An Introduction To Discrete Event Simulation

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Estimation and Inference in Discrete Event Systems Springer Science & Business Media
Collecting the work of the foremost scientists in the field, Discrete-Event Modeling and Simulation: Theory and Applications presents the state of the art in modeling discrete-event systems using the discrete-event system specification (DEVS) approach. It introduces the latest advances, recent extensions of formal techniques, and real-world examples of various applications. The book covers many topics that pertain to several layers of the modeling and simulation architecture. It discusses DEVS model development support and the interaction of DEVS with other methodologies. It describes different forms of simulation supported by DEVS, the use of real-time DEVS simulation, the relationship between DEVS and graph transformation, the influence of DEVS variants on simulation performance, and interoperability and composability with emphasis on DEVS standardization. The text also examines extensions to DEVS, new formalisms, and abstractions of DEVS models as well as the theory and analysis behind real-world system identification and control. To support the generation and search of optimal models of a system, a framework is developed based on the system entity structure and its transformation to DEVS simulation models. In addition, the book explores numerous interesting examples that illustrate the use of DEVS to build successful applications, including optical network-on-chip, construction/building design, process control, workflow systems, and environmental models. A one-stop resource on advances in DEVS theory, applications, and methodology, this volume offers a sampling of the best research in the area, a broad picture of the DEVS landscape, and trend-setting applications enabled by the DEVS approach. It provides the basis for future research discoveries and encourages the development of new applications.

Handbook of Research on Discrete Event Simulation Environments: Technologies and Applications Springer
Researches and developers of simulation models state that the Java program ming language presents a unique and significant opportunity for important changes in the way we develop simulation models today. The most important characteristics of the Java language that are advantageous for simulation are its

multi-threading capabilities, its facilities for executing programs across the Web, and its graphics facilities. It is feasible to develop compatible and reusable simulation components that will facilitate the construction of newer and more complex models. This is possible with Java development environments. Another important trend that begun very recently is web-based simulation, i.e., and the execution of simulation models using Internet browser software. This book introduces the application of the Java programming language in discrete-event simulation. In addition, the fundamental concepts and prac tical simulation techniques for modeling different types of systems to study their general behavior and their performance are introduced. The approaches applied are the process interaction approach to discrete-event simulation and object-oriented modeling. Java is used as the implementation language and UML as the modeling language. The first offers several advantages compared to C++, the most important being: thread handling, graphical user interfaces (QUI) and Web computing. The second language, UML (Unified Modeling Language) is the standard notation used today for modeling systems as a collection of classes, class relationships, objects, and object behavior.

Discrete-Event Modeling and Simulation Prentice Hall

Computer modeling and simulation (M&S) allows engineers tostudy and analyze complex systems. Discrete-event system(DES)-M&S is used in modern management, industrial engineering,computer science, and the military. As computer speeds and memorycapacity increase, so DES-M&S tools become more powerful andmore widely used in solving real-life problems. Based on over 20 years of evolution within a classroomenvironment, as well as on decades-long experience in developingsimulation-based solutions for high-tech industries, Modelingand Simulation of Discrete-Event Systems is the only book onDES-M&S in which all the major DES modeling formalisms –activity-based, process-oriented, state-based, and event-based– are covered in a unified manner: A well-defined procedure for building a formal model in theform of event graph, ACD, or state graph Diverse types of modeling templates and examples that can beused as building blocks for a complex, real-life model A systematic, easy-to-follow procedure combined with sample C#codes for developing simulators in various modeling formalisms Simple tutorials as well as

sample model files for usingpopular off-the-shelf simulators such as SIGMA®, ACE®,and Arena® Up-to-date research results as well as research issues anddirections in DES-M&S Modeling and Simulation of Discrete-Event Systems is anideal textbook for undergraduate and graduate students ofsimulation/industrial engineering and computer science, as well asfor simulation practitioners and researchers.

Discrete Event Systems John Wiley & Sons

In recent years, there has been a growing debate, particularly in the UK and Europe, over the merits of using discrete-event simulation (DES) and system dynamics (SD); there are now instances where both methodologies were employed on the same problem. This book details each method, comparing each in terms of both theory and their application to various problem situations. It also provides a seamless treatment of various topics-- theory, philosophy, detailed mechanics, practical implementation--providing a systematic treatment of the methodologies of DES and SD, which previously have been treated separately.

Discrete-event System Simulation John Wiley & Sons

CONTENIDO: Models - Random-number generation - Discrete-event simulation - Statistics - Next-event simulation - Discrete random variables - Continuous random variables - Output analysis - Input modeling - Projects.

Stochastic Discrete Event Systems Springer Science & Business Media

"This is an excellent and well-written text on discrete event simulation with a focus on applications in Operations Research. There is substantial attention to programming, output analysis, pseudo-random number generation and modelling and these sections are quite thorough. Methods are provided for generating pseudo-random numbers (including combining such streams) and for generating random numbers from most standard statistical distributions." --ISI Short Book Reviews, 22:2, August 2002

A Practical Introduction Academic Internet Pub Incorporated

Bringing together an international group of researchers involved in military, business, and health modeling and simulation, Conceptual Modeling for Discrete-Event Simulation presents a comprehensive view of the current state of the art in the field. The book addresses a host of issues, including: What is a conceptual model? How is conceptual modeling performed in general and in specific modeling domains? What is the role of established approaches

in conceptual modeling? Each of the book's six parts focuses on a different aspect of conceptual modeling for simulation. The first section discusses the purpose and requirements of a conceptual model. The next set of chapters provides frameworks and tools for conceptual modeling. The book then describes the use of soft systems methodology for model structuring as well as the application of software engineering methods and tools for model specification. After illustrating how conceptual modeling is adopted in the military and semiconductor manufacturing, the book concludes with a discussion on future research directions. This volume offers a broad, multifaceted account of the field by presenting diverse perspectives on what conceptual modeling entails. It also provides a basis upon which these perspectives can be compared.

Modeling and Performance Analysis Introduction to Discrete Event Systems Discrete-event dynamic systems (DEDs) permeate our world. They are of great importance in modern manufacturing processes, transportation and various forms of computer and communications networking. This book begins with the mathematical basics required for the study of DEDs and moves on to present various tools used in their modeling and control. Industrial examples illustrate the concepts and methods discussed, making this book an invaluable aid for students embarking on further courses in control, manufacturing engineering or computer studies.

Perturbation Analysis of Discrete Event Dynamic Systems World Scientific

The field of discrete event systems has emerged to provide a formal treatment of many of the man-made systems such as manufacturing systems, communica tion networks. automated traffic systems, database management systems, and computer systems that are event-driven, highly complex, and not amenable to the classical treatments based on differential or difference equations. Discrete event systems is a growing field that utilizes many interesting mathematical models and techniques. In this book we focus on a high level treatment of discrete event systems. where the order of events. rather than their occurrence times, is the principal concern. Such treatment is needed to guarantee that the system under study meets desired logical goals. In this framework, dis crete event systems are modeled by formal languages or, equivalently, by state machines. The field of logical discrete event systems is an interdisciplinary field-it in cludes ideas from computer science, control theory,

and operations research. Our goal is to bring together in one book the relevant techniques from these fields. This is the first book of this kind, and our hope is that it will be useful to professionals in the area of discrete event systems since most of the material presented has appeared previously only in journals. The book is also designed for a graduate level course on logical discrete event systems. It contains all the necessary background material in formal language theory and lattice the ory. The only prerequisite is some degree of "mathematical maturity".

Discrete Event & Iterative System Computational Foundations CRC Press Offers comprehensive coverage of discrete-event simulation, emphasizing and describing the procedures used in operations research - methodology, generation and testing of random numbers, collection and analysis of input data, verification of simulation models and analysis of output data.

An Introduction to Discrete-Valued Time Series Elsevier

Discrete event simulation and agent-based modeling are increasingly recognized as critical for diagnosing and solving process issues in complex systems. Introduction to Discrete Event Simulation and Agent-based Modeling covers the techniques needed for success in all phases of simulation projects. These include: • Definition – The reader will learn how to plan a project and communicate using a charter. • Input analysis – The reader will discover how to determine defensible sample sizes for all needed data collections. They will also learn how to fit distributions to that data. • Simulation – The reader will understand how simulation controllers work, the Monte Carlo (MC) theory behind them, modern verification and validation, and ways to speed up simulation using variation reduction techniques and other methods. • Output analysis – The reader will be able to establish simultaneous intervals on key responses and apply selection and ranking, design of experiments (DOE), and black box optimization to develop defensible improvement recommendations. • Decision support – Methods to inspire creative alternatives are presented, including lean production. Also, over one hundred solved problems are provided and two full case studies, including one on voting machines that received international attention. Introduction to Discrete Event Simulation and Agent-based Modeling demonstrates how simulation can facilitate improvements on the job and in local communities. It allows readers to

competently apply technology considered key in many industries and branches of government. It is suitable for undergraduate and graduate students, as well as researchers and other professionals.

Discrete-event System Theory Springer Introduction to Discrete Event Systems is a comprehensive introduction to the field of discrete event systems, offering a breadth of coverage that makes the material accessible to readers of varied backgrounds. The book emphasizes a unified modeling framework that transcends specific application areas, linking the following topics in a coherent manner: language and automata theory, supervisory control, Petri net theory, Markov chains and queuing theory, discrete-event simulation, and concurrent estimation techniques. This edition includes recent research results pertaining to the diagnosis of discrete event systems, decentralized supervisory control, and interval-based timed automata and hybrid automata models.

Voting Systems, Health Care, Military, and Manufacturing Springer Science & Business Media

Discrete event simulation and agent-based modeling are increasingly recognized as critical for diagnosing and solving process issues in complex systems. Introduction to Discrete Event Simulation and Agent-based Modeling covers the techniques needed for success in all phases of simulation projects. These include: • Definition – The reader will learn how to plan a project and communicate using a charter. • Input analysis – The reader will discover how to determine defensible sample sizes for all needed data collections. They will also learn how to fit distributions to that data. • Simulation – The reader will understand how simulation controllers work, the Monte Carlo (MC) theory behind them, modern verification and validation, and ways to speed up simulation using variation reduction techniques and other methods. • Output analysis – The reader will be able to establish simultaneous intervals on key responses and apply selection and ranking, design of experiments (DOE), and black box optimization to develop defensible improvement recommendations. • Decision support – Methods to inspire creative alternatives are presented, including lean production. Also, over one hundred solved problems are provided and two full case studies, including one on voting machines that received international attention. Introduction to Discrete Event Simulation and Agent-based Modeling demonstrates

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Dynamic Models and Discrete Event Simulation CRC Press

This book focuses on statistical methods for the analysis of discrete failure times. Failure time analysis is one of the most important fields in statistical research, with applications affecting a wide range of disciplines, in particular, demography, econometrics, epidemiology and clinical research. Although there are a large variety of statistical methods for failure time analysis, many techniques are designed for failure times that are measured on a continuous scale. In empirical studies, however, failure times are often discrete, either because they have been measured in intervals (e.g., quarterly or yearly) or because they have been rounded or grouped. The book covers well-established methods like life-table analysis and discrete hazard regression models, but also introduces state-of-the art techniques for model evaluation, nonparametric estimation and variable selection. Throughout, the methods are illustrated by real life applications, and relationships to survival analysis in continuous time are explained. Each section includes a set of exercises on the respective topics. Various functions and tools for the analysis of discrete survival data are collected in the R package discSurv that accompanies the book.

Queueing Networks and Markov Chains John Wiley & Sons

Over the last decades Discrete Event Simulation has conquered many different application areas. This trend is, on the one hand, driven by an ever wider use of this technology in different fields of science and on the other hand by an incredibly creative use of available software programs through dedicated experts. This book contains articles from scientists and experts from 10 countries. They illuminate the width of application of this technology and the quality of problems solved using Discrete Event Simulation. Practical applications of simulation dominate in the present book. The book is aimed to researchers and students who deal in their work with Discrete Event Simulation and which want to inform them about current applications. By focusing on discrete event simulation, this book can also serve as an

inspiration source for practitioners for solving specific problems during their work. Decision makers who deal with the question of the introduction of discrete event simulation for planning support and optimization this book provides a contribution to the orientation, what specific problems could be solved with the help of Discrete Event Simulation within the organization.

Discrete-event System Theory Springer This book provides a clear, understandable, and motivated account on the subject that spans both conventional and modern materials about discrete event systems, material that, up to now, has been presented in the literature in different fields, such as the graph theory, the probability theory, the automata's theory, and the queueing theory. The book gives a complete introduction to the discrete-event system theory and simultaneously applies the theory to practical problems. The book gives students of computer sciences, system sciences, and of electrical engineering, a clear, unambiguous, and relevant account of discrete-event systems. Numerous illustrations are included for better understanding. Problems as well as their solutions are included in each chapter. It can be used as a basic introduction for undergraduates and graduate students. Although it is logically self-contained, it presupposes the mathematical maturity acquired by students with two years of calculus.

Springer

Control of Discrete-event Systems provides a survey of the most important topics in the discrete-event systems theory with particular focus on finite-state automata, Petri nets and max-plus algebra. Coverage ranges from introductory material on the basic notions and definitions of discrete-event systems to more recent results. Special attention is given to results on supervisory control, state estimation and fault diagnosis of both centralized and distributed/decentralized systems developed in the framework of the Distributed Supervisory Control of Large Plants (DISC) project. Later parts of the text are devoted to the study of congested systems though fluidization, an over approximation allowing a much more efficient study of observation and control problems of timed Petri nets. Finally, the max-plus algebraic approach to the analysis and control of choice-free systems is also considered. Control of Discrete-event Systems provides an introduction to discrete-event systems for readers that are not familiar with this class of systems, but also provides an introduction to research problems and open issues of current interest to readers already familiar with them. Most of the material in this book has been presented during a Ph.D. school held in Cagliari, Italy, in June 2011.

Control of Discrete-Event Systems Springer Science & Business Media Never HIGHLIGHT a Book Again! Virtually all of the testable terms, concepts, persons, places, and events from the textbook are included. Cram101 Just the FACTS101 studyguides give all of the outlines, highlights, notes, and quizzes for your textbook with optional online comprehensive practice tests. Only Cram101 is Textbook Specific. Accompanys: 9780387333328 .

Discrete Event Simulation Springer Science & Business Media Dynamic Systems (DEDS) are almost endless: military C31 Ilogistic systems, the emergency ward of a metropolitan hospital, back offices of large insurance and brokerage fums, service and spare part operations of multinational fums . . . . the point is the pervasive nature of such systems in the daily life of human beings. Yet DEDS is a relatively new phenomenon in dynamic systems studies. From the days of Galileo to Newton to quantum mechanics and cosmology of the present, dynamic systems in nature are primarily differential equations based and time driven. A large literature and endless success stories have been built up on such Continuous Variable Dynamic Systems (CVDS). It is, however, equally clear that DEDS are fundamentally different from CVDS. They are event driven, asynchronous, mostly man-made and only became significant during the past generation. Increasingly, however, it can be argued that in the modem world our lives are being impacted by and dependent upon the efficient operations of such DEDS. Yet compared to the successful paradigm of differential equations for CVDS the mathematical modelling of DEDS is in its infancy. Nor are there as many successful and established techniques for their analysis and synthesis. The purpose of this series is to promote the study and understanding of the modelling, analysis, control, and management of DEDS. The idea of the series came from editing a special issue of the Proceedings of IEEE on DEOS during 1988.

Studyguide for Introduction to Discrete Event Systems by Cassandras, Christos G. CRC Press "This book provides a comprehensive overview of theory and practice in simulation systems focusing on major breakthroughs within the technological arena, with particular concentration on the accelerating principles, concepts and applications"--Provided by publisher.

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