

Modeling And Control Of Discrete Event Dynamic Systems With Petri Nets And Other Tools Advanced Textbooks In Control And Signal Processing

Modeling and Simulation of Discrete Event Systems **Modeling and Simulation of Discrete Event Systems** **Discrete Event Simulation Use Cases of Discrete Event Simulation** [Discrete-Event Modeling and Simulation](#) [Introduction to Discrete Event Systems](#) [Dynamic Models and Discrete Event Simulation](#) **Discrete-Event Simulation and System Dynamics for Management Decision Making** **Control of Discrete-Event Systems** [Performance Evaluation of Industrial Systems](#) **Introduction to Discrete Event Simulation and Agent-based Modeling** [Discrete-Event Simulation](#) [Discrete Event Simulation for Health Technology Assessment](#) **Conceptual Modeling for Discrete-Event Simulation Use Cases of Discrete Event Simulation** [Simulation of Industrial Systems](#) [Modeling and Control of Logical Discrete Event Systems](#) [Discrete Event Simulation Using ExtendSim 8](#) **Structures of Discrete Event Simulation** **Supervisory Control of Discrete-Event Systems** [Discrete-event System Simulation](#) **Discrete-Event Modeling and Simulation** [Object-Oriented Computer Simulation of Discrete-Event Systems](#) **Principles of Discrete Event Simulation** *Principles of Discrete Event Simulation* **Discrete Event Simulation in C** [Discrete Event Simulation](#) [Modeling Discrete-Event Systems with GPenSIM](#) **Dynamic Models and Discrete Event Simulation** **Discrete-Event Simulation** [Discrete-event System Simulation](#) [Modeling and Control of Discrete-event Dynamic Systems](#) **Stochastic Discrete Event Systems** *Discrete-event System Theory* [Out-of-order Parallel Discrete Event Simulation for Electronic System-level Design](#) *Control of Discrete-Event Systems* **Discrete Event Systems, Manufacturing Systems, and Communication Networks** **Discrete Event Simulations** **Parallel and Distributed Discrete Event Simulation** [Perturbation Analysis of Discrete Event Dynamic Systems](#)

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Parallel and Distributed Discrete Event Simulation Sep 23 2019 Discrete-event simulation has long been an integral part of the design process of complex engineering systems and the modelling of natural phenomena. Many of the systems that we seek to understand or control can be modelled as digital systems. In a digital model, we view the system at discrete instants of time, in effect taking snapshots of the system at these instants. For example, in a computer network simulation an event can be the sending of a message from one node to another node while in a VLSI logic simulation, the arrival of a signal at a gate may be viewed as an event. Digital systems such as computer systems are naturally susceptible to this approach. However, a variety of other systems may also be modelled this way. These include transportation systems such as air-traffic control systems, epidemiological models

such as the spreading of a virus, and military war-gaming models. This book is representative of the advances in this field.

Perturbation Analysis of Discrete Event Dynamic Systems Aug 22 2019 Dynamic Systems (DEDS) are almost endless: military C3I logistic systems, the emergency ward of a metropolitan hospital, back offices of large insurance and brokerage firms, service and spare part operations of multinational firms 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 modern 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.

Discrete-Event Modeling and Simulation Mar 10 2021 Complex artificial dynamic systems require advanced modeling techniques that can accommodate their asynchronous, concurrent, and highly non-linear nature. Discrete Event systems Specification (DEVS) provides a formal framework for hierarchical construction of discrete-event models in a modular manner, allowing for model re-use and reduced development time. Discrete Event Modeling and Simulation presents a practical approach focused on the creation of discrete-event applications. The book introduces the CD++ tool, an open-source framework that enables the simulation of discrete-event models. After setting up the basic theory of DEVS and Cell-DEVS, the author focuses on how to use the CD++ tool to define a variety of models in biology, physics, chemistry, and artificial systems. They also demonstrate how to map different modeling techniques, such as Finite State Machines and VHDL, to DEVS. The in-depth coverage elaborates on the creation of simulation software for DEVS models and the 3D visualization environments associated with these tools. A much-needed practical approach to creating discrete-event applications, this book offers world-class instruction on the field's most useful modeling tools.

Discrete-Event Modeling and Simulation Aug 27 2022 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.

Dynamic Models and Discrete Event Simulation Aug 03 2020 This book aims to clarify exactly how simulation studies can be carried out in the system theory paradigm, while providing a realistically complete coverage of (discrete event) simulation in its more traditional aspects. It focuses on the subclass of predictive, generative and dynamic system models.

Use Cases of Discrete Event Simulation Oct 17 2021 With contributions from experts in 10 countries, this book illuminates the breadth of application of Discrete Event Simulation technology, showing how discrete event simulation can be used to solve specific problems in planning support and optimization.

Discrete Event Simulation Oct 29 2022 Discrete Event Simulation is a process-oriented text/reference that utilizes an eleven-step model to represent the simulation process from problem formulation to implementation and documentation. The book presents the necessary level of detail required to fully develop a model that produces meaningful results and considers the tools necessary to interpret those results. Sufficient background information is provided so that the underlying concepts of simulation are understood. Major topics covered in Discrete Event Simulation include probability and distributional theory, statistical estimation and inference, the generation of random variates, verification and validation techniques, time management methods, experimental design, and programming language considerations. The book also examines distributed simulation and issues related to distributing the physical process over a network of tightly coupled processors. Topics covered in this area include deadlock, synchronization, rollback, event management, and communication processes. Fully worked examples and numerous practical exercises have been drawn from the engineering disciplines and computer science, although they have been structured so that they will be useful as well to other disciplines such as economics, business administration, and management science. The presentation of techniques and methods in Discrete Event Simulation make it an ideal text/reference for all practitioners of discrete event simulation.

Discrete Event Simulation Using ExtendSim 8 Jul 14 2021 This text presents the basic concepts of discrete event simulation using ExtendSim 8. The book can be used as either a desk reference or as a textbook for a course in discrete event simulation. This book is intended to be a blend of theory and application, presenting just enough theory to understand how to build a model, design a simulation experiment, and analyze the results. Most of the text is devoted to building models with ExtendSim 8, starting with a simple single-server queue and culminating with a transportation depot for package transfer and delivery. I have built all the models contained in this book with ExtendSim 8 LT, which limits the number of modeling blocks, but otherwise has the required ExtendSim 8 capabilities. Each chapter contains practical exercises and problems at the end of the chapters. ExtendSim 8 LT is not included in this book. Students may obtain ExtendSim 8 LT from Imagine That, Inc.

Discrete Event Systems, Manufacturing Systems, and Communication Networks Nov 25 2019 This IMA Volume in Mathematics and its Applications DISCRETE EVENT SYSTEMS, MANUFACTURING SYSTEMS AND COMMUNICATION NETWORKS is based on the proceedings of a workshop that was an integral part of the 1992-93 IMA program on "Control Theory." The study of discrete event dynamical systems (DEDS) has become rapidly popular among researchers in systems and control, in communication networks, in manufacturing, and in distributed computing. This development has created problems for researchers and potential "consumers" of the research. The first problem is the veritable Babel of languages, formalisms, and approaches, which makes it very

difficult to determine the commonalities and distinctions among the competing schools of approaches. The second, related, problem arises from the different traditions, paradigms, values, and experience that scholars bring to their study of DEDS, depending on whether they come from control, communication, computer science, or mathematical logic. As a result, intellectual exchange among scholars becomes compromised by unexplicated assumptions. The purpose of the Workshop was to promote exchange among scholars representing some of the major "schools" of thought in DEDS with the hope that (1) greater clarity will be achieved thereby, and (2) cross-fertilization will lead to more fruitful questions. We thank P. R. Kumar and P. P. Varaiya for organizing the workshop and editing the proceedings. We also take this opportunity to thank the National Science Foundation and the Army Research Office, whose financial support made the workshop possible. A vner Friedman Willard Miller, Jr.

Introduction to Discrete Event Simulation and Agent-based Modeling Feb 18 2022

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.

Principles of Discrete Event Simulation Jan 08 2021

Modeling and Simulation of Discrete Event Systems Nov 29 2022 Computer modeling and simulation (M&S) allows engineers to study 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 memory capacity increase, so DES-M&S tools become more powerful and more widely used in solving real-life problems. Based on over 20 years of evolution within a classroom environment, as well as on decades-long experience in developing simulation-based solutions for high-tech industries, Modeling and Simulation of Discrete-Event Systems is the only book on DES-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 the form of event graph, ACD, or state graph Diverse types of modeling templates and examples that can be used 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 using popular off-the-shelf simulators such as SIGMA®, ACE®, and Arena® Up-to-date research results as well as research issues and directions in DES-M&S Modeling and Simulation of Discrete-Event Systems is an ideal textbook for undergraduate and graduate students of simulation/industrial engineering and computer science, as well as for

simulation practitioners and researchers.

Structures of Discrete Event Simulation Jun 12 2021 The book presents a philosophy for simulation modeling and a new simulation language. It gives an overview of the development of (mainly discrete event) simulation, the techniques and data structures that this development brought along and the impact it had on general computer science. In fact many seminal ideas coming up in modern operating systems and concurrent programming like data structures that make algorithms fast have their origin in discrete simulation.

Discrete-Event Simulation and System Dynamics for Management Decision Making May 24 2022 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 Simulations Oct 24 2019 The Discrete Event Simulation (DES) method has received widespread attention and acceptance by both researchers and practitioners in recent years. The range of application of DES spans across many different disciplines and research fields. In research, further development and advancements of the basic DES algorithm continue to be sought while various hybrid methods derived by combining DES with other simulation techniques continue to be developed. This book presents state-of-the-art contributions on fundamental development of the DES method, novel integration of the method with other modeling techniques as well as applications towards simulating and analyzing the performances of various types of systems. This book will be of interest to undergraduate and graduate students, researchers as well as professionals who are actively engaged in DES related work.

Discrete Event Simulation Oct 05 2020 How will the Discrete event simulation team and the organization measure complete success of Discrete event simulation? What is our Discrete event simulation Strategy? Can we do Discrete event simulation without complex (expensive) analysis? What are the usability implications of Discrete event simulation actions? Is a fully trained team formed, supported, and committed to work on the Discrete event simulation improvements? Defining, designing, creating, and implementing a process to solve a challenge or meet an objective is the most valuable role... In EVERY group, company, organization and department. Unless you are talking a one-time, single-use project, there should be a process. Whether that process is managed and implemented by humans, AI, or a combination of the two, it needs to be designed by someone with a complex enough perspective to ask the right questions. Someone capable of asking the right questions and step back and say, 'What are we really trying to accomplish here? And is there a different way to look at it?' This Self-Assessment empowers people to do just that - whether their title is entrepreneur, manager, consultant, (Vice-)President, CxO etc... - they are the people who rule the future. They are the person who asks the right questions to make Discrete event simulation investments work better. This Discrete event simulation All-Inclusive Self-Assessment enables You to be that person. All the tools you need to an in-depth Discrete event simulation Self-Assessment. Featuring 711 new and updated case-based questions, organized into seven core areas of process design, this Self-Assessment will help you identify areas in which Discrete event simulation improvements can be made. In using the questions you will be better able to: - diagnose Discrete event simulation projects, initiatives, organizations, businesses and processes using accepted diagnostic standards and practices - implement evidence-based best practice strategies aligned with overall goals - integrate recent advances in Discrete event simulation and process design strategies into practice

according to best practice guidelines Using a Self-Assessment tool known as the Discrete event simulation Scorecard, you will develop a clear picture of which Discrete event simulation areas need attention. Your purchase includes access details to the Discrete event simulation self-assessment dashboard download which gives you your dynamically prioritized projects-ready tool and shows your organization exactly what to do next. Your exclusive instant access details can be found in your book.

Simulation of Industrial Systems Sep 15 2021 In any production environment, discrete event simulation is a powerful tool for the analysis, planning, and operating of a manufacturing facility. Operations managers can use simulation to improve their production systems by eliminating bottlenecks, reducing cycle time and cost, and increasing capacity utilization. Offering a hands-on tutorial on h

Control of Discrete-Event Systems Dec 27 2019 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 through 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.

Principles of Discrete Event Simulation Dec 07 2020

Object-Oriented Computer Simulation of Discrete-Event Systems Feb 06 2021 Object-Oriented Computer Simulation of Discrete-Event Systems offers a comprehensive presentation of a wide repertoire of computer simulation techniques available to the modelers of dynamic systems. Unlike other books on simulation, this book includes a complete and balanced description of all essential issues relevant to computer simulation of discrete event systems, and it teaches simulation users how to design, program and exploit their own computer simulation models. In addition, it uses the object-oriented methodology throughout the book as its main programming platform. The reader is expected to have some background in the theory of probability and statistics and only a little programming experience in C++, as the book is not tied down to any particular simulation language. The book also provides 50 complete simulation problems to assist with writing such simulation programs. Object-Oriented Computer Simulation of Discrete-Event Systems demonstrates the basic and generic concepts used in computer simulation of discrete-event systems in a comprehensive, uniform and self-contained manner.

Discrete-event System Simulation May 31 2020 This book provides a basic treatment of discrete-event simulation, including the proper collection and analysis of data, the use of analytic techniques, verification and validation of models, and designing simulation experiments. Contains up-to-date treatment of simulation of manufacturing and material handling systems. Includes numerous solved examples. Offers an integrated website. Explains how to interpret simulation software output. For those interested in learning more about discrete-event simulation.

Discrete-Event Simulation Jan 20 2022 "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

Modeling and Simulation of Discrete Event Systems Dec 31 2022 Computer modeling and simulation (M&S) allows engineers to study 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 memory capacity increase, so DES-M&S tools become more powerful and more widely used in solving real-life problems. Based on over 20 years of evolution within a classroom environment, as well as on decades-long experience in developing simulation-based solutions for high-tech industries, *Modeling and Simulation of Discrete-Event Systems* is the only book on DES-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 the form of event graph, ACD, or state graph. Diverse types of modeling templates and examples that can be used 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 using popular off-the-shelf simulators such as SIGMA®, ACE®, and Arena®. Up-to-date research results as well as research issues and directions in DES-M&S. *Modeling and Simulation of Discrete-Event Systems* is an ideal textbook for undergraduate and graduate students of simulation/industrial engineering and computer science, as well as for simulation practitioners and researchers.

Use Cases of Discrete Event Simulation Sep 27 2022 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.

Introduction to Discrete Event Systems Jul 26 2022 This unique textbook comprehensively introduces 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 queueing theory, discrete-event simulation, and concurrent estimation techniques. Topics and features: detailed treatment of automata and language theory in the context of discrete event systems, including application to state estimation and diagnosis. Comprehensive coverage of centralized and decentralized supervisory control of partially-observed systems. Timed models, including timed automata and hybrid automata. Stochastic models for discrete event systems and controlled Markov chains. Discrete event simulation. An introduction to stochastic hybrid systems. Sensitivity analysis and optimization of discrete event and hybrid systems. New in the third edition: opacity properties, enhanced coverage of supervisory control, overview of

latest software tools This proven textbook is essential to advanced-level students and researchers in a variety of disciplines where the study of discrete event systems is relevant: control, communications, computer engineering, computer science, manufacturing engineering, transportation networks, operations research, and industrial engineering. Christos G. Cassandras is Distinguished Professor of Engineering, Professor of Systems Engineering, and Professor of Electrical and Computer Engineering at Boston University. Stéphane Lafortune is Professor of Electrical Engineering and Computer Science at the University of Michigan, Ann Arbor.

Discrete-Event Simulation Jul 02 2020 "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

Modeling Discrete-Event Systems with GPenSIM Sep 03 2020 Modeling Discrete-Event Systems with GPenSIM describes the design and applications of General Purpose Petri Net Simulator (GPenSIM), which is a software tool for modeling, simulation, and performance analysis of discrete-event systems. The brief explains the principles of modelling discrete-event systems, as well as the design and applications of GPenSIM. It is based on the author's lectures that were given on "modeling, simulation, and performance analysis of discrete event systems". The brief uses GPenSIM to enable the efficient modeling of complex and large-scale discrete-event systems. GPenSIM, which is based on MATLAB®, is designed to allow easy integration of Petri net models with a vast number of toolboxes that are available on the MATLAB®. The book offers an approach for developing models that can interact with the external environment; this will help readers to solve problems in industrial diverse fields. These problems include: airport capacity evaluation for aviation authorities; finding bottlenecks in supply chains; scheduling drilling operations in the oil and gas industry; and optimal scheduling of jobs in grid computing. This brief is of interest to researchers working on the modeling, simulation and performance evaluation of discrete-event systems, as it shows them the design and applications of an efficient modeling package. Since the book also explains the basic principles of modeling discrete-event systems in a step-by-step manner, it is also of interest to final-year undergraduate and postgraduate students.

Conceptual Modeling for Discrete-Event Simulation Nov 17 2021 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.

Discrete Event Simulation in C Nov 05 2020 A software engineer's guide to model design in C. Kevin Watkins clarifies the concepts of simulation modelling and

discrete event simulation. He explores important simulation techniques such as random numbers generation, sampling, variance reduction, and analysis. Provides all the code for a library of C simulation routines.

Dynamic Models and Discrete Event Simulation Jun 24 2022 This book aims to clarify exactly how simulation studies can be carried out in the system theory paradigm, while providing a realistically complete coverage of (discrete event) simulation in its more traditional aspects. It focuses on the subclass of predictive, generative and dynamic system models.

Out-of-order Parallel Discrete Event Simulation for Electronic System-level Design Jan 26 2020 This book offers readers a set of new approaches and tools a set of tools and techniques for facing challenges in parallelization with design of embedded systems. It provides an advanced parallel simulation infrastructure for efficient and effective system-level model validation and development so as to build better products in less time. Since parallel discrete event simulation (PDES) has the potential to exploit the underlying parallel computational capability in today's multi-core simulation hosts, the author begins by reviewing the parallelization of discrete event simulation, identifying problems and solutions. She then describes out-of-order parallel discrete event simulation (OoO PDES), a novel approach for efficient validation of system-level designs by aggressively exploiting the parallel capabilities of today's multi-core PCs. This approach enables readers to design simulators that can fully exploit the parallel processing capability of the multi-core system to achieve fast speed simulation, without loss of simulation and timing accuracy. Based on this parallel simulation infrastructure, the author further describes automatic approaches that help the designer quickly to narrow down the debugging targets in faulty ESL models with parallelism.

Control of Discrete-Event Systems Apr 22 2022 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 through 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.

Supervisory Control of Discrete-Event Systems May 12 2021 This book shows how supervisory control theory (SCT) supports the formulation of various control problems of standard types, like the synthesis of controlled dynamic invariants by state feedback, and the resolution of such problems in terms of naturally definable control-theoretic concepts and properties, like reachability, controllability and observability. It exploits a simple, abstract model of controlled discrete-event systems (DES) that has proved to be tractable, appealing to control specialists, and expressive of a range of control-theoretic ideas. It allows readers to choose between automaton-based and dually language-based forms of SCT, depending on whether their preference is for an internal-structural or external-behavioral description of the problem. The monograph begins with two chapters on algebraic and linguistic preliminaries and the fundamental concepts and results of SCT are introduced. To handle complexity caused by system scale, architectural approaches—the horizontal

modularity of decentralized and distributed supervision and the vertical modularity of hierarchical supervision—are introduced. Supervisory control under partial observation and state-based supervisory control are also addressed; in the latter, a vector DES model that exploits internal regularity of algebraic structure is proposed. Finally SCT is generalized to deal with timed DES by incorporating temporal features in addition to logical ones. Researchers and graduate students working with the control of discrete-event systems or who are interested in the development of supervisory control methods will find this book an invaluable aid in their studies. The text will also be of assistance to researchers in manufacturing, logistics, communications and transportation, areas which provide plentiful examples of the class of systems being discussed.

Performance Evaluation of Industrial Systems Mar 22 2022 Basic approaches to discrete simulation have been process simulation languages (e.g., GPSS) and event-scheduling type (e.g., SIMSCRIPT). The trade-offs are that event-scheduling languages offer more modeling flexibility and process-oriented languages are more intuitive to the user. With these considerations in mind, authors David Elizandro and Hamdy Taha embarked on the development of a new discrete simulation environment that is easy to use, yet flexible enough to model complex production systems. They introduced this environment, Design Environment for Event Driven Simulation (DEEDS), in *Simulation of Industrial Systems: Discrete Event Simulation in Using Excel/VBA*. The DEEDS environment is itself an Excel/VBA add-in. Based on this foundation, the second edition, now titled *Performance Evaluation of Industrial Systems: Discrete Event Simulation in Using Excel/VBA* incorporates the use of discrete simulation to statistically analyze a system and render the most efficient time sequences, designs, upgrades, and operations. This updated edition includes new visualization graphics for DEEDS software, improvements in the optimization of the simulation algorithms, a new chapter on queuing models, and an Excel 2007 version of the DEEDS software. Organized into three parts, the book presents concepts of discrete simulation, covers DEEDS, and discusses a variety of applications using DEEDS. The flexibility of DEEDS makes it a great tool for students or novices to learn concepts of discrete simulation and this book can form the basis of an introductory undergraduate course on simulation. The expanded depth of coverage in the second edition gives it a richness other introductory texts do not have and provides practitioners a reference for their simulation projects. It may also be used as a research tool by faculty and graduate students who are interested in "optimizing" production systems.

Stochastic Discrete Event Systems Mar 29 2020 Stochastic discrete-event systems (SDES) capture the randomness in choices due to activity delays and the probabilities of decisions. This book delivers a comprehensive overview on modeling with a quantitative evaluation of SDES. It presents an abstract model class for SDES as a pivotal unifying result and details important model classes. The book also includes nontrivial examples to explain real-world applications of SDES.

Discrete-event System Simulation Apr 10 2021 For junior- and senior-level simulation courses in engineering, business, or computer science. While most books on simulation focus on particular software tools, *Discrete Event System Simulation* examines the principles of modeling and analysis that translate to all such tools. This language-independent text explains the basic aspects of the technology, including the proper collection and analysis of data, the use of analytic techniques, verification and validation of models, and designing simulation experiments.

Discrete-event System Theory Feb 27 2020 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.

Discrete Event Simulation for Health Technology Assessment Dec 19 2021 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.

Modeling and Control of Logical Discrete Event Systems Aug 15 2021 The field of discrete event systems has emerged to provide a formal treatment of many of the man-made systems such as manufacturing systems, communication 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, discrete event systems are modeled by formal languages or, equivalently, by state machines. The field of logical discrete event systems is an interdisciplinary field—it includes 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 theory. The only prerequisite is some degree of "mathematical maturity".

Modeling and Control of Discrete-event Dynamic Systems Apr 30 2020 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.

modeling-and-control-of-discrete-event-dynamic-systems-with-petri-nets-and-other-tools-advanced-textbooks-in-control-and-signal-processing

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