[Book] Mathematical Control Theory Deterministic Finite Dimensional Systems Texts In Applied Mathematics

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Mathematical Control Theory-Eduardo D. Sontag 2013-11-21 Geared primarily to an audience consisting of mathematically advanced undergraduate or beginning graduate students, this text may additionally be used by engineering students interested in a rigorous, proof-oriented systems course that goes beyond the classical frequency-domain material and more applied courses. The minimal mathematical background required is a working knowledge of linear algebra and differential equations. The book covers what constitutes the common core of control theory and is unique in its emphasis on foundational aspects. While covering a wide range of topics written in a standard theorem/proof style, it also develops the necessary techniques from scratch. In this second edition, new chapters and sections have been added, dealing with time optimal control of linear systems, variational and numerical approaches to nonlinear control, nonlinear controllability via Lie-algebraic methods, and controllability of recurrent nets and of linear systems with bounded controls.
Mathematical Control Theory-Eduardo D Sontag 2012-12-06 Mathematics is playing an ever more important role in the physical and biologi cal sciences, provoking a blurring of boundaries between scientific disciplines and a resurgence of interest in the modem as well as the classical techniques of applied mathematics. This renewal of interest, both in research and teaching, has led to the establishment of the series Texts in Applied Mathematics (TAM). The development of new courses is a natural consequence of a high level of excitement on the research frontier as newer techniques, such as numerical and symbolic computer systems, dynamical systems, and chaos, mix with and rein force the traditional methods of applied mathematics. Thus, the purpose of this textbook series is to meet the current and future needs of these advances and to encourage the teaching of new courses. TAM will publish textbooks suitable for use in advanced undergraduate and beginning graduate courses, and will complement the Applied Mathematics Sci ences (AMS) series, which will focus on advanced textbooks and research-level monographs. v Preface This textbook introduces the basic concepts and results of mathematical control and system theory. Based on courses that I have taught during the last 15 years, it presents its subject in a self-contained and elementary fashion. It is geared primarily to an audience consisting of mathematically mature advanced undergraduate or beginning graduate students. In addi tion, it can be used by engineering students interested in a rigorous, proof oriented systems course that goes beyond the classical frequency-domain material and more applied courses.
Mathematical Control Theory-Eduardo D. Sontag 1998-07-17 Geared primarily to an audience consisting of mathematically advanced undergraduate or beginning graduate students, this text may additionally be used by engineering students interested in a rigorous, proof-oriented systems course that goes beyond the classical frequency-domain material and more applied courses. The minimal mathematical background required is a working knowledge of linear algebra and differential equations. The book covers what constitutes the common core of control theory and is unique in its emphasis on foundational aspects. While covering a wide range of topics written in a standard theorem/proof style, it also develops the necessary techniques from scratch. In this second edition, new chapters and sections have been added, dealing with time optimal control of linear systems, variational and numerical approaches to nonlinear control, nonlinear controllability via Lie-algebraic methods, and controllability of recurrent nets and of linear systems with bounded controls.
Mathematical Control Theory-Jerzy Zabczyk 2009-11-03 Mathematical Control Theory: An Introduction presents, in a mathematically precise manner, a unified introduction to deterministic control theory. In addition to classical concepts and ideas, the author covers the stabilization of nonlinear systems using topological methods, realization theory for nonlinear systems, impulsive control and positive systems, the control of rigid bodies, the stabilization of infinite dimensional systems, and the solution of minimum energy problems. "Covers a remarkable number of topics....The book presents a large amount of material very well, and its use is highly recommended." --Bulletin of the AMS
Foundations of Optimal Control Theory-Ernest Bruce Lee 1967
Unsolved Problems in Mathematical Systems and Control Theory-Vincent D. Blondel 2009-04-11 This book provides clear presentations of more than sixty important unsolved problems in mathematical systems and control theory. Each of the problems included here is proposed by a leading expert and set forth in an accessible manner. Covering a wide range of areas, the book will be an ideal reference for anyone interested in the latest developments in the field, including specialists in applied mathematics, engineering, and computer science. The book consists of ten parts representing various problem areas, and each chapter sets forth a different problem presented by a researcher in the particular area and in the same way: description of the problem, motivation and history, available results, and bibliography. It aims not only to encourage work on the included problems but also to suggest new ones and generate fresh research. The reader will be able to submit solutions for possible inclusion on an online version of the book to be updated quarterly on the Princeton University Press website, and thus also be able to access solutions, updated information, and partial solutions as they are developed.
Control and Nonlinearity-Jean-Michel Coron 2007 This book presents methods to study the controllability and the stabilization of nonlinear control systems in finite and infinite dimensions. The emphasis is put on specific phenomena due to nonlinearities. In particular, many examples are given where nonlinearities turn out to be essential to get controllability or stabilization. Various methods are presented to study the controllability or to construct stabilizing feedback laws. The power of these methods is illustrated by numerous examples coming from such areas as celestial mechanics, fluid mechanics, and quantum mechanics. The book is addressed to graduate students in mathematics or control theory, and to mathematicians or engineers with an interest in nonlinear control systems governed by ordinary or partial differential equations.
Geometric Optimal Control-Heinz Schättler 2012-06-26 This book gives a comprehensive treatment of the fundamental necessary and sufficient conditions for optimality for finite-dimensional, deterministic, optimal control problems. The emphasis is on the geometric aspects of the theory and on illustrating how these methods can be used to solve optimal control problems. It provides tools and techniques that go well beyond standard procedures and can be used to obtain a full understanding of the global structure of solutions for the underlying problem. The text includes a large number and variety of fully worked out examples that range from the classical problem of minimum surfaces of revolution to cancer treatment for novel therapy approaches. All these examples, in one way or the other, illustrate the power of geometric techniques and methods. The versatile text contains material on different levels ranging from the introductory and elementary to the advanced. Parts of the text can be viewed as a comprehensive textbook for both advanced undergraduate and all level graduate courses on optimal control in both mathematics and engineering departments. The text moves smoothly from the more introductory topics to those parts that are in a monograph style were advanced topics are presented. While the presentation is mathematically rigorous, it is carried out in a tutorial style that makes the text accessible to a wide audience of researchers and students from various fields, including the mathematical sciences and engineering. Heinz Schättler is an Associate Professor at Washington University in St. Louis in the Department of Electrical and Systems Engineering, Urszula Ledzewicz is a Distinguished Research Professor at Southern Illinois University Edwardsville in the Department of Mathematics and Statistics.
Optimal Control Theory-Donald E. Kirk 2004-01-01 Geared toward upper-level undergraduates, this text introduces three aspects of optimal control theory: dynamic programming, Pontryagin's minimum principle, and numerical techniques for trajectory optimization. Numerous problems, which introduce additional topics and illustrate basic concepts, appear throughout the text. Solution guide available upon request. 131 figures. 14 tables. 1970 edition.
Control Theory from the Geometric Viewpoint-Andrei A. Agrachev 2013-03-14 This book presents some facts and methods of the Mathematical Control Theory treated from the geometric point of view. The book is mainly based on graduate courses given by the first coauthor in the years 2000-2001 at the International School for Advanced Studies, Trieste, Italy. Mathematical prerequisites are reduced to standard courses of Analysis and Linear Algebra plus some basic Real and Functional Analysis. No preliminary knowledge of Control Theory or Differential Geometry is required. What this book is about? The classical deterministic physical world is described by smooth dynamical systems: the future in such a system is com pletely determined by the initial conditions. Moreover, the near future changes smoothly with the initial data. If we leave room for "free will" in this fatalistic world, then we come to control systems. We do so by allowing certain param eters of the dynamical system to change freely at every instant of time. That is what we routinely do in real life with our body, car, cooker, as well as with aircraft, technological processes etc. We try to control all these dynamical systems! Smooth dynamical systems are governed by differential equations. In this book we deal only with finite dimensional systems: they are governed by ordi nary differential equations on finite dimensional smooth manifolds. A control system for us is thus a family of ordinary differential equations. The family is parametrized by control parameters.
Optimal Estimation-Frank L. Lewis 1986-04-15 Describes the use of optimal control and estimation in the design of robots, controlled mechanisms, and navigation and guidance systems. Covers control theory specifically for students with minimal background in probability theory. Presents optimal estimation theory as a tutorial with a direct, well-organized approach and a parallel treatment of discrete and continuous time systems. Gives practical examples and computer simulations. Provides enough mathematical rigor to put results on a firm foundation without an overwhelming amount of proofs and theorems.
Functional Analysis and Linear Control Theory-James R. Leigh 1980 Functional analysis provides a concise conceptual framework for linear control theory. This self-contained text demonstrates the subject's unity with a wide range of powerful theorems. 1980 edition.
Linear Multivariable Control-W. M. Wonham 2013-11-21 In writing this monograph my objective is to present arecent, 'geometrie' approach to the structural synthesis of multivariable control systems that are linear, time-invariant, and of finite dynamic order. The book is addressed to graduate students specializing in control, to engineering scientists engaged in control systems research and development, and to mathematicians with some previous acquaintance with control problems. The label 'geometrie' is applied for several reasons. First and obviously, the setting is linear state space and the mathematics chiefly linear algebra in abstract (geometrie) style. The basic ideas are the familiar system concepts of controllability and observability, thought of as geometrie properties of distinguished state subspaces. Indeed, the geometry was first brought in out of revulsion against the orgy of matrix manipulation which linear control theory mainly consisted of, not so long ago. But secondlyand of greater interest, the geometrie setting rather quickly suggested new methods of attacking synthesis which have proved to be intuitive and economical; they are also easily reduced to matrix arith metic as soonas you want to compute. The essence of the 'geometrie' approach is just this: instead of looking directly for a feedback laW (say u = Fx) which would solve your synthesis problem if a solution exists, first characterize solvability as a verifiable property of some constructible state subspace, say J. Then, if all is well, you may calculate F from J quite easily.
Mathematical Control Theory and Finance-Andrey Sarychev 2009-03-31 Control theory provides a large set of theoretical and computational tools with applications in a wide range of ?elds, running from ”pure” branches of mathematics, like geometry, to more applied areas where the objective is to ?nd solutions to ”real life” problems, as is the case in robotics, control of industrial processes or ?nance. The ”high tech” character of modern business has increased the need for advanced methods. These rely heavily on mathematical techniques and seem indispensable for competitiveness of modern enterprises. It became essential for the ?nancial analyst to possess a high level of mathematical skills. C- versely, the complex challenges posed by the problems and models relevant to ?nance have, for a long time, been an important source of new research topics for mathematicians. The use of techniques from stochastic optimal control constitutes a well established and important branch of mathematical ?nance. Up to now, other branches of control theory have found comparatively less application in ?n- cial problems. To some extent, deterministic and stochastic control theories developed as di?erent branches of mathematics. However, there are many points of contact between them and in recent years the exchange of ideas between these ?elds has intensi?ed. Some concepts from stochastic calculus (e.g., rough paths) havedrawntheattentionofthedeterministiccontroltheorycommunity.Also, some ideas and tools usual in deterministic control (e.g., geometric, algebraic or functional-analytic methods) can be successfully applied to stochastic c- trol.
Theory of Nonlinear Control Systems-Nicolai Minorsky 1969
Feedback Control Theory-John C. Doyle 2013-04-09 An excellent introduction to feedback control system design, this book offers a theoretical approach that captures the essential issues and can be applied to a wide range of practical problems. Its explorations of recent developments in the field emphasize the relationship of new procedures to classical control theory, with a focus on single input and output systems that keeps concepts accessible to students with limited backgrounds. The text is geared toward a single-semester senior course or a graduate-level class for students of electrical engineering. The opening chapters constitute a basic treatment of feedback design. Topics include a detailed formulation of the control design program, the fundamental issue of performance/stability robustness tradeoff, and the graphical design technique of loopshaping. Subsequent chapters extend the discussion of the loopshaping technique and connect it with notions of optimality. Concluding chapters examine controller design via optimization, offering a mathematical approach that is useful for multivariable systems.
Open Problems in Mathematical Systems and Control Theory-Vincent D. Blondel 2012-12-06 System and Control theory is one of the most exciting areas of contemporary engineering mathematics. From the analysis of Watt's steam engine governor - which enabled the Industrial Revolution - to the design of controllers for consumer items, chemical plants and modern aircraft, the area has always drawn from a broad range of tools. It has provided many challenges and possibilities for interaction between engineering and established areas of 'pure' and 'applied' mathematics. This impressive volume collects a discussion of more than fifty open problems which touch upon a variety of subfields, including: chaotic observers, nonlinear local controlability, discrete event and hybrid systems, neural network learning, matrix inequalities, Lyapunov exponents, and many other issues. Proposed and explained by leading researchers, they are offered with the intention of generating further work, as well as inspiration for many other similar problems which may naturally arise from them. With extensive references, this book will be a useful reference source - as well as an excellent addendum to the textbooks in the area.
Mathematical Control Theory-John B. Baillieul 2012-12-06 This volume on mathematical control theory contains high quality articles covering the broad range of this field. The internationally renowned authors provide an overview of many different aspects of control theory, offering a historical perspective while bringing the reader up to the very forefront of current research.
Mathematical Systems Theory I-Diederich Hinrichsen 2006-03-30 This book presents the mathematical foundations of systems theory in a self-contained, comprehensive, detailed and mathematically rigorous way. It is devoted to the analysis of dynamical systems and combines features of a detailed introductory textbook with that of a reference source. The book contains many examples and figures illustrating the text which help to bring out the intuitive ideas behind the mathematical constructions.
Optimal State Estimation-Dan Simon 2006-06-19 A bottom-up approach that enables readers to master and apply the latest techniques in state estimation This book offers the best mathematical approaches to estimating the state of a general system. The author presents state estimation theory clearly and rigorously, providing the right amount of advanced material, recent research results, and references to enable the reader to apply state estimation techniques confidently across a variety of fields in science and engineering. While there are other textbooks that treat state estimation, this one offers special features and a unique perspective and pedagogical approach that speed learning: * Straightforward, bottom-up approach begins with basic concepts and then builds step by step to more advanced topics for a clear understanding of state estimation * Simple examples and problems that require only paper and pen to solve lead to an intuitive understanding of how theory works in practice * MATLAB(r)-based source code that corresponds to examples in the book, available on the author's Web site, enables readers to recreate results and experiment with other simulation setups and parameters Armed with a solid foundation in the basics, readers are presented with a careful treatment of advanced topics, including unscented filtering, high order nonlinear filtering, particle filtering, constrained state estimation, reduced order filtering, robust Kalman filtering, and mixed Kalman/H? filtering. Problems at the end of each chapter include both written exercises and computer exercises. Written exercises focus on improving the reader's understanding of theory and key concepts, whereas computer exercises help readers apply theory to problems similar to ones they are likely to encounter in industry. With its expert blend of theory and practice, coupled with its presentation of recent research results, Optimal State Estimation is strongly recommended for undergraduate and graduate-level courses in optimal control and state estimation theory. It also serves as a reference for engineers and science professionals across a wide array of industries.
Introduction to Mathematical Systems Theory-J.C. Willems 2013-11-11 Using the behavioural approach to mathematical modelling, this book views a system as a dynamical relation between manifest and latent variables. The emphasis is on dynamical systems that are represented by systems of linear constant coefficients. The first part

analyses the structure of the set of trajectories generated by such dynamical systems, and derives the conditions for two systems of differential equations to be equivalent in the sense that they define the same behaviour. In addition the memory structure of the system is analysed through state space models. The second part of the book is devoted to a number of important system properties, notably controllability, observability, and stability. In the third part, control problems are considered, in particular stabilisation and pole placement questions. Suitable for advanced undergraduate or beginning graduate students in mathematics and engineering, this text contains numerous exercises, including simulation problems, and examples, notably of mechanical systems and electrical circuits.
Control Theory and Related Topics-Shanjian Tang 2007 Xunjing Li (1935OCo2003) was a pioneer in control theory in China. He was known in the Chinese community of applied mathematics, and in the global community of optimal control theory of distributed parameter systems. He has made important contributions to the optimal control theory of distributed parameter systems, in particular regarding the first-order necessary conditions (Pontryagin-type maximum principle) for optimal control of nonlinear infinite-dimensional systems. He directed the Seminar of Control Theory at Fudan towards stochastic control theory in 1980s, and mathematical finance in 1990s, which has led to several important subsequent developments in both closely interactive fields. These remarkable efforts in scientific research and education, among others, gave birth to the so-called OC Fudan SchoolOCO. This proceedings volume includes a collection of original research papers or reviews authored or co-authored by Xunjing Li''s former students, postdoctoral fellows, and mentored scholars in the areas of control theory, dynamic systems, mathematical finance, and stochastic analysis, among others. Sample Chapter(s). Part 1: A Tribute in Memory of Professor Xunjing Li on His Seventieth Birthday (112 KB). Contents: Stochastic Control, Mathematical Finance, and Backward Stochastic Differential Equations: Axiomatic Characteristics for Solutions of Reflected Backward Stochastic Differential Equations (X Bao & S Tang); A Linear Quadratic Optimal Control Problem for Stochastic Volterra Integral Equations (S Chen & J Yong); Stochastic Control and BSDEs with Quadratic Growth (M Fuhrman et al.); Unique Continuation and Observability for Stochastic Parabolic Equations and Beyond (X Zhang); Deterministic Control Systems: Some Counterexamples in Existence Theory of Optimal Control (H Lou); A Generalized Framework for Global Output Feedback Stabilization of Inherently Nonlinear Systems with Uncertainties (J Polendo & C Qian); On Finite-Time Stabilization of a Class of Nonsmoothly Stabilizable Systems (B Yang & W Lin); Dynamics and Optimal Control of Partial Differential Equations: Optimal Control of Quasilinear Elliptic Obstacle Problems (Q Chen & Y Ye); Controllability of a Nonlinear Degenerate Parabolic System with Bilinear Control (P Lin et al.); and other papers. Readership: Researchers and graduate students in the areas of control theory, mathematical finance and dynamical systems."
Data-Driven Science and Engineering-Steven L. Brunton 2019-02-28 This beginning graduate textbook teaches data science and machine learning methods for modeling, prediction, and control of complex systems.
Mathematical System Theory-Athanasios C. Antoulas 2013-04-17 Over the past three decades R.E. Kalman has been one of the most influential personalities in system and control theory. His ideas have been instrumental in a variety of areas. This is a Festschrift honoring his 60th birthday. It contains contributions from leading researchers in the field giving an account of the profound influence of his ideas in a number of areas of active research in system and control theory. For example, since their introduction by Kalman in the early 60's, the concepts of controllability and observability of dynamical systems with inputs, have been the corner stone of the great majority of investigations in the field.
Control Theory for Partial Differential Equations: Volume 1, Abstract Parabolic Systems-Irena Lasiecka 2000-02-13 First of a two-volume treatise on deterministic control systems modeled by multi-dimensional partial differential equations, originally published in 2000.
Calculus of Variations and Optimal Control Theory-Daniel Liberzon 2012 This textbook offers a concise yet rigorous introduction to calculus of variations and optimal control theory, and is a self-contained resource for graduate students in engineering, applied mathematics, and related subjects. Designed specifically for a one-semester course, the book begins with calculus of variations, preparing the ground for optimal control. It then gives a complete proof of the maximum principle and covers key topics such as the Hamilton-Jacobi-Bellman theory of dynamic programming and linear-quadratic optimal control. Calculus of Variations and Optimal Control Theory also traces the historical development of the subject and features numerous exercises, notes and references at the end of each chapter, and suggestions for further study. Offers a concise yet rigorous introduction Requires limited background in control theory or advanced mathematics Provides a complete proof of the maximum principle Uses consistent notation in the exposition of classical and modern topics Traces the historical development of the subject Solutions manual (available only to teachers) Leading universities that have adopted this book include: University of Illinois at Urbana-Champaign ECE 553: Optimum Control Systems Georgia Institute of Technology ECE 6553: Optimal Control and Optimization University of Pennsylvania ESE 680: Optimal Control Theory University of Notre Dame EE 60565: Optimal Control
A Primer of Infinitesimal Analysis-John L. Bell 2008 A rigorous, axiomatically formulated presentation of the 'zero-square', or 'nilpotent' infinitesimal.
Analysis and Control of Nonlinear Systems-Jean Levine 2009-05-28 This book examines control of nonlinear systems. Coverage ranges from mathematical system theory to practical industrial control applications. The author offers web-based videos illustrating some dynamical aspects and case studies in simulation.
Trends in Control Theory and Partial Differential Equations-Fatiha Alabau-Boussouira 2019-07-04 This book presents cutting-edge contributions in the areas of control theory and partial differential equations. Over the decades, control theory has had deep and fruitful interactions with the theory of partial differential equations (PDEs). Well-known examples are the study of the generalized solutions of Hamilton-Jacobi-Bellman equations arising in deterministic and stochastic optimal control and the development of modern analytical tools to study the controllability of infinite dimensional systems governed by PDEs. In the present volume, leading experts provide an up-to-date overview of the connections between these two vast fields of mathematics. Topics addressed include regularity of the value function associated to finite dimensional control systems, controllability and observability for PDEs, and asymptotic analysis of multiagent systems. The book will be of interest for both researchers and graduate students working in these areas.
Optimal Control of Differential and Functional Equations-J. Warga 2014-05-10 Optimal Control of Differential and Functional Equations presents a mathematical theory of deterministic optimal control, with emphasis on problems involving functional-integral equations and functional restrictions. The book reviews analytical foundations, and discusses deterministic optimal control problems requiring original, approximate, or relaxed solutions. Original solutions involve mathematicians, and approximate solutions concern engineers. Relaxed solutions yield a complete theory that encompasses both existence theorems and necessary conditions. The text also presents general optimal control problems, optimal control of ordinary differential equations, and different types of functional-integral equations. The book discusses control problems defined by equations in Banach spaces, the convex cost functionals, and the weak necessary conditions for an original minimum. The text illustrates a class of ordinary differential problems with examples, and explains some conflicting control problems with relaxed adverse controls, as well as conflicting control problems with hyper-relaxed adverse controls. The book is intended for mature mathematicians, graduate students in analysis, and practitioners of optimal control whose primary interests and training are in science or engineering.
Introduction to the Mathematical Theory of Control-Alberto Bressan 2007
An Introduction to Linear Control Systems-Thomas E. Fortmann 1977-10-01
Liapunov Functions and Stability in Control Theory-Andrea Bacciotti 2006-03-30 This book presents a modern and self-contained treatment of the Liapunov method for stability analysis, in the framework of mathematical nonlinear control theory. A Particular focus is on the problem of the existence of Liapunov functions (converse Liapunov theorems) and their regularity, whose interest is especially motivated by applications to automatic control. Many recent results in this area have been collected and presented in a systematic way. Some of them are given in extended, unified versions and with new, simpler proofs. In the 2nd edition of this successful book several new sections were added and old sections have been improved, e.g., about the Zubovs method, Liapunov functions for discontinuous systems and cascaded systems. Many new examples, explanations and figures were added making this book accessible and well readable for engineers as well as mathematicians.
Hybrid Dynamical Systems-Hai Lin 2014-03-24 Hybrid Dynamical Systems gives the readers a complete picture of the whole field of hybrid dynamical systems.
Stochastic Control Theory-Makiko Nisio 2014-11-27 This book offers a systematic introduction to the optimal stochastic control theory via the dynamic programming principle, which is a powerful tool to analyze control problems. First we consider completely observable control problems with finite horizons. Using a time discretization we construct a nonlinear semigroup related to the dynamic programming principle (DPP), whose generator provides the Hamilton–Jacobi–Bellman (HJB) equation, and we characterize the value function via the nonlinear semigroup, besides the viscosity solution theory. When we control not only the dynamics of a system but also the terminal time of its evolution, control-stopping problems arise. This problem is treated in the same frameworks, via the nonlinear semigroup. Its results are applicable to the American option price problem. Zero-sum two-player time-homogeneous stochastic differential games and viscosity solutions of the Isaacs equations arising from such games are studied via a nonlinear semigroup related to DPP (the min-max principle, to be precise). Using semi-discretization arguments, we construct the nonlinear semigroups whose generators provide lower and upper Isaacs equations. Concerning partially observable control problems, we refer to stochastic parabolic equations driven by colored Wiener noises, in particular, the Zakai equation. The existence and uniqueness of solutions and regularities as well as Itô's formula are stated. A control problem for the Zakai equations has a nonlinear semigroup whose generator provides the HJB equation on a Banach space. The value function turns out to be a unique viscosity solution for the HJB equation under mild conditions. This edition provides a more generalized treatment of the topic than does the earlier book Lectures on Stochastic Control Theory (ISI Lecture Notes 9), where time-homogeneous cases are dealt with. Here, for finite time-horizon control problems, DPP was formulated as a one-parameter nonlinear semigroup, whose generator provides the HJB equation, by using a time-discretization method. The semigroup corresponds to the value function and is characterized as the envelope of Markovian transition semigroups of responses for constant control processes. Besides finite time-horizon controls, the book discusses control-stopping problems in the same frameworks.
Introduction to Stochastic Control Theory-Karl J. Åström 2012-05-11 Exploration of stochastic control theory in terms of analysis, parametric optimization, and optimal stochastic control. Limited to linear systems with quadratic criteria; covers discrete time and continuous time systems. 1970 edition.
Dynamic Programming and Modern Control Theory-Richard Bellman 1965
Nonlinear Control Systems-Alberto Isidori 1995-08-11 The purpose of this book is to present a self-contained description of the fun damentals of the theory of nonlinear control systems, with special emphasis on the differential geometric approach. The book is intended as a graduate text as weil as a reference to scientists and engineers involved in the analysis and design of feedback systems. The first version of this book was written in 1983, while I was teach ing at the Department of Systems Science and Mathematics at Washington University in St. Louis. This new edition integrates my subsequent teaching experience gained at the University of Illinois in Urbana-Champaign in 1987, at the Carl-Cranz Gesellschaft in Oberpfaffenhofen in 1987, at the University of California in Berkeley in 1988. In addition to a major rearrangement of the last two Chapters of the first version, this new edition incorporates two additional Chapters at a more elementary level and an exposition of some relevant research findings which have occurred since 1985.
Polynomial Response Maps-Eduardo D. Sontag 1979
Control System Design-Bernard Friedland 2012-03-08 Introduction to state-space methods covers feedback control; state-space representation of dynamic systems and dynamics of linear systems; frequency-domain analysis; controllability and observability; shaping the dynamic response; more. 1986 edition.

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