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KEY=OF - DARIEN CAMACHO

Applied Optimal Control Theory of Distributed Systems

Springer Science & Business Media This book represents an extended and substantially revised version of my earlierbook, Optimal Control in Problems ofMathematical Physics,originally published in Russian in 1975. About 60% of the text has been completely revised and major additions have been included which have produced a practically new text. My aim was to modernize the presentation but also to preserve the original results, some of which are little known to a Western reader. The idea of composites, which is the core of the modern theory of optimization, was initiated in the early seventies. The reader will find here its implementation in the problem of optimal conductivity distribution in an MHD-generatorchannel flow.Sincethen it has emergedinto an extensive theory which is undergoing a continuous development. The book does not pretend to be a textbook, neither does it offer a systematic presentation of the theory. Rather, it reflects a concept which I consider as fundamental in the modern approach to optimization of dis tributed systems. Bibliographical notes,though extensive, do not pretend to be exhaustive as well. My thanks are due to ProfessorJean-Louis Armand and ProfessorWolf Stadler whose friendly assistance in translating and polishing the text was so valuable. I am indebted to Mrs. Kathleen Durand and Mrs. Colleen Lewis for the hard job of typing large portions of the manuscript.

Optimal Control of Distributed Systems. Theory and Applications

Theory and Applications

American Mathematical Soc. This volume presents the analysis of optimal control problems for systems described by partial differential equations. The book offers simple and clear exposition of main results in this area. The methods proposed by the author cover cases where the controlled system corresponds to well-posed or ill-posed boundary value problems, which can be linear or nonlinear. The uniqueness problem for the solution of nonlinear optimal control problems is analyzed in various settings. Solutions of several previously unsolved problems are given. In addition, general methods are applied to the study of two problems connected with optimal control of fluid flows described by the Navier-Stokes equations.

Infinite Dimensional Optimization and Control Theory

Cambridge University Press Treats optimal problems for systems described by ODEs and PDEs, using an approach that unifies finite and infinite dimensional nonlinear programming.

Optimal Sensor Networks Scheduling in Identification of Distributed Parameter Systems

Springer Sensor networks have recently come into prominence because they hold the potential to revolutionize a wide spectrum of both civilian and military applications. An ingenious characteristic of sensor networks is the distributed nature of data acquisition. Therefore they seem to be ideally prepared for the task of monitoring processes with spatio-temporal dynamics which constitute one of most general and important classes of systems in modelling of the real-world phenomena. It is clear that careful deployment and activation of sensor nodes are critical for collecting the most valuable information from the observed environment. Optimal Sensor Network Scheduling in Identification of Distributed Parameter Systems discusses the characteristic features of the sensor scheduling problem, analyzes classical and recent approaches, and proposes a wide range of original solutions, especially dedicated for networks with mobile and scanning nodes. Both researchers and practitioners will find the case studies, the proposed algorithms, and the numerical examples to be invaluable.

Applied Mechanics Reviews

Scientific and Technical Aerospace Reports

Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database.

Control of Distributed Parameter Systems 1989

Selected Papers from the 5th IFAC Symposium, Perpignan, France, 26-29 June 1989

Elsevier This volume presents state-of-the-art reports on the theory, and current and future applications of control of distributed parameter systems. The papers cover the progress not only in traditional methodology and pure research in control theory, but also the rapid growth of its importance for different applications. This title will be of interest to researchers working in the areas of mathematics, automatic control, computer science and engineering.

Control Of Nonlinear Distributed Parameter Systems

CRC Press An examination of progress in mathematical control theory applications. It provides analyses of the influence and relationship of nonlinear partial differential equations to control systems and contains state-of-the-art reviews, including presentations from a conference co-sponsored by the National Science Foundation, the Institute of Mathematics and its Applications, the University of Minnesota, and Texas A&M University.

Optimal Measurement Methods for Distributed Parameter System Identification

CRC Press For dynamic distributed systems modeled by partial differential equations, existing methods of sensor location in parameter estimation experiments are either limited to one-dimensional spatial domains or require large investments in software systems. With the expense of scanning and moving sensors, optimal placement presents a critical problem.

Optimal Control of Differential Equations

CRC Press "Based on the International Conference on Optimal Control of Differential Equations held recently at Ohio University, Athens, this Festschrift to honor the sixty-fifth birthday of Constantin Corduneanu an outstanding researcher in differential and integral equations provides in-depth coverage of recent advances, applications, and open problems relevant to mathematics and physics. Introduces new results as well as novel methods and techniques!"

Some Aspects of the Optimal Control of Distributed Parameter Systems

SIAM Discusses a number of the more interesting areas in the application of the theory of Optimal Control of distributed parameters.

Complex Systems: Innovation and Sustainability in the Digital Age

Volume 2

Springer Nature This book provides a coherent framework for understanding the essence of complex systems and the nature of digital transformations, analyzes challenges of and patterns in innovative development, and shares a wealth of insights and best practices, resulting in the most extensive coverage of the topic available. In particular, the book’s cutting-edge contributions, prepared by scientists, engineers, and field experts,focus on the design, implementation, and evaluation of practical interventions that promote the innovative and sustainable development of complex systems. In addition to sharing a rich collection of cases from around the world, they provide a broad interdisciplinary analysis of collaboration mechanisms, theories and approaches to support and accelerate the development of complex systems.

Control and Optimal Design of Distributed Parameter Systems

Springer Science & Business Media The articles in this volume focus on control theory of systems governed by nonlinear linear partial differential equations, identification and optimal design of such systems, and modelling of advanced materials. Optimal design of systems governed by PDEs is a relatively new area of study, now particularly relevant because of interest in optimization of fluid flow in domains of variable configuration, advanced and composite materials studies and "smart" materials which include possibilities for built in sensing and control actuation. The book will be of interest to both applied mathematicians and to engineers.

A Selected Annotated Bibliography on the Analysis of Water Resource Systems

Generalized Optimal Control of Linear Systems with Distributed Parameters

Springer Science & Business Media The author of this book made an attempt to create the general theory of optimization of linear systems (both distributed and lumped) with a singular control. The book touches upon a wide range of issues such as solvability of boundary values problems for partial differential equations with generalized right-hand sides, the existence of optimal controls, the necessary conditions of optimality, the controllability of systems, numerical methods of approximation of generalized solutions of initial boundary value problems with generalized data, and numerical methods for approximation of optimal controls. In particular, the problems of optimization of linear systems with lumped controls (pulse, point, pointwise, mobile and so on) are investigated in detail.

Optimal Control Theory Applied to Systems Described by Partial Differential Equations. Vol. 1 of Final Report

The study of optimal control problems for distributed parameter systems is intimately connected to the study of partial differential equations and/or integral equations involving two or more independent variables. The primary purpose of the dissertation is to investigate the application of optimal control theory to systems described by partial differential equations. The intent is not to advance the theory of partial differential equations per se. Thus all considerations will be restricted to the more familiar equations of the type which often occur in mathematical physics. Specifically, the distributed parameter systems under consideration are represented by a set of field equations.

Nonlinear Differential Equations and Dynamical Systems

Theory and Applications

MDPI This Special Edition contains new results on Differential and Integral Equations and Systems, covering higher-order Initial and Boundary Value Problems, fractional differential and integral equations and applications, non-local optimal control, inverse, and higher-order nonlinear boundary value problems, distributional solutions in the form of a finite series of the Dirac delta function and its derivatives, asymptotic properties’ oscillatory theory for neutral nonlinear differential equations, the existence of extremal solutions via monotone iterative techniques, predator–prey interaction via fractional-order models, among others. Our main goal is not only to show new trends in this field but also to showcase and provide new methods and techniques that can lead to future research.

Air Force Research Resumés

Differential Equations

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

Routledge 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.

Optimal Control Theory for the Damping of Vibrations of Simple Elastic Systems

Lecture Notes in Mathematics

Control Theory and Related Topics

Optimal Control Theory

Applications to Management Science and Economics

Springer This new 4th edition offers an introduction to optimal control theory and its diverse applications in management science and economics. It introduces students to the concept of the maximum principle in continuous (as well as discrete) time by combining dynamic programming and Kuhn-Tucker theory. While some mathematical background is needed, the emphasis of the book is not on mathematical rigor, but on modeling realistic situations encountered in business and economics. It applies optimal control theory to the functional areas of management including finance, production and marketing, as well as the economics of growth and of natural resources. In addition, it features material on stochastic Nash and Stackelberg differential games and an adverse selection model in the principal-agent framework. Exercises are included in each chapter, while the answers to selected exercises help deepen readers' understanding of the material covered. Also included are appendices of supplementary material on the solution of differential equations, the calculus of variations and its ties to the maximum principle, and special topics including the Kalman filter, certainty equivalence, singular control, a global saddle point theorem, Sethi-Skiba points, and distributed parameter systems. Optimal control methods are used to determine optimal ways to control a dynamic system. The theoretical work in this field serves as the foundation for the book, in which the author applies it to business management problems developed from his own research and classroom instruction. The new edition has been refined and updated, making it a valuable resource for graduate courses on applied optimal control theory, but also for financial and industrial engineers, economists, and operational researchers interested in applying dynamic optimization in their fields.

Control Theory and Related Topics

In Memory of Xunjing Li : Fudan University, China, 3-5 June 2005

World Scientific 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."

Recent Awards in Engineering

Control of Distributed Parameter Systems 1982

Proceedings of the Third IFAC Symposium, Toulouse, France, 29 June - 2 July 1982

Elsevier Control of Distributed Parameter Systems 1982 covers the proceeding of the Third International Federation of Automatic Control (IFAC) Symposium on Control of Distributed Parameter Systems. The book reviews papers that tackle issues concerning the control of distributed parameter systems, such as modeling, identification, estimation, stabilization, optimization, and energy system. The topics that the book tackles include notes on optimal and estimation result of nonlinear systems; approximation of the parameter identification problem in distributed parameters systems; and optimal control of a punctually located heat source. This text also encompasses the stabilization of nonlinear parabolic equations and the decoupling approach to the control of large spaceborne antenna systems. Stability of Hilbert space contraction semigroups and the tracking problem in the fractional representation approach are also discussed. This book will be of great interest to researchers and professionals whose work concerns automated control systems.

Dynamics of Solid Structures

Methods using Integrodifferential Relations

Walter de Gruyter GmbH & Co KG This monograph covers new variational and projection methods to study the dynamics within solid structures. To cope with the underlying initial-boundary value problems, the method of integrodifferential relations is employed. Applications and examples in physics, mechanics and control engineering range from natural vibrations or forced motions of elastic and viscoelastic bodies to heat and mass transfer processes. Contents Generalized formulations of parabolic and hyperbolic problems Variational principles in linear elasticity Variational statements in structural mechanics Ritz method for initial-boundary value problems Variational and projection techniques with semi-discretization Integrodifferential approach to eigenvalue problems Spatial vibrations of elastic beams with convex cross-sections Double minimization in optimal control problems Semi-discrete approximations in inverse dynamic problems Modeling and control in mechatronics

Estimation and Control Problems for Stochastic Partial Differential Equations

Springer Science & Business Media Focusing on research surrounding aspects of insufficiently studied problems of estimation and optimal control of random fields, this book exposes some important aspects of those fields for systems modeled by stochastic partial differential equations. It contains many results of interest to specialists in both the theory of random fields and optimal control theory who use modern mathematical tools for resolving specific applied problems, and presents research that has not previously been covered. More generally, this book is intended for scientists, graduate, and post-graduates specializing in probability theory and mathematical statistics. The models presented describe many processes in turbulence theory, fluid mechanics, hydrology, astronomy, and meteorology, and are widely used in pattern recognition theory and parameter identification of stochastic systems. Therefore, this book may also be useful to applied mathematicians who use probability and statistical methods in the selection of useful signals subject to noise, hypothesis distinguishing, distributed parameter systems optimal control, and more. Material presented in this monograph can be used for education courses on the estimation and control theory of random fields.

Distributed Parameter Systems Theory: Control

Research Directions in Distributed Parameter Systems

SIAM Eleven chapters, written by experts in their respective fields, on topics ranging from control of the Navier-Stokes equations to nondestructive evaluation - all of which are modeled by distributed parameter systems.

Advances in Theoretical and Computational Energy Optimization Processes

Volume 2

MDPI The paradigm in the design of all human activity that requires energy for its development must change from the past. We must change the processes of product manufacturing and functional services. This is necessary in order to mitigate the ecological footprint of man on the Earth, which cannot be considered as a resource with infinite capacities. To do this, every single process must be analyzed and modified, with the aim of decarbonising each production sector. This collection of articles has been assembled to provide ideas and new broad-spectrum contributions for these purposes.

Control of Distributed Parameter Systems, 1986

Proceedings of the 4th IFAC Symposium, Los Angeles, California, USA, 30 June-2 July 1986

Pergamon The increasing requirements for active control of large aerospace, chemical and mechanical systems have focused attention on recent research into the control of distributed parameter systems. The increasing capabilities in computation, instrumentation and actuators have made possible implementation of sophisticated control schemes based on this research. This volume represents state of the art reports on the theory and current and future applications, and should be considered essential reading for all those involved in the production of such systems.

Solar Energy Update

Some Aspects of the Optimal Control Theory of Distributed Parameter Systems

USSR Scientific Abstracts: Cybernetics, Computers and Automation Technology

Space Station Systems

Supplement

Encyclopaedia of Mathematics

Monge—Ampère Equation — Rings and Algebras

Springer

Optimal Mobile Sensing and Actuation Policies in Cyber-physical Systems

Springer Science & Business Media A successful cyber-physical system, a complex interweaving of hardware and software with some part of the physical environment, depends on proper identification of the, often pre-existing, physical element. A bespoke “cyber” part of the system may then be designed from scratch. Optimal Mobile Sensing and Actuation Strategies in Cyber-physical Systems focuses on distributed-parameter systems the dynamics of which can be modelled with partial differential equations. These are very challenging to observe, their states and inputs being distributed throughout a spatial domain. Consequently, systematic approaches to the optimization of sensor location have to be devised for parameter estimation. The text begins by reviewing the field of cyber-physical systems and introducing background notions of distributed parameter systems and optimal observation theory. New research problems are then defined within this framework. Two important problems considered are optimal mobile sensor trajectory planning and the accuracy effects and allocation of remote sensors. These are followed up with a solution to the problem of optimal robust estimation. Actuation policies are then introduced into the framework with the purpose of improving estimation and optimizing the trajectories of both sensors and actuators simultaneously. The large number of illustrations within the text will assist the reader to visualize the application of the methods proposed. A group of similar examples are used throughout the book to help the reader assimilate the material more easily. The monograph concentrates on the use of methods for which a cyber-physical-systems infrastructure is required. The methods are computationally heavy and require mobile sensors and actuators with communications abilities. Application examples cover fields from environmental science to national security so that readers are encouraged to link the ideas of cyber-physical systems with their own research.

Computation and Control III

Proceedings of the Third Bozeman Conference, Bozeman, Montana, August 5–11, 1992

Springer Science & Business Media The third Conference on Computation and Control was held at Mon tana State University in Bozeman, Montana from August 5-11, 1992 and this proceedings represents the evolution that the conference has taken since its 1988 and 1990 predecessors. The first conference and proceedings (Volume 1 in PSCT) nurtured a dialogue between researchers in control theory and the area of numerical computation. This cross-fertilization was continued with the 1990 conference and proceedings (Volume 11 in PSCT) while forecasting the theme for this conference. The present volume contains a collection of papers addressing issues ranging from noise abatement via smart material technology, robotic vi sion, and parameter identification to feedback design challenges in fluid control and other areas of topical interest. The area of feedback design in fluid control spawns computational challenges in the form of Burgers' equation which is addressed both with standard numerical methods as well as new computational procedures. Applications which involve inverse prob lems include material parameter estimation and sampling in observability. Whether motivated by the plant or arising as the distributed system in the design of a feedback compensator for problems in nonlinear control, the theme of this conference placed an emphasis on the use of partial dif ferential equations in control theory. Through challenges initiated via the control problem or the subsequent computational problem, the joint efforts of experts from the respective disciplines enhance the development of both.

Technical Abstract Bulletin

Machine Learning for Cyber Security

Third International Conference, ML4CS 2020, Guangzhou, China, October 8–10, 2020, Proceedings, Part I

Springer Nature This three volume book set constitutes the proceedings of the Third International Conference on Machine Learning for Cyber Security, ML4CS 2020, held in Xi’an, China in October 2020. The 118 full papers and 40 short papers presented were carefully reviewed and selected from 360 submissions. The papers offer a wide range of the following subjects: Machine learning, security, privacy-preserving, cyber security, Adversarial machine Learning, Malware detection and analysis, Data mining, and Artificial Intelligence.