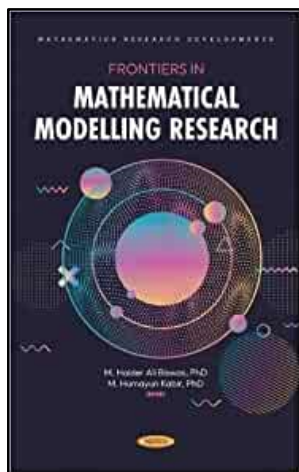


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Frontiers in Mathematical Modelling Research

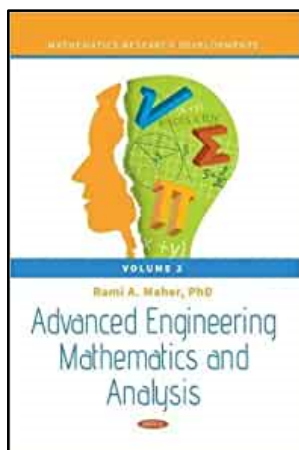
Edited by M Haider Ali Biswas

Mathematical modelling is the process of trying to precisely define a nonmathematical situation, real-life phenomena of changing world and the relationships between the situations in the language of mathematics, and finding out mathematical formulations or patterns within these situations and phenomena. Mathematical modelling in terms of nonlinear dynamic equations is described as a conversion activity of real problems in a mathematical form. The interactions between the mathematical and biological sciences have been increasing rapidly in recent years.

Both traditional topics, such as population and disease modelling, and new ones, such as those in genomics arising from the accumulation of DNA sequence data, have made mathematical modelling in biomathematics an exciting field. The best predictions of numerous individuals and scientific communities have suggested that this growing area will continue to be one of the most dominating and fascinating driving factors to capture the global change phenomena and design a sustainable management for a better world. Frontiers in Mathematical Modelling Research provides the most recent and up-to-date developments in the mathematical analysis of real world problems arising in engineering, biology, economics, geography, planning, sociology, psychology, medicine and epidemiology of infectious diseases.

Mathematical modelling and analysis are important, not only to understand disease progression, but also to provide predictions about the evolution of the disease and insights about the dynamics of the transmission rate and the effectiveness of control measures. One of the main focuses of the book is the transmission dynamics of emerging and re-emerging infectious diseases and the implementation of intervention strategies. This book also covers a wide variety of topics like dynamic models in robotics, chemical process, biodynamic hypothesis and its application for the mathematical modelling of biological growth and the analysis of diagnosis rate effects and prediction of zoonotic viruses, data-driven dynamic simulation and scenario analysis of the spread of diseases.

HB 9781685074302 £203.99 May 2022 Nova Science Publishers, Inc 379 pages



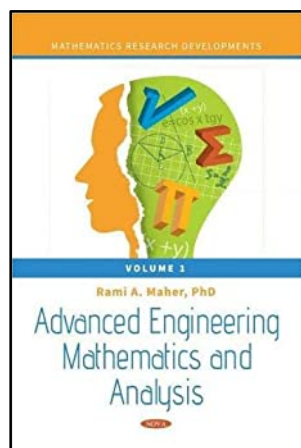
Advanced Engineering Mathematics and Analysis - Volume 2

Rami A Maher

Volume 2 offers a straightforward approach to understanding the theory of several engineering tools used to compute, evaluate, and analyse practical problems. It is a mathematic textbook that can be used by students, instructors, and technical carriers; partially, the book also covers signal processing in the related course syllabus. Throughout the four chapters of the book, besides the pure mathematical examples, several practical issues from different fields are modelled and solved to illustrate the relation between the theory and its applications. The book elucidates the subjects in a self-contained style. The reader can select what he wants to read without following a particular sequence of reading.

Volume 2 contains four chapters that consist of two units. The first two chapters deal with the continuous and discrete function (signal) analysis that is based on Fourier's series and transforms, and on the z-transform for the discrete functions. The considered functions are periodic as well as aperiodic. The second unit consists of special multivariable functions, specifically, the space vector and the complex functions. Each chapter is ended with exercises that are arranged according to the chapter sections. The readers will find the answers at the end of the book.

HB 9781685076054 £203.99 February 2022 Nova Science Publishers, Inc 342 pages



Advanced Engineering Mathematics and Analysis - Volume 1

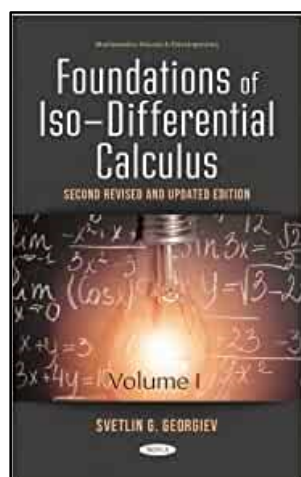
Rami A. Maher

Advanced Engineering Mathematics and Analysis: Volume 1 offers a straightforward approach to understanding the theory of several engineering tools that are used to compute, evaluate, and analyse practical problems. It is a mathematics textbook that can be used by students, instructors, and technical carriers. Throughout the five chapters of the book, besides the pure mathematical examples, several practical issues from different fields are modelled and solved to illustrate the relation between the theory and its applications.

The book elucidates the subjects in a self-contained style. This volume contains the basics and advanced topics of linear algebra and matrix theory, two-chapter ordinary differential equations to elaborate many classes, Laplace transforms with fundamental applications, and a complete engineering course of numerical methods. Each chapter ends with exercises that are arranged according to the chapter sections. The readers will find the answers at the end of the book.

HB 9781536198690 £203.99 December 2021 Nova Science Publishers, Inc 378 pages

Calculus



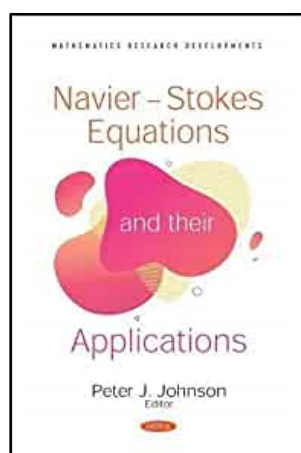
Foundations of Iso-Differential Calculus - Volume I

Svetlin G. Georgiev

This is the second edition of Foundations of Iso-Differential Calculus, Volume 1, which gives an overview of the development of iso-differential calculus. The second edition introduces a new class of iso-functions, named iso-functions of the fifth kind. Also, further examples, exercises and problems have been added. Chapter 1 reviews Ruggero Maria Santilli's scientific journey, identifying its most important references. Chapter 2 introduces iso-real numbers, some basic functions and their properties.

Chapter 3 defines sequences of iso-real numbers and deduces their properties. Chapter 4 gives definitions for five kinds of iso-functions and outlines their properties. Chapter 5 introduces the limits of iso-functions and continuous iso-functions. Chapter 6 presents the first comprehensive study of iso-differential calculus for the specific intent of showing its non-triviality. Chapter 7 reflects integral calculus in the language of iso-mathematics. Lastly, Chapter 8 outlines the isodual iso-mathematics and presents the first comprehensive study of isodual iso-differential calculus.

HB 9781685074777 £203.99 February 2022 Nova Science Publishers, Inc 361 pages



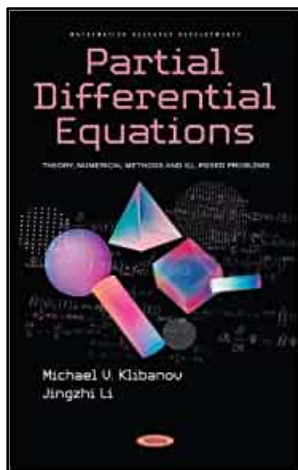
Navier-Stokes Equations and their Applications

Edited by Peter J. Johnson

In physics, Navier-Stokes equations are the partial differential equations that describe the motion of viscous fluid substances. In this book, these equations and their applications are described in detail. Chapter One analyses the differences between kinetic monism and all-unity in Russian cosmism and Newtonian dualism of separated energies. Chapter Two presents a model for the numerical study of unsteady gas dynamic effects accompanying local heat release in the subsonic part of a nozzle for a given distribution of power of energy. Chapter Three describes a study of relationships between integrals and areas of their applicability. Lastly, Chapter Four defines the exact solutions of the Navier-Stokes equations characterizing movement in deep water and near the surface.

PB 9781536199673 £72.99 October 2021 Nova Science Publishers, Inc 98 pages

Differential Calculus & Equations



Partial Differential Equations - Theory, Numerical Methods and Ill-Posed Problems

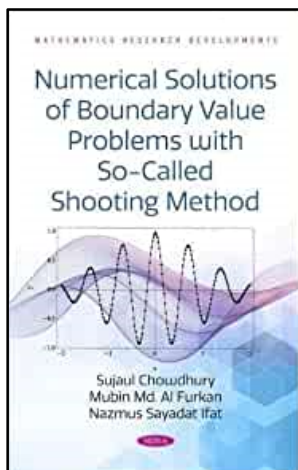
Michael V. Klibanov

The laws of nature are written in the language of partial differential equations. Therefore, these equations arise as models in virtually all branches of science and technology. Our goal in this book is to help you to understand what this vast subject is about. The book is an introduction to the field suitable for senior undergraduate and junior graduate students. Introductory courses in partial differential equations (PDEs) are given all over the world in various forms. The traditional approach to the subject is to introduce a number of analytical techniques, enabling the student to derive exact solutions of some simplified problems.

Students who learn about computational techniques in other courses subsequently realize the scope of partial differential equations beyond paper and pencil. Our book is significantly different from the existing ones. We introduce both analytical theory, including the theory of classical solutions and that of weak solutions, and introductory techniques of ill-posed problems with reference to weak solutions. Besides, since computational techniques are commonly available and are currently used in all practical applications of partial differential equations, we incorporate classical finite difference methods and finite element methods in our book.

HB 9781685075927 £203.99 February 2022 Nova Science Publishers, Inc 347 pages

Numerical Analysis

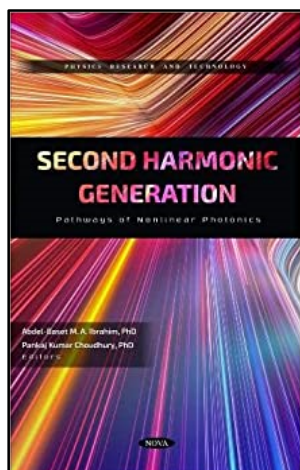


Numerical Solutions of Boundary Value Problems with So-Called Shooting Method

Sujaul Chowdhury

This book presents in comprehensive detail numerical solutions to boundary value problems of a number of differential equations using the so-called Shooting Method. 4th order Runge-Kutta method, Newton's forward difference interpolation method and bisection method for root finding have been employed in this regard. Programs in Mathematica 6.0 were written to obtain the numerical solutions. This monograph on Shooting Method is the only available detailed resource of the topic.

HB 9781685070397 £172.99 October 2021 Nova Science Publishers, Inc 261 pages



Second Harmonic Generation: Pathways of Nonlinear Photonics

Edited by Abdel-Baset M. A. Ibrahim

Second harmonic generation (SHG) has a wide range of applications in today's technological era, including nonlinear optics, quantum optics, lasers, material science, medical science, biological imaging, and high-resolution optical microscopy. In the laser industry, for example, SHG is prudent to create wavelength-specific high-energy lasers. It is also used to measure ultra-short pulse width with autocorrelators. SHG is now indispensable as a spectroscopic imaging tool in applications, such as biophysical characterization of the plasma membrane, biological sensing, disease diagnostics, and investigations of biomolecular interactions at interfaces.

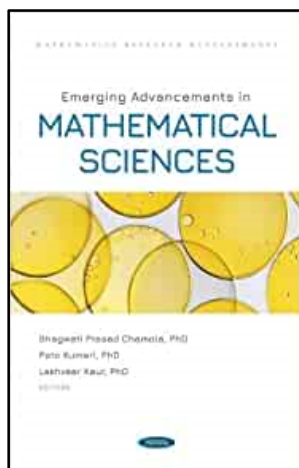
Because of its non-destructive detection, ultrafast response, and polarization sensitivity, SHG is exploited to describe crystal structures and materials. The use of SHG to characterize two-dimensional (2D) material structures gives crucial insights into their physical properties, thereby promoting the development of the relevant basic research, leading to the investigation of the potential applications of those materials. Developments in SHG research hold promising potentials of a large class of materials, such as magnetic- and nonmagnetic layered materials, perovskites, antiferromagnetic oxides, II-VI and III-V semiconductors, and nanotubes, for a variety of technological applications.

This book focuses on the process of modelling and simulations of the SHG phenomenon in the area of nonlinear and quantum optics. The first chapter provides a visualization of the scientific landscape of research in SHG using scientometric analysis from 1962 to 2020 based on Scopus database. This chapter gives new postgraduate students in the subject useful information on hot themes in SHG research and how they are related to one another. There is also a brief mention of multinational collaborative networks.

The following four research chapters look at the SHG from a classical standpoint, using Maxwell's equations to describe the nonlinear optical interaction between the electromagnetic wave and the medium. Such interaction is treated quantum mechanically in the second section of the book, with the SHG process described using a propagating Hamiltonian. As such, the volume adequately describes the SHG from both the classical and quantum mechanical standpoints. This allows the postgraduate researchers, focusing on the nonlinear phenomena, resulting from light-matter interaction, to find the content useful. In the second part of this volume, readers are introduced to a full theoretical analysis of the quantum features generated in certain optical devices, such as a two-waveguide device working under the SHG and coupled waveguide arrays with the combined second- and third-order nonlinear effects.

To be more specific, this part discusses how SHG-enabled devices might be a useful source of nonclassical light. This section remains relevant for postgraduate students commencing their studies in quantum optics, where the nonclassical phenomena, such as squeezing and entanglement, require a solid understanding of the underlying techniques, namely the phase space and the analytical perturbative methods.

HB 9781685078881 £141.99 July 2022 Nova Science Publishers, Inc 229 pages



Emerging Advancements in Mathematical Sciences

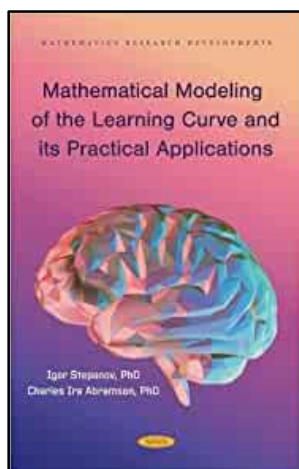
Edited by Bhagwati Prasad Chamola

The present book of proceedings includes chapters related to the areas of pure, applied and interdisciplinary mathematics reflecting the potential applications in the domains of sciences and engineering. The main areas include algebra and its applications, analysis and approximation theory, cryptography, computational fluid dynamics, continuum mechanics and vibrations, differential equations and applications, graph theory, fuzzy mathematics and logic, numerical analysis, optimization and its applications, wave propagation, etc.

The scientists, engineers, academicians and researchers working in the proposed areas of coding and information theory, computational fluid dynamics, differential equations, fuzzy sets and systems, numerical analysis, optimization, vibrations, etc. looking for new insight and ideas in these areas will be benefitted by the contents of this book. In fact, it will be useful to a large class of readers interested in recent findings related to mathematical sciences and their applications to the diverse domains of knowledge.

The book will be a fruitful contribution to all knowledge seekers and researchers in the concerned areas who are looking for new insight and ideas. As it consists of updated research articles on emerging areas of mathematical sciences and their applications, it will be a valued addition to the learning resource centres of various universities, industries, and research and development organizations across the globe.

HB 9781685077112 £141.99 April 2022 Nova Science Publishers, Inc 205 pages



Mathematical Modeling of the Learning Curve and its Practical Applications

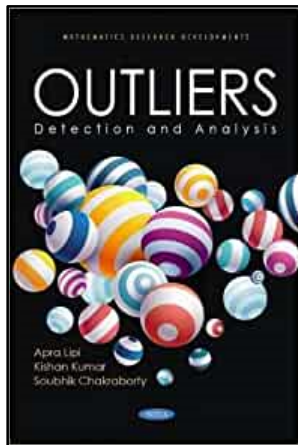
Igor Igorevich Stepanov

This book provides a detailed description of the application of mathematical learning curve modelling to analyse the state of learning and memory in humans and animals. The purpose of the book is to enable the readers to apply the knowledge gained in their own research on learning and memory.

The authors hope that the readers may achieve success in this field of knowledge, expand and advance mathematical modelling of the learning curve, and that this book may aid in this process. For this, the authors have developed their own mathematical model based on the systems theory and proved its advantage in relation to those previously proposed. The authors developed MS Windows application "Learning Curve Modeling Tool" to help the reader modelling the learning curve from raw learning data in the California Verbal Learning Test, the Rey Auditory Verbal Learning Test, and other similar memory tests. Moreover, the book describes in detail the Windows and Android application "Memory Monitoring Tool", developed by the authors, which is suited well for mathematical modelling of the learning curves.

The application aims to reveal initial signs of memory impairment. Besides, the section APPENDIX A describes a Web application -- "Learning curve simulator" -- developed by the authors for helping readers to get started with practically modelling the learning curve and testing their memory. This application is included in the book. The book will be useful for undergraduate students, graduate students, advanced graduate students, and professors, especially for professors who work on learning in both humans and animals, and those interested in the memory of marijuana users, alcoholics, and those suffering from diabetes and multiple sclerosis, as well as other neurological and psychological diseases and their neurological complications including those after COVID-19.

HB 9781685077372 £172.99 April 2022 Nova Science Publishers, Inc 255 pages



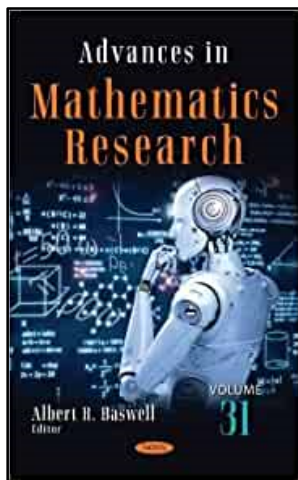
Outliers - Detection and Analysis

Apra Lipi

This brief monograph, in the broadest terms, reviews some of the techniques for outlier detection and analysis. In addition, the effect of the presence of outliers on the statistical parameters such as higher-order moments, quartiles, deciles, percentiles, skewness, and kurtosis, etc. of the distribution are studied.

It also discusses the masking and swamping effect of outliers and some primitive methods of detecting these behaviours. Furthermore, some methods of detecting outliers in multivariate data using the clustering algorithm approach are also discussed.

PB 9781685075545 £84.99 January 2022 Nova Science Publishers, Inc 141 pages



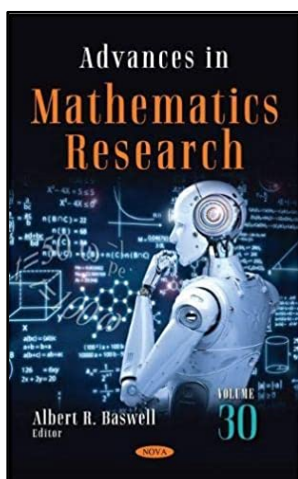
Advances in Mathematics Research. Volume 31

Edited by Albert R. Baswell

This volume includes six chapters that detail recent advancements in mathematics research. Chapter One presents various capabilities of the Maple computer algebra system. Chapter Two uses data from the Children of Immigrants Longitudinal Study to demonstrate how to perform multilevel structural equation modelling to investigate if academic aspiration of immigrant youths in late adolescence mediates both the effects of family socioeconomic status and school location at individual and school levels in early adolescence on their later successful college graduation in young adulthood.

Chapter Three proves the existence and regularity of solutions in \hat{L}_\pm -norm for some partial functional integrodifferential equations in Banach spaces. Chapter Four discusses a method for obtaining exact solutions of nonlinear partial differential equations. Chapter Five analyses the linear and nonlinear stability of modons and We-Verkley waves, which are weak solutions of the barotropic vorticity equation. Lastly, Chapter Six provides an explicit representation of the maps interconnecting the sets of solutions to the special double confluent Heun equation and the equation of the RSJ model of overdamped Josephson junction in case of shifted sinusoidal bias.

HB 9781685078928 £221.99 June 2022 Nova Science Publishers, Inc 205 pages



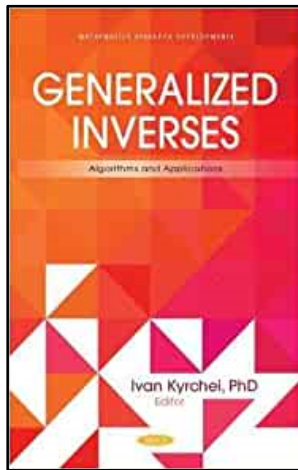
Advances in Mathematics Research - Volume 30

Edited by Albert R. Baswell

This volume includes some of the latest advancements in mathematics research. Chapter One aims to increase the certainty and reliability of G index through different examples and show that G index can be reached by two different paths. Chapter Two focuses on deriving exact trigonometric ratios using equations. Chapter Three presents a review of rough set theory-based feature selection approaches for small to large scale machine learning tasks.

Chapter Four delivers an analytic approach to the Riemann hypothesis. Chapter Five aims to present a comparative analysis of mathematical models of transmission lines applied to two short lines of medium voltage. Finally, Chapter Six focuses on the numerical investigation of the one and two dimensional semi-linear scale-invariant wave equation with damping, mass and power non-linearity.

HB 9781685074531 £221.99 February 2022 Nova Science Publishers, Inc 250 pages



Generalized Inverses - Algorithms and Applications

Edited by Ivan Kyrchei

This book demonstrates some of the latest hot topics on generalized inverse matrices and their applications. Each article has been carefully selected to present substantial research results. Topics discussed herein include recent advances in exploring of generalisations of the core inverse, particularly in composing appropriate outer inverses and the Moore-Penrose inverse such as OMP, MPO and MPOMP inverses; in analysing of properties of the BT inverse and the BT-order; in perturbation estimations for the Drazin inverse; in using generalized inverses to solve systems of quaternion matrix equations and Sylvester-type tensor equations under t-product; in computing and approximating the matrix generalised inverses by hyperpower family of iterative methods of arbitrary convergence order; and in studying of the weighted pseudoinverse matrices with singular indefinite weights.

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Outliers	PB	9781685075545	£84.99		
Partial Differential Equations	HB	9781685075927	£203.99		
Second Harmonic Generation: Pathways of Nonlinear Photonics	HB	9781685078881	£141.99		



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