

Analytical Modeling In Applied Electromagnetics

Mathematical Models in the Applied Sciences Modeling in Applied Sciences Progress in Applied Mathematical Modeling Applied Mathematical Modeling Physical Modeling Applied to Coastal Zone Pollution Problems Comprehensive Applied Mathematical Modeling in the Natural and Engineering Sciences Bio-Economic Models applied to Agricultural Systems Assessment of Truss Plate Performance Model Applied to Southern Pine Truss Joints Applied Mathematical Models in Human Physiology Finite Element Glacier Dynamics Model Applied to Columbia Glacier, Alaska Implementation and Interpretation of Machine and Deep Learning to Applied Subsurface Geological Problems Applied Mathematical Modelling of Engineering Problems Applied Mathematical Modeling Mathematical Modeling, Applied Analysis and Computational Methods Mathematical Modelling Blockchain, Crypto Assets, and Financial Innovation Model Arithmetic Metallurgical Modeling for Aluminum Alloys Applied Data Analysis and Modeling for Energy Engineers and Scientists Mathematical Modelling A. C. Fowler Nicola Bellomo Fengshan Yang Eetu N. Virtanen David J. Wollkind Guillermo Flichman Monica McCarthy Johnny T. Ottesen William G. Sikonja David A. Wood N.V. Hritonenko Douglas R. Shier Khursheed Alam Murray S. Klamkin Gang Kou Alfred Kirk Murat Tirakioglu T. Agami Reddy Seyed M. Moghadas Mathematical Models in the Applied Sciences Modeling in Applied Sciences Progress in Applied Mathematical Modeling Applied Mathematical Modeling Physical Modeling Applied to Coastal Zone Pollution Problems Comprehensive Applied Mathematical Modeling in the Natural and Engineering Sciences Bio-Economic Models applied to Agricultural Systems Assessment of Truss Plate Performance Model Applied to Southern Pine Truss Joints Applied Mathematical Models in Human Physiology Finite Element Glacier Dynamics Model Applied to Columbia Glacier, Alaska Implementation and Interpretation of Machine and Deep Learning to Applied Subsurface Geological Problems Applied Mathematical Modelling of Engineering Problems Applied Mathematical Modeling Mathematical Modeling, Applied Analysis and Computational Methods Mathematical Modelling Blockchain, Crypto Assets, and Financial Innovation Model Arithmetic Metallurgical Modeling for Aluminum Alloys Applied Data Analysis and Modeling for Energy Engineers and Scientists Mathematical Modelling A. C. Fowler Nicola Bellomo Fengshan Yang Eetu N. Virtanen David J. Wollkind Guillermo Flichman Monica McCarthy Johnny T. Ottesen William G. Sikonja David A. Wood N.V. Hritonenko Douglas R. Shier Khursheed Alam Murray S. Klamkin Gang Kou Alfred Kirk Murat Tirakioglu T. Agami Reddy Seyed M. Moghadas

presents a thorough grounding in the techniques of mathematical modelling and proceeds to explore a range of classical and continuum models from an array of disciplines

modeling complex biological chemical and physical systems in the context of spatially heterogeneous mediums is a challenging task for scientists and engineers using traditional methods of analysis modeling in applied sciences is a comprehensive survey of modeling large systems using kinetic equations and in particular the boltzmann equation and its generalizations an interdisciplinary group of leading authorities carefully develop the foundations of kinetic models and discuss the connections and interactions between model theories qualitative and computational analysis and real world applications this book provides a thoroughly accessible and lucid overview of the different aspects models computations and methodology for the kinetic theory modeling process topics and features integrated modeling perspective utilized in all chapters fluid dynamics of reacting gases self contained introduction to kinetic models becker doring equations nonlinear kinetic models with chemical reactions kinetic traffic flow models models of granular media large communication networks thorough discussion of numerical simulations of boltzmann equation this new book is an essential resource for all scientists and engineers who use large scale computations for studying the dynamics of complex systems of fluids and particles professionals researchers and postgraduates will find the book a modern and authoritative guide to the topic

this book presents new research related to the mathematical modelling of engineering and environmental processes manufacturing and industrial systems it includes heat transfer fluid mechanics cfd and transport phenomena solid mechanics and mechanics of metals electromagnets and mhd reliability modelling and system optimisation finite volume finite element and boundary element procedures decision sciences in an industrial and manufacturing context civil engineering systems and structures mineral and energy resources relevant software engineering issues associated with cad

and cae and materials and metallurgical engineering

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this text demonstrates the process of comprehensive applied mathematical modeling through the introduction of various case studies the case studies are arranged in increasing order of complexity based on the mathematical methods required to analyze the models the development of these methods is also included providing a self contained presentation to reinforce and supplement the material introduced original problem sets are offered involving case studies closely related to the ones presented with this style the text s perspective scope and completeness of the subject matter are considered unique having grown out of four self contained courses taught by the authors this text will be of use in a two semester sequence for advanced undergraduate and beginning graduate students requiring rudimentary knowledge of advanced calculus and differential equations along with a basic understanding of some simple physical and biological scientific principles

this book has the purpose of providing the state of the arts concerning bio economic modelling dealing with agricultural systems in most cases the contributions use a methodology combining the use of biophysical and economic models in all cases an engineering production function approach is totally or partially applied this practice is being developed in the last years as a response to concrete policy matters agricultural policies are increasingly combined with environmental and natural resources policies and this reality involves the need of an integrated assessment that current economic models are not able to provide

this book introduces mathematicians to real applications from physiology using mathematics to analyze physiological systems the authors discuss models reflecting current research in cardiovascular and pulmonary physiology in particular they present models describing blood flow in the heart and the cardiovascular system as well as the transport of oxygen and carbon dioxide through the respiratory system and a model for baroreceptor regulation this is the only book available that analyzes up to date models of the physiological system at several levels of detail both simple real time models that can be directly used in larger systems and more detailed reference models that show the underlying physiological mechanisms and provide parameters for and validation of simpler models the book also covers two dimensional modeling of the fluid dynamics in the heart and its ability to pump and includes a discussion of modeling wave propagation throughout the systemic arteries

description of a computer model indicating that columbia glacier will begin a rapid catastrophic retreat in 1983

implementation and interpretation of machine and deep learning to applied subsurface geological problems prediction models exploiting well log information explores machine and deep learning models for subsurface geological prediction problems commonly encountered in applied resource evaluation and reservoir characterization tasks the book provides insights into how the performance of ml dl models can be optimized and sparse datasets of input variables enhanced and or rescaled to improve prediction performances a variety of topics are covered including regression models to estimate total organic carbon from well log data predicting brittleness indexes in tight formation sequences trapping mechanisms in potential subsurface carbon storage reservoirs and more each chapter includes its own introduction summary and nomenclature sections along with one or more case studies focused on prediction model implementation related to its topic addresses common applied geological problems focused on machine and deep learning implementation with case studies considers regression classification and clustering machine learning methods and how to optimize and assess their performance considering suitable error and accuracy metric contrasts the pros and cons of multiple machine and deep learning methods includes techniques to improve the identification of geological carbon capture and storage reservoirs a key part of many energy transition strategies

the subject of the book is the know how of applied mathematical modelling how to construct specific models and adjust them to a new engineering environment or more precise realistic assumptions how to analyze models for the purpose of investigating real life phenomena and how the models

can extend our knowledge about a specific engineering process two major sources of the book are the stock of classic models and the authors wide experience in the field the book provides a theoretical background to guide the development of practical models and their investigation it considers general modelling techniques explains basic underlying physical laws and shows how to transform them into a set of mathematical equations the emphasis is placed on common features of the modelling process in various applications as well as on complications and generalizations of models the book covers a variety of applications mechanical acoustical physical and electrical water transportation and contamination processes bioengineering and population control production systems and technical equipment renovation mathematical tools include partial and ordinary differential equations difference and integral equations the calculus of variations optimal control bifurcation methods and related subjects

the practice of modeling is best learned by those armed with fundamental methodologies and exposed to a wide variety of modeling experience ideally this experience could be obtained by working on actual modeling problems but time constraints often make this difficult applied mathematical modeling provides a collection of models illustrating the power and richness of the mathematical sciences in supplying insight into the operation of important real world systems it fills a gap within modeling texts focusing on applications across a broad range of disciplines the first part of the book discusses the general components of the modeling process and highlights the potential of modeling in practice these chapters discuss the general components of the modeling process and the evolutionary nature of successful model building the second part provides a rich compendium of case studies each one complete with examples exercises and projects in keeping with the multidimensional nature of the models presented the chapters in the second part are listed in alphabetical order by the contributor s last name unlike most mathematical books in which you must master the concepts of early chapters to prepare for subsequent material you may start with any chapter begin with cryptology if that catches your fancy or go directly to bursty traffic if that is your cup of tea applied mathematical modeling serves as a handbook of in depth case studies that span the mathematical sciences building upon a modest mathematical background readers in other applied disciplines will benefit from seeing how selected mathematical modeling philosophies and techniques can be brought to bear on problems in their disciplines the models address actual situations studied in chemistry physics demography economics civil engineering environmental engineering industrial engineering telecommunications and other areas

this volume presents a curated selection of papers presented at the international conference on applied and industrial mathematics icaim 2023 hosted by sharda university in greater noida uttar pradesh india from 24 26 march 2023 it delves into diverse realms of mathematical modelling applied analyses computational methods and industrial mathematics each chapter within this collection offers intriguing insights into tackling real world challenges through the lens of mathematical modelling and computational approaches the book traverses an array of compelling subjects from safeguarding secrets through specialized codes to optimizing solar energy utilization it illuminates how mathematics is potent in unravelling intricate problems such as understanding disease propagation or enhancing machine learning algorithms through lucid explanations and engaging examples this volume is tailored for curious minds eager to delve into the marvels of mathematics from fresh perspectives

the proceedings from the october 2003 pittsburgh conference include 28 papers on plasticity quench and solidification modeling and microstructure evolution researchers from north america and europe present recent work on computational micromechanical modeling fatigue crack growth methodologies mathematical pitfalls thermal and residual stress analysis the simulation of local microstructures and thermal growth elastic strain energy analysis computer modeling of phase transformations integral modeling and other modeling issues there is no index annotation 2004 book news inc portland or booknews com

applied data analysis and modeling for energy engineers and scientists fills an identified gap in engineering and science education and practice for both students and practitioners it demonstrates how to apply concepts and methods learned in disparate courses such as mathematical modeling probability statistics experimental design regression model building optimization risk analysis and decision making to actual engineering processes and systems the text provides a formal structure that offers a basic broad and unified perspective while imparting the knowledge skills and confidence to work in data analysis and modeling this volume uses numerous solved examples published case studies from the author s own research and well conceived problems in order to enhance comprehension levels among readers and their understanding of the processes along with the tools

an important resource that provides an overview of mathematical modelling mathematical modelling offers a comprehensive guide to both analytical

and computational aspects of mathematical modelling that encompasses a wide range of subjects the authors provide an overview of the basic concepts of mathematical modelling and review the relevant topics from differential equations and linear algebra the text explores the various types of mathematical models and includes a range of examples that help to describe a variety of techniques from dynamical systems theory the book s analytical techniques examine compartmental modelling stability bifurcation discretization and fixed point analysis the theoretical analyses involve systems of ordinary differential equations for deterministic models the text also contains information on concepts of probability and random variables as the requirements of stochastic processes in addition the authors describe algorithms for computer simulation of both deterministic and stochastic models and review a number of well known models that illustrate their application in different fields of study this important resource includes a broad spectrum of models that fall under deterministic and stochastic classes and discusses them in both continuous and discrete forms demonstrates the wide spectrum of problems that can be addressed through mathematical modelling based on fundamental tools and techniques in applied mathematics and statistics contains an appendix that reveals the overall approach that can be taken to solve exercises in different chapters offers many exercises to help better understand the modelling process written for graduate students in applied mathematics instructors and professionals using mathematical modelling for research and training purposes mathematical modelling a graduate textbook covers a broad range of analytical and computational aspects of mathematical modelling

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