Robust Control Design An Optimal Control Approach Hardcover

Optimal Control TheoryOptimal Control TheoryAn Introduction to Optimal Control TheoryOptimal ControlOptimal ControlOptimal ControlApplied Optimal ControlOptimal Control by Mathematical ProgrammingIntroduction to Control Theory, Including Optimal ControlOptimal Control TheoryIntroduction to Optimal ControlOptimal Control TheoryPrimer on Optimal Control TheoryIntroduction to Optimal Control TheoryOptimal Control Theory Essentials of Optimal Control Optimal Control with Engineering ApplicationsRobust Control DesignElements of Optimal ControlOptimization and Optimal Control Suresh P. Sethi Donald E. Kirk Aaron Strauss Frank L. Lewis Michael Athans Leslie M. Hocking A. E. Bryson Daniel Tabak David N. Burghes Robert Pallu de La Barrière Ian McCausland Suresh P. Sethi Jason L. Speyer Jack Macki Zhongjing Ma Pierre Naslin Hans P. Geering Feng Lin Stephen J. Citron Panos M. Pardalos Optimal Control Theory Optimal Control Theory An Introduction to Optimal Control Theory Optimal Control Optimal Control Applied Optimal Control Optimal Control by Mathematical Programming Introduction to Control Theory, Including Optimal Control Optimal Control Theory Introduction to Optimal Control Optimal Control Theory Primer on Optimal Control Theory Introduction to Optimal Control Theory Optimal Control Theory Essentials of Optimal Control Optimal Control with Engineering Applications Robust Control Design Elements of Optimal Control Optimization and Optimal Control Suresh P. Sethi Donald E. Kirk Aaron Strauss Frank L. Lewis Michael Athans Leslie M. Hocking A. E. Bryson Daniel Tabak David N. Burghes Robert Pallu de La Barrière lan McCausland Suresh P. Sethi Jason L. Speyer Jack Macki Zhongjing Ma Pierre Naslin Hans P. Geering Feng Lin Stephen J. Citron Panos M. Pardalos

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

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

this paper is intended for the beginner it is not a state of the art paper for research workers in the field of control theory its purpose is to introduce the reader to some of the problems and results in control theory to illustrate the application of these re sults and to provide a guide for his further reading on this subject i have tried to motivate the results with examples especial ly with one canonical simple example described in 3 many results such as the maximum principle have long and difficult proofs i have omitted these proofs in general i have included only the proofs which are either 1 not too difficult or 2 fairly enlightening as to the nature of the result i have however usually attempted to draw the strongest conclusion from a given proof for example many existing proofs in control theory for compact targets and uniqueness of solutions also hold for closed targets and non uniqueness finally at the end of each section i have given references to generalizations and origins of the results discussed in that section i make no claim of completeness in the references however as i have often been content merely to refer the reader either to an exposition or to a paper which has an extensive bibliography iv these 1ecture notes are revisions of notes i used for aseries of nine 1ectures on control theory at the international summer school on mathematical systems and economics held in varenna italy june 1967

a new edition of the classic text on optimal control theory as a superb introductory text and an indispensable reference this new edition of optimal control will serve the needs of both the professional engineer and the advanced student in mechanical electrical and aerospace engineering its coverage encompasses all the fundamental topics as well as the major changes that have occurred in recent years an abundance of computer simulations using matlab and relevant toolboxes is included to give the reader the actual experience of applying the theory to real world situations major topics covered include static optimization optimal control of discrete time systems optimal control of continuous time systems the tracking problem and other lqr extensions final time free and constrained input control dynamic programming optimal control for polynomial systems output feedback and structured control robustness and multivariable frequency domain techniques differential games reinforcement learning and optimal adaptive control

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

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

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 fully revised 3rd edition offers an introduction to optimal control theory and its diverse applications in management science and economics it brings to students the concept of the maximum principle in continuous as well as discrete time by using 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 faced in business and economics the book exploits optimal control theory to the functional areas of management including finance production and marketing and to economics of growth and of natural resources in addition this new edition features materials on stochastic nash and stackelberg differential games and an adverse selection model in the principal agent framework the book provides exercises for each chapter and answers to selected exercises to help deepen the understanding of the material presented also included are appendices comprised of supplementary material on the solution of differential equations the calculus of variations and its relationships 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 a foundation for the book which the author has applied to business management problems developed from his research and classroom instruction the new edition has been completely refined and brought up to date ultimately this should continue to be a valuable resource for graduate courses on applied optimal control theory but also for financial and industrial engineers economists and operational researchers concerned with the application of dynamic optimization in their fields

a rigorous introduction to optimal control theory which will enable engineers and scientists to put the theory into practice

this monograph is an introduction to optimal control theory for systems governed by vector ordinary differential equations it is not intended as a state of the art handbook for researchers we have tried to keep two types of reader in mind 1 mathematicians graduate students and advanced undergraduates in mathematics who want a concise introduction to a field which contains nontrivial interesting applications of mathematics for example weak convergence convexity and the theory of ordinary differential equations 2 economists applied scientists and engineers who want to understand some of the mathematical foundations of optimal control theory in general we have emphasized motivation and explanation avoiding the definition axiom theorem proof approach we make use of a large number of examples especially one simple canonical example which we carry through the entire book in proving theorems we often just prove the simplest case then state the more general results which can be proved many of the more difficult topics are discussed in the notes sections at the end of chapters and several major proofs are in the appendices we feel that a solid understanding of basic facts is best attained by at first avoiding excessive generality we have not tried to give an exhaustive list of references preferring to refer the reader to existing books or papers with extensive bibliographies references are given by author s name and the year of publication e g waltman 1974

this book focuses on how to implement optimal control problems via the variational method it studies how to implement the extrema of functional by applying the variational method and covers the extrema of functional with different boundary conditions involving multiple functions and with certain constraints etc it gives the necessary and sufficient condition for the continuous time optimal control solution via the variational method solves

the optimal control problems with different boundary conditions analyzes the linear quadratic regulator tracking problems respectively in detail and provides the solution of optimal control problems with state constraints by applying the pontryagin s minimum principle which is developed based upon the calculus of variations and the developed results are applied to implement several classes of popular optimal control problems and say minimum time minimum fuel and minimum energy problems and so on as another key branch of optimal control methods it also presents how to solve the optimal control problems via dynamic programming and discusses the relationship between the variational method and dynamic programming for comparison concerning the system involving individual agents it is also worth to study how to implement the decentralized solution for the underlying optimal control problems in the framework of differential games the equilibrium is implemented by applying both pontryagin s minimum principle and dynamic programming the book also analyzes the discrete time version for all the above materials as well since the discrete time optimal control problems are very popular in many fields

this book introduces a variety of problem statements in classical optimal control in optimal estimation and filtering and in optimal control problems with non scalar valued performance criteria many example problems are solved completely in the body of the text all chapter end exercises are sketched in the appendix the theoretical part of the book is based on the calculus of variations so the exposition is very transparent and requires little mathematical rigor

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

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

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