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Discrete-Time Control System Design with Applications
Advanced Discrete-Time Control
Discrete-time Control Systems
Turnpike Properties in the Calculus of Variations and Optimal Control
Linear Systems: Analysis and Applications , Second Edition
Nonlinear Control Systems Design 1989
Linear Systems Control
Linear Stochastic Control Systems
Optimal Control Problems Arising in Mathematical Economics
Robust Industrial Control Systems
Variational Analysis and Generalized Differentiation II
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Discrete-time and Computer Control Systems
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Harmonic Limits of Dynamical and Control Systems
Modeling and Control of Complex Systems
Control and Dynamic Systems V56: Digital and Numeric Techniques and Their Application in Control Systems
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Control Systems
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Designing Linear Control Systems with MATLAB

Discrete-time Control Systems
Recent Advances in Optimization

KENDRA HESTER

Discrete-Time Control System Design with Applications CRC PressI Llc
Control and Dynamic Systems: Advances in Theory and Applications, Volume 56: Digital and Numeric Techniques and their Applications in Control Systems, Part 2 of 2 covers the significant developments in digital and numerical techniques for the analysis and design of modern complex control systems. This volume is composed of 12 chapters and starts with a description of the design techniques of linear constrained discrete-time control systems. The subsequent chapters describe the techniques dealing with robust real-time system identification, the adaptive control algorithms, and the utilization of methods from generalized interpolation and operator theory to deal with a wide range of problems in robust control. These topics are followed by reviews f the decentralized control design for interconnected uncertain systems; the computation of frequency response of descriptor systems by rational interpolation; the techniques for the synthesis of multivariable feedback control laws; and the

effect of the initial condition in state estimation for discrete-time linear systems. Other chapters illustrate practical, efficient, and reliable numerical algorithms for robust multivariable control design of linear time-invariant systems, as well as a complete analysis of closed-loop transfer recovery in discrete-time systems using observer-based controllers. The last chapters provide the techniques in robust policy-making in the global economic environment and the implications of robust control techniques for continuous-time systems. This book will prove useful to process, control, systems, and design engineers.

Advanced Discrete-Time Control John Wiley & Sons

The contributions appearing in this book give an overview of recent research done in optimization and related areas, such as optimal control, calculus of variations, and game theory. They do not only address abstract issues of optimization theory, but are also concerned with the modeling and computer resolution of specific optimization problems arising in industry and applied sciences.

Discrete-time Control Systems CRC Press

Written as a companion volume to the author's Solving Control Engineering Problems with MATLAB, this indispensable guide illustrates the power of MATLAB as a tool for synthesizing

control systems, emphasizing pole placement, and optimal systems design.

Turnpike Properties in the Calculus of Variations and Optimal Control Springer

Highlights the Hamiltonian approach to singularly perturbed linear optimal control systems. Develops parallel algorithms in independent slow and fast time scales for solving various optimal linear control and filtering problems in standard and nonstandard singularly perturbed systems, continuous- and discrete-time, deterministic and stochastic, multimodeling structures, Kalman filtering, sampled data systems, and much more.

Linear Systems: Analysis and Applications , Second Edition

Springer Science & Business Media

These papers cover the recent advances in the field of control theory and are designed for electrical engineers in digital signal processing.

Nonlinear Control Systems Design 1989

Routledge

Hybrid systems describe the interaction of software, described by finite models such as finite-state machines, with the physical world, described by infinite models such as differential equations. This book addresses problems of verification and controller synthesis for hybrid systems. Although these problems are

very difficult to solve for general hybrid systems, several authors have identified classes of hybrid systems that admit symbolic or finite models. The novelty of the book lies on the systematic presentation of these classes of hybrid systems along with the relationships between the hybrid systems and the corresponding symbolic models. To show how the existence of symbolic models can be used for verification and controller synthesis, the book also outlines several key results for the verification and controller design of finite systems. Several examples illustrate the different methods and techniques discussed in the book.

Linear Systems Control Springer Nature

In this thesis, we will analyze an approach to describe the rotational behaviour of dynamical systems and control systems, namely the concept of rotational factor maps. The general idea is to find a complex-valued map F on the state space that maps the dynamics onto a rotation around the origin in the complex plane. We will call such a map a rotational factor map. More formally, these rotational factor maps are eigenfunctions of the Koopman operator. This concept of rotational factor maps is closely connected to harmonic limits, which are ergodic sums (for discrete-time systems) or integrals (for systems in continuous time). It turns out that the existence of

rotational factor maps is equivalent to the existence of non-zero harmonic limits. So we use harmonic limits to analyse the spectral properties of dynamical systems given by the iteration of a map, by a semi-flow or by a control system.

Linear Stochastic Control Systems Elsevier

Comprehension of complex systems comes from an understanding of not only the behavior of constituent elements but how they act together to form the behavior of the whole. However, given the multidisciplinary nature of complex systems, the scattering of information across different areas creates a chaotic situation for those trying to understand pos

Optimal Control Problems Arising in Mathematical Economics Elsevier

Integrates MATLAB throughout the text.

Robust Industrial Control Systems Springer

This book focuses on one- and multi-dimensional linear integral and discrete Gronwall-Bellman type inequalities. It provides a useful collection and systematic presentation of known and new results, as well as many applications to differential (ODE and PDE), difference, and integral equations. With this work the author fills a gap in the literature on inequalities, offering an ideal source for researchers in these topics. The present

volume is part 1 of the author's two-volume work on inequalities. Integral and discrete inequalities are a very important tool in classical analysis and play a crucial role in establishing the well-posedness of the related equations, i.e., differential, difference and integral equations.

Variational Analysis and Generalized Differentiation II

Discrete-time Control Systems

This book is devoted to the study of the turnpike phenomenon and describes the existence of solutions for a large variety of infinite horizon optimal control classes of problems. Chapter 1 provides introductory material on turnpike properties. Chapter 2 studies the turnpike phenomenon for discrete-time optimal control problems. The turnpike properties of autonomous problems with extended-value integrands are studied in Chapter 3. Chapter 4 focuses on large classes of infinite horizon optimal control problems without convexity (concavity) assumptions. In Chapter 5, the turnpike results for a class of dynamic discrete-time two-player zero-sum game are proven. This thorough exposition will be very useful for mathematicians working in the fields of optimal control, the calculus of variations, applied functional analysis and infinite horizon optimization. It may also be used as a primary text in a graduate course in optimal control or as supplementary text for

a variety of courses in other disciplines. Researchers in other fields such as economics and game theory, where turnpike properties are well known, will also find this Work valuable.

Turnpike Phenomenon and Infinite Horizon Optimal Control I. K. International Pvt Ltd

Discrete-time Control SystemsPearson

State Feedback Control and Kalman Filtering with MATLAB/Simulink Tutorials Academic Press

This book is devoted to the recent progress on the turnpike theory. The turnpike property was discovered by Paul A. Samuelson, who applied it to problems in mathematical economics in 1949. These properties were studied for optimal trajectories of models of economic dynamics determined by convex processes. In this monograph the author, a leading expert in modern turnpike theory, presents a number of results concerning the turnpike properties in the calculus of variations and optimal control which were obtained in the last ten years. These results show that the turnpike properties form a general phenomenon which holds for various classes of variational problems and optimal control problems. The book should help to correct the misapprehension that turnpike properties are only special features of some narrow classes of convex problems of mathematical economics. Audience

This book is intended for mathematicians interested in optimal control, calculus of variations, game theory and mathematical economics.

Algorithms and Architectures for Real-Time Control 1992 Springer

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 included (3.5 IBM-compatible disk). This edition: supplies new coverage of the Ragazzini technique; describes digital filtering, including Butterworth prototype filters; and more. A solutions manual is included for instructors.

Design of Nonlinear Control Systems with the Highest Derivative in Feedback Springer Science & Business Media

This book highlights the latest achievements concerning the theory, methods and practice of fault diagnostics, fault tolerant systems and cyber safety. When considering the diagnostics of industrial processes and systems, increasingly important safety issues cannot be ignored. In this context, diagnostics plays a crucial role as a

primary measure of the improvement of the overall system safety integrity level. Obtaining the desired diagnostic coverage or providing an appropriate level of inviolability of the integrity of a system is now practically inconceivable without the use of fault detection and isolation methods. Given the breadth and depth of its coverage, the book will be of interest to researchers faced with the challenge of designing technical and medical diagnosis systems, as well as junior researchers and students in the fields of automatic control, robotics, computer science and artificial intelligence.

Discrete-time and Computer Control Systems John Wiley & Sons

Modern control theory and in particular state space or state variable methods can be adapted to the description of many different systems because it depends strongly on physical modeling and physical intuition. The laws of physics are in the form of differential equations and for this reason, this book concentrates on system descriptions in this form. This means coupled systems of linear or nonlinear differential equations. The physical approach is emphasized in this book because it is most natural for complex systems. It also makes what would ordinarily be a difficult mathematical subject into one which can straightforwardly be

understood intuitively and which deals with concepts which engineering and science students are already familiar. In this way it is easy to immediately apply the theory to the understanding and control of ordinary systems. Application engineers, working in industry, will also find this book interesting and useful for this reason. In line with the approach set forth above, the book first deals with the modeling of systems in state space form. Both transfer function and differential equation modeling methods are treated with many examples. Linearization is treated and explained first for very simple nonlinear systems and then more complex systems. Because computer control is so fundamental to modern applications, discrete time modeling of systems as difference equations is introduced immediately after the more intuitive differential equation models. The conversion of differential equation models to difference equations is also discussed at length, including transfer function formulations. A vital problem in modern control is how to treat noise in control systems. Nevertheless this question is rarely treated in many control system textbooks because it is considered to be too mathematical and too difficult in a second course on controls. In this textbook a simple

physical approach is made to the description of noise and stochastic disturbances which is easy to understand and apply to common systems. This requires only a few fundamental statistical concepts which are given in a simple introduction which lead naturally to the fundamental noise propagation equation for dynamic systems, the Lyapunov equation. This equation is given and exemplified both in its continuous and discrete time versions. With the Lyapunov equation available to describe state noise propagation, it is a very small step to add the effect of measurements and measurement noise. This gives immediately the Riccati equation for optimal state estimators or Kalman filters. These important observers are derived and illustrated using simulations in terms which make them easy to understand and easy to apply to real systems. The use of LQR regulators with Kalman filters give LQG (Linear Quadratic Gaussian) regulators which are introduced at the end of the book. Another important subject which is introduced is the use of Kalman filters as parameter estimations for unknown parameters. The textbook is divided into 7 chapters, 5 appendices, a table of contents, a table of examples, extensive index and extensive list of references. Each chapter is provided with a summary of the main points covered

and a set of problems relevant to the material in that chapter. Moreover each of the more advanced chapters (3 - 7) are provided with notes describing the history of the mathematical and technical problems which lead to the control theory presented in that chapter. Continuous time methods are the main focus in the book because these provide the most direct connection to physics. This physical foundation allows a logical presentation and gives a good intuitive feel for control system construction. Nevertheless strong attention is also given to discrete time systems. Very few proofs are included in the book but most of the important results are derived. This method of presentation makes the text very readable and gives a good foundation for reading more rigorous texts. A complete set of solutions is available for all of the problems in the text. In addition a set of longer exercises is available for use as Matlab/Simulink 'laboratory exercises' in connection with lectures. There is material of this kind for 12 such exercises and each exercise requires about 3 hours for its solution. Full written solutions of all these exercises are available. *Discrete-Time Control System Implementation Techniques* Elsevier 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

Advanced Solutions in Diagnostics and Fault Tolerant Control CRC Press

Theory and Application of Digital Control contains the proceedings of the IFAC Symposium held at New Delhi, India on January 5-7, 1982. This book particularly presents the texts of the five plenary talks and the 110 papers of the symposium. This book organizes the papers into 109 chapters, with nearly one-third of the papers focus on digital control, particularly, software and hardware of control using microcomputers; computer-aided design; and adaptive control and modeling for digital control. Another set of papers deal with several applications of digital control techniques in solving interesting problems of socio economic systems, electrical power systems, bio systems, and artificial satellites. The reader will benefit hugely from the topics in this book that span several important theoretical and applied areas of the fast-changing topic of digital control.

Harmonic Limits of Dynamical and Control

Systems CRC Press This unique book provides a bridge between digital control theory and vehicle guidance and control practice. It presents practical techniques of digital redesign and direct discrete-time design suitable for a real-time implementation of controllers and guidance laws at multiple rates and with and computational techniques. The theory of digital control is given as theorems, lemmas, and propositions. The design of the digital guidance and control systems is illustrated by means of step-by-step procedures, algorithms, and case studies. The systems proposed are applied to realistic models of unmanned systems and missiles, and digital implementation. Modeling and Control of Complex Systems Springer Science & Business Media Comprehensive and state-of-the art study of the basic concepts and principles of variational analysis and generalized differentiation in both finite-dimensional and infinite-dimensional spaces Presents numerous applications to problems in the optimization, equilibria, stability and sensitivity, control theory, economics, mechanics, etc.

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