



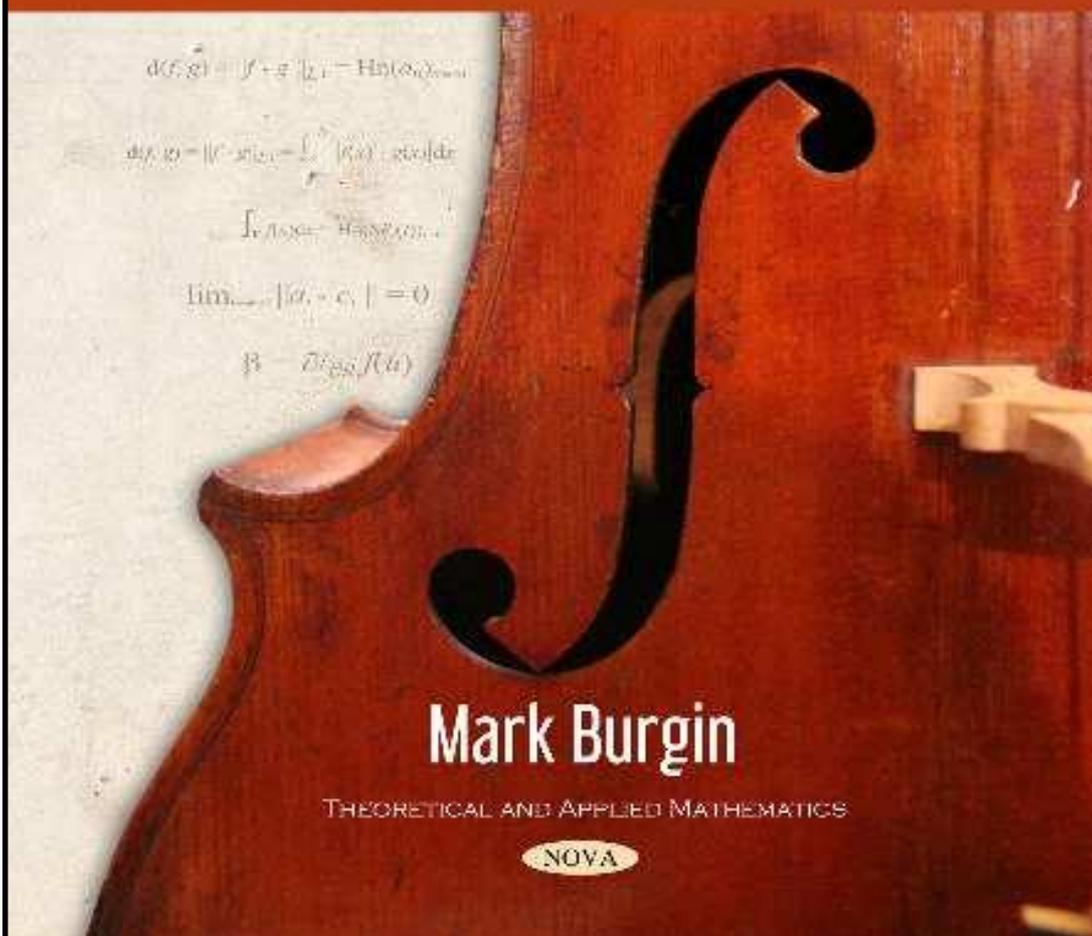
Gazelle Academic

Mathematics

New Titles - November 2017

Functional Algebra and Hypercalculus in Infinite Dimensions

Hyperintegrals, Hyperfunctionals and Hyperderivatives



Stochastic
Dynamics

God & the
Mathematics of
Infinity

Chaotic Systems

Functional
Algebra &
Hypercalculus in
Infinite Dimensions

Interval Analysis

Principal Component
Analysis

Linear Regression

Nonlinearity

Condition
Monitoring &
Dynamic Control
Systems

Complex Systems

Stochastic
Programming

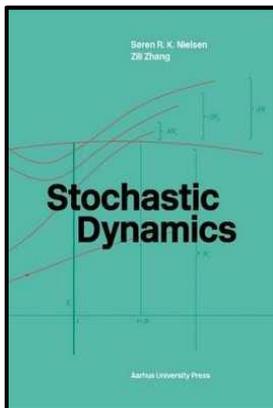
Finite Fields

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Aarhus University Press



Stochastic Dynamics

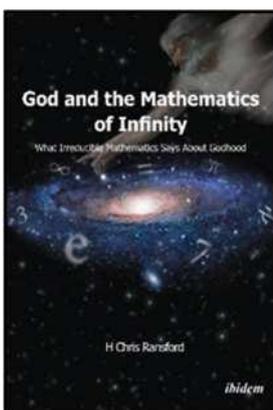
Zili Zhang, Søren Nielsen

Buildings, bridges and tunnels are continuously exposed to forces of nature such as wind, waves, earthquakes and even traffic. Because these forces are hard to predict and model, it is also hard to predict how these structures respond.

Stochastic Dynamics introduces a way of modeling forces and responses using stochastic systems, providing a method of statistical analysis where precise predictions are impossible. Including topics such as stochastic processes, stochastic vibration theory of linear structures, reliability theory of dynamic structures and Monte Carlo techniques, this book explains stochastic structural dynamics and how to apply it to modern structures.

PB 9788771842326 £19.95 June 2017 Aarhus University Press 220 pages

Ibidem Press



God & the Mathematics of Infinity

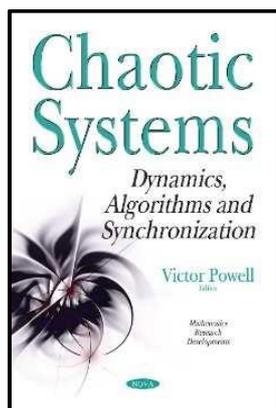
What Irreducible Mathematics Says About Godhood

H. Chris Ransford

Drawing on incontrovertible results from the science and mathematics of Infinity, H. Chris Ransford analyzes the traditional concept of Godhood and reaches astonishing conclusions. He addresses humankind's abiding core debate on the meaning of spirituality and God. Using mathematics to explore key questions within this debate, the author is led to counter-intuitive conclusions, including some that had long baffled humanity: For instance, why does evil exist if there is a God?

The book fastidiously does not take sides nor proffers opinions, it only follows allowable mathematics wherever it leads. By doing so, it makes a major contribution to an understanding of the nature of reality.

PB 9783838210193 £13.00 March 2017 Ibidem Press 152 pages

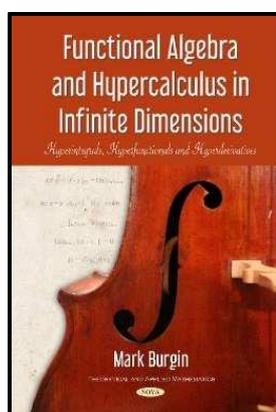


**Chaotic Systems
Dynamics, Algorithms & Synchronization**

Edited by Victor Powell

This book provides new research on the dynamics, algorithms and synchronization of chaotic systems. Chapter One introduces some nonlinear techniques for the synchronization of a class of chaotic oscillator under the framework of observer design from control theory. Chapter Two discusses in detail the application of a novel multi-domain spectral collocation approach for finding solutions of ordinary differential equations that exhibit general chaotic behaviour. Chapter Three designs an adaptive state feedback controller guaranteeing the asymptotic stability followed by the synchronization of the nonlinear discrete-time error of two identical hyper chaotic systems.

PB 9781536110654 £78.50 May 2017 Nova Science Publishers 107 pages



**Functional Algebra & Hypercalculus in Infinite Dimensions
Hyperintegrals, Hyperfunctionals & Hyperderivatives**

Mark Burgin

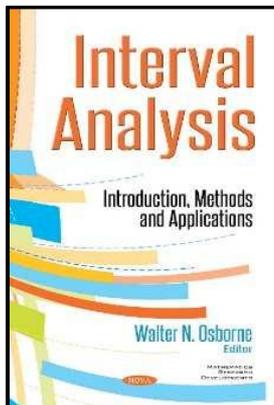
The theory of hypernumbers and extrafunctions is further development in distribution theory inspired by contemporary physics and influenced by problems in mathematical physics. It makes more functions differentiable and provides new kinds of derivatives and hyperderivatives aimed at solving more differential and operator equations than ever before possible.

In the book, extrafunctions are extended to hyperfunctionals and hyperoperators in infinite-dimensional vector spaces. Due to its development, many problems in contemporary physics, as well as in modern linear and nonlinear analysis have an infinite-dimensional nature, and the infinite-dimensional theory of extrafunctions, hyperfunctionals and hyperoperators provides new tools for solving many of these problems.

The book describes new mathematical structures such as hyperderivatives and hyperintegrals of real and complex functions, hyperprobability and hyperexpectation of random processes and some others, essentially increasing power of functional analysis and probability applications. It presents the key parts of calculus – number systems, function spaces, the differential calculus and the integral calculus – in the setting of hypernumbers, extrafunctions, hyperfunctionals and hyperoperators in finite-dimensional and infinite-dimensional vector spaces. In addition, functional algebra, which employs algebraic operations with extrafunctions, hyperfunctionals and hyperoperators is developed. New relations between hyperdifferentiation and continuity of functions and operators are explicated. As differentiation and integration are special cases of hyperdifferentiation and hyperintegration, respectively, hypercalculus includes calculus as its part or subtheory.

It is possible to use this book for enhancing traditional courses of calculus for undergraduates, as well as for teaching separate courses for graduate and undergraduate students at colleges and universities. To achieve these goals, exposition in the book goes from simple topics to more and more advanced topics, while proof of some statements are left as exercises for the students.

HB 9781536124415 £219.50 September 2017 Nova Science Publishers 381 pages

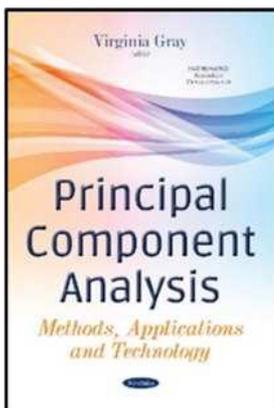


Interval Analysis **Introduction, Methods & Applications**

Walter N. Osborne

This book begins by presenting a method for Interval Analysis based on simple statistical tools applied on a space of Gaussian variables in Chapter One. Chapter Two describes how using interval analysis the main part of optimization techniques will allow to partially solve global optimization problems. Chapter Three covers the applications of interval computations in computer graphics. The final chapter addresses the synthesis of Cable-Driven Parallel Manipulators (CDPMs) using interval analysis.

HB 9781536120288 £90.50 July 2017 Nova Science Publishers 70 pages

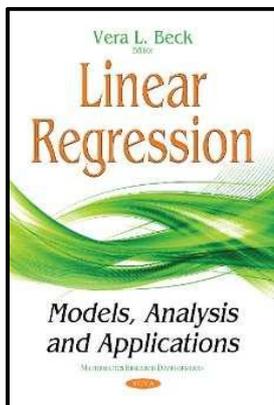


Principal Component Analysis **Methods, Applications & Technology**

Edited by Virginia Gray

This book provides new research on principal component analysis (PCA). Chapter One introduces typical PCA applications of transcriptomic, proteomic and metabolomic data. Chapter Two studies the factor analysis of an outcome measurement survey for science, technology and society. Chapter Three examines the application of PCA to performance enhancement of hyperspectral radiative transfer computations.

PB 9781536108897 £78.50 May 2017 Nova Science Publishers 130 pages

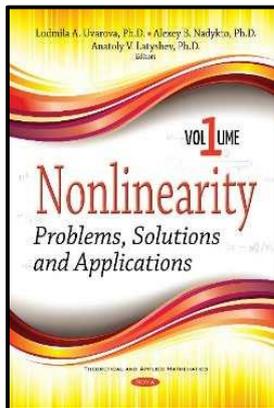


Linear Regression **Models, Analysis & Applications**

Edited by Vera L. Beck

Chapter One addresses the importance of weighted linear regression in fitting straight lines. In Chapter Two, the authors cover the homocedastic condition, i.e. variance of y 's independent of x , errors of y 's accumulative, the heterocedastic case, i.e. variance or standard deviation proportional to x values, respectively, and orthogonal regression (error in both axes). The chapter also covers topics such as prediction (using the regression line in reverse), leverage, goodness of fit, comparison between models with and without intercept, uncertainty, polynomial regression models without intercept, and an overview of robust regression through the origin. Chapter Three focuses on linear regression for interval-valued data within the framework of random sets, and proposes a new model that generalizes a series of existing ones. Chapter Four provides an investigation on modeling of adsorption of heavy metal ions onto surface-functionalized polymer beads. Linear and non-linear regressions were employed for each of the isotherm models considered to describe the equilibrium data. To reliably assess model validity, various error functions (whose mathematical expressions contain the number of experimental measurements, the numbers of independent variables and parameters in the regression equation as well as the measured and predicted equilibrium adsorption capacities) were used.

HB 9781536119923 £90.50 July 2017 Nova Science Publishers 75 pages



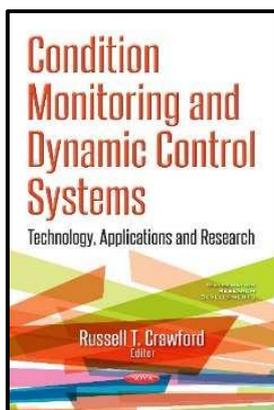
Nonlinearity Problems, Solutions and Applications

Edited by Ludmila A. Uvarova, Alexey B. Nadykto, Anatoly V. Latyshev

The book has two volumes and consists of forty-four chapters, which are divided into five sections: (i) Mathematical treatment of non-linear problems, including the differential equations, numerical methods, algorithms and solutions; (ii) theoretical and computational studies dedicated to the physics and chemistry of advanced materials, nanostructured systems and fractal systems; (iii) articles dedicated to non-linear processes in complex biological processes, systems and objects; (iv) theoretical and modeling studies of kinetics, dynamics and thermochemistry of micro-, meso- and macro-scale systems; and (v) multidisciplinary research focused on forecasting, control and management problems.

Volume 1 HB 9781536120325 £295.50 September 2017 Nova Science Publishers 320 pages

Volume 2 HB 9781536121636 £219.50 August 2017 Nova Science Publishers 275 pages

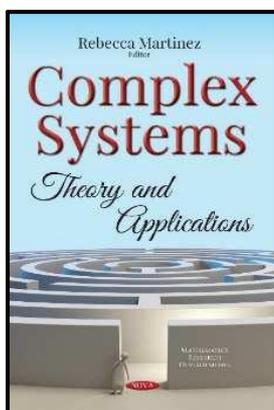


Condition Monitoring & Dynamic Control Systems Technology, Applications & Research

Edited by Russell T. Crawford

In Chapter One, the implementation of an advanced control strategy based on Model Predictive Control (MPC) is proposed. In Chapter Two, an uncertainty observer based controller in order to regulate a class of highly nonlinear system is considered. Chapter Three presents the development of an integrated monitoring system for the continuous evaluation of the condition of critical rotating and structural components in tidal turbines. The system can be used to provide information regarding the presence of faults as well as advanced warning of impending failures. Chapter Four presents a multi-functional oil condition sensor for detecting wear debris and measuring lubricant properties. To conclude, Chapter Five analyzes current issues and development directions of next generation manufacturing systems, with particular emphasis on digital manufacturing proposed as part of the Industry 4.0 revolution.

PB 9781536119947 £90.50 August 2017 Nova Science Publishers 150 pages

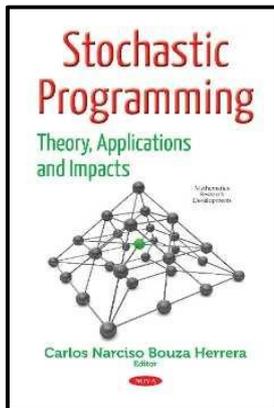


Complex Systems Theory & Applications

Edited by Rebecca Martinez

This book provides new research on the theories and applications of complex systems. Chapter One reviews the process algebra approach to quantum electrodynamics. Chapter Two describes a specific aspect of complex systems and the fact that they may consist of established subsystems or components that originate from converging industries. Chapter Three examines the development of the generalized nonlinear Schrödinger equation of rotating cosmogonical body formation. Chapter Four analyzes the application of neural network modeling in organizing a hierarchical teaching system based on mentorship. The final chapter presents two methods to evaluate the collaborative potential of a network of 16 organizations and identifies measures to promote their coordination.

PB 9781536108606 £90.50 April 2017 Nova Science Publishers 100 pages



Stochastic Programming Theory, Applications & Impacts

Edited by Carlos Narciso Bouza Herrera

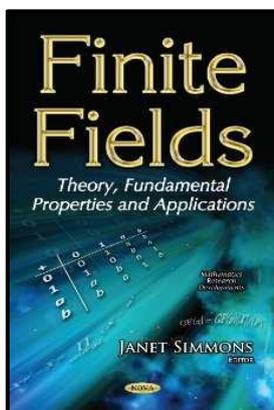
This book is concerned with fostering theoretical issues on stochastic programming and discussing how it can solve real life problems.

The book presents applications which solve the optimization of concrete problems in electricity markets, market equilibria, resource markets and environments. Each chapter presents a survey on the main results concerned with its contents, and discusses their impact by illustrating how they are applicable in real life. The authors use concrete, real life problems and simulation-motivated experiments for illustrating the behavior of the stochastic models discussed.

The target audience for this title is graduate students or researchers in optimization, approximation, statistics, operations research and computing, as well as professionals dealing with applications where uncertainty may be modeled by using stochastic optimization and academics.

The contributors are well-known specialists in stochastic programming.

PB 9781536109405 £78.50 May 2017 Nova Science Publishers 153 pages

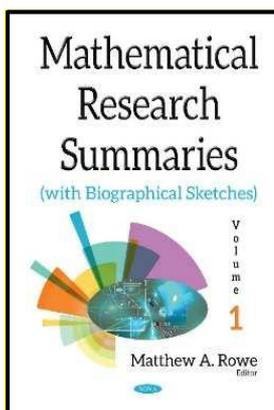


Finite Fields Theory, Fundamental Properties & Applications

Edited by Janet Simmons

This book provides new research in finite fields. Chapter One presents some techniques that rely on a combination of results from graph theory, finite fields, matrix theory, and finite geometry to researchers working in the area of preserver problems. It also gives a brief presentation of this research field to other mathematicians. Chapter Two contains a basic and self-contained introduction to classical coherent state transforms, namely classical wavelet and classical wavepacket transforms, on finite fields. Chapter Three proposes an intrinsic representation of finite $m\Theta$ extension as this is a tradition for finite extension fields. Chapter Four reviews $m\Theta$ cyclic codes on a $m\Theta$ field. Chapter Five discusses recent results concerning the number of solutions to certain equations in several variables over finite fields.

PB 9781536103854 £90.50 April 2017 Nova Science Publishers 125 pages



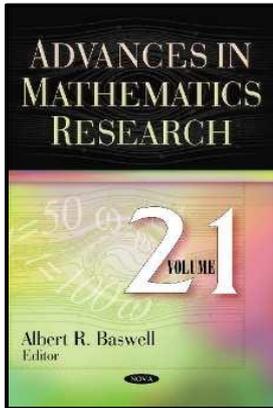
Mathematical Research Summaries (with Biographical Sketches)

Matthew A. Rowe

This book provides research summaries from a number of different focuses in Mathematics, and compiles biographical sketches of top professionals in this important field.

Volume 1 HB 9781536120219 £219.50 July 2017 Nova Science Publishers 328 pages

Volume 2 HB 9781536120226 £219.50 July 2017 Nova Science Publishers 350 pages



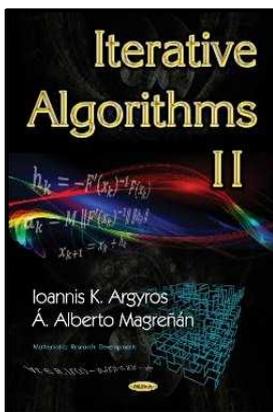
Advances in Mathematics Research

Edited by Albert R. Baswell

"Advances in Mathematics Research" presents original studies on the leading edge of mathematics. Each article has been carefully selected in an attempt to present substantial research results across a broad spectrum. Topics discussed include modern works in the field of mathematical modeling of intracellular processes; the improvement of Bezier basis function efficiency in object surface modeling; performance evaluation of simultaneous coding of scatter matrices in Two-Dimensional Linear Discriminant Analysis; the differential inequalities that make it possible to build a global theory of pseudoholomorphic functions in the case of one or several complex variables; recent advances on short interest rate models which can be formulated in terms of a stochastic differential equation for the instantaneous interest rate (also called short rate) or a system of such equations in case the short rate is assumed to depend on other stochastic factors; and structural transformations in the relationships between mathematics and music up to the Renaissance and the emergence of the idea of number as a continuous quantity.

Volume 21 HB 9781536104707 £238.50 April 2017 Nova Science Publishers 122 pages

Volume 22 HB 9781536123715 £238.50 September 2017 Nova Science Publishers 221 pages



Iterative Algorithms II

Ioannis K. Argyros, Alberto Magreñán

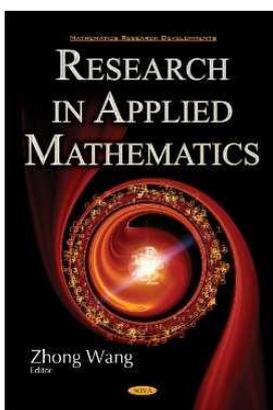
The study of iterative methods began several years ago in order to find the solutions of problems where mathematicians cannot find a solution in closed form. In this way, different studies related to different methods with different behaviors have been presented over the last decades.

Convergence conditions have become one of the most studied topics in recent mathematical research. One of the most well-known conditions are the Kantorovich conditions, which has allowed many researchers to experiment with all kinds of conditions. In recent years, several authors have studied different modifications of the mentioned conditions considering inter alia, Hölder conditions, alpha-conditions or even convergence in other spaces.

In this monograph, the authors present the complete work within the past decade on convergence and dynamics of iterative methods. It acts as an extension of their related publications in these areas. The chapters are self-contained and can be read independently. Moreover, an extensive list of references is given in each chapter, in order to allow the reader to refer to previous ideas. For these reasons, several advanced courses can be taught using this book.

This book intends to find applications in many areas of applied mathematics, engineering, computer science and real problems. As such, this monograph is suitable for researchers, graduate students and seminars in the above subjects, and it would be an excellent addition to all science and engineering libraries.

HB 9781634858793 £219.50 May 2017 Nova Science Publishers 360 pages

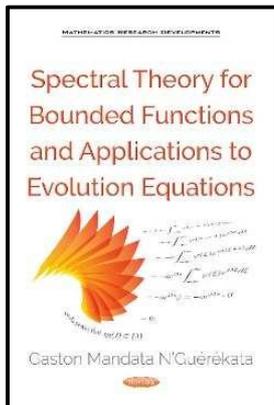


Research in Applied Mathematics

Edited by Zhong Wang

This book presents current research in the field of applied mathematics. Topics discussed include, Linear Systems, the Discrete Davey-Stewart System, Kukles Systems, nonlinear equations, differential equations, and many other advanced and relevant topics in mathematics.

HB 9781634856980 £199.99 May 2017 Nova Science Publishers 275 pages



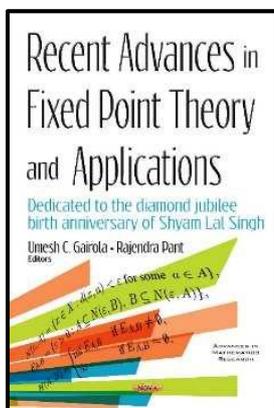
Spectral Theory for Bounded Functions & Applications to Evolution Equations

Gaston Mandata N'Guérékata

One of the central questions in the qualitative theory of difference and differential equations is to find the conditions of existence and asymptotic behavior of bounded solutions. For equations with almost periodic coefficients, the problem goes back to Favard and Perron. A remarkable theory has been developed in harmonic analysis with outstanding contributions by Loomis, Arendt, Batty, Lyubic, Phong, Naito, Minh and many others, when the Carleman spectrum of the functions is countable. Uniform continuity in this case plays a key role. In the absence of this condition, the theory does not apply. This led to the introduction over the last decade of new types of spectrum of functions which helped solve the problem, especially in the case of almost automorphic functions, using the theory of commuting operators.

This monograph presents in a unique and unified manner recent developments in the theory of spectra of bounded continuous functions including the space of (Bohr) almost periodic functions and some of their generalizations, and the spaces of (Bochner) almost automorphic functions and almost automorphic sequences. Classical concepts from harmonic analysis such as the Bohr spectrum, Beurling spectrum and Carleman spectrum are also presented with some examples. A special attention is devoted to the recently introduced concepts of uniform spectrum and circular spectrum of bounded functions derived from the study of the existence of solutions of linear differential equations whose forcing terms are not necessarily uniformly continuous. Connections between these various types of spectrum are also investigated. As applications the book provides a semigroup-free study of the existence and asymptotic behavior of mild solutions of evolution equations of the first and second order, and difference equations. Bibliographical and historical notes complete the major chapters. An appendix on basic results on the theory of commuting operators is given. The content is presented in a way that is easily accessible to readers who are working in differential equations but are not familiar with harmonic analysis and advanced functional analysis. It's our hope that this first monograph ever on this topic will attract more researchers.

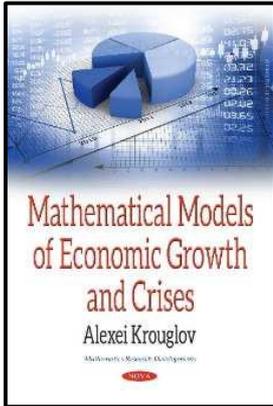
PB 9781536121124 £78.50 July 2017 Nova Science Publishers 110 pages



Recent Advances in Fixed Point Theory & Applications

Fixed point theory is a growing and exciting branch of mathematics with a variety of wide applications in biological and mathematical sciences, proposing newer applications in discrete dynamics and super fractals. The present endeavor is to report the latest trend in metric fixed point theory, emphasizing newer applications in numerical analysis, discrete dynamics and fractal graphics, besides traditional applications. The book is useful to a large class of readers interested in analysis, applicable mathematics and fractal graphics. The articles have been selected carefully so that the book is useful for sophomores up to senior researchers looking for new material and new ideas in the existence of fixed points, new applications and survey articles. A few chapters included herein are formal in nature and suggest new directions of research in this area, which are especially useful to beginners in the field.

HB 9781536120851 £219.50 September 2017 Nova Science Publishers 315 pages



Mathematical Models of Economic Growth & Crises

Alexei Krouglov

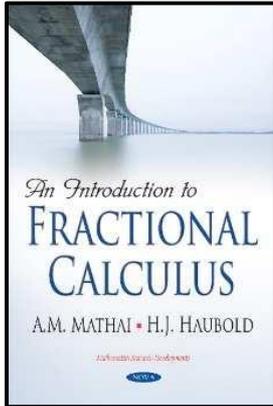
The main goal of this book is to present coherent mathematical models to describe an economic growth and related economic issues. The book is a continuation of the author's previous book *Mathematical Dynamics of Economic Markets*, which presented mathematical models of economic forces acting on the markets. In his previous book, the author described a system of ordinary differential equations, which connected together economic forces behind the product's demand, supply and prices on the market.

The author focuses on a specific aspect of how to modify the said system of ordinary differential equations, in order to describe the phenomenon of economic growth. In order to achieve clarity, the author restricted himself to economic processes arising on the markets of a single-product economy. Economic growth is presented as a result of savings and investment occurring on the markets. The market's participants withdraw part of the product from markets in the form of savings and use the withdrawn product in production in the form of an investment. The withdrawal drives the product's supply on the market down while at the same time driving the product's price up, which in turn drives the product's demand down. When an impact of the product's price increase exceeds an impact of the product's demand decrease, economic growth occurs. Contrarily, one observes an economic decline in the opposite situation.

The author looks into various aspects that savings and investment exert on the market. He in particular discusses the models that examine an economic growth in situations when savings and investment were done in the form of a one-time withdrawal of the product, constant-rate withdrawal of product, constant-accelerated withdrawal of product, and exponential withdrawal of product from the market.

The author further examines an impact of four economic concepts on economic growth – demand, supply, investment, and debt. He presents mathematical models exploring interconnections among these concepts and studies their mutual impacts on both economic growth and decline. He builds a mathematical model in order to verify a hypothesis that weak recovery after the financial crisis could be attributed to the decline of investments that were not compensated by the decrease of an interest rate.

HB 9781536120448 £152.50 July 2017 Nova Science Publishers 90 pages

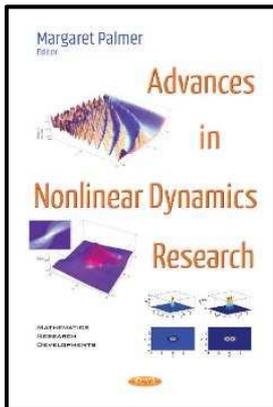


An Introduction to Fractional Calculus

A. M. Mathai, H. J. Haubold

This is a modified version of Module 10 of the Centre for Mathematical and Statistical Sciences (CMSS). CMSS modules are notes prepared on various topics with many examples from real-life situations and exercises so that the subject matter becomes interesting to students. These modules are used for undergraduate level courses and graduate level training in various topics at CMSS. Aside from Module 8, these modules were developed by Dr. A. M. Mathai, Director of CMSS and Emeritus Professor of Mathematics and Statistics, McGill University, Canada. Module 8 is based on the lecture notes of Professor W. J. Anderson of McGill University, developed for his undergraduate course (Mathematics 447). Professor Dr. Hans J. Haubold has been a research collaborator of Dr. A.M. Mathai's since 1984, mainly in the areas of astrophysics, special functions and statistical distribution theory. He is also a lifetime member of CMSS and a Professor at CMSS. A large number of papers have been published jointly in these areas since 1984. The following monographs and books have been brought out in conjunction with this joint research: Modern Problems in Nuclear and Neutrino Astrophysics (A.M. Mathai and H.J. Haubold, 1988, Akademie-Verlag, Berlin); Special Functions for Applied Scientists (A.M.Mathai and H.J. Haubold, 2008, Springer, New York); and The H-Function: Theory and Applications (A.M.Mathai, R.K. Saxena and H.J. Haubold, 2010, Springer, New York). These CMSS modules are printed at CMSS Press and published by CMSS. Copies are made available to students free of charge, and to researchers and others at production cost. For the preparation of the initial drafts of all these modules, financial assistance was made available from the Department of Science and Technology, the Government of India (DST), New Delhi under project number SR/S4/MS:287/05. Hence, the authors would like to express their thanks and gratitude to DST, the Government of India, for its financial assistance.

HB 9781536120424 £152.50 September 2017 Nova Science Publishers 240 pages

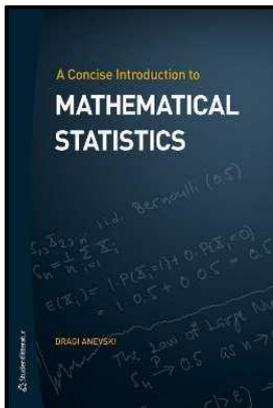


Advances in Nonlinear Dynamics Research

Edited by Margaret Palmer

This book provides new research on the advances in nonlinear dynamics. Chapter One studies compactons in carbon nanotube arrays. Chapter Two reviews the elastic and plastic type behaviors in the Fractal Theory of Motion at nanoscale. Chapter Three analyzes a particular model of tumor progression, assuming that the invasive cells, the connective tissue and the proteases are moving through a non-differential medium governed by the Non-Standard Scale Relativity Theory (NSRT) (Scale Relativity Theory with arbitrary constant fractal dimension). Chapter Four studies the process of drug release from a polymer matrix. Chapter Five examines the implications of drug release from a polymeric matrix process. Chapter Six reviews behaviors of traveling waves and Shapiro step types in a tumor-growth model. Chapter Seven discusses the astonishing evolutionary dynamics of a class of nonlinear discrete 2D pattern formations and growth models.

HB 9781536107401 £185.99 April 2017 Nova Science Publishers 266 pages



A Concise Introduction to Mathematical Statistics

Dragi Anevski

This book gives a thorough introduction to mathematical statistics. The text is unique as an introductory text, mainly by the use of the Riemann-Stieltjes integral. This enables a unified treatment of basic concepts in probability and inference theory, in a mathematically rigorous manner, without the use of measure theory. The approach differentiates this book from other introductory texts, where one does not give a unified approach to basic concepts, as well as from advanced texts, where one does give a unified approach relying on advanced mathematics.

The treatment of probability theory differs from comparable books in that one discusses basic concepts rigorously but without the use of Lebesgue integration. Thereby it allows one to concentrate on the basic concepts of mathematical statistics, without sacrifice of mathematical stringency.

The approach also enables a concise definition of the plug-in estimator in inference theory. Arguably, the plug-in estimator is the most natural and intuitive estimator possible. The introduction of it is however mathematically advanced, and typically covered in PhD level texts. Using the Riemann-Stieltjes integral the introduction of it becomes elementary.

The book is intended for students at the Faculty of Science and Faculty of Engineering that have taken a full year of basic mathematics courses, including real analysis and linear algebra.

PB 9789144115757 £65.00 August 2017 Studentlitteratur AB 420 pages



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Mathematics

New Titles - November 2017

A Concise Introduction to

MATHEMATICAL STATISTICS

DRAGI ANEVSKI

Studentlitteratur

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Research

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Algorithms II

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Spectral Theory for
Bounded Functions &
Applications to
Evolution Equations

Recent Advances in
Fixed Point Theory &
Applications

Mathematical
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