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COUNTEREXAMPLES IN OPTIMAL CONTROL THEORY

INVERSE AND ILL-POSED PROBLEMS SERIES

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Counterexamples In Optimal Control Theory Inverse And Illposed Problems

F. A. Muckler

Counterexamples In Optimal Control Theory Inverse And Illposed Problems:

Counterexamples in Optimal Control Theory S. I□A□ Serovaĭskiĭ,2004 This monograph deals with cases where optimal control either does not exist or is not unique cases where optimality conditions are insufficient of degenerate or where extremum problems in the sense of Tikhonov and Hadamard are ill posed and other situations A formal application of classical optimisation methods in such cases either leads to wrong results or has no effect The detailed analysis of these examples should provide a better understanding of the modern theory of optimal control and the practical difficulties of solving extremum problems *Operator Theory and Ill-Posed Problems* Mikhail M. Lavrent'ev,Lev Ja. Savel'ev,2011-12-22 This book consists of three major parts The first two parts deal with general mathematical concepts and certain areas of operator theory The third part is devoted to ill posed problems It can be read independently of the first two parts and presents a good example of applying the methods of calculus and functional analysis The first part Basic Concepts briefly introduces the language of set theory and concepts of abstract linear and multilinear algebra Also introduced are the language of topology and fundamental concepts of calculus the limit the differential and the integral A special section is devoted to analysis on manifolds The second part Operators describes the most important function spaces and operator classes for both linear and nonlinear operators Different kinds of generalized functions and their transformations are considered Elements of the theory of linear operators are presented Spectral theory is given a special focus The third part Ill Posed Problems is devoted to problems of mathematical physics integral and operator equations evolution equations and problems of integral geometry It also deals with problems of analytic continuation Detailed coverage of the subjects and numerous examples and exercises make it possible to use the book as a textbook on some areas of calculus and functional analysis It can also be used as a reference textbook because of the extensive scope and detailed references with comments

Well-posed, Ill-posed, and Intermediate Problems with Applications Petrov Yuri P.,Valery S. Sizikov,2011-12-22 This book deals with one of the key problems in applied mathematics namely the investigation into and providing for solution stability in solving equations with due allowance for inaccuracies in set initial data parameters and coefficients of a mathematical model for an object under study instrumental function initial conditions etc and also with allowance for miscalculations including roundoff errors Until recently all problems in mathematics physics and engineering were divided into two classes well posed problems and ill posed problems The authors introduce a third class of problems intermediate ones which are problems that change their property of being well or ill posed on equivalent transformations of governing equations and also problems that display the property of being either well or ill posed depending on the type of the functional space used The book is divided into two parts Part one deals with general properties of all three classes of mathematical physical and engineering problems with approaches to solve them Part two deals with several stable models for solving inverse ill posed problems illustrated with numerical examples *Modelling with Ordinary Differential Equations* Alfio

Borzì,2020-04-13 Modelling with Ordinary Differential Equations A Comprehensive Approach aims to provide a broad and self contained introduction to the mathematical tools necessary to investigate and apply ODE models The book starts by establishing the existence of solutions in various settings and analysing their stability properties The next step is to illustrate modelling issues arising in the calculus of variation and optimal control theory that are of interest in many applications This discussion is continued with an introduction to inverse problems governed by ODE models and to differential games The book is completed with an illustration of stochastic differential equations and the development of neural networks to solve ODE systems Many numerical methods are presented to solve the classes of problems discussed in this book Features Provides insight into rigorous mathematical issues concerning various topics while discussing many different models of interest in different disciplines biology chemistry economics medicine physics social sciences etc Suitable for undergraduate and graduate students and as an introduction for researchers in engineering and the sciences Accompanied by codes which allow the reader to apply the numerical methods discussed in this book in those cases where analytical solutions are not available

Optimization and Differentiation Simon Serovajsky,2017-09-13 Optimization and Differentiation is an introduction to the application of optimization control theory to systems described by nonlinear partial differential equations As well as offering a useful reference work for researchers in these fields it is also suitable for graduate students of optimal control theory

Optimization Simon Serovajsky,2024-07-30 Optimization 100 Examples is a book devoted to the analysis of scenarios for which the use of well known optimization methods encounter certain difficulties Analysing such examples allows a deeper understanding of the features of these optimization methods including the limits of their applicability In this way the book seeks to stimulate further development and understanding of the theory of optimal control The study of the presented examples makes it possible to more effectively diagnose problems that arise in the practical solution of optimal control problems and to find ways to overcome the difficulties that have arisen Features Vast collection of examples Simple accessible presentation Suitable as a research reference for anyone with an interest in optimization and optimal control theory including mathematicians and engineers Examples differ in properties i e each effect for each class of problems is illustrated by a unique example Simon Serovajsky is a professor of mathematics at Al Farabi Kazakh National University in Kazakhstan He is the author of many books published in the area of optimization and optimal control theory mathematical physics mathematical modelling philosophy and history of mathematics as well as a long list of high quality publications in learned journals **Characterisation of Bio-Particles from Light Scattering** Valeri P. Maltsev,Konstantin A. Semyanov,2013-03-01 The primary aim of this monograph is to provide a systematic state of the art summary of the light scattering of bioparticles including a brief consideration of analytical and numerical methods for computing electromagnetic scattering by single particles a detailed discussion of the instrumental approach used in measurement of light scattering an analysis of the methods used in solution of the inverse light scattering problem and an introduction of the results dealing

with practical analysis of biosamples Considering the widespread need for this information in optics remote sensing engineering medicine and biology the book is useful to many graduate students scientists and engineers working on various aspects of electromagnetic scattering and its applications Computational Methods in Applied Mathematics ,2005 *Mathematical Reviews* ,2005 **Rundbrief der Gesellschaft fur Angewandte Mathematik und Mechanik** Gesellschaft für Angewandte Mathematik und Mechanik,2002 *Current Index to Statistics, Applications, Methods and Theory* ,1992 The Current Index to Statistics CIS is a bibliographic index of publications in statistics probability and related fields **Index of Mathematical Papers** ,1985 Ill-posed Problems in Optimal Control Systems and a Method to Solve Them Lili Hedayatolah-Tabrizi,1983 A Note on the General Inverse Problem of Optimal Control Theory John Louis Casti,1974 *Nearest Approach Paths in Optimal Control Problems* Suresh P. Sethi,University of Toronto. Faculty of Management Studies,1976 **On the Inverse Optimal Control Problem in Manual Control Systems** F. A. Muckler,1965 **Control Theory and Inverse Problems** Kaïs Ammari,Sami Tliba,Chaker Jammazi,2025-09-22 This volume presents a timely overview of control theory and inverse problems and highlights recent advances in these active research areas The chapters are based on talks given at the spring school Control Theory Inverse Problems held in Monastir Tunisia in May 2024 In addition to providing a snapshot of these two areas chapters also highlight breakthroughs on more specific topics such as Neural network modeling Optimal control of the Euler Bernoulli equation Traffic signal control Spectral description of a cell growth and division equation Control Theory and Inverse Problems will be a valuable resource for both established researchers as well as more junior members of the community Nearest Feasible Paths in Optimal Control Problems Suresh Sethi,2014 Many infinite horizon optimal control problems in management science and economics have optimal paths that approach some stationary level Often this path has the property of being the nearest feasible path to the stationary equilibrium This paper obtains a simple multiplicative characterization for a single state single control problem to have this property By using Green s theorem it is shown that the property is observed as long as the stationary level is sustainable by a feasible control If not the property is in general shown to be false The paper concludes with an important theorem which states that even in the case of multiple equilibria the optimal path is a nearest feasible path to one of them

Reduction of Some Optimal Control Problems with Variational Inequalities to Ill Posed Optimal Control Problems with Linear State Equations Sergej Rotin,2000 **Inverse Problems in Optimal Control with Emphasis on Dynamical Systems in Human Movement** Yusuf Fuad,1990

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