Stochastic Simulation And Applications In Finance With Matlab Programs The Wiley Finance Series

Sampling-based computational methods have become a fundamental part of the numerical toolset of practitioners and researchers across an enormous number of different applied domains and academic disciplines. This book provides a broad treatment of such sampling-based methods, as well as accompanying mathematical analysis of the convergence properties of the methods discussed. The reach of the ideas is illustrated by discussing a wide range of applications and the models that have found wide usage. The first half of the book focuses on general methods; the second half discusses model-specific al.

In various scientific and industrial fields, stochastic simulations are taking on a new importance. This is due to the increasing power of computers and practitioners' aim to simulate more and more complex systems, and thus use random parameters as well as random noises to model the parametric uncertainties and the lack of knowledge on the physics of these systems. The error analysis of these computations is a highly complex mathematical undertaking. Approaching these issues, the authors present stochastic numerical methods and prove accurate convergence rate estimates in terms of their numerical parameters (number of simulations, time discretization steps). As a result, the book is a self-contained and rigorous study of the numerical methods within a theoretical framework. After briefly reviewing the basics, the authors first introduce fundamental notions in stochastic calculus and continuous-time martingale theory, then develop the analysis of pure-jump Markov processes, Poisson processes, and stochastic differential equations. In particular, they review the essential properties of Itô integrals and prove fundamental results on the probabilistic analysis of parabolic partial differential equations. These results in turn provide the basis for developing stochastic numerical methods, both from an algorithmic and theoretical point of view. The book combines advanced mathematical tools, theoretical analysis of stochastic numerical methods, and practical issues at a high level, so as to provide optimal results on the accuracy of Monte Carlo simulations of stochastic processes. It is intended for master and Ph.D. students in the field of stochastic processes and their numerical applications, as well as for physicists, biologists, economists and other professionals working with stochastic simulations, who will benefit from the ability to reliably estimate and control the accuracy of their simulations.

Discrete event systems (DES) have become pervasive in our daily lives. Examples include (but are not restricted to) manufacturing and supply chains, transportation, healthcare, call centers, and financial engineering. However, due to their complexities that often involve millions or even billions of events with many variables and constraints, modeling these stochastic simulations has long been a hard nut to crack. The advance in available computer technology, especially of cluster and cloud computing, has paved the way for the realization of a number of stochastic simulation optimization for complex discrete event systems. This book will introduce two important techniques initially proposed and developed by Professor Y C Ho and his team; namely perturbation analysis and ordinal optimization for stochastic simulation optimization, and present the state-of-the-art technology, and their future research directions.

Although stochastic kinetic models are increasingly accepted as the best way to represent and simulate genetic and biochemical networks, most researchers in the field have limited knowledge of stochastic process theory. The stochastic processes formalism provides a beautiful, elegant, and coherent foundation for chemical kinetics and there is a wealth of associated theory every bit as powerful and elegant as that for conventional continuous deterministic models. The time is right for an introductory text written from this perspective. Stochastic Modelling for Systems Biology presents an accessible introduction to stochastic modelling using examples that are familiar to systems biology researchers. Focusing on computer simulation, the author examines the use of stochastic processes for modelling biological systems. He provides a comprehensive understanding of stochastic kinetic modelling of biological networks in the systems biology context. The text covers the latest simulation techniques and research material, such as parameter inference, and includes many examples and figures as well as software code in R for various applications. While emphasizing the necessary probabilistic and stochastic methods, the author takes a practical approach, rooting his theoretical development in discussions of the intended application. Written with self-study in mind, the book includes technical chapters that deal with the difficult problems of inference for stochastic kinetic models from experimental data. Providing enough background information to make the subject accessible to the non-specialist, the book integrates a fairly diverse literature into a single convenient and notationally consistent source.

This book constitutes the refereed proceedings of the 17th International Conference on Analytical and Stochastic Modeling Techniques and Applications, ASMTA 2010, held in Cardiff, UK, in June 2010. The 28 revised full papers presented were carefully reviewed and selected from numerous submissions for inclusion in the book. The papers are organized in topical sections on queueing theory, specification languages and tools, telecommunication systems, estimation, prediction, and stochastic modelling.

WILEY-INTERSCIENCE PAPERBACK SERIES The Wiley-Interscience Paperback Series consists of selected books that have been made more accessible to consumers in an effort to increase global appeal and general circulation. With these new unabridged softcover volumes, Wiley hopes to extend the lives of these works by making them available to future generations of statisticians, mathematicians, and scientists. ". . .this is a very competently written and useful addition to the statistical literature; a book every statistician should look at and that many should study!" —Short Book Reviews, International Statistical Institute ". . .reading this book was an enjoyable learning experience. The suggestions and recommendations on the methods [make] this book an excellent reference for anyone interested in simulation. With its compact structure and good coverage of material, it [is] an excellent textbook for a simulation course." —Technometrics ". . .this work is an excellent comprehensive guide to simulation methods, written by a very competent author.

It is especially recommended for those users of simulation methods who want more than a 'cook book'. " —Mathematics Abstracts This book is a comprehensive guide to simulation methods with explicit recommendations of methods and algorithms. It covers both the technical aspects of the subject, such as the generation of random numbers, non-uniform random variates and stochastic processes, and the use of simulation. Supported by the relevant mathematical theory, the text contains a great deal of unpublished research material, including coverage of the analysis of shift-register generators, sensitivity analysis of normal variate generators, analysis of simulation output, and more.
Stochastic hydrology is an essential base of water resources systems analysis, due to the inherent randomness of the input, and consequently of the results. These results have to be incorporated in a decision-making process regarding the planning and management of water systems. It is through this application that stochastic hydrology finds its true meaning, otherwise it becomes merely an academic exercise.A set of well known specialists from both stochastic hydrology and water resources systems present a synthesis of the actual knowledge currently used in real-world planning and management.The book is intended for both practitioners and researchers who are willing to apply advanced approaches for incorporating hydrological randomness and uncertainty into the simulation and optimization of water resources systems.
This carefully edited book discusses new methods and applications for stochastic simulation and experimental design with the focus on methodological issues and recent developments for computer simulations in statistical application problems. A large number of topics are treated, including computer simulation methodology queueing systems, statistical methods in simulation, optimal experimental design, and numerical algorithms. The book will be an essential up-to-date resource for researchers and professionals in applied statistics, experimental design, operations research and stochastic simulation.
Algebraic, differential, and integral equations are used in the applied sciences, en gineering, economics, and the social sciences to characterize the current state of a physical, economic, or social system and forecast its evolution in time. Generally, the coefficients of and/or the input to these equations are not precisely known be cause of insufficient information, limited understanding of some underlying phe nomena, and inherent randonmess. For example, the orientation of the atomic lattice in the grains of a polycrystal varies randomly from grain to grain, the spa tial distribution of a phase of a composite material is not known precisely for a particular specimen, bone properties needed to develop reliable artificial joints vary significantly with individual and age, forces acting on a plane from takeoff to landing depend in a complex manner on the environmental conditions and flight pattern, and stock prices and their evolution in time depend on a large number of factors that cannot be described by deterministic models. Problems that can be defined by algebraic, differential, and integral equations with random coefficients and/or input are referred to as stochastic problems. The main objective of this book is the solution of stochastic problems, that is, the determination of the probability law, moments, and/or other probabilistic properties of the state of a physical, economic, or social system. It is assumed that the operators and inputs defining a stochastic problem are specified.
This volume presents the most recent applied and methodological issues in stochastic modeling and data analysis. The contributions cover various fields such as stochastic processes and applications, data analysis methods and techniques, Bayesian methods, biostatistics, econometrics, sampling, linear and nonlinear models, networks and queues, survival analysis, and time series. The volume presents new results with potential for solving real-life problems and provides novel methods for solving these problems by analyzing the relevant data. The use of recent advances in different fields is emphasized, especially new optimization and statistical methods, data warehouse, data mining and knowledge systems, neural computing, and bioinformatics. Sample Chapter(s). Chapter 1: An approach to Stochastic Process using Quasi-Arithmetic Means (373 KB). Contents: Stochastic Processes and Models; Distributions; Insurance; Stochastic Modeling for Healthcare Management; Markov and Semi Markov Models; Parametric/Non-Parametric; Dynamical Systems/Forecasting; Modeling and Stochastic Modeling; Statistical Applications in Socioeconimic Problems; Sampling and Optimization Problems; Data Mining and Applications; Clustering and Classification; Applications of Data Analysis; Miscellaneous. Readership: Researchers in probability and statistics, stochastics and fuzzy logic.
This book constitutes the refereed proceedings of the 24th International Conference on Analytical and Stochastic Modelling Techniques and Applications, ASMTA 2017, held in Newcastle-upon-Tyne UK, in July 2017. The 14 full papers presented in this book were carefully reviewed and selected from 27 submissions. The scope of the conference is on following topics: analytical, numerical and simulation algorithms for stochastic systems, including Markov processes, queueing networks, stochastic Petri nets, process algebras, game theoretical models.
Alexander Hübl develops models for production planning and analyzes performance indicators to investigate production system behaviour. He extends existing literature by considering the uncertainty of customer required lead time and processing times as well as by increasing the complexity of multi-machine multi-items production models. Results are on the one hand a decision support system for determining capacity and the further development of the production planning method Conwip. On the other hand, the author develops the JIT intensity and analytically proves the effects of dispatching rules on production lead time.
This textbook focuses on stochastic analysis in systems biology containing both the theory and application. While the authors provide a review of probability and random variables, subsequent notions of biochemical reaction systems and the relevant concepts of probability theory are introduced side by side. This leads to an intuitive and easy-to-follow presentation of stochastic framework for modeling subcellular biochemical systems. In particular, the authors make an effort to show how the notion of propensity, the chemical master equation and the stochastic simulation algorithm arise as consequences of the Markov property. The text contains many illustrations, examples and exercises to illustrate the ideas and methods that are introduced. Matlab code is also provided where appropriate. Additionally, the cell cycle is introduced as a more complex case study. Senior undergraduate and graduate students in mathematics and physics as well as researchers working in the area of systems biology, bioinformatics and related areas will find this text useful.
Stochastic Simulation and Applications in Finance with MATLAB ProgramsJohn Wiley & Sons
This textbook shall serve a double purpose: first of all, it is a book about generalized stochastic processes, a very important but highly neglected part of probability theory which plays an outstanding role in noise modelling. Secondly, this textbook is a guide to noise modelling for mathematicians and engineers to foster the interdisciplinary discussion between mathematicians (to provide effective noise models) and engineers (to be familiar with the mathematical backround of noise modelling in order to handle noise models in an optimal way).Two appendices on "A Short Course in Probability Theory" and "Spectral Theory of Stochastic Processes" plus a well-choosen set of problems and solutions round this compact textbook off.
Sampling-based computational methods have become a fundamental part of the numerical toolset of practitioners and researchers across an enormous number of different applied domains and academic disciplines. This book provides a broad treatment of such sampling-based methods, as well as accompanying mathematical analysis of the convergence properties of the methods discussed. The reach of the ideas is illustrated by discussing a wide range of applications and the models that have found wide usage. The first half of the book focuses on general

methods; the second half discusses model-specific algorithms. Exercises and illustrations are included.

This book constitutes the refereed proceedings of the 23rd International Conference on Analytical and Stochastic Modelling Techniques and Applications, ASMTA 2016, held in Cardiff, UK, in August 2016. The 21 full papers presented in this book were carefully reviewed and selected from 30 submissions. The papers discuss the latest developments in analytical, numerical and simulation algorithms for stochastic systems, including Markov processes, queueing networks, stochastic Petri nets, process algebras, game theory, etc.

In this dissertation, we study two problems. In the first part, we consider the two-stage methods for comparing alternatives using simulation. Suppose there are a finite number of alternatives to compare, with each alternative having an unknown parameter that is the basis for comparison. The parameters are to be estimated using simulation, where the alternatives are simulated independently. We develop two-stage selection and multiple-comparison procedures for simulations under a general framework. The assumptions are that each alternative has a parameter estimation process that satisfies a random- time-change central limit theorem (CLT), and there is a weakly consistent variance estimator (WCVE) for the variance constant appearing in the CLT. The framework encompasses comparing means of independent populations, functions of means, and steady-state means. One problem we consider of considerable practical interest and not handled in previous work on two-stage multiple-comparison procedures is comparing quantiles of alternative populations. We establish the asymptotic validity of our procedures as the prescribed width of the confidence intervals or indifference-zone parameter shrinks to zero. Also, for the steady-state simulation context, we compare our procedures based on WCVEs with techniques that instead use standardized time series methods. In the second part, we propose a new technique of estimating the variance parameter of a wide variety of stochastic processes. This new technique is better than the existing techniques for some standard stochastic processes in terms of bias and variance properties, since it reduces bias at the cost of no significant increase in variance.

Discrete event systems (DES) have become pervasive in our daily lives. Examples include (but are not restricted to) manufacturing and supply chains, transportation, healthcare, call centers, and financial engineering. However, due to their complexities that often involve millions or even billions of events with many variables and constraints, modeling these stochastic simulations has long been a “hard nut to crack”. The advance in available computer technology, especially of cluster and cloud computing, has paved the way for the realization of a number of stochastic simulation optimization for complex discrete event systems. This book will introduce two important techniques initially proposed and developed by Professor Y C Ho and his team; namely perturbation analysis and ordinal optimization for stochastic simulation optimization, and present the state-of-the-art technology, and their future research directions. Contents:Part I: Perturbation Analysis:The IPA Calculus for Hybrid SystemsSmoothed Perturbation Analysis: A Retrospective and Prospective LookPerturbation Analysis and Variance Reduction in Monte Carlo SimulationAdjoints and AveragingInfinitesimal Perturbation Analysis and Optimization AlgorithmsSimulation-based Optimization of Failure-prone Continuous Flow LinesPerturbation Analysis, Dynamic Programming, and BeyondPart II: Ordinal Optimization:Fundamentals of Ordinal OptimizationOptimal Computing Budget Allocation FrameworkNested PartitionsApplications of Ordinal Optimization Readership: Professionals in industrial and systems engineering, graduate reference for probability & statistics, stochastic analysis and general computer science, and research. Keywords:Simulation;Optimization;Stochastic Systems;Discrete-Even Systems;Perturbation Analysis;Ordinal Optimization

This graduate-level text covers modeling, programming and analysis of simulation experiments and provides a rigorous treatment of the foundations of simulation and why it works. It introduces object-oriented programming for simulation, covers both the probabilistic and statistical basis for simulation in a rigorous but accessible manner (providing all necessary background material); and provides a modern treatment of experiment design and analysis that goes beyond classical statistics. The book emphasizes essential foundations throughout, rather than providing a compendium of algorithms and theorems and prepares the reader to use simulation in research as well as practice. The book is a rigorous, but concise treatment, emphasizing lasting principles but also providing specific training in modeling, programming and analysis. In addition to teaching readers how to do simulation, it also prepares them to use simulation in their research; no other book does this. An online solutions manual for end of chapter exercises is also be provided.?

Conditional Monte Carlo: Gradient Estimation and Optimization Applications deals with various gradient estimation techniques of perturbation analysis based on the use of conditional expectation. The primary setting is discrete-event stochastic simulation. This book presents applications to queueing and inventory, and to other diverse areas such as financial derivatives, pricing and statistical quality control. To researchers already in the area, this book offers a unified perspective and adequately summarizes the state of the art. To researchers new to the area, this book offers a more systematic and accessible means of understanding the techniques without having to scour through the immense literature and learn a new set of notation with each paper. To practitioners, this book provides a number of diverse application areas that makes the intuition accessible without having to fully commit to understanding all the theoretical niceties. In sum, the objectives of this monograph are two-fold: to bring together many of the interesting developments in perturbation analysis based on conditioning under a more unified framework, and to illustrate the diversity of applications to which these techniques can be applied. Conditional Monte Carlo: Gradient Estimation and Optimization Applications is suitable as a secondary text for graduate level courses on stochastic simulations, and as a reference for researchers and practitioners in industry.

Consisting of two parts, this book presents papers describing publicly available stochastic programming systems that are operational. It presents a diverse collection of application papers in areas such as production, supply chain and scheduling, gaming, environmental and pollution control, financial modeling, telecommunications, and electricity.

"[This third edition] reflects the latest developments in the field and presents a fully updates and comprehensive account of state-of-the art theory, methods, and applications that have emerged in Monte Carlo simulation since the publication of the classic first edition over more than a quarter of a century ago. While maintaining its accessible and intuitive approach, this revised edition features a wealth of up-to-date information facilitating a deeper understanding of problem solving across a wide array of subject areas, such as engineering, statistics, computer science, mathematics, and the physical and life sciences. The book begins with a modernized introduction addressing the basic concepts of probability, Markov processes, and convex optimization. Subsequent chapters discuss dramatic changes that have occurred in the field of the Monte Carlo method, with coverage of many modern topics including : Markov chain Monte Carlo, variance reduction techniques such a importance (re)sampling and the transform likelihood ratio method, score function method for sensitivity analysis, stochastic approximation method and stochastic counter-part method for Monte Carlo optimization, cross-entropy method for rare events estimation and combinatorial optimization, and application of Monte Carlo techniques for counting problems. An extensive range of exercises is provided at the end of each chapter, as well as a generous sampling of

applied examples." (source : 4ème de couverture).
This book constitutes the refereed proceedings of the 21st International Conference on Analytical and Stochastic Modelling Techniques and Applications, ASMTA 2014, held in Budapest, Hungary, in June/July 2014. The 18 papers presented were carefully reviewed and selected from 27 submissions. The papers discuss the latest developments in analytical, numerical and simulation algorithms for stochastic systems, including Markov processes, queueing networks, stochastic Petri nets, process algebras, game theory, etc.
In this dissertation, three new algorithms for three distinct problems are proposed. The three distinct problems considered here have applications to stochastic modeling, compressive sensing, and numerical solutions of partial differential equations. A common aspect of these problems is that to obtain accurate results require an ever increasing number of unknown variables. Since the proposed algorithms are more efficient than the state of the art methods used for these problems, the use of these new algorithms allows one to compute solutions to these problems with substantially higher accuracy. In addition, some theoretical analysis is provided relating to the investigated problems and the proposed algorithms.
This book constitutes the refereed proceedings of the 16th International Conference on Analytical and Stochastic Modeling Techniques and Applications, ASMTA 2009, held in Madrid, Spain, in June 2009 in conjunction with ECMS 2009, the 23nd European Conference on Modeling and Simulation. The 27 revised full papers presented were carefully reviewed and selected from 55 submissions. The papers are organized in topical sections on telecommunication networks; wireless & mobile networks; simulation; quueing systems & distributions; queueing & scheduling in telecommunication networks; model checking & process algebra; performance & reliability analysis of various systems.
Simulation is a controlled statistical sampling technique that can be used to study complex stochastic systems when analytic and/or numerical techniques do not suffice. The focus of this book is on simulations of discrete-event stochastic systems; namely, simulations in which stochastic state transitions occur only at an increasing sequence of random times. The discussion emphasizes simulations on a finite or countably infinite state space. * Develops probabilistic methods for simulation of discrete-event stochastic systems * Emphasizes stochastic modeling and estimation procedures based on limit theorems for regenerative stochastic processes * Includes engineering applications of discrete-even simulation to computer, communication, manufacturing, and transportation systems * Focuses on simulations with an underlying stochastic process that can specified as a generalized semi-Markov process * Unique approach to simulation, with heavy emphasis on stochastic modeling * Includes engineering applications for computer, communication, manufacturing, and transportation systems
Computer-aided modelling is one of the most effective means of getting to the root of a natural phenomenon and of predicting the consequences of human impact on the environment. General methods of numerical modelling of random processes have been effectively developed and the area of applications has rapidly expanded in recent years. This book deals with the development and investigation of numerical methods for simulation of random processes and fields. The book opens with a description of scalar and vector-valued Gaussian models, followed by non-Gaussian models. Furthermore, issues of convergence of approximate models of random fields are studied. The last part of this book is devoted to applications of stochastic modelling, in which new application areas such as simulation of meteorological processes and fields, sea surface undulation, and stochastic structure of clouds, are presented.
This research monograph deals with fast stochastic simulation based on im portance sampling (IS) principles and some of its applications. It is in large part devoted to an adaptive form of IS that has proved to be effective in appli cations that involve the estimation of probabilities of rare events. Rare events are often encountered in scientific and engineering processes. Their charac terization is especially important as their occurrence can have catastrophic consequences of varying proportions. Examples range from fracture due to material fatigue in engineering structures to exceedance of dangerous levels during river water floods to false target declarations in radar systems. Fast simulation using IS is essentially a forced Monte Carlo procedure designed to hasten the occurrence of rare events. Development of this simu lation method of analysis of scientific phenomena is usually attributed to the mathematician von Neumann, and others. Since its inception, MC simula tion has found a wide range of employment, from statistical thermodynamics in disordered systems to the analysis and design of engineering structures characterized by high complexity. Indeed, whenever an engineering problem is analytically intractable (which is often the case) and a solution by nu merical techniques prohibitively expensive computationally, a last resort to determine the input-output characteristics of, or states within, a system is to carry out a simulation.
Stochastic Simulation and Applications in Finance with MATLAB Programs explains the fundamentals of Monte Carlo simulation techniques, their use in the numerical resolution of stochastic differential equations and their current applications in finance. Building on an integrated approach, it provides a pedagogical treatment of the need-to-know materials in risk management and financial engineering. The book takes readers through the basic concepts, covering the most recent research and problems in the area, including: the quadratic re-sampling technique, the Least Squared Method, the dynamic programming and Stratified State Aggregation technique to price American options, the extreme value simulation technique to price exotic options and the retrieval of volatility method to estimate Greeks. The authors also present modern term structure of interest rate models and pricing swaptions with the BGM market model, and give a full explanation of corporate securities valuation and credit risk based on the structural approach of Merton. Case studies on financial guarantees illustrate how to implement the simulation techniques in pricing and hedging. NOTE TO READER: The CD has been converted to URL. Go to the following website www.wiley.com/go/huyhnstochastic which provides MATLAB programs for the practical examples and case studies, which will give the reader confidence in using and adapting specific ways to solve problems involving stochastic processes in finance.
While there have been few theoretical contributions on the Markov Chain Monte Carlo (MCMC) methods in the past decade, current understanding and application of MCMC to the solution of inference problems has increased by leaps and bounds. Incorporating changes in theory and highlighting new applications, Markov Chain Monte Carlo: Stochastic Simulation for Bayesian Inference, Second Edition presents a concise, accessible, and comprehensive introduction to the methods of this valuable simulation technique. The second edition includes access to an internet site that provides the code, written in R and WinBUGS, used in many of the previously existing and new examples and exercises. More importantly, the self-explanatory nature of the codes will enable modification of the inputs to the codes and variation on many directions will be available for further exploration. Major changes from the previous edition: · More examples with discussion of computational details in chapters on Gibbs sampling and Metropolis-Hastings algorithms · Recent developments in MCMC, including reversible jump, slice sampling, bridge sampling, path sampling, multiple-try, and delayed rejection · Discussion of computation using both R and WinBUGS · Additional exercises and selected solutions within the text, with all data sets and software available for download from the Web · Sections on spatial models and model adequacy The self-contained text units make MCMC accessible to scientists in other disciplines as well as statisticians. The book will appeal to everyone working with MCMC techniques, especially research and graduate statisticians and biostatisticians, and scientists handling data and

formulating models. The book has been substantially reinforced as a first reading of material on MCMC and, consequently, as a textbook for modern Bayesian computation and Bayesian inference courses.

Approaches to simulate single- and multiple-component multiple-station ground motion records with target spatial coherency and spatial correlation structures are developed for scenario events in this study. To develop the approaches, spatial correlation of the Fourier amplitude spectrum for a random orientation and for two orthogonal directions is assessed, and empirical equations are suggested. Moreover, spatial coherency of ground motions for two orthogonal horizontal directions is estimated using actual records from seven seismic events. Empirical coherency function is suggested for the components of records in two orthogonal horizontal directions at single and multiple recording stations. It was also found that the coherency for the records along the major and minor principal axes at a recording station is similar to that for two randomly oriented orthogonal directions. Based on the proposed approaches in this thesis, spatial correlated and coherent ground motions can be simulated for randomly oriented uni-directional excitations at considered sites for a scenario event. For the simulation, it is considered that the reference Fourier amplitude spectrum for scenario events can be defined by using the stochastic point-source method or the stochastic finite-fault method. It is shown that the estimated spatial correlation and coherency from the simulated records match well the target spatial correlation and coherency. Furthermore, the application of the simulated records for seismic risk assessment of a group of buildings is presented. The results indicate that the spatial correlation of Fourier amplitude spectrum must be considered in estimating the distribution of the aggregated seismic loss of spatially distributed group of buildings. Spatial correlated and coherent ground motions are simulated for two orthogonal horizontal directions at considered sites for a scenario event. Again, it is shown that the estimated spatial correlation and coherency from the simulated records adequately match the target spatial correlation and coherency.

This book constitutes the refereed proceedings of the 15th International Conference on Analytical and Stochastic Modeling Techniques and Applications, ASMTA 2008, held in Nicosia, Cyprus, in June 2008 in conjunction with ECMS 2008, the 22nd European Conference on Modeling and Simulation. The 22 revised full papers presented were carefully reviewed and selected from 55 submissions. The papers are organized in topical sections on traffic modeling, queueing systems, analytical methods and applications, distributions in stochastic modeling, queueing networks, simulation and model checking, as well as wireless networks.

This book constitutes the refereed proceedings of the 22nd International Conference on Analytical and Stochastic Modelling Techniques and Applications, ASMTA 2015, held in Albena, Bulgaria, in May 2015. The 15 full papers presented in this book were carefully reviewed and selected from numerous submissions. The papers discuss the latest developments in analytical, numerical and simulation algorithms for stochastic systems, including Markov processes, queueing networks, stochastic Petri nets, process algebras, game theory, etc.

With the advance of new computing technology, simulation is becoming very popular for designing large, complex and stochastic engineering systems, since closed-form analytical solutions generally do not exist for such problems. However, the added flexibility of simulation often creates models that are computationally intractable. Moreover, to obtain a sound statistical estimate at a specified level of confidence, a large number of simulation runs (or replications) is usually required for each design alternative. If the number of design alternatives is large, the total simulation cost can be very expensive. Stochastic Simulation Optimization addresses the pertinent efficiency issue via smart allocation of computing resource in the simulation experiments for optimization, and aims to provide academic researchers and industrial practitioners with a comprehensive coverage of OCBA approach for stochastic simulation optimization. Starting with an intuitive explanation of computing budget allocation and a discussion of its impact on optimization performance, a series of OCBA approaches developed for various problems are then presented, from the selection of the best design to optimization with multiple objectives. Finally, this book discusses the potential extension of OCBA notion to different applications such as data envelopment analysis, experiments of design and rare-event simulation.