Modern Digital Control Systems

Second Edition
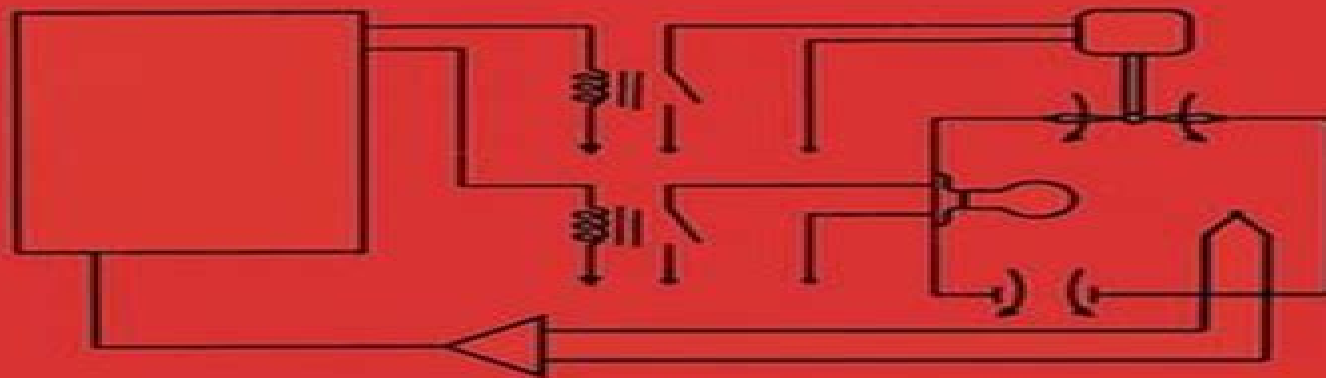
Raymond G. Jacquot

Modern Digital Control Systems

M. Sami Fadali,Antonio Visioli

Modern Digital Control Systems:

   Modern Digital Control Systems Raymond G. Jacquot,2019 This work presents traditional methods and current techniques of incorporating the computer into closed loop dynamic systems control combining conventional transfer function design and state variable concepts Digital Control Designer an award winning software program which permits the solution of highly complex problems is available on the CR   Modern Digital Control Systems Jacquot,2019-01-22 This work presents traditional methods and current techniques of incorporating the computer into closed loop dynamic systems control combining conventional transfer function design and state variable concepts Digital Control Designer an award winning software program which permits the solution of highly complex problems is available on the CR   **Modern Digital Control Systems** Jacquot,2019-01-22 This work presents traditional methods and current techniques of incorporating the computer into closed loop dynamic systems control combining conventional transfer function design and state variable concepts Digital Control Designer an award winning software program which permits the solution of highly complex problems is available on the CR   **Digital Control Systems** Ioan Doré Landau,Gianluca Zito,2005-10-13 The extraordinary development of digital computers microprocessors microcontrollers and their extensive use in control systems in all fields of applications has brought about important changes in the design of control systems Their performance and their low cost make them suitable for use in control systems of various kinds which demand far better capabilities and performances than those provided by analog controllers However in order really to take advantage of the capabilities of microprocessors it is not enough to reproduce the behavior of analog PID controllers One needs to implement specific and high performance model based control techniques developed for computer controlled systems techniques that have been extensively tested in practice In this context identification of a plant dynamic model from data is a fundamental step in the design of the control system The book takes into account the fact that the association of books with software and on line material is radically changing the teaching methods of the control discipline Despite its interactive character computer aided control design software requires the understanding of a number of concepts in order to be used efficiently The use of software for illustrating the various concepts and algorithms helps understanding and rapidly gives a feeling of the various phenomena   **Industrial Digital Control Systems** K. Warwick,D. Rees,1988 Includes Digital signals and systems Digital controllers for process control applications Design of digital controllers Control of time delay systems State space concepts System identification Introduction to discrete optimal control Multivariable control Adaptive control Computer aided design for industrial control systems Reliability and redundancy in microprocessor controllers Software and hardware aspects of industrial controller implementations Application of distributed digital control algorithms to power stations An expert system for process control   Digital Control Systems Constantine H. Houpis,Gary B. Lamont,1992 Continuous time control system response characteristics Linear systems and the sampling process Discrete systems modeling Discrete control analysis Discrete transform analysis

approximations Principles of signal conversion and measurement Digital control system implementation Random processes in digital control systems Finite word lenght and compensator structure Cascade compensation digitization DIG technique Cascade compensation direct DIR technique Feedback compensation Discrete state variable model State space design methods Discrete quantitative feedback technique Modern discrete control theory Discrete optimal control Discrete estimation and stochastic control Fourier transform Convolution Pade approximation Power series Computer Aided Design CAD programs for control Matrix manipulations Signal flow graphs w Transformation characteristics Number representations Theory of probability Discrete QFT design processes   Digital Control Systems Anastasia Veloni,Nikolaos Miridakis,2017-08-07 The objective of this book is to provide a collection of solved problems on control systems with an emphasis on practical problems System functionality is described the modeling process is explained the problem solution is introduced and the derived results are discussed Each chapter ends with a discussion on applying MATLAB LabVIEW and or Comprehensive Control to the previously introduced concepts The aim of the book is to help an average reader understand the concepts of control systems through problems and applications The solutions are based directly on math formulas given in extensive tables throughout the text   **Digital Control Systems Implementation and Computational Techniques** ,1996-07-30 Praise for the Series This book will be a useful reference to control engineers and researchers The papers contained cover well the recent advances in the field of modern control theory IEEE Group CorrespondenceThis book will help all those researchers who valiantly try to keep abreast of what is new in the theory and practice of optimal control Control   **Analog and Digital Control System Design** Chi-Tsong Chen,2006-02-24 This text s contemporary approach focuses on the concepts of linear control systems rather than computational mechanics Straightforward coverage includes an integrated treatment of both classical and modern control system methods The text emphasizes design with discussions of problem formulation design criteria physical constraints several design methods and implementation of compensators Discussions of topics not found in other texts such as pole placement model matching and robust tracking add to the text s cutting edge presentation Students will appreciate the applications and discussions of practical aspects including the leading problem in developing block diagrams noise disturbances and plant perturbations State feedback and state estimators are designed using state variable equations and transfer functions offering a comparison of the two approaches The incorporation of MATLAB throughout the text helps students to avoid time consuming computation and concentrate on control system design and analysis   **Direct Digital Control for Building HVAC Systems** Michael J. Coffin,2012-12-06 Since the publication of the first edition in 1992 the HVAC industry has gone through enormous changes As simple digital systems have given way to more complex systems demand for information on how these systems operate how they are best applied and how they communicate with other building control systems has grown rapidly Direct Digital Control for Building Systems Second Edition is thoroughly updated and expanded to include coverage of the architecture of modern digital

control systems distributed intelligence networked systems communication protocols the technologies and issues concerning interoperability the latest application strategies and defensive techniques for designing and specifying control systems Numerous illustrations throughout help keep the subject highly accessible and hardware software and systems applications are described in the most universal terms possible This thoroughly revised second edition also contains a full section on BACnet standard and Echelon s LonWorks technology their meaning applications and future implications An up to date appendix is provided Insights on emerging technologies in intelligent control systems and what the future holds for this dynamic field is covered throughout   Digital Control Systems--theory, Hardware, Software Constantine H. Houpis,Gary B. Lamont,1985   **Modern Control System Theory and Design** Stanley M. Shinners,1998-05-06 The definitive guide to control system design Modern Control System Theory and Design Second Edition offers themost comprehensive treatment of control systems available today Its unique text software combination integrates classical andmodern control system theories while promoting an interactive computer based approach to design solutions The sheer volume ofpractical examples as well as the hundreds of illustrations ofcontrol systems from all engineering fields make this volumeaccessible to students and indispensable for professionalengineers This fully updated Second Edition features a new chapter on moderncontrol system design including state space design techniques Ackermann s formula for pole placement estimation robust control and the H method for control system design Other notable additionsto this edition are Free MATLAB software containing problem solutions which can beretrieved from The Mathworks Inc anonymous FTP server atftp ftp mathworks com pub books shinners Programs and tutorials on the use of MATLAB incorporated directlyinto the text A complete set of working digital computer programs Reviews of commercial software packages for control systemanalysis An extensive set of new worked out illustrative solutions addedin dedicated sections at the end of chapters Expanded end of chapter problems one third with answers tofacilitate self study An updated solutions manual containing solutions to the remainingtwo thirds of the problems Superbly organized and easy to use Modern Control System Theoryand Design Second Edition is an ideal textbook for introductorycourses in control systems and an excellent professional reference Its interdisciplinary approach makes it invaluable for practicingengineers in electrical mechanical aeronautical chemical andnuclear engineering and related areas

   Digital Control Engineering M. Sami Fadali,Antonio Visioli,2012-08-21 Digital controllers are part of nearly all modern personal industrial and transportation systems Every senior or graduate student of electrical chemical or mechanical engineering should therefore be familiar with the basic theory of digital controllers This new text covers the fundamental principles and applications of digital control engineering with emphasis on engineering design Fadali and Visioli cover analysis and design of digitally controlled systems and describe applications of digital controls in a wide range of fields With worked examples and Matlab applications in every chapter and many end of chapter assignments this text provides both theory and practice for those coming to digital control engineering for the first time whether as a student or practicing

engineer Extensive Use of computational tools Matlab sections at end of each chapter show how to implement concepts from the chapter Frees the student from the drudgery of mundane calculations and allows him to consider more subtle aspects of control system analysis and design An engineering approach to digital controls emphasis throughout the book is on design of control systems Mathematics is used to help explain concepts but throughout the text discussion is tied to design and implementation For example coverage of analog controls in chapter 5 is not simply a review but is used to show how analog control systems map to digital control systems Review of Background Material contains review material to aid understanding of digital control analysis and design Examples include discussion of discrete time systems in time domain and frequency domain reviewed from linear systems course and root locus design in s domain and z domain reviewed from feedback control course Inclusion of Advanced Topics In addition to the basic topics required for a one semester senior graduate class the text includes some advanced material to make it suitable for an introductory graduate level class or for two quarters at the senior graduate level Examples of optional topics are state space methods which may receive brief coverage in a one semester course and nonlinear discrete time systems Minimal Mathematics Prerequisites The mathematics background required for understanding most of the book is based on what can be reasonably expected from the average electrical chemical or mechanical engineering senior This background includes three semesters of calculus differential equations and basic linear algebra Some texts on digital control require more   Introduction to Digital Control Systems Hugh F. VanLandingham,1985   Direct Digital Control of Building Systems H. Michael Newman,1994 It emphasizes throughout the high performance reliability and reduced cost of modern digital sensors control devices microprocessors computer memory and other electronic components   Modern Control Theory Uday A. Bakshi,Dr. Mayuresh V. Bakshi,2020-11-01 The book is written for an undergraduate course on the Modern Control Systems It provides comprehensive explanation of state variable analysis of linear control systems and analysis of nonlinear control systems Each chapter starts with the background of the topic Then it gives the conceptual knowledge about the topic dividing it in various sections and subsections Each chapter provides the detailed explanation of the topic practical examples and variety of solved problems The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting The book starts with explaining the concept of state variable and state model of linear control systems Then it explains how to obtain the state models of various types of systems using phase variables canonical variables Jordan s canonical form and cascade programming Then the book includes good coverage of the matrix algebra including eigen values eigen vectors modal matrix and diagonalization It also includes the derivation of transfer function of the system from its state model The book further explains the solution of state equations including the concept of state transition matrix It also includes the various methods of obtaining the state transition matrix such as Laplace transform method Power series method Cayley Hamilton method and Similarity transformation method It further includes the detailed discussion of controllability and observability of systems It

also provides the discussion of pole placement technique of system design The book teaches various types of nonlinearities and the nonlinear systems The book covers the fundamental knowledge of analysis of nonlinear systems using phase plane method isocline method and delta method Finally it explains stability analysis of nonlinear systems and Liapunov s stability analysis   *Digital Control Engineering* M. Gopal,1988   **Digital Control System Analysis and Design** Charles L. Phillips,H. Troy Nagle,1990   **Further Developments in Modeling Digital Control Systems with MA-prefiltered Measurements** Michael E. Polites,1989   **Control Systems** M. Gopal,2008 Part of the McGraw Hill Core Concepts Series Control Systems Principles and Design is a textbook for a control systems course at the advanced undergraduate level The book presents a balanced approach incorporating the frequency response root locus and state variable methods as well as discussing the digital control of systems MATLAB and real world problems and examples are integrated throughout the book so that practical applications are emphasized over theory About the Core Concepts in Electrical Engineering Series As advances in networking and communications bring the global academic community even closer together it is essential that textbooks recognize and respond to this shift It is in this spirit that we will publish textbooks in the McGraw Hill Core Concepts in Electrical Engineering Series The series will offer textbooks for the global electrical engineering curriculum that are reasonably priced innovative dynamic and will cover fundamental subject areas studied by Electrical and Computer Engineering students Written with a global perspective and presenting the latest in technological advances these books will give students of all backgrounds a solid foundation in key engineering subjects

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