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Generalized Solutions of Operator Equations and Extreme Elements May 25 2020

Abstract models for many problems in science and engineering take the form of an operator equation. The resolution of these problems often requires determining the existence and uniqueness of solutions to these equations. "Generalized Solutions of Operator Equations and Extreme Elements" presents recently obtained results in the study of the generalized solutions of operator equations and extreme elements in linear topological spaces. The presented results offer new methods of identifying these solutions and studying their properties. These new methods involve the application of a priori estimations and a general topological approach to construct generalized solutions of linear and nonlinear operator equations. The monograph is intended for mathematicians, graduate students and researchers studying functional analysis, operator theory, and the theory of optimal control.

Statistical Theory and Method Abstracts Jul 28 2020

Ionic Solution Theory Aug 01 2023

Convex Integration Theory Sep 09 2021 §1. Historical Remarks Convex Integration theory, first introduced by M. Gromov [17], is one of three general methods in immersion-theoretic topology for solving a broad range of problems in geometry and topology. The other methods are: (i) Removal of Singularities, introduced by M. Gromov and Y. Eliashberg [8]; (ii) the covering homotopy method which, following M. Gromov's thesis [16], is also referred to as the method of sheaves. The covering homotopy method is due originally to S. Smale [36] who proved a crucial covering homotopy result in order to solve the classification problem for immersions of spheres in Euclidean space. These general methods are not linearly related in the sense that successive methods subsumed the previous methods. Each method has its own distinct foundation, based on an independent geometrical or analytical insight. Consequently, each method has a range of applications to problems in topology that are best suited to its particular insight. For example, a distinguishing feature of Convex Integration theory is that it applies to solve closed relations in jet spaces, including certain general classes of underdetermined non-linear systems of partial differential equations. As a case of interest, the Nash-Kuiper C^1 -isometric immersion theorem can be reformulated and proved using Convex Integration theory (cf. Gromov [18]). No such results on closed relations in jet spaces can be proved by means of the other two methods.

Mathematical Models in Boundary Layer Theory Jan 02 2021 Since Prandtl first suggested it in 1904, boundary layer theory has become a fundamental aspect of fluid dynamics. Although a vast literature exists for theoretical and experimental aspects of the theory, for the most part, mathematical studies can be found only in separate, scattered articles. *Mathematical Models in Boundary Layer Theory* offers the first systematic exposition of the mathematical methods and main results of the theory. Beginning with the basics, the authors detail the techniques and results that reveal the nature of the equations that govern the flow within boundary layers and ultimately describe the laws underlying the motion of fluids with small viscosity. They investigate the questions of existence and uniqueness of solutions, the stability of solutions with respect to perturbations, and the qualitative behavior of solutions and their asymptotics. Of particular importance for applications, they present methods for an approximate solution of the Prandtl system and a subsequent evaluation of the rate of convergence of the approximations to the exact solution. Written by the world's foremost experts on the subject, *Mathematical Models in Boundary Layer Theory* provides the opportunity to explore its mathematical studies and their importance to the nonlinear theory of viscous and electrically conducting flows, the theory of heat and mass transfer, and the dynamics of reactive and multiphase media. With the theory's importance to a wide variety of applications, applied mathematicians—especially those in fluid dynamics—along with engineers of aeronautical and ship design will undoubtedly welcome this authoritative, state-of-the-art treatise.

Control Theory Methods in Economics Nov 11 2021 Control theory methods in economics have historically developed over three phases. The first involved basically the feedback control rules in a deterministic framework which were applied in macrodynamic models for analyzing stabilization policies. The second phase raised the issues of various types of inconsistencies in deterministic optimal control models due to changing information and other aspects of stochasticity. Rational expectations models have been extensively used in this plan to resolve some of the inconsistency problems. The third phase has recently focused on the various aspects of adaptive control, where stochasticity and information adaptivity are introduced in diverse ways e.g. • risk adjustment and risk sensitivity of optimal control, recursive updating rules via Kalman filtering and weighted recursive least squares and variable structure control methods in nonlinear framework. Problems of efficient econometric estimation of optimal control models have now acquired significant importance. This monograph provides an integrated view of control theory methods, synthesizing the three phases from feedback control to stochastic control and from stochastic control to adaptive control. Aspects of econometric estimation are strongly emphasized here, since these are very important in empirical applications in economics.

Complex Ions in Aqueous Solutions Jun 18 2022

Hamiltonian Methods in the Theory of Solitons Apr 16 2022 The main characteristic of this classic exposition of the inverse scattering method and its applications to soliton theory is its consistent Hamiltonian approach to the theory. The nonlinear Schrödinger

equation is considered as a main example, forming the first part of the book. The second part examines such fundamental models as the sine-Gordon equation and the Heisenberg equation, the classification of integrable models and methods for constructing their solutions.

Extended Finite Element Method Jan 26 2023 Introduces the theory and applications of the extended finite element method (XFEM) in the linear and nonlinear problems of continua, structures and geomechanics Explores the concept of partition of unity, various enrichment functions, and fundamentals of XFEM formulation. Covers numerous applications of XFEM including fracture mechanics, large deformation, plasticity, multiphase flow, hydraulic fracturing and contact problems Accompanied by a website hosting source code and examples

Problems and Solutions in Thermoelasticity and Magneto-thermoelasticity Apr 24 2020 This book presents problems and solutions of the mathematical theories of thermoelasticity and magneto-thermoelasticity. The classical, coupled and generalized theories are solved using the eigenvalue methodology. Different methods of numerical inversion of the Laplace transform are presented and their direct applications are illustrated. The book is very useful to those interested in continuum mechanics.

Some Basic Problems of the Mathematical Theory of Elasticity Apr 04 2021 TO THE FIRST ENGLISH EDITION. In preparing this translation, I have taken the liberty of including footnotes in the main text or inserting them in small type at the appropriate places. I have also corrected minor misprints without special mention .. The Chapters and Sections of the original text have been called Parts and Chapters respectively, where the latter have been numbered consecutively. The subject index was not contained in the Russian original and the authors' index represents an extension of the original list of references. In this way the reader should be able to find quickly the pages on which anyone reference is discussed. The transliteration problem has been overcome by printing the names of Russian authors and journals also in Russian type. While preparing this translation in the first place for my own information, the knowledge that it would also become accessible to a large circle of readers has made the effort doubly worthwhile. I feel sure that the reader will share with me in my admiration for the simplicity and lucidity of presentation.

Theories of Solutions Sep 21 2022

Computer Aided Systems Theory – EUROCAST 2005 Feb 12 2022 This book constitutes the thoroughly refereed post-proceedings of the 10th International Conference on Computer Aided Systems Theory, EUROCAST 2005, held in Las Palmas de Gran Canaria, Spain in February 2005. The 83 revised full papers presented were carefully reviewed and selected for inclusion in the book. The papers are organized in topical sections on formal approaches in modelling, intelligent information systems, information applications components, cryptography and spectral analysis, computer vision, biocomputing, intelligent vehicular systems, robotic soccer, robotics and control.

Time Series: Theory and Methods May 30 2023 This edition contains a large number

of additions and corrections scattered throughout the text, including the incorporation of a new chapter on state-space models. The companion diskette for the IBM PC has expanded into the software package ITSM: An Interactive Time Series Modelling Package for the PC, which includes a manual and can be ordered from Springer-Verlag.

* We are indebted to many readers who have used the book and programs and made suggestions for improvements. Unfortunately there is not enough space to acknowledge all who have contributed in this way; however, special mention must be made of our prize-winning fault-finders, Sid Resnick and F. Pukelsheim. Special mention should also be made of Anthony Brockwell, whose advice and support on computing matters was invaluable in the preparation of the new diskettes. We have been fortunate to work on the new edition in the excellent environments provided by the University of Melbourne and Colorado State University. We thank Duane Boes particularly for his support and encouragement throughout, and the Australian Research Council and National Science Foundation for their support of research related to the new material. We are also indebted to Springer-Verlag for their constant support and assistance in preparing the second edition. Fort Collins, Colorado P. J. BROCKWELL November, 1990 R. A. DAVIS * /TSM: An Interactive Time Series Modelling Package for the PC by P. J. Brockwell and R. A. Davis. ISBN: 0-387-97482-2; 1991.

The Many Facets of Graph Theory Mar 04 2021

Methods for Constructing Exact Solutions of Partial Differential Equations Mar 16 2022 Differential equations, especially nonlinear, present the most effective way for describing complex physical processes. Methods for constructing exact solutions of differential equations play an important role in applied mathematics and mechanics. This book aims to provide scientists, engineers and students with an easy-to-follow, but comprehensive, description of the methods for constructing exact solutions of differential equations.

Molecular Theory of Solutions Oct 23 2022 This book presents new and updated developments in the molecular theory of mixtures and solutions. It is based on the theory of Kirkwood and Buff which was published more than fifty years ago. This theory has been dormant for almost two decades. It has recently become a very powerful and general tool to analyze, study and understand any type of mixtures from the molecular, or the microscopic point of view. The traditional approach to mixture has been, for many years, based on the study of excess thermodynamic quantities. This provides a kind of global information on the system. The new approach provides information on the local properties of the same system. Thus, the new approach supplements and enriches our information on mixtures and solutions.

Solutions Manual for Circuit Theory with Computer Methods Jun 30 2023

Canonical Duality Theory Dec 13 2021 This book on canonical duality theory provides a comprehensive review of its philosophical origin, physics foundation, and mathematical statements in both finite- and infinite-dimensional spaces. A ground-breaking methodological theory, canonical duality theory can be used for modeling complex systems within a unified framework and for solving a large class of

challenging problems in multidisciplinary fields in engineering, mathematics, and the sciences. This volume places a particular emphasis on canonical duality theory's role in bridging the gap between non-convex analysis/mechanics and global optimization. With 18 total chapters written by experts in their fields, this volume provides a nonconventional theory for unified understanding of the fundamental difficulties in large deformation mechanics, bifurcation/chaos in nonlinear science, and the NP-hard problems in global optimization. Additionally, readers will find a unified methodology and powerful algorithms for solving challenging problems in complex systems with real-world applications in non-convex analysis, non-monotone variational inequalities, integer programming, topology optimization, post-buckling of large deformed structures, etc. Researchers and graduate students will find explanation and potential applications in multidisciplinary fields.

Econometric Theory and Methods Mar 28 2023 *Econometric Theory and Methods* International Edition provides a unified treatment of modern econometric theory and practical econometric methods. The geometrical approach to least squares is emphasized, as is the method of moments, which is used to motivate a wide variety of estimators and tests. Simulation methods, including the bootstrap, are introduced early and used extensively. The book deals with a large number of modern topics. In addition to bootstrap and Monte Carlo tests, these include sandwich covariance matrix estimators, artificial regressions, estimating functions and the generalized method of moments, indirect inference, and kernel estimation. Every chapter incorporates numerous exercises, some theoretical, some empirical, and many involving simulation.

Nonlinear Theory of Pseudodifferential Equations on a Half-line Nov 23 2022 This book is the first attempt to develop systematically a general theory of the initial-boundary value problems for nonlinear evolution equations with pseudodifferential operators K_μ on a half-line or on a segment. We study traditionally important problems, such as local and global existence of solutions and their properties, in particular much attention is drawn to the asymptotic behavior of solutions for large time. Up to now the theory of nonlinear initial-boundary value problems with a general pseudodifferential operator has not been well developed due to its difficulty. There are many open natural questions. Firstly how many boundary data should we pose on the initial-boundary value problems for its correct solvability? As far as we know there are few results in the case of nonlinear nonlocal equations. The methods developed in this book are applicable to a wide class of dispersive and dissipative nonlinear equations, both local and nonlocal. · For the first time the definition of pseudodifferential operator on a half-line and a segment is done · A wide class of nonlinear nonlocal and local equations is considered · Developed theory is general and applicable to different equations · The book is written clearly, many examples are considered · Asymptotic formulas can be used for numerical computations by engineers and physicists · The authors are recognized experts in the nonlinear wave phenomena

Iterative Methods for the Solution of Equations Aug 28 2020 From the Preface (1964):
“This book presents a general theory of iteration algorithms for the numerical solution

of equations and systems of equations. The relationship between the quantity and the quality of information used by an algorithm and the efficiency of the algorithm is investigated. Iteration functions are divided into four classes depending on whether they use new information at one or at several points and whether or not they reuse old information. Known iteration functions are systematized and new classes of computationally effective iteration functions are introduced. Our interest in the efficient use of information is influenced by the widespread use of computing machines ... The mathematical foundations of our subject are treated with rigor, but rigor in itself is not the main object. Some of the material is of wider application ... Most of the material is new and unpublished. Every attempt has been made to keep the subject in proper historical perspective ... "

Bayesian Theory and Methods with Applications Jun 06 2021 Bayesian methods are growing more and more popular, finding new practical applications in the fields of health sciences, engineering, environmental sciences, business and economics and social sciences, among others. This book explores the use of Bayesian analysis in the statistical estimation of the unknown phenomenon of interest. The contents demonstrate that where such methods are applicable, they offer the best possible estimate of the unknown. Beyond presenting Bayesian theory and methods of analysis, the text is illustrated with a variety of applications to real world problems.

Computational Methods in Reactor Shielding Jul 20 2022 Computational Methods in Reactor Shielding deals with the mathematical processes involved in how to effectively control the dangerous effect of nuclear radiation. Reactor shielding is considered an important aspect in the operation of reactor systems to ensure the safety of personnel and others that can be directly or indirectly affected. Composed of seven chapters, the book discusses ionizing radiation and how it aids in the control and containment of radioactive substances that are considered harmful to all living things. The text also outlines the necessary radiation quantities and units that are needed for a systemic control of shielding and presents an examination of the main sources of nuclear radiation. A discussion of the gamma photon cross sections and an introduction to BMIX, a computer program used in illustrating a technique in identifying the gamma ray build-up factor for a reactor shield, are added. The selection also discusses various mathematical representations and areas of shielding theory that are being used in radiation shielding. The book is of great value to those involved in the development and implementation of systems to minimize and control the dangerous and lethal effect of radiation.

Solution Methods for Integral Equations Sep 02 2023

Economic Growth Jan 14 2022 This is a book on deterministic and stochastic Growth Theory and the computational methods needed to produce numerical solutions. Exogenous and endogenous growth models are thoroughly reviewed. Special attention is paid to the use of these models for fiscal and monetary policy analysis. Modern Business Cycle Theory, the New Keynesian Macroeconomics, the class of Dynamic Stochastic General Equilibrium models, can be all considered as special cases of

models of economic growth, and they can be analyzed by the theoretical and numerical procedures provided in the textbook. Analytical discussions are presented in full detail. The book is self contained and it is designed so that the student advances in the theoretical and the computational issues in parallel. EXCEL and Matlab files are provided on an accompanying website to illustrate theoretical results as well as to simulate the effects of economic policy interventions.

Molecular Theory of Solutions Apr 28 2023 This book presents new and updated developments in the molecular theory of mixtures and solutions. It is based on the theory of Kirkwood and Buff which was published more than fifty years ago. This theory has been dormant for almost two decades. It has recently become a very powerful and general tool to analyze, study and understand any type of mixtures from the molecular, or the microscopic point of view. The traditional approach to mixture has been, for many years, based on the study of excess thermodynamic quantities. This provides a kind of global information on the system. The new approach provides information on the local properties of the same system. Thus, the new approach supplements and enriches our information on mixtures and solutions.

Constant-Sign Solutions of Systems of Integral Equations May 06 2021 This monograph provides a complete and self-contained account of the theory, methods, and applications of constant-sign solutions of integral equations. In particular, the focus is on different systems of Volterra and Fredholm equations. The presentation is systematic and the material is broken down into several concise chapters. An introductory chapter covers the basic preliminaries. Throughout the book many examples are included to illustrate the theory. The book contains a wealth of results that are both deep and interesting. This unique book will be welcomed by mathematicians working on integral equations, spectral theory, and on applications of fixed point theory and boundary value problems.

Cybernetics and Automation Control Theory Methods in Intelligent Algorithms Feb 24 2023 This book discusses novel intelligent-system algorithms and methods in cybernetics, presenting new approaches in the field of cybernetics and automation control theory. It constitutes the proceedings of the Cybernetics and Automation Control Theory Methods in Intelligent Algorithms Section of the 8th Computer Science On-line Conference 2019 (CSOC 2019), held on-line in April 2019.

Fractional Programming Sep 29 2020 Mathematical programming has know a spectacular diversification in the last few decades. This process has happened both at the level of mathematical research and at the level of the applications generated by the solution methods that were created. To write a monograph dedicated to a certain domain of mathematical programming is, under such circumstances, especially difficult. In the present monograph we opt for the domain of fractional programming. Interest of this subject was generated by the fact that various optimization problems from engineering and economics consider the minimization of a ratio between physical and/or economical functions, for example cost/time, cost/volume, cost/profit, or other quantities that measure the efficiency of a system. For example, the productivity of

industrial systems, defined as the ratio between the realized services in a system within a given period of time and the utilized resources, is used as one of the best indicators of the quality of their operation. Such problems, where the objective function appears as a ratio of functions, constitute fractional programming problem. Due to its importance in modeling various decision processes in management science, operational research, and economics, and also due to its frequent appearance in other problems that are not necessarily economical, such as information theory, numerical analysis, stochastic programming, decomposition algorithms for large linear systems, etc., the fractional programming method has received particular attention in the last three decades.

Solutions Dec 01 2020

The Theory of Approximate Methods and Their Applications to the Numerical Solution of Singular Integral Equations Jan 31 2021

Antenna Theory Jun 26 2020 The discipline of antenna theory has experienced vast technological changes. In response, Constantine Balanis has updated his classic text, *Antenna Theory*, offering the most recent look at all the necessary topics. New material includes smart antennas and fractal antennas, along with the latest applications in wireless communications. Multimedia material on an accompanying CD presents PowerPoint viewgraphs of lecture notes, interactive review questions, Java animations and applets, and MATLAB features. Like the previous editions, *Antenna Theory, Third Edition* meets the needs of electrical engineering and physics students at the senior undergraduate and beginning graduate levels, and those of practicing engineers as well. It is a benchmark text for mastering the latest theory in the subject, and for better understanding the technological applications. An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department.

Colloid Chemistry, Theoretical and Applied: Theory and methods Dec 25 2022

Approximation Methods for Solutions of Differential and Integral Equations Aug 21 2022 This book is the result of 20 years of investigations carried out by the author and his colleagues in order to bring closer and, to a certain extent, synthesize a number of well-known results, ideas and methods from the theory of function approximation, theory of differential and integral equations and numerical analysis. The book opens with an introduction on the theory of function approximation and is followed by a new approach to the Fredholm integral equations to the second kind. Several chapters are devoted to the construction of new methods for the effective approximation of solutions of several important integral, and ordinary and partial differential equations. In addition, new general results on the theory of linear differential equations with one regular singular point, as well as applications of the various new methods are discussed.

Economic Growth Oct 11 2021 This is a book on deterministic and stochastic Growth Theory and the computational methods needed to produce numerical solutions. Exogenous and endogenous growth models are thoroughly reviewed. Special attention is paid to the use of these models for fiscal and monetary policy analysis. Modern

Business Cycle Theory, the New Keynesian Macroeconomics, the class of Dynamic Stochastic General Equilibrium models, can be all considered as special cases of models of economic growth, and they can be analyzed by the theoretical and numerical procedures provided in the textbook. Analytical discussions are presented in full detail. The book is self contained and it is designed so that the student advances in the theoretical and the computational issues in parallel. EXCEL and Matlab files are provided on an accompanying website (see Preface to the Second Edition) to illustrate theoretical results as well as to simulate the effects of economic policy interventions. The structure of these program files is described in "Numerical exercise"-type of sections, where the output of these programs is also interpreted. The second edition corrects a few typographical errors and improves some notation.

Theory of Elasticity and Thermal Stresses Oct 30 2020 This book contains the elements of the theory and the problems of Elasticity and Thermal Stresses with full solutions. The emphasis is placed on problems and solutions and the book consists of four parts: one part is on The Mathematical Theory of Elasticity, two parts are on Thermal Stresses and one part is on Numerical Methods. The book is addressed to higher level undergraduate students, graduate students and engineers and it is an indispensable companion to all who study any of the books published earlier by the authors. This book links the three previously published books by the authors into one comprehensive entity.

Mathematical Theory of Elasticity of Quasicrystals and Its Applications Jul 08 2021 This inter-disciplinary work covering the continuum mechanics of novel materials, condensed matter physics and partial differential equations discusses the mathematical theory of elasticity of quasicrystals (a new condensed matter) and its applications by setting up new partial differential equations of higher order and their solutions under complicated boundary value and initial value conditions. The new theories developed here dramatically simplify the solving of complicated elasticity equation systems. Large numbers of complicated equations involving elasticity are reduced to a single or a few partial differential equations of higher order. Systematical and direct methods of mathematical physics and complex variable functions are developed to solve the equations under appropriate boundary value and initial value conditions, and many exact analytical solutions are constructed. The dynamic and non-linear analysis of deformation and fracture of quasicrystals in this volume presents an innovative approach. It gives a clear-cut, strict and systematic mathematical overview of the field. Comprehensive and detailed mathematical derivations guide readers through the work. By combining mathematical calculations and experimental data, theoretical analysis and practical applications, and analytical and numerical studies, readers will gain systematic, comprehensive and in-depth knowledge on continuum mechanics, condensed matter physics and applied mathematics.

Iterative Solution of Large Linear Systems Aug 09 2021 This self-contained treatment offers a systematic development of the theory of iterative methods. Its focal point resides in an analysis of the convergence properties of the successive

overrelaxation (SOR) method, as applied to a linear system with a consistently ordered matrix. The text explores the convergence properties of the SOR method and related techniques in terms of the spectral radii of the associated matrices as well as in terms of certain matrix norms. Contents include a review of matrix theory and general properties of iterative methods; SOR method and stationary modified SOR method for consistently ordered matrices; nonstationary methods; generalizations of SOR theory and variants of method; second-degree methods, alternating direction-implicit methods, and a comparison of methods. 1971 edition.

Problems & Solutions in Group Theory for Physicists May 18 2022 This book is aimed at graduate students and young researchers in physics who are studying group theory and its application to physics. It contains a short explanation of the fundamental knowledge and method, and the fundamental exercises for the method, as well as some important conclusions in group theory. This book is also suitable for some graduate students in theoretical chemistry.

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