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Hands-On Simulation Modeling with Python - Giuseppe Ciaburro 2022-11-30
Learn to construct state-of-the-art simulation models with Python and enhance your simulation modelling skills, as well as create and analyze digital prototypes of physical models with ease Key Features Understand various statistical and physical simulations to improve systems using Python Learn to create the numerical prototype of a real model using hands-on examples Evaluate performance and output results based on how the prototype would work in the real world Book Description Simulation modelling is an exploration method that aims to imitate physical systems in a virtual environment and retrieve useful statistical inferences from it. The ability to analyze the model as it runs sets simulation modelling apart from other methods used in conventional analyses. This book is your comprehensive and hands-on guide to understanding various computational statistical simulations using Python. The book begins by helping you get familiarized with the fundamental concepts of simulation modelling, that'll enable you to understand the various methods and techniques needed to explore complex topics. Data scientists working with simulation models will be able to put their knowledge to work with this practical guide. As you advance, you'll dive deep into numerical simulation algorithms, including an overview of relevant applications, with the help of real-world use cases and practical examples. You'll also find out how to use Python to develop simulation models and how to use several Python packages. Finally, you'll get to grips with various numerical simulation algorithms and concepts, such as Markov Decision Processes, Monte Carlo methods, and bootstrapping techniques. By the end of this book, you'll have learned how to construct and deploy simulation models of your own to overcome real-world challenges. What you will learn Get to grips with the concept of randomness and the data generation process Delve into resampling methods Discover how to work with Monte Carlo

simulations Utilize simulations to improve or optimize systems Find out how to run efficient simulations to analyze real-world systems Understand how to simulate random walks using Markov chains Who this book is for This book is for data scientists, simulation engineers, and anyone who is already familiar with the basic computational methods and wants to implement various simulation techniques such as Monte-Carlo methods and statistical simulation using Python.

Simulation and Modeling Methodologies, Technologies and Applications - Mohammad S. Obaidat 2016-01-14

The present book includes a set of selected extended papers from the 4th International Conference on Simulation and Modeling Methodologies, Technologies and Applications (SIMULTECH 2014), held in Vienna, Austria, from 28 to 30 August 2014. The conference brought together researchers, engineers and practitioners interested in methodologies and applications of modeling and simulation. New and innovative solutions are reported in this book. SIMULTECH 2014 received 167 submissions, from 45 countries, in all continents. After a double blind paper review performed by the Program Committee, 23% were accepted as full papers and thus selected for oral presentation. Additional papers were accepted as short papers and posters. A further selection was made after the Conference, based also on the assessment of presentation quality and audience interest, so that this book includes the extended and revised versions of the very best papers of SIMULTECH 2014. Commitment to high quality standards is a major concern of SIMULTECH that will be maintained in the next editions, considering not only the stringent paper acceptance ratios but also the quality of the program committee, keynote lectures, participation level and logistics.

Financial Modeling with Crystal Ball and Excel, + Website - John Charnes 2012-06-05

Updated look at financial modeling and Monte Carlo simulation with software by Oracle Crystal Ball This revised and updated edition of the bestselling book on financial modeling provides the tools and techniques needed to perform spreadsheet simulation. It answers the essential question of why risk analysis is vital to the decision-making process, for any problem posed in finance and investment. This reliable resource reviews the basics and covers how to define and refine probability distributions in financial modeling, and explores the concepts driving the simulation modeling process. It also discusses simulation controls and analysis of simulation results. The second edition of Financial Modeling with Crystal Ball and Excel contains instructions, theory, and practical example models to help apply risk analysis to such areas as derivative pricing, cost estimation, portfolio allocation and optimization, credit risk, and cash flow analysis. It includes the resources needed to develop essential skills in the areas of valuation, pricing, hedging, trading, risk management, project evaluation, credit risk, and portfolio management. Offers an updated edition of the bestselling book covering the newest version of Oracle Crystal Ball Contains valuable insights on Monte Carlo simulation—an essential skill applied by many corporate finance and investment professionals Written by John Charnes, the former finance department chair at the University of Kansas and senior vice president of global portfolio strategies at Bank of America, who is currently President and Chief Data Scientist at Syntelli Solutions, Inc. Risk Analytics and Predictive Intelligence Division (Syntelli RAPID) Engaging and informative, this book is a vital resource designed to help you become more adept at financial modeling and simulation.

Simulation Modeling Using @Risk - Wayne L. Winston 1996

Risk Management and Simulation - Aparna Gupta 2016-04-19

The challenges of the current financial environment have revealed the need for a new generation of professionals who combine training in traditional finance disciplines with an

understanding of sophisticated quantitative and analytical tools. Risk Management and Simulation shows how simulation modeling and analysis can help you solve risk management problems related to market, credit, operational, business, and strategic risk. Simulation models and methodologies offer an effective way to address many of these problems and are easy for finance professionals to understand and use. Drawing on the author's extensive teaching experience, this accessible book walks you through the concepts, models, and computational techniques. How Simulation Models Can Help You Manage Risk More Effectively Organized into four parts, the book begins with the concepts and framework for risk management. It then introduces the modeling and computational techniques for solving risk management problems, from model development, verification, and validation to designing simulation experiments and conducting appropriate output analysis. The third part of the book delves into specific issues of risk management in a range of risk types. These include market risk, equity risk, interest rate risk, commodity risk, currency risk, credit risk, liquidity risk, and strategic, business, and operational risks. The author also examines insurance as a mechanism for risk management and risk transfer. The final part of the book explores advanced concepts and techniques. The book contains extensive review questions and detailed quantitative or computational exercises in all chapters. Use of MATLAB® mathematical software is encouraged and suggestions for MATLAB functions are provided throughout. Learn Step by Step, from Basic Concepts to More Complex Models Packed with applied examples and exercises, this book builds from elementary models for risk to more sophisticated, dynamic models for risks that evolve over time. A comprehensive introduction to simulation modeling and analysis for risk management, it gives you the tools to better assess and manage the impact of risk in your organizations. The book can also serve as a support reference for readers preparing for CFA exams, GARP FRM exams, PRMIA PRM exams, and actuarial exams.

Modeling Risk - Johnathan Mun 2010-06-15

An updated guide to risk analysis and modeling Although risk was once seen as something that was both unpredictable and uncontrollable, the evolution of risk analysis tools and theories has changed the way we look at this important business element. In the Second Edition of Analyzing and Modeling Risk, expert Dr. Johnathan Mun provides up-to-date coverage of risk analysis as it is applied within the realms of business risk analysis and offers an intuitive feel of what risk looks like, as well as the different ways of quantifying it. This Second Edition provides professionals in all industries a more comprehensive guide on such key concepts as risk and return, the fundamentals of model building, Monte Carlo simulation, forecasting, time-series and regression analysis, optimization, real options, and more. Includes new examples, questions, and exercises as well as updates using Excel 2007 Book supported by author's proprietary risk analysis software found on the companion CD-ROM Offers both a qualitative and quantitative description of risk Filled with in-depth insights and practical advice, this reliable resource covers all of the essential tools and techniques that risk managers need to successfully conduct risk analysis. Note: CD-ROM/DVD and other supplementary materials are not included as part of eBook file.

Advances in Modeling and Simulation - Andreas Tolk 2017-08-27

This broad-ranging text/reference presents a fascinating review of the state of the art of modeling and simulation, highlighting both the seminal work of preeminent authorities and exciting developments from promising young researchers in the field. Celebrating the 50th anniversary of the Winter Simulation Conference (WSC), the premier international forum for disseminating recent advances in the field of system simulation, the book showcases the historical importance of this influential conference while also looking forward to a bright future for the

simulation community. Topics and features: examines the challenge of constructing valid and efficient models, emphasizing the benefits of the process of simulation modeling; discusses model calibration, input model risk, and approaches to validating emergent behaviors in large-scale complex systems with non-linear interactions; reviews the evolution of simulation languages, and the history of the Time Warp algorithm; offers a focus on the design and analysis of simulation experiments under various goals, and describes how data can be “farmed” to support decision making; provides a comprehensive overview of Bayesian belief models for simulation-based decision making, and introduces a model for ranking and selection in cloud computing; highlights how input model uncertainty impacts simulation optimization, and proposes an approach to quantify and control the impact of input model risk; surveys the applications of simulation in semiconductor manufacturing, in social and behavioral modeling, and in military planning and training; presents data analysis on the publications from the Winter Simulation Conference, offering a big-data perspective on the significant impact of the conference. This informative and inspiring volume will appeal to all academics and professionals interested in computational and mathematical modeling and simulation, as well as to graduate students on the path to form the next generation of WSC pioneers.

Verification and Validation for Modeling and Simulation - Jeffrey Strickland 2014-12-08

This work began when I was appointed as a Technical Director for Modeling and Simulation (M&S) Verification and Validation (V&V) for a major defense system in 2008. It is intended to provide the nuts and bolts of performing M&S V&V in one volume. It is not intended to provide a holistic approach to M&S V&V, as that can be derived from other sources. As such, this book assumes a basic understanding of V&V, including its place in the lifecycle, its purpose and its scope for ensuring the quality of models and simulations. During the process of developing this text, the Simulation Interoperability Standards Organization (SISO) completed SISO-GUIDE-001.2-2013, Guide for Generic Methodology for Verification and Validation (GM-VV) to Support Acceptance of Models, Simulations, and Data, 2 Volumes, June 2013. The guide does serve the purpose not covered by this book. This text provides procedural details for performing V&V. The procedures are static, dynamic and informal.

Introduction to Simulation and Risk Analysis - James R. Evans 2002

Simulation fundamentals : Introduction to Simulation - Simulation Using Excel - Probability and Statistics in Simulation - Simulation in risk analysis : Risk Analysis Using Crystal Ball - Applications of Risk Analysis - Building System Simulation Models - Systems simulation : Output Analysis and Experimentation for Systems Simulation - Systems Simulation Using ProcessModel - Applications of Systems Simulation - Extensions of simulation : Simulation in Forecasting and Optimization.

Principles of Object-Oriented Modeling and Simulation with Modelica 3.3 - Peter Fritzson 2014-11-24

Fritzson covers the Modelica language in impressive depth from the basic concepts such as cyber-physical, equation-base, object-oriented, system, model, and simulation, while also incorporating over a hundred exercises and their solutions for a tutorial, easy-to-read experience. The only book with complete Modelica 3.3 coverage Over one hundred exercises and solutions Examines basic concepts such as cyber-physical, equation-based, object-oriented, system, model, and simulation

Discrete Event Simulation for Health Technology Assessment - J. Jaime Caro 2015-10-16

Discover How to Apply DES to Problems Encountered in HTA Discrete event simulation (DES) has traditionally been used in the engineering and operations research fields. The use of DES to inform decisions about health technologies is still in its infancy.

Written by specialists at the forefront of this area, Discrete Event Simulation for Health Technology Assessment is the first book to make all the central concepts of DES relevant for health technology assessment (HTA). Accessible to beginners, the book requires no prerequisites and describes the concepts with as little jargon as possible. The book first covers the essential concepts and their implementation. It next provides a fully worked out example using both a widely available spreadsheet program (Microsoft Excel) and a popular specialized simulation package (Arena). It then presents approaches to analyze the simulations, including the treatment of uncertainty; tackles the development of the required equations; explains the techniques to verify that the models are as efficient as possible; and explores the indispensable topic of validation. The book also covers a variety of non-essential yet handy topics, such as the animation of a simulation and extensions of DES, and incorporates a real case study involving screening strategies for breast cancer surveillance. This book guides you in leveraging DES in your assessments of health technologies. After reading the chapters in sequence, you will be able to construct a realistic model designed to help in the assessment of a new health technology.

Business Risk and Simulation Modelling in Practice - Michael Rees 2015-09-21

The complete guide to the principles and practice of risk quantification for business applications. The assessment and quantification of risk provide an indispensable part of robust decision-making; to be effective, many professionals need a firm grasp of both the fundamental concepts and of the tools of the trade. Business Risk and Simulation Modelling in Practice is a comprehensive, in–depth, and practical guide that aims to help business risk managers, modelling analysts and general management to understand, conduct and use quantitative risk assessment and uncertainty modelling in their own situations. Key content areas include: Detailed descriptions of risk assessment processes, their objectives and uses, possible approaches to risk quantification, and their associated decision-benefits and organisational challenges. Principles and techniques in the design of risk models, including the similarities and differences with traditional financial models, and the enhancements that risk modelling can provide. In depth coverage of the principles and concepts in simulation methods, the statistical measurement of risk, the use and selection of probability distributions, the creation of dependency relationships, the alignment of risk modelling activities with general risk assessment processes, and a range of Excel modelling techniques. The implementation of simulation techniques using both Excel/VBA macros and the @RISK Excel add-in. Each platform may be appropriate depending on the context, whereas the core modelling concepts and risk assessment contexts are largely the same in each case. Some additional features and key benefits of using @RISK are also covered. Business Risk and Simulation Modelling in Practice reflects the author′s many years in training and consultancy in these areas. It provides clear and complete guidance, enhanced with an expert perspective. It uses approximately one hundred practical and real-life models to demonstrate all key concepts and techniques; these are accessible on the companion website.

Credit Risk Modeling using Excel and VBA - Gunter Löeffler 2011-01-31

It is common to blame the inadequacy of credit risk models for the fact that the financial crisis has caught many market participants by surprise. On closer inspection, though, it often appears that market participants failed to understand or to use the models correctly. The recent events therefore do not invalidate traditional credit risk modeling as described in the first edition of the book. A second edition is timely, however, because the first dealt relatively briefly with instruments featuring prominently in the crisis (CDSs and CDOs). In addition to

expanding the coverage of these instruments, the book will focus on modeling aspects which were of particular relevance in the financial crisis (e.g. estimation error) and demonstrate the usefulness of credit risk modelling through case studies. This book provides practitioners and students with an intuitive, hands-on introduction to modern credit risk modelling. Every chapter starts with an explanation of the methodology and then the authors take the reader step by step through the implementation of the methods in Excel and VBA. They focus specifically on risk management issues and cover default probability estimation (scoring, structural models, and transition matrices), correlation and portfolio analysis, validation, as well as credit default swaps and structured finance. The book has an accompanying website, http://loeffler-posch.com/, which has been specially updated for this Second Edition and contains slides and exercises for lecturers.

Financial Simulation Modeling in Excel - Keith A. Allman 2011-09-02

"I've worked with simulation in business for over 20 years, andAllman really nails it with this book. I admit that I own hisprevious book on structured finance cash flows, but I was surprisedby what I found in here. He addresses the fundamental questions ofhow decision makers react to simulations and his read was very muchin accordance with what I've experienced myself. When it came tothe nuts and bolts of describing the different types of simulationanalysis the book becomes incredibly detailed. There is workingcode and models for a fantastic array of the most common simulationproblems. If you're so inclined, the book very carefully stepsthrough the tricky math needed to really understand the theorybehind stochastic modeling in finance. If you're preparing modelsthat include any kind of randomization or stochastic modelingcomponent, this book is a must-read, a tremendous value andtime-saver." — David Brode of The Brode Group A practical guide to understanding and implementing financialsimulation modeling As simulation techniques become more popular among the financialcommunity and a variety of sub-industries, a thorough understandingof theory and implementation is critical for practitioners involvedin portfolio management, risk management, pricing, and capitalbudgeting. Financial Simulation Modeling in Excel containsthe information you need to make the most informed decisionspossible in your professional endeavors. Financial Simulation Modeling in Excel contains apractical, hands-on approach to learning complex financialsimulation methodologies using Excel and VBA as a medium. Craftedin an easy to understand format, this book is suitable for anyonewith a basic understanding of finance and Excel. Filled within-depth insights and expert advice, each chapter takes you throughthe theory behind a simulation topic and the implementation of thatsame topic in Excel/VBA in a step-by-step manner. Organized in an easy-to-follow fashion, this guide effectivelywalks you through the process of creating and implementing riskmodels in Excel A companion website contains all the Excel models risk expertsand quantitative analysts need to practice and confirm theirresults as they progress Keith Allman is the author of other successful modeling books,including Corporate Valuation Modeling and ModelingStructured Finance Cash Flows with Microsoft Excel Created for those with some background in finance and experiencein Excel, this reliable resource shows you how to effectivelyperform sound financial simulation modeling, even if you've yet todo extensive modeling up to this point in your professional oracademic career.

Data Analysis, Optimization, and Simulation Modeling - S. Christian Albright 2011

DATA ANALYSIS, OPTIMIZATION, AND SIMULATION MODELING, 4e, International Edition is a teach-by-example approach, learner-friendly writing style, and complete Excel integration focusing on data analysis, modeling, and spreadsheet use in statistics and management science. The Premium Online

Content Website (accessed by a unique code with every new book) includes links to the following add-ins: the Palisade Decision Tools Suite (@RISK, StatTools, PrecisionTree, TopRank, RISKOptimizer, NeuralTools, and Evolver); and SolverTable, allowing users to do sensitivity analysis. All of the add-ins is revised for Excel 2007 and notes about Excel 2010 are added where applicable.

Modeling Risk - Johnathan Mun 2006-07-21

This completely revised and updated edition of Applied Risk Analysis includes new case studies in modeling risk and uncertainty as well as a new risk analysis CD-ROM prepared by Dr. Mun. On the CD-ROM you'll find his Risk Simulator and Real Options Super Lattice Solver software as well as many useful spreadsheet models. "Johnathan Mun's book is a sparkling jewel in my finance library. Mun demonstrates a deep understanding of the underlying mathematical theory in his ability to reduce complex concepts to lucid explanations and applications. For this reason, he's my favorite writer in this field." —Janet Tavakoli, President, Tavakoli Structured Finance, Inc. and author of Collateralized Debt Obligations and Structured Finance "A must-read for product portfolio managers . . . it captures the risk exposure of strategic investments, and provides management with estimates of potential outcomes and options for risk mitigation." —Rafael E. Gutierrez, Executive Director of Strategic Marketing and Planning, Seagate Technology, Inc. "Once again, Dr. Mun has created a 'must-have, must-read' book for anyone interested in the practical application of risk analysis. Other books speak in academic generalities, or focus on one area of risk application. [This book] gets to the heart of the matter with applications for every area of risk analysis. You have a real option to buy almost any book?you should exercise your option and get this one!" —Glenn Kautt, MBA, CFP, EA, President and Chairman, The Monitor Group, Inc. Note: CD-ROM/DVD and other supplementary materials are not included as part of eBook file.

Reliability and Risk Models - Michael Todinov 2015-09-01

A comprehensively updated and reorganized new edition. The updates include comparative methods for improving reliability; methods for optimal allocation of limited resources to achieve a maximum risk reduction; methods for improving reliability at no extra cost and building reliability networks for engineering systems. Includes: A unique set of 46 generic principles for reducing technical risk Monte Carlo simulation algorithms for improving reliability and reducing risk Methods for setting reliability requirements based on the cost of failure New reliability measures based on a minimal separation of random events on a time interval Overstress reliability integral for determining the time to failure caused by overstress failure modes A powerful equation for determining the probability of failure controlled by defects in loaded components with complex shape Comparative methods for improving reliability which do not require reliability data Optimal allocation of limited resources to achieve a maximum risk reduction Improving system reliability based solely on a permutation of interchangeable components

Business Economics and Finance with MATLAB, GIS, and Simulation Models - Patrick L. Anderson 2004-07-27

This book takes recent theoretical advances in Finance and Economics and shows how they can be implemented in the real world. It presents tactics for using mathematical and simulation models to solve complex tasks of forecasting income, valuing businesses, predicting retail sales, and evaluating markets and tax and regulatory problems. Busine

Spatial Agent-Based Simulation Modeling in Public Health - S. M. Niaz Arifin 2016-04-11

Presents an overview of the complex biological systems used within a global public health setting and features a focus on malaria analysis Bridging the gap between agent-based modeling and simulation (ABMS) and geographic information systems (GIS), Spatial Agent-Based Simulation Modeling in Public Health:

Design, Implementation, and Applications for Malaria Epidemiology provides a useful introduction to the development of agent-based models (ABMs) by following a conceptual and biological core model of Anopheles gambiae for malaria epidemiology. Using spatial ABMs, the book includes mosquito (vector) control interventions and GIS as two example applications of ABMs, as well as a brief description of epidemiology modeling. In addition, the authors discuss how to most effectively integrate spatial ABMs with a GIS. The book concludes with a combination of knowledge from entomological, epidemiological, simulation-based, and geo-spatial domains in order to identify and analyze relationships between various transmission variables of the disease. Spatial Agent-Based Simulation Modeling in Public Health: Design, Implementation, and Applications for Malaria Epidemiology also features: Location-specific mosquito abundance maps that play an important role in malaria control activities by guiding future resource allocation for malaria control and identifying hotspots for further investigation Discussions on the best modeling practices in an effort to achieve improved efficacy, cost-effectiveness, ecological soundness, and sustainability of vector control for malaria An overview of the various ABMs, GIS, and spatial statistical methods used in entomological and epidemiological studies, as well as the model malaria study A companion website with computer source code and flowcharts of the spatial ABM and a landscape generator tool that can simulate landscapes with varying spatial heterogeneity of different types of resources including aquatic habitats and houses Spatial Agent-Based Simulation Modeling in Public Health: Design, Implementation, and Applications for Malaria Epidemiology is an excellent reference for professionals such as modeling and simulation experts, GIS experts, spatial analysts, mathematicians, statisticians, epidemiologists, health policy makers, as well as researchers and scientists who use, manage, or analyze infectious disease data and/or infectious disease-related projects. The book is also ideal for graduate-level courses in modeling and simulation, bioinformatics, biostatistics, public health and policy, and epidemiology.

Simulation Strategies to Reduce Recidivism - Faye S. Taxman 2013-06-05

The use of simulation modeling in criminal justice dates back to the 1970s. Early models were developed to capture the realities of the criminal justice system, to identify what changes were needed, and how small changes would affect the overall picture. Significant time and effort were devoted to these projects and although they achieved some success, the complex nature of the criminal justice system and the difficulties associated with improving and maintaining the models prohibited wide spread adoption in the field. Some of the problems with early simulation projects were the lack of data to validate models, the lack of technical skills needed by staff to design and build the models, and the technical difficulties with software programming to transform models into computerized representations. As simulation modeling has becoming a more popular technique across many disciplines, and technology as well as the technical skills of researchers has improved, this book revisits the concept of simulation modeling with new applications for the criminal justice system. The wider availability of data has made for more opportunity to verify and validate models; computing software has become more available and easier to use; and the capacity for visualization and communication of models shows promise for the future of simulation in criminal justice. The time has come to examine the past, present, and future contributions of simulation modeling to the field of criminal justice. This work provides a central resource of information for the current state of simulation modeling, and overview of existing techniques and cases of success, and directions for future development. This work will be an important resource for researchers in criminal justice and

related fields, as well as those studying policy-related topics.

Underwater Acoustic Modeling and Simulation, Fourth Edition - Paul C. Etter 2013-02-21

Underwater Acoustic Modeling and Simulation, Fourth Edition continues to provide the most authoritative overview of currently available propagation, noise, reverberation, and sonar-performance models. This fourth edition of a bestseller discusses the fundamental processes involved in simulating the performance of underwater acoustic systems and emphasizes the importance of applying the proper modeling resources to simulate the behavior of sound in virtual ocean environments. New to the Fourth Edition Extensive new material that addresses recent advances in inverse techniques and marine-mammal protection Problem sets in each chapter Updated and expanded inventories of available models Designed for readers with an understanding of underwater acoustics but who are unfamiliar with the various aspects of modeling, the book includes sufficient mathematical derivations to demonstrate model formulations and provides guidelines for selecting and using the models. Examples of each type of model illustrate model formulations, model assumptions, and algorithm efficiency. Simulation case studies are also included to demonstrate practical applications. Providing a thorough source of information on modeling resources, this book examines the translation of our physical understanding of sound in the sea into mathematical models that simulate acoustic propagation, noise, and reverberation in the ocean. The text shows how these models are used to predict and diagnose the performance of complex sonar systems operating in the undersea environment.

Simulation Modeling and Analysis - Averill M. Law 2007

Since the publication of the first edition in 1982, the goal of Simulation Modeling and Analysis has always been to provide a comprehensive, state-of-the-art, and technically correct treatment of all important aspects of a simulation study. The book strives to make this material understandable by the use of intuition and numerous figures, examples, and problems. It is equally well suited for use in university courses, simulation practice, and self study. The book is widely regarded as the "bible" of simulation and now has more than 100,000 copies in print. The book can serve as the primary text for a variety of courses; for example: *A first course in simulation at the junior, senior, or beginning-graduate-student level in engineering, manufacturing, business, or computer science (Chaps. 1 through 4, and parts of Chaps. 5 through 9). At the end of such a course, the students will be prepared to carry out complete and effective simulation studies, and to take advanced simulation courses. *A second course in simulation for graduate students in any of the above disciplines (most of Chaps. 5 through 12). After completing this course, the student should be familiar with the more advanced methodological issues involved in a simulation study, and should be prepared to understand and conduct simulation research. *An introduction to simulation as part of a general course in operations research or management science (part of Chaps. 1, 3, 5, 6, and 9).

Financial Modeling with Crystal Ball and Excel - John Charnes 2011-08-04

Praise for Financial Modeling with Crystal Ball(r) and Excel(r) "Professor Charnes's book drives clarity into applied Monte Carlo analysis using examples and tools relevant to real-world finance. The book will prove useful for analysts of all levels and as a supplement to academic courses in multiple disciplines." -Mark Odermann, Senior Financial Analyst, Microsoft "Think you really know financial modeling? This is a must-have for power Excel users. Professor Charnes shows how to make more realistic models that result in fewer surprises. Every analyst needs this credibility booster." -James Franklin, CEO, Decisioneering, Inc. "This book packs a first-year MBA's worth of financial and business modeling education into a few dozen easy-to-understand

examples. Crystal Ball software does the housekeeping, so readers can concentrate on the business decision. A careful reader who works the examples on a computer will master the best general-purpose technology available for working with uncertainty." -Aaron Brown, Executive Director, Morgan Stanley, author of The Poker Face of Wall Street "Using Crystal Ball and Excel, John Charnes takes you step by step, demonstrating a conceptual framework that turns static Excel data and financial models into true risk models. I am astonished by the clarity of the text and the hands-on, step-by-step examples using Crystal Ball and Excel; Professor Charnes is a masterful teacher, and this is an absolute gem of a book for the new generation of analyst." -Brian Watt, Chief Operating Officer, GECC, Inc. "Financial Modeling with Crystal Ball and Excel is a comprehensive, well-written guide to one of the most useful analysis tools available to professional risk managers and quantitative analysts. This is a must-have book for anyone using Crystal Ball, and anyone wanting an overview of basic risk management concepts." -Paul Dietz, Manager, Quantitative Analysis, Westar Energy "John Charnes presents an insightful exploration of techniques for analysis and understanding of risk and uncertainty in business cases. By application of real options theory and Monte Carlo simulation to planning, doors are opened to analysis of what used to be impossible, such as modeling the value today of future project choices." -Bruce Wallace, Nortel

Financial Modeling with Crystal Ball and Excel, + Website, 2nd Edition - John Charnes 2012

Updated look at financial modeling and Monte Carlo simulation with software by Oracle Crystal Ball This revised and updated edition of the bestselling book on financial modeling provides the tools and techniques needed to perform spreadsheet simulation. It answers the essential question of why risk analysis is vital to the decision-making process, for any problem posed in finance and investment. This reliable resource reviews the basics and covers how to define and refine probability distributions in financial modeling, and explores the concepts driving the simulation modeling process. It also discusses simulation controls and analysis of simulation results. The second edition of Financial Modeling with Crystal Ball and Excel contains instructions, theory, and practical example models to help apply risk analysis to such areas as derivative pricing, cost estimation, portfolio allocation and optimization, credit risk, and cash flow analysis. It includes the resources needed to develop essential skills in the areas of valuation, pricing, hedging, trading, risk management, project evaluation, credit risk, and portfolio management. Offers an updated edition of the bestselling book covering the newest version of Oracle Crystal Ball Contains valuable insights on Monte Carlo simulation-an essential skill applied by many corporate finance and investment professionals Written by John Charnes, the former finance department chair at the University of Kansas and senior vice president of global portfolio strategies at Bank of America, who is currently President and Chief Data Scientist at Syntelli Solutions, Incorporated Risk Analytics and Predictive Intelligence Division (Syntelli RAPID) Engaging and informative, this book is a vital resource designed to help you become more adept at financial modeling and simulation.

Simulation Modeling - Constantin Volosencu 2022-01-19

The book presents some recent specialized works of a theoretical and practical nature in the field of simulation modeling, which is being addressed to a large number of specialists, mathematicians, doctors, engineers, economists, professors, and students. The book comprises 11 chapters that promote modern mathematical algorithms and simulation modeling techniques, in practical applications, in the following thematic areas: mathematics, biomedicine, systems of systems, materials science and engineering, energy systems, and economics. This project presents scientific papers and applications that emphasize the capabilities of simulation modeling methods, helping readers to

understand the phenomena that take place in the real world, the conditions of their development, and their effects, at a high scientific and technical level. The authors have published work examples and case studies that resulted from their researches in the field. The readers get new solutions and answers to questions related to the emerging applications of simulation modeling and their advantages.

Business Risk and Simulation Modelling in Practice - Michael Rees 2015-08-03

The complete guide to the principles and practice of risk quantification for business applications. The assessment and quantification of risk provide an indispensable part of robust decision-making; to be effective, many professionals need a firm grasp of both the fundamental concepts and of the tools of the trade. Business Risk and Simulation Modelling in Practice is a comprehensive, in–depth, and practical guide that aims to help business risk managers, modelling analysts and general management to understand, conduct and use quantitative risk assessment and uncertainty modelling in their own situations. Key content areas include: Detailed descriptions of risk assessment processes, their objectives and uses, possible approaches to risk quantification, and their associated decision-benefits and organisational challenges. Principles and techniques in the design of risk models, including the similarities and differences with traditional financial models, and the enhancements that risk modelling can provide. In depth coverage of the principles and concepts in simulation methods, the statistical measurement of risk, the use and selection of probability distributions, the creation of dependency relationships, the alignment of risk modelling activities with general risk assessment processes, and a range of Excel modelling techniques. The implementation of simulation techniques using both Excel/VBA macros and the @RISK Excel add-in. Each platform may be appropriate depending on the context, whereas the core modelling concepts and risk assessment contexts are largely the same in each case. Some additional features and key benefits of using @RISK are also covered. Business Risk and Simulation Modelling in Practice reflects the author′s many years in training and consultancy in these areas. It provides clear and complete guidance, enhanced with an expert perspective. It uses approximately one hundred practical and real-life models to demonstrate all key concepts and techniques; these are accessible on the companion website.

Simulation Modeling and Analysis with ARENA - Tayfur Altiok 2010-07-26

Simulation Modeling and Analysis with Arena is a highly readable textbook which treats the essentials of the Monte Carlo discrete-event simulation methodology, and does so in the context of a popular Arena simulation environment. It treats simulation modeling as an in-vitro laboratory that facilitates the understanding of complex systems and experimentation with what-if scenarios in order to estimate their performance metrics. The book contains chapters on the simulation modeling methodology and the underpinnings of discrete-event systems, as well as the relevant underlying probability, statistics, stochastic processes, input analysis, model validation and output analysis. All simulation-related concepts are illustrated in numerous Arena examples, encompassing production lines, manufacturing and inventory systems, transportation systems, and computer information systems in networked settings. · Introduces the concept of discrete event Monte Carlo simulation, the most commonly used methodology for modeling and analysis of complex systems · Covers essential workings of the popular animated simulation language, ARENA, including set-up, design parameters, input data, and output analysis, along with a wide variety of sample model applications from production lines to transportation systems · Reviews elements of statistics, probability, and stochastic processes relevant to simulation

modeling * Ample end-of-chapter problems and full Solutions Manual * Includes CD with sample ARENA modeling programs

Practical Spreadsheet Modeling Using @Risk - Dale Lehman 2019-11-11

Practical Spreadsheet Modeling Using @Risk provides a guide of how to construct applied decision analysis models in spreadsheets. The focus is on the use of Monte Carlo simulation to provide quantitative assessment of uncertainties and key risk drivers. The book presents numerous examples based on real data and relevant practical decisions in a variety of settings, including health care, transportation, finance, natural resources, technology, manufacturing, retail, and sports and entertainment. All examples involve decision problems where uncertainties make simulation modeling useful to obtain decision insights and explore alternative choices. Good spreadsheet modeling practices are highlighted. The book is suitable for graduate students or advanced undergraduates in business, public policy, health care administration, or any field amenable to simulation modeling of decision problems. The book is also useful for applied practitioners seeking to build or enhance their spreadsheet modeling skills. Features Step-by-step examples of spreadsheet modeling and risk analysis in a variety of fields Description of probabilistic methods, their theoretical foundations, and their practical application in a spreadsheet environment Extensive example models and exercises based on real data and relevant decision problems Comprehensive use of the @Risk software for simulation analysis, including a free one-year educational software license

Simulation for Policy Inquiry - Anand Desai 2012-06-12

Public policy and management problems have been described as poorly defined, messy, squishy, unstructured, intractable, and wicked. In a word, they are complex. This book illustrates the development and use of simulation models designed to capture some of the complexity inherent in the formulation, management, and implementation of policies aimed at addressing such problems. Simulation models have long existed at the fringes of policy inquiry but are not yet considered an essential component of the policy analyst’s toolkit. However, this situation is likely to change because with improvements in computational power and software, simulation is now easier to include in the standard repertoire of research tools available for discovery and decision support. This volume provides both a conceptual rationale for using simulations to inform public policy and a practical introduction to how such models might be constructed and employed. The focus of these papers is on the uses of simulation to gain understanding and inform policy decisions and action. Techniques represented in this volume include Monte Carlo simulation, system dynamics and agent based modeling.

Simulation and Optimization in Finance - Dessislava A. Pachamanova 2010-09-23

An introduction to the theory and practice of financial simulation and optimization In recent years, there has been a notable increase in the use of simulation and optimization methods in the financial industry. Applications include portfolio allocation, risk management, pricing, and capital budgeting under uncertainty. This accessible guide provides an introduction to the simulation and optimization techniques most widely used in finance, while at the same time offering background on the financial concepts in these applications. In addition, it clarifies difficult concepts in traditional models of uncertainty in finance, and teaches you how to build models with software. It does this by reviewing current simulation and optimization methodology-along with available software-and proceeds with portfolio risk management, modeling of random processes, pricing of financial derivatives, and real options applications. Contains a unique combination of finance theory and rigorous mathematical modeling emphasizing a hands-on approach through implementation with software Highlights not only classical applications, but also more recent

developments, such as pricing of mortgage-backed securities Includes models and code in both spreadsheet-based software (@RISK, Solver, Evolver, VBA) and mathematical modeling software (MATLAB) Filled with in-depth insights and practical advice, Simulation and Optimization Modeling in Finance offers essential guidance on some of the most important topics in financial management.

Simulation Techniques in Financial Risk Management - Ngai Hang Chan 2015-04-22

Praise for the First Edition "…a nice, self-contained introduction to simulation and computational techniques in finance…" – Mathematical Reviews Simulation Techniques in Financial Risk Management, Second Edition takes a unique approach to the field of simulations by focusing on techniques necessary in the fields of finance and risk management. Thoroughly updated, the new edition expands on several key topics in these areas and presents many of the recent innovations in simulations and risk management, such as advanced option pricing models beyond the Black–Scholes paradigm, interest rate models, MCMC methods including stochastic volatility models simulations, model assets and model-free properties, jump diffusion, and state space modeling. The Second Edition also features: Updates to primary software used throughout the book, Microsoft Office® Excel® VBA New topical coverage on multiple assets, model-free properties, and related models More than 300 exercises at the end of each chapter, with select answers in the appendix, to help readers apply new concepts and test their understanding Extensive use of examples to illustrate how to use simulation techniques in risk management Practical case studies, such as the pricing of exotic options; simulations of Greeks in hedging; and the use of Bayesian ideas to assess the impact of jumps, so readers can reproduce the results of the studies A related website with additional solutions to problems within the book as well as Excel VBA and S-Plus computer code for many of the examples within the book Simulation Techniques in Financial Risk Management, Second Edition is an invaluable resource for risk managers in the financial and actuarial industries as well as a useful reference for readers interested in learning how to better gauge risk and make more informed decisions. The book is also ideal for upper-undergraduate and graduate-level courses in simulation and risk management.

Current Issues in Computer Simulation - Nabil R. Adam 2014-05-09

Current Issues in Computer Simulation is a collection of papers dealing with computer simulation languages, statistical aspects of simulation, linkage with optimization and analytical models, as well as theory and application of simulation methodology. Some papers explain the General Purpose Simulation System (GPSS), a programming package incorporating a language to simulate discrete systems; and the SIMSCRIPT, a general-purpose simulation language using English commands, for example, FORTRAN. Another simulation language is the General Activity Simulation Program (GASP), providing for an organizational structure to build models to simulate the dynamic performance of systems on a digital computer. Other papers discuss simulation models of real systems, including corporate simulation models, multistage consumer choice process, determination of maximum occupancy for hospital facilities, and the juvenile court system. Many computer simulations are statistical sampling experiments performed on a model of the system under investigation. Other papers discuss some of the variables involved in the statistical design and analysis of simulation experiments such as variance reduction techniques, generation of random variates, and experimental layout. For example, one application simulates inventory systems when many items are stocked in various locations. The collection is suitable for programmers, computer engineers, businessmen, hospital administrators, schools officials, and depositories of huge volumes of information or data.

Business Process Modeling, Simulation and Design, Second Edition - Manuel Laguna 2013-04-25

Most textbooks on business process management focus on either the nuts and bolts of computer simulation or the managerial aspects of business processes. Covering both technical and managerial aspects of business process management, Business Process Modeling, Simulation and Design, Second Edition presents the tools to design effective business processes and the management techniques to operate them efficiently. New to the Second Edition Three completely revised chapters that incorporate ExtendSim 8 An introduction to simulation A chapter on business process analytics Developed from the authors' many years of teaching process design and simulation courses, the text provides students with a thorough understanding of numerous analytical tools that can be used to model, analyze, design, manage, and improve business processes. It covers a wide range of approaches, including discrete event simulation, graphical flowcharting tools, deterministic models for cycle time analysis and capacity decisions, analytical queuing methods, and data mining. Unlike other operations management books, this one emphasizes user-friendly simulation software as well as business processes, rather than only manufacturing processes or general operations management problems. Taking an analytical modeling approach to process design, this book illustrates the power of simulation modeling as a vehicle for analyzing and designing business processes. It teaches how to apply process simulation and discusses the managerial implications of redesigning processes. The ExtendSim software is available online and ancillaries are available for instructors.

Enterprise Risk Management - David L Olson 2015-01-21

Risk is inherent in business. Without risk, there would be no motivation to conduct business. But a key principle is that organizations should accept risks that they are competent enough to deal with, and "outsource" other risks to those who are more competent to deal with them (such as insurance companies). Enterprise Risk Management (2nd Edition) approaches enterprise risk management from the perspectives of accounting, supply chains, and disaster management, in addition to the core perspective of finance. While the first edition included the perspective of information systems, the second edition views this as part of supply chain management or else focused on technological specifics. It discusses analytical tools available to assess risk, such as balanced scorecards, risk matrices, multiple criteria analysis, simulation, data envelopment analysis, and financial risk measures.

Advances in Applied Digital Human Modeling and Simulation - Vincent G. Duffy 2016-07-26

This book focuses on the predictive capabilities derived from digital representation of humans in simulation or virtual environments. It reports on models that facilitate prediction of safety and performance, and describes both innovative visualization techniques as well as the underlying mathematics and science. Contributions cover a wealth of topics, including simulation tools and platforms, virtual interactive design, model optimization methods, ontologies and knowledge-based decision support, human-computer interaction, human augmentation, and many others. The book gives special emphasis to cutting-edge simulation applications of human system modeling and optimization, including aviation, manufacturing and service industries, automotive design, product design, healthcare, sustainability, and emergency management. Based on the AHFE 2016 International Conference on Digital Human Modeling and Simulation, held on July 27-31, 2016, in Walt Disney World®, Florida, USA, it is intended as timely survey for researchers, engineers, designers, applied mathematicians and practitioners working in the field of Human Factors and Ergonomics.

Simulation Modeling Using @Risk - Wayne L. Winston 1995-01-01

This new book shows how to use Monte Carlo simulation to model

and solve complex business problems in finance, operations, and marketing using @RISK. The book's timely applications include simulating the risk of derivatives, hedging with futures, analyzing investment portfolios, modeling market share, calculating optimal maintenance policies, and many others. The book also contains specific instruction in simulation concepts and modeling, making it appropriate as a textbook, supplement, or self-directed guidebook.

Applied Simulation Modeling - Andrew F. Seila 2003

APPLIED SIMULATION MODELING provides the student with both a conceptual introduction to the concepts of simulation modeling and practical experience with real examples using popular commercial simulation packages ARENA and @Risk. The coverage includes Risk Simulation, Dynamic Systems, and Discrete Event Simulation models. Throughout the text, the authors show readers how they can use simulation in the context of decision making. Practical examples from Operations Management, Manufacturing, Health Care, and Finance are included throughout to give students an appreciation for the wide scope of application and the robust nature of simulation modeling. Special student editions of ARENA and @Risk are packaged with the text.

Simulation Techniques in Financial Risk Management - Ngai Hang Chan 2015-05-04

Praise for the First Edition "…a nice, self-contained introduction to simulation and computational techniques in finance…" – Mathematical Reviews Simulation Techniques in Financial Risk Management, Second Edition takes a unique approach to the field of simulations by focusing on techniques necessary in the fields of finance and risk management. Thoroughly updated, the new edition expands on several key topics in these areas and presents many of the recent innovations in simulations and risk management, such as advanced option pricing models beyond the Black–Scholes paradigm, interest rate models, MCMC methods including stochastic volatility models simulations, model assets and model-free properties, jump diffusion, and state space modeling. The Second Edition also features: Updates to primary software used throughout the book, Microsoft Office® Excel® VBA New topical coverage on multiple assets, model-free properties, and related models More than 300 exercises at the end of each chapter, with select answers in the appendix, to help readers apply new concepts and test their understanding Extensive use of examples to illustrate how to use simulation techniques in risk management Practical case studies, such as the pricing of exotic options; simulations of Greeks in hedging; and the use of Bayesian ideas to assess the impact of jumps, so readers can reproduce the results of the studies A related website with additional solutions to problems within the book as well as Excel VBA and S-Plus computer code for many of the examples within the book Simulation Techniques in Financial Risk Management, Second Edition is an invaluable resource for risk managers in the financial and actuarial industries as well as a useful reference for readers interested in learning how to better gauge risk and make more informed decisions. The book is also ideal for upper-undergraduate and graduate-level courses in simulation and risk management.

Systems Modeling and Computer Simulation - Naim Kheir 2018-12-12

This second edition describes the fundamentals of modelling and simulation of continuous-time, discrete time, discrete-event and large-scale systems. Coverage new to this edition includes: a chapter on non-linear systems analysis and modelling, complementing the treatment of of continuous-time and discrete-time systems and a chapter on the computer animation and visualization of dynamical systems motion.

Modeling and Simulation Environment for Satellite and Terrestrial Communications Networks - A. Nejat Ince 2012-12-06

Modeling and Simulation Environment for Satellite and

Terrestrial Communications Networks: Proceedings of the European COST Telecommunications Symposium will be of interest to network designers, developers, and operators. This book is a collection of papers given at the European Cost Telecommunications Symposium. The Symposium was broken down into four sessions: Modelling and Simulation. Teletraffic Modelling. Communications Networks Simulation. Problems in Simulation. Each session addressed a wide spectrum of subjects. The symposium covered nearly all of the important aspects of simulation modeling and tools for the design and performance evaluation of communication techniques and systems. Emerging techniques were emphasized. Modeling and Simulation Environment for Satellite and Terrestrial Communications Networks: Proceedings of the European COST Telecommunications Symposium is a useful reference work for practicing engineers and academic researchers.