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Discrete Time Control Problems Using Matlab Bookware Companion Series Pacific Grove Calif ***2021-04-23***

BRIANNA KAYLYN

Differential Equations World Scientific The book reports on the latest theories on artificial neural networks, with a special emphasis on bio-neuroinformatics methods. It includes twenty-three papers selected from among the best contributions on bio-neuroinformatics-related issues, which were presented at the International Conference on Artificial Neural Networks, held in Sofia, Bulgaria, on September 10-13, 2013 (ICANN 2013). The book covers a broad range of topics concerning the theory and applications of artificial neural networks, including recurrent neural networks, super-Turing computation and reservoir computing, double-layer vector perceptrons, nonnegative matrix factorization, bio-inspired models of cell communities, Gestalt laws, embodied theory of language understanding, saccadic gaze shifts and memory formation, and new training algorithms for Deep Boltzmann Machines, as well as dynamic neural networks and kernel machines. It also reports on new approaches to reinforcement learning, optimal control of discrete time-delay systems, new algorithms for prototype selection, and group structure discovering. Moreover, the book discusses one-class support vector machines for pattern recognition, handwritten digit recognition, time series forecasting and classification, and anomaly identification in data analytics and automated data analysis. By presenting the state-of-the-art and discussing the current challenges in the fields of artificial neural networks,

bioinformatics and neuroinformatics, the book is intended to promote the implementation of new methods and improvement of existing ones, and to support advanced students, researchers and professionals in their daily efforts to identify, understand and solve a number of open questions in these fields.

Robust Discrete-Time Flight Control of UAV with External Disturbances

Brooks/Cole Publishing Company

This book is devoted to the study of optimal control problems arising in forest management, an important and fascinating topic in mathematical economics studied by many researchers over the years. The volume studies the forest management problem by analyzing a class of optimal control problems that contains it and showing the existence of optimal solutions over infinite horizon. It also studies the structure of approximate solutions on finite intervals and their turnpike properties, as well as the stability of the turnpike phenomenon and the structure of approximate solutions on finite intervals in the regions close to the end points. The book is intended for mathematicians interested in the optimization theory, optimal control and their applications to the economic theory.

Infinite-Horizon Optimal Control in the Discrete-Time Framework

Springer Science & Business Media

This will be the most up-to-date book in the area (the closest competition was published in 1990) This book takes a new slant and is in discrete rather than continuous time

Discrete Time Systems Springer

This book contains an introduction to three topics in stochastic control: discrete time stochastic control, i. e. , stochastic dynamic programming (Chapter 1), piecewise - terministic control problems (Chapter 3), and control of Ito diffusions (Chapter 4). The chapters include treatments of optimal stopping problems. An Appendix - calls material from elementary probability theory and gives heuristic explanations of certain more advanced tools in probability theory. The book will hopefully be of interest to students in several ?elds: economics, engineering, operations research, ?nance, business, mathematics. In economics and business administration, graduate students should readily be able to read it, and the mathematical level can be suitable for advanced undergraduates in mathem- ics and science. The prerequisites for reading the book are only a calculus course and a course in elementary probability. (Certain technical comments may demand a slightly better background.) As this book perhaps (and hopefully) will be read by readers with widely diff- ing backgrounds, some general advice may be useful: Don’t be put off if paragraphs, comments, or remarks contain material of a seemingly more technical nature that you don’t understand. Just skip such material and continue reading, it will surely not be needed in order to understand the main ideas and results. The presentation avoids the use of measure theory.

Stability of the Turnpike Phenomenon in Discrete-Time Optimal Control Problems

Pearson

Praise for Previous Volumes "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 CORRESPONDENCE "This 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

Dynamical Systems, and Control Science: Lecture Notes in Pure and Applied Mathematics Series/152 Springer

The theory of optimal control systems has grown and flourished since the 1960's. Many texts, written on varying levels of sophistication, have been published on the subject. Yet even those purportedly designed for beginners in the field are often riddled with complex theorems, and many treatments fail to include topics that are essential to a thorough grounding in the various aspects of and approaches to optimal control. Optimal Control Systems provides a comprehensive but accessible treatment of the subject with just the right degree of mathematical rigor to be complete but practical. It provides a solid bridge between "traditional" optimization using the calculus of variations and what is called "modern" optimal control. It also treats both continuous-time and discrete-time optimal control systems, giving students a firm grasp on both methods. Among this book's most outstanding features is a summary table that accompanies each topic or problem and includes a statement of the problem with a step-by-step solution. Students will also gain valuable experience in using industry-standard MATLAB and SIMULINK software, including the Control System and Symbolic Math Toolboxes. Diverse applications across fields from power engineering to medicine make a foundation in optimal control systems an essential part of an engineer's background. This clear, streamlined presentation is ideal for a graduate level course on control systems and as a quick reference for working engineers.

Solving Unconstrained Discrete-time Optimal Control Problems Using Trust Region Method Springer Nature

As our title reveals, we focus on optimal control methods and applications relevant to linear dynamic economic systems in discrete-time variables. We deal only with discrete cases simply because economic data are available in discrete forms, hence realistic economic policies should be established in discrete-time structures. Though many books have been written on optimal control in engineering, we see few on discrete-type optimal control. More over, since economic models take slightly different forms than do engineer ing ones, we need a comprehensive, self-contained treatment of linear optimal control applicable to discrete-time economic systems. The present work is intended to fill this need from the standpoint of contemporary macroeconomic stabilization. The work is organized as follows. In Chapter 1 we demonstrate instru ment instability in an economic stabilization problem and thereby establish the motivation for our departure into the optimal control world. Chapter 2 provides fundamental concepts and propositions for controlling linear deterministic discrete-time systems, together with some economic applica tions and numerical methods. Our optimal control rules are in the form of feedback from known state variables of the preceding period. When state variables are not observable or are accessible only with observation errors, we must obtain appropriate proxies for these variables, which are called "observers" in deterministic cases or "filters" in stochastic circumstances. In Chapters 3 and 4, respectively, Luenberger observers and Kalman filters are discussed, developed, and applied in

various directions. Noticing that a separation principle lies between observer (or filter) and controller (cf.
Discrete-Time Linear Systems Springer
Computer scientists have long appreciated that the relationship between algorithms and architecture is crucial. Broadly speaking the more specialized the architecture is to a particular algorithm then the more efficient will be the computation. The penalty is that the architecture will become useless for computing anything other than that algorithm. This message holds for the algorithms used in real-time automatic control as much as any other field. These Proceedings will provide researchers in this field with a useful up-to-date reference source of recent developments.
Analysis and Applications Springer
Devoted to the structure of approximate solutions of discrete-time optimal control problems and approximate solutions of dynamic discrete-time two-player zero-sum games, this book presents results on properties of approximate solutions in an interval that is independent lengthwise, for all sufficiently large intervals. Results concerning the so-called turnpike property of optimal control problems and zero-sum games in the regions close to the endpoints of the time intervals are the main focus of this book. The description of the structure of approximate solutions on sufficiently large intervals and its stability will interest graduate students and mathematicians in optimal control and game theory, engineering, and economics. This book begins with a brief overview and moves on to analyze the structure of approximate solutions of autonomous nonconcave discrete-time optimal control Lagrange problems.Next the structures of approximate solutions of autonomous discrete-time optimal control problems that are discrete-time analogs of Bolza problems in calculus of variations are studied. The structures of approximate solutions of two-player zero-sum games are analyzed through standard convexity-concavity assumptions. Finally, turnpike properties for approximate solutions in a class of nonautonomic dynamic discrete-time games with convexity-concavity assumptions are examined.
Neural Network Control of Nonlinear Discrete-Time Systems Brooks/Cole Publishing Company
This book studies selected discrete-time flight control schemes for fixed-wing unmanned aerial vehicle (UAV) systems in the presence of system uncertainties, external disturbances and input saturation. The main contributions of this book for UAV systems are as follows: (i) the proposed integer-order discrete-time control schemes are based on the designed discrete-time disturbance observers (DTDOs) and the neural network (NN); and (ii) the fractional-order discrete-time control schemes are developed by using the fractional-order calculus theory, the NN and the DTDOs. The book offers readers a good understanding of how to establish discrete-time tracking control schemes for fixed-wing UAV systems subject to system uncertainties, external wind disturbances and input saturation. It represents a valuable reference guide for academic research on uncertain UAV systems, and can also support advanced / Ph.D. studies on control theory and engineering.
Advances in Discrete-Time Sliding Mode Control Springer Science & Business Media
Discrete-Time Systems comprehend an important and broad research field. The

consolidation of digital-based computational means in the present, pushes a technological tool into the field with a tremendous impact in areas like Control, Signal Processing, Communications, System Modelling and related Applications. This book attempts to give a scope in the wide area of Discrete-Time Systems. Their contents are grouped conveniently in sections according to significant areas, namely Filtering, Fixed and Adaptive Control Systems, Stability Problems and Miscellaneous Applications. We think that the contribution of the book enlarges the field of the Discrete-Time Systems with signification in the present state-of-the-art. Despite the vertiginous advance in the field, we also believe that the topics described here allow us also to look through some main tendencies in the next years in the research area.

Analysis and Synthesis of Polynomial Discrete-Time Systems

Academic Press

Discrete-Time Linear Systems: Theory and Design with Applications combines system theory and design in order to show the importance of system theory and its role in system design. The book focuses on system theory (including optimal state feedback and optimal state estimation) and system design (with applications to feedback control systems and wireless transceivers, plus system identification and channel estimation).

Advances in Theory and Applications

BoD – Books on Demand

The book gives a novel treatment of recent advances on constrained control problems with emphasis on the controllability, reachability of dynamical discrete-time systems. The new proposed approach provides the right setting for the study of qualitative properties of general types of dynamical systems in both discrete-time and continuous-time systems with possible applications to some control engineering models. Most of the material appears for the first time in a book form. The book is addressed to advanced students, postgraduate students and researchers interested in control system theory and optimal control.

The Euler–Equation Approach Elsevier

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.

Discrete-time Control Problems Using MATLAB and the Control System Toolbox

Springer Science & Business Media

This book is a supplement for any standard control systems text. It serves to reinforce the learning process for those who are studying introductory aspects of control systems. The authors accomplish this by teaching the use of MATLAB® and its CONTROL SYSTEM TOOLBOX to rapidly solve a wide range of numerical problems. This book also provides the user with opportunities to apply techniques of linear system analysis, which forms the basis for the analysis and design of feedback control systems. This approach frees the user from the laborious calculations required

to solve meaningful problems, thus allowing him or her to concentrate on interpreting the analysis and design results. Topical coverage includes both classical control design method and state-space models and design methods. Some specific topics covered are root-locus plots, frequency-response analysis, system performance, proportional-integral-derivative control, and frequency-response design. This updated printing revises the book and code examples (available for downloading from the Brooks/Cole Web site) to MATLAB® V5.

Constrained Control Problems of Discrete Processes Springer Science & Business Media

The focus of this book is on the design of a specific control strategy using digital computers. This control strategy referred to as Sliding Mode Control (SMC), has its roots in (continuous-time) relay control. This book aims to explain recent investigations' output in the field of discrete-time sliding mode control (DSMC). The book starts by explaining a new robust LMI-based (state-feedback and observer-based output-feedback) DSMC including a new scheme for sparsely distributed control. It includes a novel event-driven control mechanism, called actuator-based event-driven scheme, using a synchronized-rate biofeedback system for heart rate regulation during cycle-ergometer. Key Features: Focuses on LMI-based SMC (sliding mode control) for uncertain discrete-time system using novel nonlinear components in the control law Makes reader understand the techniques of designing a discrete controller based on the flexible sliding functions Proposes new algorithms for sparsifying control and observer network through multi-objective optimization frameworks Discusses a framework for the design of SMC for two-dimensional systems along with analyzing the controllability of two-dimensional systems Discusses novel schemes for sparsifying the control network

Time-Dependent Switched Discrete-Time Linear Systems: Control and Filtering Springer

In this book the authors take a rigorous look at the infinite-horizon discrete-time optimal control theory from the viewpoint of Pontryagin’s principles. Several Pontryagin principles are described which govern systems and various criteria which define the notions of optimality, along with a detailed analysis of how each Pontryagin principle relate to each other. The Pontryagin principle is examined in a stochastic setting and results are given which generalize Pontryagin’s principles to multi-criteria problems. Infinite-Horizon Optimal Control in the Discrete-Time Framework is aimed toward researchers and PhD students in various scientific fields such as mathematics, applied mathematics, economics, management, sustainable development (such as, of fisheries and of forests), and Bio-medical sciences who are drawn to infinite-horizon discrete-time optimal control problems.

Trained with Kalman Filtering

Discrete-time Control Problems Using MATLAB and the Control System Toolbox

This book constitutes the refereed proceedings of the 5th International Workshop on Hybrid Systems: Computation and Control, HSCC 2002, held in Stanford, California, USA, in March 2002. The 33 revised full papers presented were carefully reviewed and selected from 73 submissions. All current issues in hybrid systems are addressed including formal models and methods

and computational representations, algorithms and heuristics, computational tools, and innovative applications.
Theory and Applications Springer Science & Business Media
Presents recent developments in the areas of differential equations, dynamical systems, and control of finke and infinite dimensional systems. Focuses on current trends in differential equations and dynamical system research-from Darameterdependence of solutions to robui control laws for inflnite dimensional systems.
An SOS Approach Springer
The aim of this book is to furnish the reader with a rigorous and detailed exposition of the concept of control parametrization and time scaling transformation. It presents computational solution techniques for a special class of constrained optimal control problems as well as applications to some practical examples. The book may be considered an extension of the 1991 monograph A Unified Computational Approach Optimal Control Problems, by K.L. Teo, C.J. Goh, and K.H. Wong. This publication discusses the development of new theory and computational methods for solving various optimal control problems numerically and in a unified fashion. To keep the book accessible and uniform, it includes those results developed by the authors, their students, and their past and present collaborators. A brief review of methods that are not covered in this exposition, is also included. Knowledge gained from this book may inspire advancement of new techniques to solve complex problems that arise in the future. This book is intended as reference for researchers in mathematics, engineering, and other sciences, graduate students and practitioners who apply optimal control methods in their work. It may be appropriate reading material for a graduate level seminar or as a text for a course in optimal control.