Applied Optimal Control And Estimation

Optimum Systems ControlNonlinear and Optimal Control SystemsOptimal Control and EstimationOptimal Control TheoryOptimal Control and the Calculus of VariationsApplied Optimal ControlElements of Optimal ControlOptimal Control TheoryAn Introduction to Optimal Control Problems in Life Sciences and EconomicsApplied Optimal ControlOptimization and Optimal ControlOptimal ControlOptimal Control TheoryOptimal ControlOptimal Control TheoryIntroduction to Control Theory, Including Optimal ControlNonlinear Controllability and Optimal ControlOptimal Control of Dynamic Systems Driven by Vector MeasuresOptimal Control Theory and Static Optimization in EconomicsOptimization, control and related subjects Andrew P. Sage Thomas L. Vincent Robert F. Stengel Donald E. Kirk Enid R. Pinch Arthur Earl Bryson Stephen J. Citron Suresh P. Sethi Sebastian Aniţa A. E. Bryson Panos M. Pardalos Leslie M. Hocking Robert Pallu de La Barrière Michael Athans Suresh P. Sethi David N. Burghes H.J. Sussmann N. U. Ahmed Daniel Léonard

structurally the text is divided into three areas although overlap certainly exists these are 1 optimal control with deterministic inputs 2 state estimation and combined estimation and control and 3 sensitivity and computational techniques in systems control preface

designed for one semester introductory senior or graduate level course the

authors provide the student with an introduction of analysis techniques used in the design of nonlinear and optimal feedback control systems there is special emphasis on the fundamental topics of stability controllability and optimality and on the corresponding geometry associated with these topics each chapter contains several examples and a variety of exercises

graduate level text provides introduction to optimal control theory for stochastic systems emphasizing application of basic concepts to real problems invaluable as a reference for those already familiar with the subject automatica

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

a paperback edition of this successful textbook for final year undergraduate mathematicians and control engineering students this book contains exercises and many worked examples with complete solutions and hints making it ideal not only as a class textbook but also for individual study the intorduction to optimal control begins by considering the problem of minimizing a function of many variables before moving on to the main subject the optimal control of systems governed by ordinary differential equations

this is one of the best books on optimal control it covers a wide range of interesting material including parameter optimization optimization for systems with constraints feedback control and singular solutions of optimization the book can be useful in teaching courses in control theory there are plenty of exercises included in the text

it is the purpose of this text to provide in introduction to the development and utilization of techniques applicable to the solution of optimal control problems such problems are within the domain of system optimization theory it is felt that the text is a suitable beginning point for the engineering reader interested in the fields of optimal control and system optimization no prerequisites in control theory are required and use of the text is not limited to any one special field of engineering several methods of formulating and solving deterministic optimal control problems are presented preface

optimal control methods are used to determine optimal ways to control a dynamic system the theoretical work in this field serves as a foundation for the book which the authors have applied to business management problems

developed from their research and classroom instruction sethi and thompson have provided management science and economics communities with a thoroughly revised edition of their classic text on optimal control theory the new edition has been completely refined with careful attention to the text and graphic material presentation chapters cover a range of topics including finance production and inventory problems marketing problems machine maintenance and replacement problems of optimal consumption of natural resources and applications of control theory to economics the book contains new results that were not available when the first edition was published as well as an expansion of the material on stochastic optimal control theory

combining control theory and modeling this textbook introduces and builds on methods for simulating and tackling concrete problems in a variety of applied sciences emphasizing learning by doing the authors focus on examples and applications to real world problems an elementary presentation of advanced concepts proofs to introduce new ideas and carefully presented matlab programs help foster an understanding of the basics but also lead the way to new independent research with minimal prerequisites and exercises in each chapter this work serves as an excellent textbook and reference for graduate and advanced undergraduate students researchers and practitioners in mathematics physics engineering computer science as well as biology biotechnology economics and finance

this best selling text focuses on the analysis and design of complicated dynamics systems choice called it a high level concise book that could well be used as a reference by engineers applied mathematicians and undergraduates the format is good the presentation clear the diagrams instructive the examples and problems helpful references and a multiple choice examination are included

this volume gives the latest advances in optimization and optimal control which are the main part of applied mathematics it covers various topics of optimization optimal control and operations research

systems that evolve with time occur frequently in nature and modelling the behaviour of such systems provides an important application of mathematics these systems can be completely deterministic but it may be possible too to control their behaviour by intervention through controls the theory of optimal control is concerned with determining such controls which at minimum cost either direct the system along a given trajectory or enable it to reach a given point in its state space this textbook is a straightforward introduction to the theory of optimal control with an emphasis on presenting many different applications professor hocking has taken pains to ensure that the theory is

developed to display the main themes of the arguments but without using sophisticated mathematical tools problems in this setting can arise across a wide range of subjects and there are illustrative examples of systems from as diverse fields as dynamics economics population control and medicine throughout there are many worked examples and numerous exercises with solutions are provided

geared toward advanced undergraduate and graduate engineering students this text introduces the theory and applications of optimal control it serves as a bridge to the technical literature enabling students to evaluate the implications of theoretical control work and to judge the merits of papers on the subject rather than presenting an exhaustive treatise optimal control offers a detailed introduction that fosters careful thinking and disciplined intuition it develops the basic mathematical background with a coherent formulation of the control problem and discussions of the necessary conditions for optimality based on the maximum principle of pontryagin in depth examinations cover applications of the theory to minimum time minimum fuel and to quadratic criteria problems the structure properties and engineering realizations of several optimal feedback control systems also receive attention special features include numerous specific problems carried through to engineering realization in block diagram form the text treats almost all current examples of control problems that permit analytic solutions and its unified approach makes frequent use of geometric ideas to encourage students intuition

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

this outstanding reference presents current state of the art research on importantproblems of finite dimensional nonlinear optimal control and controllability theory itpresents an overview of a broad variety of new techniques useful in solving classicalcontrol theory problems written and edited by renowned mathematicians at the forefront of research in thisevolving field nonlinear controllability and optimal control providesdetailed coverage of the construction of solutions of differential inclusions by means ofdirectionally continuous sections lie algebraic conditions for local controllability the use of the campbell hausdorff series to derive properties of optimal trajectories the fuller phenomenon the theory of orbits and more containing more than 1 300 display equations this exemplary instructive reference is aninvaluable source for mathematical researchers and applied mathematicians electrical andelectronics aerospace mechanical control systems and computer engineers and graduatestudents in these disciplines

this book is devoted to the development of optimal control theory for finite dimensional systems governed by deterministic and stochastic differential equations driven by vector measures the book deals with a broad class of controls including regular controls vector valued measurable functions relaxed controls measure valued functions and controls determined by vector measures where both fully and partially observed control problems are considered in the past few decades there have been remarkable advances in the field of systems and control theory thanks to the unprecedented interaction between mathematics and the physical and engineering sciences recently optimal control theory for dynamic systems driven by vector measures has attracted increasing interest this book presents this theory for dynamic systems governed by both ordinary and stochastic differential equations including extensive results on the existence of optimal controls and necessary conditions for optimality computational algorithms are developed based on the optimality conditions with numerical results presented to demonstrate the applicability of the theoretical results developed in the book this book will be of interest to researchers in optimal control or applied functional analysis interested in applications of vector measures to control theory stochastic systems driven by vector measures and related topics in particular this self contained account can be a starting point for

further advances in the theory and applications of dynamic systems driven and controlled by vector measures

optimal control theory is a technique being used increasingly by academic economists to study problems involving optimal decisions in a multi period framework this textbook is designed to make the difficult subject of optimal control theory easily accessible to economists while at the same time maintaining rigour economic intuitions are emphasized and examples and problem sets covering a wide range of applications in economics are provided to assist in the learning process theorems are clearly stated and their proofs are carefully explained the development of the text is gradual and fully integrated beginning with simple formulations and progressing to advanced topics such as control parameters jumps in state variables and bounded state space for greater economy and elegance optimal control theory is introduced directly without recourse to the calculus of variations the connection with the latter and with dynamic programming is explained in a separate chapter a second purpose of the book is to draw the parallel between optimal control theory and static optimization chapter 1 provides an extensive treatment of constrained and unconstrained maximization with emphasis on economic insight and applications starting from basic concepts it derives and explains important results including the envelope theorem and the method of comparative statics this chapter may be used for a course in static optimization the book is largely self contained no previous knowledge of differential equations is required

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