improve quality management. Touching on all of the fundamental levers of project control, this book will prove to be a comprehensive "owner's manual" for project and team managers, project team members, engineers, business consultants, and all those involved in any aspect of project management. Complete your understanding of project management with these other books in The Wiley Guides to the Management of Projects series: * The Wiley Guide to Project Organization & Project Management Competencies * The Wiley Guide to Project Technology, Supply Chain & Procurement Management * The Wiley Guide to Project, Program & Portfolio Management This book discusses relevant microgrid technologies in the context of integrating renewable energy and also addresses challenging issues. The authors summarize long term academic and research outcomes and contributions. In addition, this book is influenced by the authors' practical experiences on microgrids (MGs), electric network monitoring, and control and power electronic systems. A thorough discussion of the basic principles of the MG modeling and operating issues is provided. The MG structure, types, operating modes, modelling, dynamics, and control levels are covered. Recent advances in DC microgrids, virtual synchronous generators, MG planning and energy management are examined. The physical constraints and engineering aspects of the MGs are covered, and developed robust and intelligent control strategies are discussed using real time simulations and experimental studies. Motion control is widely used in all types of industries including packaging, assembly, textile, paper, printing, food processing, wood products, machinery, electronics and semiconductor manufacturing. Industrial motion control applications use specialized equipment and require system design and integration. To design such systems, engineers need to be familiar with industrial motion control products; be able to bring together control theory, kinematics, dynamics, electronics, simulation, programming and machine design; apply interdisciplinary knowledge; and deal with practical application issues. The book is intended to be an introduction to the topic for senior level undergraduate mechanical and electrical engineering students. It should also be resource for system design engineers, mechanical engineers, electrical engineers, project managers, industrial engineers, manufacturing engineers, product managers, field engineers, and programmers in industry. 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. Chemical Reactor Design and Control uses process simulators like Matlab®, Aspen Plus, and Aspen Dynamics to study the design of chemical reactors and their dynamic control. There are numerous books that focus

on steady-state reactor design. There are no books that consider practical control systems for real industrial reactors. This unique reference addresses the simultaneous design and control of chemical reactors. After a discussion of reactor basics, it: Covers three types of classical reactors: continuous stirred tank (CSTR), batch, and tubular plug flow Emphasizes temperature control and the critical impact of steady-state design on the dynamics and stability of reactors Covers chemical reactors and control problems in a plantwide environment Incorporates numerous tables and shows step-by-step calculations with equations Discusses how to use process simulators to address diverse issues and types of operations This is a practical reference for chemical engineering professionals in the process industries, professionals who work with chemical reactors, and students in undergraduate and graduate reactor design, process control, and plant design courses. Closes the gap between bioscience and mathematics-based process engineering This book presents the most commonly employed approaches in the control of bioprocesses. It discusses the role that control theory plays in understanding the mechanisms of cellular and metabolic processes, and presents key results in various fields such as dynamic modeling, dynamic properties of bioprocess models, software sensors designed for the online estimation of parameters and state variables, and control and supervision of bioprocesses Control in Bioengineering and Bioprocessing: Modeling, Estimation and the Use of Sensors is divided into three sections. Part I, Mathematical preliminaries and overview of the control and monitoring of bioprocess, provides a general overview of the control and monitoring of bioprocesses, and introduces the mathematical framework necessary for the analysis and characterization of bioprocess dynamics. Part II, Observability and control concepts, presents the observability concepts which form the basis of design online estimation algorithms (software sensor) for bioprocesses, and reviews controllability of these concepts, including automatic feedback control systems. Part III, Software sensors and observer-based control schemes for bioprocesses, features six application cases including dynamic behavior of 3-dimensional continuous bioreactors; observability analysis applied to 2D and 3D bioreactors with inhibitory and non-inhibitory models; and regulation of a continuously stirred bioreactor via modeling error compensation. Applicable across all areas of bioprocess engineering, including food and beverages, biofuels and renewable energy, pharmaceuticals and nutraceuticals, fermentation systems, product separation technologies, wastewater and solid-waste treatment technology, and bioremediation Provides a clear explanation of the mass-balance-based mathematical modelling of bioprocesses and the main tools for its dynamic analysis Offers industry-based applications on: myco-diesel for implementing "quality" of observability; developing a virtual sensor based on the Just-In-Time Model to monitor biological control systems; and virtual sensor design for state estimation in a photocatalytic bioreactor for hydrogen production Control in Bioengineering and Bioprocessing is intended as a foundational text for graduate level students in bioengineering, as well as a reference text for researchers, engineers, and other practitioners interested in the field of estimation and control of bioprocesses. The second edition of Ventilation Control of the Work Environment incorporates changes in the field of industrial hygiene since the first edition was published in 1982. Integrating feedback from students and professionals, the new edition includes problems sets for each chapter and updated information on the modeling of exhaust ventilation systems, and thus assures the continuation of the book's role as the primary industry textbook. This revised text includes a large amount of material on HVAC systems, and has been updated to reflect the changes in the Ventilation Manual published by ACGIH. It uses both English and metric units, and each chapter concludes with a problem set. An extensive text reference includes around an asteroid – a new and important topic Covers the most updated contents in spacecraft dynamics and control, both in theory and application Introduces the application to motion around asteroids – a new and important topic Written by a very experienced researcher in this area This book presents the most important methods used for the design of digital controls implemented in industrial applications. The best modelling and identification techniques for dynamical systems are presented as well as the algorithms for the implementation of the modern solutions of process control. The proposed described methods are illustrated by various case studies for the main industrial sectors There exist a number of books related each one to a single type of control, yet usually without comparisons for various industrial sectors. Some other books present modelling and identification methods or signal processing. This book presents the methods to solve all the problems linked to the design of a process control without the need to find additional information. Crystallization is an important technique for separation and purification of substances as well as for product design in chemical, pharmaceutical and biotechnological process industries. This ready reference and handbook draws on research work and industrial practice of a large group of experts in the various areas of industrial crystallization processes, capturing the essence of current trends, the markets, design tools and technologies in this key field. Along the way, it outlines trouble free production, provides laboratory controls, analyses case studies and discusses new challenges. First the instrumentation and techniques used to measure the crystal size distribution, the nucleation and solubility points, and the chemical composition of the solid and liquid phase are outlined. Then the main techniques adopted to control industrial crystallizers, starting from fundamental approaches to the most advanced ones, including the multivariable predictive control are described. An overview of the main crystallizer types is given with details of the main control schemes adopted in industry as well as the more suitable sensors and actuators. A comprehensive overview of

integrated vehicle system dynamics exploring the fundamentals and new and emerging developments This book provides a comprehensive coverage of vehicle system dynamics and control, particularly in the area of integrated vehicle dynamics control. The book consists of two parts, (1) development of individual vehicle system dynamic model and control methodology; and (2) development of integrated vehicle dynamic model and control methodology. The first part focuses on investigating vehicle system dynamics and control according to the three directions of vehicle motions, including longitudinal, vertical, and lateral. Corresponding individual control systems, e.g. Anti-lock Brake System (ABS), Active Suspension, Electric Power Steering System (EPS), are introduced and developed respectively. Particular attention is paid in the second part of the book to develop integrated vehicle dynamic control system. Integrated vehicle dynamics control system is an advanced system that coordinates all the chassis control systems and components to improve the overall vehicle performance including safety, comfort, and economy. Integrated vehicle dynamics control has been an important research topic in the area of vehicle dynamics and control over the past two decades. The research topic on integrated vehicle dynamics control is investigated comprehensively and intensively in the book through both theoretical analysis and experimental study. In this part, two types of control architectures, i.e. centralized and multi-layer, have been developed and compared to demonstrate their advantages and disadvantages. Integrated vehicle dynamics control is a hot topic in automotive research; this is one of the few books to address both theory and practice of integrated systems

Comprehensively explores the research area of integrated vehicle dynamics and control through both theoretical analysis and experimental study Addresses a full range of vehicle system topics including tyre dynamics, chassis systems, control architecture, 4 wheel steering system and design of control systems using Linear Matrix Inequality (LMI) Method Offering a different approach to other textbooks in the area, this book is a comprehensive introduction to the subject divided in three broad parts. The first part deals with building physical models, the second part with developing empirical models and the final part discusses developing process control solutions. Theory is discussed where needed to ensure students have a full understanding of key techniques that are used to solve a modeling problem.

Hallmark Features: Includes worked out examples of processes where the theory learned early on in the text can be applied. Uses MATLAB simulation examples of all processes and modeling techniques- further information on MATLAB can be obtained from www.mathworks.com Includes supplementary website to include further references, worked examples and figures from the book This book is structured and aimed at upper level undergraduate students within chemical engineering and other engineering disciplines looking for a comprehensive introduction to the subject. It is also of use to practitioners of process control where the integrated approach of physical and empirical modeling is particularly valuable. An Introduction to the Fundamentals and History of Control Charts, Applications, and Guidelines for Implementation Introduction to Statistical Process Control examines various types of control charts that are typically used by engineering students and practitioners. This book helps readers develop a better understanding of the history, implementation, and use-cases. Students are presented with varying control chart techniques, information, and roadmaps to ensure their control charts are operating efficiently and producing specification-confirming products. This is the essential text on the theories and applications behind statistical methods and control procedures. This eight-chapter reference breaks information down into digestible sections and covers topics including: ? An introduction to the basics as well as a background of control charts ? Widely used and newly researched attributes of control charts, including guidelines for implementation ? The process capability index for both normal and non-normal distribution via the sampling of multiple dependent states ? An overview of attribute control charts based on memory statistics ? The development of control charts using EQMA statistics For a solid understanding of control methodologies and the basics of quality assurance, Introduction to Statistical Process Control is a definitive reference designed to be read by practitioners and students alike. It is an essential textbook for those who want to explore quality control and systems design. A comprehensive review of the principles and dynamics of robotic systems Dynamics and Control of Robotic Systems offers a systematic and thorough theoretical background for the study of the dynamics and control of robotic systems. The authors—noted experts in the field—highlight the underlying principles of dynamics and control that can be employed in a variety of contemporary applications. The book contains a detailed presentation of the precepts of robotics and provides methodologies that are relevant to realistic robotic systems. The robotic systems represented include wide range examples from classical industrial manipulators, humanoid robots to robotic surgical assistants, space vehicles, and computer controlled milling machines. The book puts the emphasis on the systematic application of the underlying principles and show how the computational and analytical tools such as MATLAB, Mathematica, and Maple enable students to focus on robotics' principles and theory. Dynamics and Control of Robotic Systems contains an extensive collection of examples and problems and: Puts the focus on the fundamentals of kinematics and dynamics as applied to robotic systems Presents the techniques of analytical mechanics of robotics Includes a review of advanced topics such as the recursive order N formulation Contains a wide array of design and analysis problems for robotic systems Written for students of robotics, Dynamics and Control of Robotic Systems offers a comprehensive review of the underlying principles and methods of the science of robotics. Frequency

Variations in Power Systems: Modeling, State Estimation and Control presents the Frequency Divider Formula (FDF); a unique approach that defines, calculates and estimates the frequency in electrical energy systems. This authoritative book is written by two noted researchers on the topic. They define the meaning of frequency of an electrical quantity (such as voltage and current) in non-stationary conditions (for example the frequency is not equal to the nominal one) and pose the foundation of the frequency divider formula. The book describes the consequences of using a variable frequency in power system modelling and simulations, in state estimation and frequency control applications. In addition, the authors include a discussion on the applications of the frequency divider in systems where part of the generation is not based on synchronous machines, but rather on converter-interfaced energy resources, such as wind and solar power plants. This important book: Offers a review that clearly defines and shows how the Frequency Divider Formula can be applied Discusses the link between frequency and energy in power systems Presents a unified vision that accurately reveals the common thread that links modelling, control and estimation Includes information on the many implications that "local frequency variations" have on power system dynamics and control Contains several numerical examples Written for researchers, academic staff members, students, specialised consultants and professional software developers, Frequency Variations in Power Systems questions the conventional transient stability model of power system and proposes a new formulation. After an overview of the fundamentals, limitations, and scope of reactive distillation, this book uses rigorous models for steady-state design and dynamic analysis of different types of reactive distillation columns and quantitatively compares the economics of reactive distillation columns with conventional multi-unit processes. It goes beyond traditional steady-state design that primarily considers the capital investment and energy costs when analyzing the control structure and the dynamic robustness of disturbances, and discusses how to maximize the economic and environmental benefits of reactive distillation technology. Provides students with an understanding of the modeling and practice in power system stability analysis and control design, as well as the computational tools used by commercial vendors Bringing together wind, FACTS, HVDC, and several other modern elements, this book gives readers everything they need to know about power systems. It makes learning complex power system concepts, models, and dynamics simpler and more efficient while providing modern viewpoints of power system analysis. Power System Modeling, Computation, and Control provides students with a new and detailed analysis of voltage stability; a simple example illustrating the BCU method of transient stability analysis; and one of only a few derivations of the transient synchronous machine model. It offers a discussion on reactive power consumption of induction motors during start-up to illustrate the low-voltage phenomenon observed in urban load centers. Damping controller designs using power system stabilizer, HVDC systems, static var compensator, and thyristor-controlled series compensation are also examined. In addition, there are chapters covering flexible AC transmission Systems (FACTS)—including both thyristor and voltage-sourced converter technology—and wind turbine generation and modeling. Simplifies the learning of complex power system concepts, models, and dynamics Provides chapters on power flow solution, voltage stability, simulation methods, transient stability, small signal stability, synchronous machine models (steady-state and dynamic models), excitation systems, and power system stabilizer design Includes advanced analysis of voltage stability, voltage recovery during motor starts, FACTS and their operation, damping control design using various control equipment, wind turbine models, and control Contains numerous examples, tables, figures of block diagrams, MATLAB plots, and problems involving real systems Written by experienced educators whose previous books and papers are used extensively by the international scientific community Power System Modeling, Computation, and Control is an ideal textbook for graduate students of the subject, as well as for power system engineers and control design professionals. A timely treatment of distillation combining steady-state design and dynamic controllability As the world continues to seek new sources of energy, the distillation process remains one of the most important separation methods in the chemical, petroleum, and energy industries. And as new renewable sources of energy and chemical feedstocks become more universally utilized, the issues of distillation design and control will remain vital to a future sustainable lifestyle. Distillation Design and Control Using Aspen Simulation introduces the current status and future implications of this vital technology from the dual perspectives of steady-state design and dynamics. Where traditional design texts have focused mainly on the steady-state economic aspects of distillation design, William Luyben also addresses such issues as dynamic performance in the face of disturbances. Utilizing the commercial simulators Aspen Plus and Aspen Dynamics, the text guides future and practicing chemical engineers first in the development of optimal steady-state designs of distillation systems, and then in the development of effective control structures. Unique features of the text include: * In-depth coverage of the dynamics of column design to help develop effective control structures for distillation columns * Development of rigorous simulations of single distillation columns and sequences of columns * Coverage of design and control of petroleum fractionators Encompassing nearly four decades of research and practical developments in this dynamic field, the text represents an important reference for both students and experienced engineers faced with distillation problems. Handbook of MARINE CRAFT HYDRODYNAMICS AND MOTION CONTROL The latest tools for analysis and design of advanced GNC systems Handbook of Marine Craft Hydrodynamics and Motion

Control is an extensive study of the latest research in hydrodynamics, guidance, navigation, and control systems for marine craft. The text establishes how the implementation of mathematical models and modern control theory can be used for simulation and verification of control systems, decision-support systems, and situational awareness systems. Coverage includes hydrodynamic models for marine craft, models for wind, waves and ocean currents, dynamics and stability of marine craft, advanced guidance principles, sensor fusion, and inertial navigation. This important book includes the latest tools for analysis and design of advanced GNC systems and presents new material on unmanned underwater vehicles, surface craft, and autonomous vehicles. References and examples are included to enable engineers to analyze existing projects before making their own designs, as well as MATLAB scripts for hands-on software development and testing. Highlights of this Second Edition include: Topical case studies and worked examples demonstrating how you can apply modeling and control design techniques to your own designs A Github repository with MATLAB scripts (MSS toolbox) compatible with the latest software releases from Mathworks New content on mathematical modeling, including models for ships and underwater vehicles, hydrostatics, and control forces and moments New methods for guidance and navigation, including line-of-sight (LOS) guidance laws for path following, sensory systems, model-based navigation systems, and inertial navigation systems This fully revised Second Edition includes innovative research in hydrodynamics and GNC systems for marine craft, from ships to autonomous vehicles operating on the surface and under water. Handbook of Marine Craft Hydrodynamics and Motion Control is a must-have for students and engineers working with unmanned systems, field robots, autonomous vehicles, and ships. MSS toolbox: <https://github.com/cybergalactic/mss> Lecture notes: <https://www.fossen.biz/wiley> Author's home page: <https://www.fossen.biz> Infection Prevention and Control at a Glance is the perfect companion for study and revision for pre-registration nursing and healthcare students, as well as qualified nurses and medical students. Infection prevention and control is one of the key five 'essential skills clusters' that is incorporated into all pre-registration nursing programmes. This highly visual and dynamic book is a thorough resource for nurses wanting to consolidate and expand their knowledge of this important part of nursing. Written by experienced infection prevention and control specialist nurses, it provides a concise and simple approach to a vast and complex subject, and equips the reader with key information in relation to various aspects of infection prevention and control practice. Provides a snap-shot of the application of infection prevention and control in practice and the key infections affecting patients in both acute and primary care A uniquely visual and accessible overview of a topic of relevance to all nursing staff Includes key points for clinical practice, patient management, and signposting of key national guidance documents and websites Available in a wide-range of digital formats - perfect for 'on the go' study and revision A Real- Time Approach to Process Control provides the reader with both a theoretical and practical introduction to this increasingly important approach. Assuming no prior knowledge of the subject, this text introduces all of the applied fundamentals of process control from instrumentation to process dynamics, PID loops and tuning, to distillation, multi-loop and plant-wide control. In addition, readers come away with a working knowledge of the three most popular dynamic simulation packages. The text carefully balances theory and practice by offering readings and lecture materials along with hands-on workshops that provide a 'virtual' process on which to experiment and from which to learn modern, real time control strategy development. As well as a general updating of the book specific changes include: A new section on boiler control in the chapter on common control loops A major rewrite of the chapters on distillation column control and multiple single-loop control schemes The addition of new figures throughout the text Workshop instructions will be altered to suit the latest versions of HYSYS, ASPEN and DYN SIM simulation software A new solutions manual for the workshop problems Includes a solution manual for problems. Provides MATLAB code for examples and solutions. Deals with robust systems in both theory and practice. A practical and straightforward exploration of the basic tools for the modeling, analysis, and design of control systems In An Introduction to System Modeling and Control, Dr. Chiasson delivers an accessible and intuitive guide to understanding modeling and control for students in electrical, mechanical, and aerospace/aeronautical engineering. The book begins with an introduction to the need for control by describing how an aircraft flies complete with figures illustrating roll, pitch, and yaw control using its ailerons, elevators, and rudder, respectively. The book moves on to rigid body dynamics about a single axis (gears, cart rolling down an incline) and then to modeling DC motors, DC tachometers, and optical encoders. Using the transfer function representation of these dynamic models, PID controllers are introduced as an effective way to track step inputs and reject constant disturbances. It is further shown how any transfer function model can be stabilized using output pole placement and on how two-degree of freedom controllers can be used to eliminate overshoot in step responses. Bode and Nyquist theory are then presented with an emphasis on how they give a quantitative insight into a control system's robustness and sensitivity. An Introduction to System Modeling and Control closes with chapters on modeling an inverted pendulum and a magnetic levitation system, trajectory tracking control using state feedback, and state estimation. In addition the book offers: A complete set of MATLAB/SIMULINK files for examples and problems included in the book. A set of lecture slides for each chapter. A solutions manual with recommended problems to assign. An analysis of the robustness and sensitivity of four different controller designs for an inverted

pendulum (cart-pole). Perfect for electrical, mechanical, and aerospace/aeronautical engineering students, An Introduction to System Modeling and Control will also be an invaluable addition to the libraries of practicing engineers. Comprehensive in scope, it describes the process of system safety--from the creation and management of a safety program on a system under development to the analysis that must be performed as this system is designed and produced to assure acceptable risk in its operation. Unique in its coverage, it is the only work on this subject that combines full descriptions of the management and analysis processes and procedures in one handy volume. Designed for both system safety managers and engineers, it incorporates the safety procedures used by the Department of Defense and NASA and explains basic statistical methods and network analysis methods which provide an understanding of the engineering analysis methods that follow. An up-close look at the theory behind and application of extremum seeking Originally developed as a method of adaptive control for hard-to-model systems, extremum seeking solves some of the same problems as today's neural network techniques, but in a more rigorous and practical way. Following the resurgence in popularity of extremum-seeking control in aerospace and automotive engineering, Real-Time Optimization by Extremum-Seeking Control presents the theoretical foundations and selected applications of this method of real-time optimization. Written by authorities in the field and pioneers in adaptive nonlinear control systems, this book presents both significant theoretic value and important practical potential. Filled with in-depth insight and expert advice, Real-Time Optimization by Extremum-Seeking Control: * Develops optimization theory from the points of dynamic feedback and adaptation * Builds a solid bridge between the classical optimization theory and modern feedback and adaptation techniques * Provides a collection of useful tools for problems in this complex area * Presents numerous applications of this powerful methodology * Demonstrates the immense potential of this methodology for future theory development and applications Real-Time Optimization by Extremum-Seeking Control is an important resource for both students and professionals in all areas of engineering-electrical, mechanical, aerospace, chemical, biomedical-and is also a valuable reference for practicing control engineers. Covering basic theory, new research, and intersections with adjacent fields, this is the first comprehensive reference work on cognitive control – our ability to use internal goals to guide thought and behavior. Draws together expert perspectives from a range of disciplines, including cognitive psychology, neuropsychology, neuroscience, cognitive science, and neurology Covers behavioral phenomena of cognitive control, neuroanatomical and computational models of frontal lobe function, and the interface between cognitive control and other mental processes Explores the ways in which cognitive control research can inform and enhance our understanding of brain development and neurological and psychiatric conditions An authoritative guide to the most up-to-date information on power system dynamics The revised third edition of Power System Dynamics and Stability contains a comprehensive, state-of-the-art review of information on the topic. The third edition continues the successful approach of the first and second editions by progressing from simplicity to complexity. It places the emphasis first on understanding the underlying physical principles before proceeding to more complex models and algorithms. The book is illustrated by a large number of diagrams and examples. The third edition of Power System Dynamics and Stability explores the influence of wind farms and virtual power plants, power plants inertia and control strategy on power system stability. The authors—noted experts on the topic—cover a range of new and expanded topics including: Wide-area monitoring and control systems. Improvement of power system stability by optimization of control systems parameters. Impact of renewable energy sources on power system dynamics. The role of power system stability in planning of power system operation and transmission network expansion. Real regulators of synchronous generators and field tests. Selectivity of power system protections at power swings in power system. Criteria for switching operations in transmission networks. Influence of automatic control of a tap changing step-up transformer on the power capability area of the generating unit. Mathematical models of power system components such as HVDC links, wind and photovoltaic power plants. Data of sample (benchmark) test systems. Power System Dynamics: Stability and Control, Third Edition is an essential resource for students of electrical engineering and for practicing engineers and researchers who need the most current information available on the topic. Control systems have come to play an important role in the performance of modern vehicles with regards to meeting goals on low emissions and low fuel consumption. To achieve these goals, modeling, simulation, and analysis have become standard tools for the development of control systems in the automotive industry. Modeling and Control of Engines and Drivelines provides an up-to-date treatment of the topic from a clear perspective of systems engineering and control systems, which are at the core of vehicle design. This book has three main goals. The first is to provide a thorough understanding of component models as building blocks. It has therefore been important to provide measurements from real processes, to explain the underlying physics, to describe the modeling considerations, and to validate the resulting models experimentally. Second, the authors show how the models are used in the current design of control and diagnosis systems. These system designs are never used in isolation, so the third goal is to provide a complete setting for system integration and evaluation, including complete vehicle models together with actual requirements and driving cycle analysis. Key features: Covers signals, systems, and control in modern vehicles Covers the basic dynamics of internal combustion engines and drivelines Provides a

set of standard models and includes examples and case studies Covers turbo- and super-charging, and automotive dependability and diagnosis Accompanied by a web site hosting example models and problems and solutions Modeling and Control of Engines and Drivelines is a comprehensive reference for graduate students and the authors' close collaboration with the automotive industry ensures that the knowledge and skills that practicing engineers need when analysing and developing new powertrain systems are also covered. The book blends readability and accessibility common to undergraduate control systems texts with the mathematical rigor necessary to form a solid theoretical foundation. Appendices cover linear algebra and provide a Matlab overview and files. The reviewers pointed out that this is an ambitious project but one that will pay off because of the lack of good up-to-date textbooks in the area. This book fills the gap between basic control configurations (Practical Process Control) and model predictive control (MPC). For those loops whose performance has a direct impact on plant economics or product quality, going beyond simple feedback or cascade can improve control performance, or specifically, reduce the variance about the target. However, the effort required to implement such control technology must be offset by increased economic returns from production operations. The economic aspects of the application of the various advanced control technologies are stressed throughout the book. A systematic and unified presentation of the fundamentals of adaptive control theory in both continuous time and discrete time Today, adaptive control theory has grown to be a rigorous and mature discipline. As the advantages of adaptive systems for developing advanced applications grow apparent, adaptive control is becoming more popular in many fields of engineering and science. Using a simple, balanced, and harmonious style, this book provides a convenient introduction to the subject and improves one's understanding of adaptive control theory. Adaptive Control Design and Analysis features: Introduction to systems and control Stability, operator norms, and signal convergence Adaptive parameter estimation State feedback adaptive control designs Parametrization of state observers for adaptive control Unified continuous and discrete-time adaptive control L1+ ∞ robustness theory for adaptive systems Direct and indirect adaptive control designs Benchmark comparison study of adaptive control designs Multivariate adaptive control Nonlinear adaptive control Adaptive compensation of actuator nonlinearities End-of-chapter discussion, problems, and advanced topics As either a textbook or reference, this self-contained tutorial of adaptive control design and analysis is ideal for practicing engineers, researchers, and graduate students alike. The new 4th edition of Seborg's Process Dynamics Control provides full topical coverage for process control courses in the chemical engineering curriculum, emphasizing how process control and its related fields of process modeling and optimization are essential to the development of high-value products. A principal objective of this new edition is to describe modern techniques for control processes, with an emphasis on complex systems necessary to the development, design, and operation of modern processing plants. Control process instructors can cover the basic material while also having the flexibility to include advanced topics.

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