

Interdisciplinary topics in applied mathematics modeling and computational science springer proceedings in mathematics statistics (PDF)

Mathematical Modeling And Computation In Finance: With Exercises And Python And Matlab Computer Codes Computational Cognitive Modeling and Linguistic Theory Introduction to Computational Science Modeling Time in Computing Principles of Computational Modelling in Neuroscience Simulation and Computational Red Teaming for Problem Solving Computational Modeling of Cognition and Behavior Modeling and Computational Methods for Kinetic Equations Computational Modeling in Semiconductor Processing Computational Modeling and Problem Solving in the Networked World Introduction to Computational Modeling Using C and Open-Source Tools Advances in Computational Modeling and Simulation Computational Modeling in Cognition Advanced Computational Materials Modeling Computational Modeling of Human Language Acquisition Computational Nanophotonics Modelling Computing Systems Computational Modeling and Visualization of Physical Systems with Python Computational Multiscale Modeling of Fluids and Solids Computational and Mathematical Modeling in the Social Sciences Computational Fluid Dynamics in Fire Engineering An Introduction to Mathematical Modeling Bayesian Thinking, Modeling and Computation A Course in Mathematical Biology Modeling, Computation and Optimization Integrated Computational Materials Engineering (ICME) for Metals Think Complexity Computational Chemistry and Molecular Modeling Essentials of Computational Chemistry Computational Modelling and Simulation of Aircraft and the Environment: Platform kinematics and synthetic environment Deterministic and Stochastic Modeling in Computational Electromagnetics Introduction to Computational Optimization Models for Production Planning in a Supply Chain Introduction to Computational Science Scientific Modeling and Simulations Computational Modeling in Bioengineering and Bioinformatics Computational Modeling of Objects Presented in Images Computational Trust Models and Machine Learning Power System Modeling, Computation, and Control Dynamic General Equilibrium Modeling Computational Modelling in Hydraulic and Coastal Engineering

Mathematical Modeling And Computation In Finance: With Exercises And Python And Matlab Computer Codes

2019-10-29

this book discusses the interplay of stochastics applied probability theory and numerical analysis in the field of quantitative finance the stochastic models numerical valuation techniques computational aspects financial products and risk management applications presented will enable readers to progress in the challenging field of computational finance when the behavior of financial market participants changes the corresponding stochastic mathematical models describing the prices may also change financial regulation may play a role in such changes too the book thus presents several models for stock prices interest rates as well as foreign exchange rates with increasing complexity across the chapters as is said in the industry do not fall in love with your favorite model the book covers equity models before moving to short rate and other interest rate models we cast these models for interest rate into the heath jarrow morton framework show relations between the different models and explain a few interest rate products and their pricing the chapters are accompanied by exercises students can access solutions to selected exercises while complete solutions are made available to instructors the matlab and python computer codes used for most tables and figures in the book are made available for both print and e book users this book will be useful for people working in the financial industry for those aiming to work there one day and for anyone interested in quantitative finance the topics that are discussed are relevant for msc and phd students academic researchers and for quants in the financial industry supplementary material solutions manual is available to instructors who adopt this textbook for their courses please contact sales wspc com

2013-10-07

1/15

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Computational Cognitive Modeling and Linguistic Theory

2020-06-01

this open access book introduces a general framework that allows natural language researchers to enhance existing competence theories with fully specified performance and processing components gradually developing increasingly complex and cognitively realistic competence performance models it provides running code for these models and shows how to fit them to real time experimental data this computational cognitive modeling approach opens up exciting new directions for research in formal semantics and linguistics more generally and offers new ways of re connecting semantics and the broader field of cognitive science

Introduction to Computational Science

2014-03-30

computational science is an exciting new field at the intersection of the sciences computer science and mathematics because much scientific investigation now involves computing as well as theory and experiment this textbook provides students with a versatile and accessible introduction to the subject it assumes only a background in high school algebra enables instructors to follow tailored pathways through the material and is the only textbook of its kind designed specifically for an introductory course in the computational science and engineering curriculum while the text itself is generic an accompanying website offers tutorials and files in a variety of software packages this fully updated and expanded edition features two new chapters on agent based simulations and modeling with matrices ten new project modules and an additional module on diffusion besides increased treatment of high performance computing and its applications the book also includes additional quick review questions with answers exercises and individual and team projects the only introductory textbook of its kind now fully updated and expanded features two new chapters on agent based simulations and modeling with matrices increased coverage of high performance computing and its applications includes additional modules review questions exercises and projects an online instructor s manual with exercise answers selected project solutions and a test bank and solutions available only to professors an online illustration package is available to professors

Modeling Time in Computing

2012-10-19

models that include a notion of time are ubiquitous in disciplines such as the natural sciences engineering philosophy and linguistics but in computing the abstractions provided by the traditional models are problematic and the discipline has spawned many novel models this book is a systematic thorough presentation of the results of several decades of research on developing analyzing and applying time models to computing and engineering after an opening motivation introducing the topics structure and goals the authors introduce the notions of formalism and model in general terms along with some of their fundamental classification criteria in doing so they present the fundamentals of propositional and predicate logic and essential issues that arise when modeling time across all types of system part i is a summary of the models that are traditional in engineering and the natural sciences including fundamental computer science dynamical systems and control theory hardware design and software algorithmic and complexity analysis part ii covers advanced and specialized formalisms dealing with time modeling in heterogeneous software intensive systems formalisms that share finite state machines as common ancestors petri nets in many variants notations based on mathematical logic such as temporal logic process algebras and dual language approaches combining two notations with different characteristics to model and verify

2013-10-07

2/15

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complex systems e.g. model checking frameworks finally the book concludes with summarizing remarks and hints towards future developments and open challenges the presentation uses a rigorous yet not overly technical style appropriate for readers with heterogeneous backgrounds and each chapter is supplemented with detailed bibliographic remarks and carefully chosen exercises of varying difficulty and scope the book is aimed at graduate students and researchers in computer science while researchers and practitioners in other scientific and engineering disciplines interested in time modeling with a computational flavor will also find the book of value and the comparative and conceptual approach makes this a valuable introduction for non experts the authors assume a basic knowledge of calculus probability theory algorithms and programming while a more advanced knowledge of automata formal languages and mathematical logic is useful

Principles of Computational Modelling in Neuroscience

2011-06-30

the nervous system is made up of a large number of interacting elements to understand how such a complex system functions requires the construction and analysis of computational models at many different levels this book provides a step by step account of how to model the neuron and neural circuitry to understand the nervous system at all levels from ion channels to networks starting with a simple model of the neuron as an electrical circuit gradually more details are added to include the effects of neuronal morphology synapses ion channels and intracellular signaling the principle of abstraction is explained through chapters on simplifying models and how simplified models can be used in networks this theme is continued in a final chapter on modeling the development of the nervous system requiring an elementary background in neuroscience and some high school mathematics this textbook is an ideal basis for a course on computational neuroscience

Simulation and Computational Red Teaming for Problem Solving

2019-11-19

an authoritative guide to computer simulation grounded in a multi disciplinary approach for solving complex problems simulation and computational red teaming for problem solving offers a review of computer simulation that is grounded in a multi disciplinary approach the authors present the theoretical foundations of simulation and modeling paradigms from the perspective of an analyst the book provides the fundamental background information needed for designing and developing consistent and useful simulations in addition to this basic information the authors explore several advanced topics the book's advanced topics demonstrate how modern artificial intelligence and computational intelligence concepts and techniques can be combined with various simulation paradigms for solving complex and critical problems authors examine the concept of computational red teaming to reveal how the combined fundamentals and advanced techniques are used successfully for solving and testing complex real world problems this important book demonstrates how computer simulation and computational red teaming support each other for solving complex problems describes the main approaches to modeling real world phenomena and embedding these models into computer simulations explores how a number of advanced artificial intelligence and computational intelligence concepts are used in conjunction with the fundamental aspects of simulation written for researchers and students in the computational modelling and data analysis fields simulation and computational red teaming for problem solving covers the foundation and the standard elements of the process of building a simulation and explores the simulation topic with a modern research approach

Computational Modeling of Cognition and Behavior

2018-02-22

computational modeling is now ubiquitous in psychology and researchers who are not modelers may find it increasingly difficult to follow the theoretical developments in their field this book presents an integrated framework for the development and application of models in psychology and related disciplines researchers and students are given the knowledge and tools to interpret models published in their area as well as to develop fit and test their own models both the development of models and key features of any model are covered as are the applications of models in a variety of domains across the behavioural sciences a number of chapters are devoted to fitting models using maximum likelihood and bayesian estimation including fitting hierarchical and mixture models model comparison is described as a core philosophy of scientific inference and the use of models to understand theories and advance scientific discourse is explained

Modeling and Computational Methods for Kinetic Equations

2012-12-06

in recent years kinetic theory has developed in many areas of the physical sciences and engineering and has extended the borders of its traditional fields of application this monograph is a self contained presentation of such recently developed aspects of kinetic theory as well as a comprehensive account of the fundamentals of the theory emphasizing modeling techniques and numerical methods the book provides a unified treatment of kinetic equations not found in more focused works specific applications presented include plasma kinetic models traffic flow models granular media models and coagulation fragmentation problems the work may be used for self study as a reference text or in graduate level courses in kinetic theory and its applications

Computational Modeling in Semiconductor Processing

1995

this book provides you with in depth coverage of the models governing equations and numerical techniques suitable for process simulation so you can give your designs the competitive edge you will understand the basic principles of transport phenomena gas phase and surface reactions in electronics material processing and learn practical numerical techniques used in process simulations

Computational Modeling and Problem Solving in the Networked World

2012-12-06

this book is a compilation of a selected subset of research articles presented at the eighth informs computing society conference held in chandler arizona from january 8 to 10 2003 the articles in this book represent the diversity and depth of the interface between orims operations research and the management sciences and us a computer science and artificial intelligence

2013-10-07

4/15

intelligence this volume starts with two papers that represent the reflective and integrative thinking that is critical to any scientific discipline these two articles present philosophical perspectives on computation covering a variety of traditional and newer methods for modeling solving and explaining mathematical models the next set includes articles that study machine learning and computational heuristics and is followed by articles that address issues in performance testing of solution algorithms and heuristics these two sets of papers demonstrate the richness of thought that takes place at the orims and csi ai interface the final set of articles demonstrates the usefulness of these and other methods at the interface towards solving problems in the real world covering e commerce workflow electronic negotiation music parallel computation and telecommunications the articles in this collection represent the results of cross fertilization between orims and csi ai making possible advances that could have not been achieved in isolation the continuing aim of the informs computing society and this research conference is to invigorate and further develop this interface

Introduction to Computational Modeling Using C and Open-Source Tools

2013-11-13

introduction to computational modeling using c and open source tools presents the fundamental principles of computational models from a computer science perspective it explains how to implement these models using the c programming language the software tools used in the book include the gnu scientific library gsl which is a free software library of c functions and the versatile open source gnuplot for visualizing the data all source files shell scripts and additional notes are located at science kennesaw edu jgarrido comp models the book first presents an overview of problem solving and the introductory concepts principles and development of computational models before covering the programming principles of the c programming language the author then applies programming principles and basic numerical techniques such as polynomial evaluation regression and other numerical methods to implement computational models he also discusses more advanced concepts needed for modeling dynamical systems and explains how to generate numerical solutions the book concludes with the modeling of linear optimization problems emphasizing analytical skill development and problem solving this book helps you understand how to reason about and conceptualize the problems generate mathematical formulations and computationally visualize and solve the problems it provides you with the foundation to understand more advanced scientific computing including parallel computing using mpi grid computing and other techniques in high performance computing

Advances in Computational Modeling and Simulation

2022

the book presents select proceedings of global meet on computational modelling and simulation recent innovations challenges and perspectives 2020 this book covers leading edge technologies from different domains such as computation in optimization and control multiscale and multiphysics modeling and computation analysis environmental modeling modeling approaches to enterprise systems and services finite element analysis dependability and security high performance computation cloud computing applications computational biology and chemistry and computational mechanics the primary goal of this book is to strengthen pre eminence in computational modeling and simulation by catalyzing the transformative use of innovative developments in a wide range of disciplines to achieve lasting societal impact the book discusses on how to perform simulation of large complex dynamic systems in an efficient manner using advanced computational analysis the inter disciplinary nature of the book would be a valuable reference for academicians and research scientists industrialists interested in modelling and simulation driven by computational technology

Computational Modeling in Cognition

2010-11-29

key features

Advanced Computational Materials Modeling

2010-12-06

with its discussion of strategies for modeling complex materials using new numerical techniques mainly those based on the finite element method this monograph covers a range of topics including computational plasticity multi scale formulations optimization and parameter identification damage mechanics and nonlinear finite elements

Computational Modeling of Human Language Acquisition

2011

human language acquisition has been studied for centuries but using computational modeling for such studies is a relatively recent trend however computational approaches to language learning have become increasingly popular mainly due to advances in developing machine learning techniques and the availability of vast collections of experimental data on child language learning and child adult interaction many of the existing computational models attempt to study the complex task of learning a language under cognitive plausibility criteria such as memory and processing limitations that humans face and to explain the developmental stages observed in children by simulating the process of child language learning computational models can show us which linguistic representations are learnable from the input that children have access to and which mechanisms yield the same patterns of behaviour that children exhibit during this process in doing so computational modeling provides insight into the plausible mechanisms involved in human language acquisition and inspires the development of better language models and techniques this book provides an overview of the main research questions in the field of human language acquisition it reviews the most commonly used computational frameworks methodologies and resources for modeling child language learning and the evaluation techniques used for assessing these computational models the book is aimed at cognitive scientists who want to become familiar with the available computational methods for investigating problems related to human language acquisition as well as computational linguists who are interested in applying their skills to the study of child language acquisition different aspects of language learning are discussed in separate chapters including the acquisition of the individual words the general regularities which govern word and sentence form and the associations between form and meaning for each of these aspects the challenges of the task are discussed and the relevant empirical findings on children are summarized furthermore the existing computational models that attempt to simulate the task under study are reviewed and a number of case studies are presented table of contents overview computational models of language learning learning words putting words together form meaning associations final thoughts

Computational Nanophotonics

2017-03-29

this reference offers tools for engineers scientists biologists and others working with the computational techniques of nanophotonics it introduces the key concepts of computational methods in a manner that is easily digestible for newcomers to the field the book also examines future applications of nanophotonics in the technical industry and covers new developments and interdisciplinary research in engineering science and medicine it provides an overview of the key computational nanophotonics and describes the technologies with an emphasis on how they work and their key benefits

Modelling Computing Systems

2013-07-24

this engaging text presents the fundamental mathematics and modelling techniques for computing systems in a novel and light hearted way which can be easily followed by students at the very beginning of their university education key concepts are taught through a large collection of challenging yet fun mathematical games and logical puzzles that require no prior knowledge about computers the text begins with intuition and examples as a basis from which precise concepts are then developed demonstrating how by working within the confines of a precise structured method the occurrence of errors in the system can be drastically reduced features demonstrates how game theory provides a paradigm for an intuitive understanding of the nature of computation contains more than 400 exercises throughout the text with detailed solutions to half of these presented at the end of the book together with numerous theorems definitions and examples describes a modelling approach based on state transition systems

Computational Modeling and Visualization of Physical Systems with Python

2015-12-21

computational modeling by jay wang introduces computational modeling and visualization of physical systems that are commonly found in physics and related areas the authors begin with a framework that integrates model building algorithm development and data visualization for problem solving via scientific computing through carefully selected problems methods and projects the reader is guided to learning and discovery by actively doing rather than just knowing physics

Computational Multiscale Modeling of Fluids and Solids

2008

the idea of the book is to provide a comprehensive overview of computational physics methods and techniques that are used for materials modeling on different length and time scales each chapter first provides an overview of the physical basic principles which are the basis for the numerical and mathematical modeling on the respective length scale the book includes the micro scale the meso scale and the macro scale the chapters follow this classification the book will explain in detail many tricks on the trade of some of the most important

2013-10-07

7/15

methods and techniques that are used to simulate materials on the perspective levels of spatial and temporal resolution case studies are occasionally included to further illustrate some methods or theoretical considerations example applications for all techniques are provided some of which are from the author s own contributions to some of the research areas methods are explained if possible on the basis of the original publications but also references to standard text books established in the various fields are mentioned

Computational and Mathematical Modeling in the Social Sciences

2009-07-23

mathematical models in the social sciences have become increasingly sophisticated and widespread in the last decade this period has also seen many critiques most lamenting the sacrifices incurred in pursuit of mathematical perfection if as critics argue our ability to understand the world has not improved during the mathematization of the social sciences we might want to adopt a different paradigm this book examines the three main fields of mathematical modeling game theory statistics and computational methods and proposes a new framework for modeling

Computational Fluid Dynamics in Fire Engineering

2009-04-20

fire and combustion presents a significant engineering challenge to mechanical civil and dedicated fire engineers as well as specialists in the process and chemical safety buildings and structural fields we are reminded of the tragic outcomes of untenable fire disasters such as at king s cross underground station or switzerland s st gotthard tunnel in these and many other cases computational fluid dynamics cfd is at the forefront of active research into unravelling the probable causes of fires and helping to design structures and systems to ensure that they are less likely in the future computational fluid dynamics cfd is routinely used as an analysis tool in fire and combustion engineering as it possesses the ability to handle the complex geometries and characteristics of combustion and fire this book shows engineering students and professionals how to understand and use this powerful tool in the study of combustion processes and in the engineering of safer or more fire resistant or conversely more fire efficient structures no other book is dedicated to computer based fire dynamics tools and systems it is supported by a rigorous pedagogy including worked examples to illustrate the capabilities of different models an introduction to the essential aspects of fire physics examination and self test exercises fully worked solutions and a suite of accompanying software for use in industry standard modeling systems computational fluid dynamics cfd is widely used in engineering analysis this is the only book dedicated to cfd modeling analysis in fire and combustion engineering strong pedagogic features mean this book can be used as a text for graduate level mechanical civil structural and fire engineering courses while its coverage of the latest techniques and industry standard software make it an important reference for researchers and professional engineers in the mechanical and structural sectors and by fire engineers safety consultants and regulators strong author team cuhk is a recognized centre of excellence in fire eng deliver an expert package for students and professionals showing both theory and applications accompanied by cfd modeling code and ready to use simulations to run in industry standard ansys cfx and fluent software

An Introduction to Mathematical Modeling

2012-02-23

2013-10-07

8/15

a modern approach to mathematical modeling featuring unique applications from the field of mechanics an introduction to mathematical modeling a course in mechanics is designed to survey the mathematical models that form the foundations of modern science and incorporates examples that illustrate how the most successful models arise from basic principles in modern and classical mathematical physics written by a world authority on mathematical theory and computational mechanics the book presents an account of continuum mechanics electromagnetic field theory quantum mechanics and statistical mechanics for readers with varied backgrounds in engineering computer science mathematics and physics the author streamlines a comprehensive understanding of the topic in three clearly organized sections nonlinear continuum mechanics introduces kinematics as well as force and stress in deformable bodies mass and momentum balance of linear and angular momentum conservation of energy and constitutive equations electromagnetic field theory and quantum mechanics contains a brief account of electromagnetic wave theory and maxwell s equations as well as an introductory account of quantum mechanics with related topics including ab initio methods and spin and pauli s principles statistical mechanics presents an introduction to statistical mechanics of systems in thermodynamic equilibrium as well as continuum mechanics quantum mechanics and molecular dynamics each part of the book concludes with exercise sets that allow readers to test their understanding of the presented material key theorems and fundamental equations are highlighted throughout and an extensive bibliography outlines resources for further study extensively class tested to ensure an accessible presentation an introduction to mathematical modeling is an excellent book for courses on introductory mathematical modeling and statistical mechanics at the upper undergraduate and graduate levels the book also serves as a valuable reference for professionals working in the areas of modeling and simulation physics and computational engineering

Bayesian Thinking, Modeling and Computation

2005-11-29

this volume describes how to develop bayesian thinking modelling and computation both from philosophical methodological and application point of view it further describes parametric and nonparametric bayesian methods for modelling and how to use modern computational methods to summarize inferences using simulation the book covers wide range of topics including objective and subjective bayesian inferences with a variety of applications in modelling categorical survival spatial spatiotemporal epidemiological software reliability small area and micro array data the book concludes with a chapter on how to teach bayesian thoughts to nonstatisticians critical thinking on causal effects objective bayesian philosophy nonparametric bayesian methodology simulation based computing techniques bioinformatics and biostatistics

A Course in Mathematical Biology

2006-07-01

this is the only book that teaches all aspects of modern mathematical modeling and that is specifically designed to introduce undergraduate students to problem solving in the context of biology included is an integrated package of theoretical modeling and analysis tools computational modeling techniques and parameter estimation and model validation methods with a focus on integrating analytical and computational tools in the modeling of biological processes divided into three parts it covers basic analytical modeling techniques introduces computational tools used in the modeling of biological problems and includes various problems from epidemiology ecology and physiology all chapters include realistic biological examples including many exercises related to biological questions in addition 25 open ended research projects are provided suitable for students an accompanying site contains solutions and a tutorial for the implementation of the computational modeling techniques calculations can be done in modern computing languages such as maple mathematica and matlab

2013-10-07

9/15

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statistics

Modeling, Computation and Optimization

2018-03-20

focuses entirely on demystifying the field and subject of icme and provides step by step guidance on its industrial application via case studies this highly anticipated follow up to mark f horstemeyer s pedagogical book on integrated computational materials engineering icme concepts includes engineering practice case studies related to the analysis design and use of structural metal alloys a welcome supplement to the first book which includes the theory and methods required for teaching the subject in the classroom integrated computational materials engineering icme for metals concepts and case studies focuses on engineering applications that have occurred in industries demonstrating the icme methodologies and aims to catalyze industrial diffusion of icme technologies throughout the world the recent confluence of smaller desktop computers with enhanced computing power coupled with the emergence of physically based material models has created the clear trend for modeling and simulation in product design which helped create a need to integrate more knowledge into materials processing and product performance integrated computational materials engineering icme for metals case studies educates those seeking that knowledge with chapters covering body centered cubic materials designing an interatomic potential for fe c alloys phase field crystal modeling simulating dislocation plasticity in bcc metals by integrating fundamental concepts with macroscale models steel powder metal modeling hexagonal close packed materials multiscale modeling of pure nickel predicting constitutive equations for materials design and more presents case studies that connect modeling and simulation for different materials processing methods for metal alloys demonstrates several practical engineering problems to encourage industry to employ icme ideas introduces a new simulation based design paradigm provides web access to microstructure sensitive models and experimental database integrated computational materials engineering icme for metals case studies is a must have book for researchers and industry professionals aiming to comprehend and employ icme in the design and development of new materials

Integrated Computational Materials Engineering (ICME) for Metals

2012-03-02

enhances python skills by working with data structures and algorithms and gives examples of complex systems using exercises case studies and simple explanations

Think Complexity

2008-06-13

the gap between introductory level textbooks and highly specialized monographs is filled by this modern textbook it provides in one comprehensive volume the in depth theoretical background for molecular modeling and detailed descriptions of the applications in chemistry and related fields like drug design molecular sciences biomedical polymer and materials engineering special chapters on basic mathematics and the use of respective software tools are included numerous numerical examples exercises and explanatory illustrations as well as a web site with application tools amrita edu cen cmm support the students and lecturers

Computational Chemistry and Molecular Modeling

2004-10-29

essentials of computational chemistry provides a balanced introduction to this dynamic subject suitable for both experimentalists and theorists a wide range of samples and applications are included drawn from all key areas the book carefully leads the reader through the necessary equations providing information explanations and reasoning where necessary and firmly placing each equation in context

Essentials of Computational Chemistry

2009

this book provides a comprehensive guide to the derivation of computational models for aerospace operations from basic physical and mathematical principles highly relevant to practioners it takes into account the multidisciplinary nature of the aerospace environment and the integrated nature of the models needed to represent it

Computational Modelling and Simulation of Aircraft and the Environment: Platform kinematics and synthetic environment

2023-12-07

deterministic and stochastic modeling in computational electromagnetics help protect your network with this important reference work on cyber security deterministic computational models are those for which all inputs are precisely known whereas stochastic modeling reflects uncertainty or randomness in one or more of the data inputs many problems in computational engineering therefore require both deterministic and stochastic modeling to be used in parallel allowing for different degrees of confidence and incorporating datasets of different kinds in particular non intrusive stochastic methods can be easily combined with widely used deterministic approaches enabling this more robust form of data analysis to be applied to a range of computational challenges deterministic and stochastic modeling in computational electromagnetics provides a rare treatment of parallel deterministic stochastic computational modeling and its beneficial applications unlike other works of its kind which generally treat deterministic and stochastic modeling in isolation from one another it aims to demonstrate the usefulness of a combined approach and present particular use cases in which such an approach is clearly required it offers a non intrusive stochastic approach which can be incorporated with minimal effort into virtually all existing computational models readers will also find a range of specific examples demonstrating the efficiency of deterministic stochastic modeling computational examples of successful applications including ground penetrating radars gpr radiation from 5g systems transcranial magnetic and electric stimulation tms and tes and more introduction to fundamental principles in field theory to ground the discussion of computational modeling deterministic and stochastic modeling in computational electromagnetics is a valuable reference for researchers including graduate and undergraduate students in computational electromagnetics as well as to multidisciplinary researchers engineers physicists and mathematicians

Deterministic and Stochastic Modeling in Computational Electromagnetics

2013-06-05

an easy to read introduction to the concepts associated with the creation of optimization models for production planning starts off this book these concepts are then applied to well known planning models namely mrp and mrp ii from this foundation fairly sophisticated models for supply chain management are developed another unique feature is that models are developed with an eye toward implementation in fact there is a chapter that provides explicit examples of implementation of the basic models using a variety of popular commercially available modeling languages

Introduction to Computational Optimization Models for Production Planning in a Supply Chain

2014

computational science is an exciting new field at the intersection of the sciences computer science and mathematics because much scientific investigation now involves computing as well as theory and experiment this textbook provides students with a versatile and accessible introduction to the subject it assumes only a background in high school algebra enables instructors to follow tailored pathways through the material and is the only textbook of its kind designed specifically for an introductory course in the computational science and engineering curriculum while the text itself is generic an accompanying website offers tutorials and files in a variety of software packages this edition features two new chapters on agent based simulations and modeling with matrices ten new project modules and an additional module on diffusion besides increased treatment of high performance computing and its applications the book also includes additional quick review questions with answers exercises and individual and team projects

Introduction to Computational Science

2010-04-07

although computational modeling and simulation of material deformation was initiated with the study of structurally simple materials and inert environments there is an increasing demand for predictive simulation of more realistic material structure and physical conditions in particular it is recognized that applied mechanical force can plausibly alter chemical reactions inside materials or at material interfaces though the fundamental reasons for this chemomechanical coupling are studied in a material specific manner atomistic level simulations can provide insight into the unit processes that facilitate kinetic reactions within complex materials but the typical nanosecond timescales of such simulations are in contrast to the second scale to hour scale timescales of experimentally accessible or technologically relevant timescales further in complex materials these key unit processes are rare events due to the high energy barriers associated with those processes examples of such rare events include unbinding between two proteins that tether biological cells to extracellular materials 1 unfolding of complex polymers stiffness and bond breaking in amorphous glass fibers and gels 2 and diffusive hops of point defects within crystalline alloys 3

Scientific Modeling and Simulations

2019-10-09

computational modeling in bioengineering and bioinformatics promotes complementary disciplines that hold great promise for the advancement of research and development in complex medical and biological systems and in the environment public health drug design and so on it provides a common platform by bridging these two very important and complementary disciplines into an interactive and attractive forum chapters cover biomechanics and bioimaging biomedical decision support system data mining personalized diagnoses bio signal processing protein structure prediction tissue and cell engineering biomedical image processing analysis and visualization high performance computing and sports bioengineering the book s chapters are the result of many international projects in the area of bioengineering and bioinformatics done at the research and development center for bioengineering bioirc and by the faculty of engineering at the university of kragujevac serbia presents recent advances at the crossroads of biomedical engineering and bioinformatics one of the hottest areas in biomedical and clinical research discusses a wide range of leading edge research topics including biomechanics and bioimaging biomedical decision support systems data mining personalized diagnoses bio signal processing protein structure prediction tissue and cell engineering amongst others includes coverage of biomechanical bioengineering and computational methods of treatment and diagnosis

Computational Modeling in Bioengineering and Bioinformatics

2014-02-01

this book contains extended versions of selected papers from the 3rd edition of the international symposium compimage these contributions include cover methods of signal and image processing and analysis to tackle problems found in medicine material science surveillance biometric robotics defence satellite data traffic analysis and architecture image segmentation 2d and 3d reconstruction data acquisition interpolation and registration data visualization motion and deformation analysis and 3d vision

Computational Modeling of Objects Presented in Images

2020-12-18

this book provides an introduction to computational trust models from a machine learning perspective after reviewing traditional computational trust models it discusses a new trend of applying formerly unused machine learning methodologies such as supervised learning the application of various learning algorithms such as linear regression matrix decomposition and decision trees illustrates how to translate the trust modeling problem into a supervised learning problem the book also shows how novel machine learning techniques can improve the accuracy of trust assessment compared to traditional approaches

Computational Trust Models and Machine Learning

2019-12-13

2013-10-07

13/15

provides students with an understanding of the modeling and practice in power system stability analysis and control design as well as the computational tools used by commercial vendors bringing together wind facts hvdc and several other modern elements this book gives readers everything they need to know about power systems it makes learning complex power system concepts models and dynamics simpler and more efficient while providing modern viewpoints of power system analysis power system modeling computation and control provides students with a new and detailed analysis of voltage stability a simple example illustrating the bcu method of transient stability analysis and one of only a few derivations of the transient synchronous machine model it offers a discussion on reactive power consumption of induction motors during start up to illustrate the low voltage phenomenon observed in urban load centers damping controller designs using power system stabilizer hvdc systems static var compensator and thyristor controlled series compensation are also examined in addition there are chapters covering flexible ac transmission systems facts including both thyristor and voltage sourced converter technology and wind turbine generation and modeling simplifies the learning of complex power system concepts models and dynamics provides chapters on power flow solution voltage stability simulation methods transient stability small signal stability synchronous machine models steady state and dynamic models excitation systems and power system stabilizer design includes advanced analysis of voltage stability voltage recovery during motor starts facts and their operation damping control design using various control equipment wind turbine models and control contains numerous examples tables figures of block diagrams matlab plots and problems involving real systems written by experienced educators whose previous books and papers are used extensively by the international scientific community power system modeling computation and control is an ideal textbook for graduate students of the subject as well as for power system engineers and control design professionals

Power System Modeling, Computation, and Control

2009-08-29

modern business cycle theory and growth theory uses stochastic dynamic general equilibrium models in order to solve these models economists need to use many mathematical tools this book presents various methods in order to compute the dynamics of general equilibrium models in part i the representative agent stochastic growth model is solved with the help of value function iteration linear and linear quadratic approximation methods parameterised expectations and projection methods in order to apply these methods fundamentals from numerical analysis are reviewed in detail in particular the book discusses issues that are often neglected in existing work on computational methods e g how to find a good initial value in part ii the authors discuss methods in order to solve heterogeneous agent economies in such economies the distribution of the individual state variables is endogenous this part of the book also serves as an introduction to the modern theory of distribution economics applications include the dynamics of the income distribution over the business cycle or the overlapping generations model in an accompanying home page to this book computer codes to all applications can be downloaded

Dynamic General Equilibrium Modeling

2019-12-12

combines more than 40 years of expert experience computational modelling and simulation methods have a wide range of applications in hydraulic and coastal engineering computational modelling in hydraulic and coastal engineering provides an introductory but comprehensive coverage of these methods it emphasizes the use of the finite differences method with applications in reservoir management closed conduit hydraulics free surface channel and coastal domain flows surface gravity waves groundwater movement and pollutant and sediment transport processes it focuses on applications rather than lengthy theories or derivations of complex formulas and is supported by a wealth of hands on numerical examples and computer codes written in matlab but available also in basic powerpoint presentations and learning assignment projects quizzes along with matlab codes and

2013-10-07

14/15

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are included a comprehensive study highlighting the infinite differences method this book covers the fundamentals of flow in pressurized conduits contains solutions for the classical hardy cross pipe network problem designates the mathematical description of groundwater flow in confined and unconfined aquifers provides numerical examples for one and two dimensional applications including saltwater intrusion presents examples of transport of pollutants sediment and air bubbles using eulerian and lagrangian solution methodologies includes information on weighted residuals the finite elements method and the boundary integral method computational modelling in hydraulic and coastal engineering suits senior level undergraduates and graduate students as well as practitioners such as coastal and maritime engineers environmental engineers civil engineers computer modellers and hydro geologis

Computational Modelling in Hydraulic and Coastal Engineering