Performance Modeling And Design Of Computer Systems

Effective building performance simulation can reduce the environmental impact of the built environment, improve indoor quality and productivity, and facilitate future innovation and technological progress in construction. It draws on many disciplines, including physics, mathematics, material science, biophysics and human behavioural, environmental and computational sciences. The discipline itself is continuously evolving and maturing, and improvements in model robustness and fidelity are constantly being made. This has sparked a new agenda focusing on the effectiveness of simulation in building life-cycle processes. Building Performance Simulation for Design and Operation begins with an introduction to the concepts of performance indicators and targets, followed by a discussion on the role of building simulation in performance-based building design and operation. This sets the ground for in-depth discussion of performance prediction for energy demand, indoor environmental quality (including thermal, visual, indoor air quality and moisture phenomena), HVAC and renewable system performance, urban level modelling, building operational optimization and automation. Produced in cooperation with the International Building Performance Simulation Association (IBPSA), and featuring contributions from fourteen internationally recognised experts in this field, this book provides a unique and comprehensive overview of building performance simulation for the complete building life-cycle from conception to demolition. It is primarily intended for advanced students in building services engineering, and in architectural, environmental or mechanical engineering; and will be useful for building and systems designers and operators.
The goal of this book is to present an overview of the current state-of-the-art in computer architecture performance evaluation. The book covers various aspects that relate to performance evaluation, ranging from performance metrics, to workload selection, to various modeling approaches such as analytical modeling and simulation. And because simulation is by far the most prevalent modeling technique in computer architecture evaluation, the book spends more than half its content on simulation, covering an overview of the various simulation techniques in the computer designer's toolbox, followed by various simulation acceleration techniques such as sampled simulation, statistical simulation, and parallel and hardware-accelerated simulation. The evaluation methods described in this book have a primary focus on performance. Although performance remains to be a key design target, it no longer is the sole design target. Power consumption and reliability have quickly become primary design concerns, and today they probably are as important as performance. Other important design constraints relate to cost, thermal issues, yield, etc. This book focuses on performance evaluation methods only. This does not compromise on the importance and general applicability of the techniques described in this book because power and reliability models are typically integrated into existing performance models. These integrated models pose similar challenges to the ones handled in this book. The book also focuses on presenting fundamental concepts and ideas. The book does not provide much quantitative data. Although quantitative data is crucial to performance evaluation, to understand the fundamentals of performance evaluation methods it is not. Moreover, quantitative data from different sources may be hard to compare, and may even be misleading, because the contexts in which the results were obtained may be very different - a comparison based on these numbe
Models in system design follow the general tendency in electronics in terms of size,

complexity and difficulty of maintenance. While a model should be a manageable representation of a system, this increasing complexity sometimes forces current CAD-tool designers and model writers to apply modeling techniques to the model itself. Model writers are interested in instrumenting their model, so as to extract critical information before the model is complete. CAD tools designers use internal representations of the design at various stages. The complexity has also led CAD-tool developers to develop formal tools, theories and methods to improve relevance, completeness and consistency of those internal representations. Information modeling involves the representation of objects, their properties and relationships. Performance Modeling When it comes to design choices and trade-offs, performance is generally the final key. However performance estimations have to be extracted at a very early stage in the system design. Performance modeling concerns the set of tools and techniques that allow or help the designer to capture metrics relating to future architectures. Performance modeling encompasses the whole system, including software modeling. It has a strong impact on all levels of design choices, from hardware/software partitioning to the final layout. Information Modeling Specification and formalism have in the past traditionally played little part in the design and development of EDA systems, their support environments, languages and processes. Instead, EDA system developers and EDA system users have seemed to be content to operate within environments that are often extremely complex and may be poorly tested and understood. This situation has now begun to change with the increasing use of techniques drawn from the domains of formal specification and database design. This section of this volume addresses aspects of the techniques being used. In particular, it considers a specific formalism, called information modeling, which has gained increasing acceptance recently and is now a key part of many of the proposals in the EDA Standards Roadmap, which promises to be of significance to the EDA industry. In addition, the section looks at an example of a design system from the point of view of its underlying understanding of the design process rather than through a consideration of particular CAD algorithms. Meta-Modeling: Performance and Information Modeling contains papers describing the very latest techniques used in meta-modeling. It will be a valuable text for researchers, practitioners and students involved in Electronic Design Automation.

Advances in Materials and Pavement Performance Prediction contains the papers presented at the International Conference on Advances in Materials and Pavement Performance Prediction (AM3P, Doha, Qatar, 16- 18 April 2018). There has been an increasing emphasis internationally in the design and construction of sustainable pavement systems. Advances in Materials and Pavement Prediction reflects this development highlighting various approaches to predict pavement performance. The contributions discuss links and interactions between material characterization methods, empirical predictions, mechanistic modeling, and statistically-sound calibration and validation methods. There is also emphasis on comparisons between modeling results and observed performance. The topics of the book include (but are not limited to): • Experimental laboratory material characterization • Field measurements and in situ material characterization • Constitutive modeling and simulation • Innovative pavement materials and interface systems • Non-destructive measurement techniques • Surface characterization, tire-surface interaction, pavement noise • Pavement rehabilitation • Case studies Advances in Materials and Pavement Performance Prediction will be of interest to academics and engineers involved in pavement engineering.

Building Performance Simulation for Design and Operation

Systems Performance Modeling

The Art Of Computer Systems Performance Analysis:

PERFORMANCE MODELING OF AUTOMATED SYSTEMS
Meta-Modeling
Performance Modeling for Computer Architects

Written with computer scientists and engineers in mind, this book brings queueing theory decisively back to computer science.

Computer Performance Modeling Handbook

"If this book had been available to Healthcare.gov's contractors, and they read and followed its life cycle performance processes, there would not have been the enormous problems apparent in that application. In my 40+ years of experience in building leading-edge products, poor performance is the single most frequent cause of the failure or cancellation of software-intensive projects. This book provides techniques and skills necessary to implement performance engineering at the beginning of a project and manage it throughout the product's life cycle. I cannot recommend it highly enough." – Don Shafer, CSDP, Technical Fellow, Athens Group, LLC Poor performance is a frequent cause of software project failure. Performance engineering can be extremely challenging. In Foundations of Software and System Performance Engineering, leading software performance expert Dr. André Bondi helps you create effective performance requirements up front, and then architect, develop, test, and deliver systems that meet them. Drawing on many years of experience at Siemens, AT&T Labs, Bell Laboratories, and two startups, Bondi offers practical guidance for every software stakeholder and development team participant. He shows you how to define and use metrics; plan for diverse workloads; evaluate scalability, capacity, and responsiveness; and test both individual components and entire systems. Throughout, Bondi helps you link performance engineering with everything else you do in the software life cycle, so you can achieve the right performance–now and in the future–at lower cost and with less pain. This guide will help you • Mitigate the business and engineering risk associated with poor system performance • Specify system performance requirements in business and engineering terms • Identify metrics for comparing performance requirements with actual performance • Verify the accuracy of measurements • Use simple mathematical models to make predictions, plan performance tests, and anticipate the impact of changes to the system or the load placed upon it • Avoid common performance and scalability mistakes • Clarify business and engineering needs to be satisfied by given levels of throughput and response time • Incorporate performance engineering into agile processes • Help stakeholders of a system make better performance-related decisions • Manage stakeholders' expectations about system performance throughout the software life cycle, and deliver a software product with quality performance André B. Bondi is a senior staff engineer at Siemens Corp., Corporate Technologies in Princeton, New

Jersey. His specialties include performance requirements, performance analysis, modeling, simulation, and testing. Bondi has applied his industrial and academic experience to the solution of performance issues in many problem domains. In addition to holding a doctorate in computer science and a master's in statistics, he is a Certified Scrum Master.

The text is designed for engineering students at the senior undergraduate level and first-year students at graduate level, and professionals (R&D engineers in the industry and factory managers). The authors offer a unique effort in presenting a unified and systematic treatment of various modeling methodologies and analysis techniques for performance evaluation of automated manufacturing systems. The text begins with an overview of automated manufacturing systems, and then provides a clear and comprehensive discussion of three principal analytical modeling paradigms: Markov Chains, Queues and Queuing Networks, and Petri Nets. Salient Features • Present the first ever treatment of the mathematical modeling of manufacturing systems. • Offers a unified study of principal analytical modeling paradigms for automated manufacturing systems. • Discusses many recent research contributions in the area of modeling of automated manufacturing systems. • Discusses many recent research contributions in the area of modeling of automated manufacturing systems, including deadlock modeling, transient analysis, queuing network approximations, Petri Net modeling, and integrated analytical modeling. • Provides a large number of exercises and problems.

An Exploration of Gas Turbine Performance Modeling

Computer Performance Modeling Handbook

Model-Based Software Performance Analysis

Computer Capacity Planning by Example

Business Process Modeling, Simulation and Design

Papers from the International Conference on Advances in Materials and Pavement Performance Prediction (AM3P 2018), April 16-18, 2018, Doha, Qatar

With the fast development of networking and software technologies, information processing infrastructure and applications have been growing at an impressive rate in both size and complexity, to such a degree that the design and development of high performance and scalable data processing systems and networks have become an ever-challenging issue. As a result, the use of performance modeling and m- surementtechniquesas a critical step in designand developmenthas becomea c- mon practice. Research and developmenton methodologyand tools of performance modeling and performance engineering have gained further importance in order to improve the performance and scalability of these systems. Since the seminal work of A. K. Erlang almost a century ago on the mod- ing of telephone traf

c, performance modeling and measurement have grown into a discipline and have been evolving both in their methodologies and in the areas in which they are applied. It is noteworthy that various mathematical techniques were brought into this eld, including in particular probability theory, stochastic processes, statistics, complex analysis, stochastic calculus, stochastic comparison, optimization, control theory, machine learning and information theory. The app- cation areas extended from telephone networks to Internet and Web applications, from computer systems to computer software, from manufacturing systems to s- ply chain, from call centers to workforce management.

Based on the six-year NASA Aviation Safety and Security Program Human Performance Modeling project, a collaboration of five teams from industry and academia, Human Performance Modeling in Aviation chronicles the results of modeling NASA-supplied data on two aviation flight deck problems: pilot surface operations taxi errors, and approach and landing with synthetic vision systems. The book provides a deep understanding of the aviation problems and "what-if" system redesigns of flight deck technologies and procedures. Five modeling teams describe how they applied their models to these two problems and discuss the results in terms of the specific problems addressed, the modeling challenges faced, and the modeling solutions developed to address complex, real-world situations. The book then compares the five modeling tools used, shedding light on the unique approach that each brings to bear on two qualitatively different problems. It includes a "virtual roundtable discussion" that poses questions to each of the five teams and offers take-home lessons and insights into the modeling process and its complexities. The modeling teams also explore the issue of model validation and the approach that they adopted. Concluding with a summary of how modeling fits into the system design and evaluation process, the text covers state-of-the-art advances in human performance modeling for complex systems. Critical for modeling aviation-domain tasks, these modeling capabilities can also be applied to other complex-system domains such as process control, medical applications, surface transportation, and military command and control, which share similar human-system interaction issues.

Poor performance is one of the main quality-related shortcomings that cause software projects to fail. Thus, the need to address performance concerns early during the software development process is fully acknowledged, and there is a growing interest in the research and software industry communities towards techniques, methods and tools that permit to manage system performance concerns as an integral

part of software engineering. Model-based software performance analysis introduces performance concerns in the scope of software modeling, thus allowing the developer to carry on performance analysis throughout the software lifecycle. With this book, Cortellessa, Di Marco and Inverardi provide the cross-knowledge that allows developers to tackle software performance issues from the very early phases of software development. They explain the basic concepts of performance analysis and describe the most representative methodologies used to annotate and transform software models into performance models. To this end, they go all the way from performance primers through software and performance modeling notations to the latest transformation-based methodologies. As a result, their book is a self-contained reference text on software performance engineering, from which different target groups will benefit: professional software engineers and graduate students in software engineering will learn both basic concepts of performance modeling and new methodologies; while performance specialists will find out how to investigate software performance model building.
Modeling Microprocessor Performance focuses on the development of a design and evaluation tool, named RIPE (Rensselaer Interconnect Performance Estimator). This tool analyzes the impact on wireability, clock frequency, power dissipation, and the reliability of single chip CMOS microprocessors as a function of interconnect, device, circuit, design and architectural parameters. It can accurately predict the overall performance of existing microprocessor systems. For the three major microprocessor architectures, DEC, PowerPC and Intel, the results have shown agreement within 10% on key parameters. The models cover a broad range of issues that relate to the implementation and performance of single chip CMOS microprocessors. The book contains a detailed discussion of the various models and the underlying assumptions based on actual design practices. As such, RIPE and its models provide an insightful tool into single chip microprocessor design and its performance aspects. At the same time, it provides design and process engineers with the capability to model, evaluate, compare and optimize single chip microprocessor systems using advanced technology and design techniques at an early design stage without costly and time consuming implementation. RIPE and its models demonstrate the factors which must be considered when estimating tradeoffs in device and interconnect technology and architecture design on microprocessor performance.
Queueing Theory in Action
Process, Performance Modeling, Requirements, Testing, Scalability,

and Practice
13th International Conference, TOOLS 2003, Urbana, IL, USA, September 2-5, 2003, Proceedings
Advances in Materials and Pavement Prediction
Fundamentals of Performance Modeling
Performance Modeling and Design of Computer Systems

Building energy design is currently going through a period of major changes. One key factor of this is the adoption of net-zero energy as a long term goal for new buildings in most developed countries. To achieve this goal a lot of research is needed to accumulate knowledge and to utilize it in practical applications. In this book, accomplished international experts present advanced modeling techniques as well as in-depth case studies in order to aid designers in optimally using simulation tools for net-zero energy building design. The strategies and technologies discussed in this book are, however, also applicable for the design of energy-plus buildings. This book was facilitated by International Energy Agency's Solar Heating and Cooling (SHC) Programs and the Energy in Buildings and Communities (EBC) Programs through the joint SHC Task 40/EBC Annex 52: Towards Net Zero Energy Solar Buildings R&D collaboration. After presenting the fundamental concepts, design strategies, and technologies required to achieve net-zero energy in buildings, the book discusses different design processes and tools to support the design of net-zero energy buildings (NZEBs). A substantial chapter reports on four diverse NZEBs that have been operating for at least two years. These case studies are extremely high quality because they all have high resolution measured data and the authors were intimately involved in all of them from conception to operating. By comparing the projections made using the respective design tools with the actual performance data, successful (and unsuccessful) design techniques and processes, design and simulation tools, and technologies are identified. Written by both academics and practitioners (building designers) and by North Americans as well as Europeans, this book provides a very broad perspective. It includes a detailed description of design processes and a list of appropriate tools for each design phase, plus methods for parametric analysis and mathematical optimization. It is a guideline for building designers that draws from both the profound theoretical background and the vast practical experience of the authors.

Modeling and Simulation of Computer Networks and Systems: Methodologies and Applications introduces you to a broad array of modeling and simulation issues related to computer networks and systems. It focuses on the theories, tools, applications and

uses of modeling and simulation in order to effectively optimize networks. It describes methodologies for modeling and simulation of new generations of wireless and mobiles networks and cloud and grid computing systems. Drawing upon years of practical experience and using numerous examples and illustrative applications recognized experts in both academia and industry, discuss: Important and emerging topics in computer networks and systems including but not limited to; modeling, simulation, analysis and security of wireless and mobiles networks especially as they relate to next generation wireless networks Methodologies, strategies and tools, and strategies needed to build computer networks and systems modeling and simulation from the bottom up Different network performance metrics including, mobility, congestion, quality of service, security and more... Modeling and Simulation of Computer Networks and Systems is a must have resource for network architects, engineers and researchers who want to gain insight into optimizing network performance through the use of modeling and simulation. Discusses important and emerging topics in computer networks and Systems including but not limited to; modeling, simulation, analysis and security of wireless and mobiles networks especially as they relate to next generation wireless networks Provides the necessary methodologies, strategies and tools needed to build computer networks and systems modeling and simulation from the bottom up Includes comprehensive review and evaluation of simulation tools and methodologies and different network performance metrics including mobility, congestion, quality of service, security and more

Computer systems design is full of conundrums: Given a choice between a single machine with speed s, or n machines each with speed s/n, which should we choose? If both the arrival rate and service rate double, will the mean response time stay the same? Should systems really aim to balance load, or is this a convenient myth? If a scheduling policy favors one set of jobs, does it necessarily hurt some other jobs, or are these conservation laws being misinterpreted? Do greedy, shortest-delay, routing strategies make sense in a server farm, or is what's good for the individual disastrous for the system as a whole? How do high job size variability and heavy-tailed workloads affect the choice of a scheduling policy? How should one trade off energy and delay in designing a computer system? If 12 servers are needed to meet delay guarantees when the arrival rate is 9 jobs/sec, will we need 12,000 servers when the arrival rate is 9,000 jobs/sec? Tackling the questions that systems designers care about, this book brings queueing theory decisively back to computer science. The book is written with

computer scientists and engineers in mind and is full of examples from computer systems, as well as manufacturing and operations research. Fun and readable, the book is highly approachable, even for undergraduates, while still being thoroughly rigorous and also covering a much wider span of topics than many queueing books. Readers benefit from a lively mix of motivation and intuition, with illustrations, examples, and more than 300 exercises all while acquiring the skills needed to model, analyze, and design large-scale systems with good performance and low cost. The exercises are an important feature, teaching research-level counterintuitive lessons in the design of computer systems. The goal is to train readers not only to customize existing analyses but also to invent their own.

This book describes and evaluates existing models of human performance and their use in the design and evaluation of new human-technology systems. Its primary focus is on the modeling of system operators who perform supervisory and manual control tasks. After an introduction on human performance modeling, the book describes information processing, control theory, task network, and knowledge-based models. It explains models of human performance in aircraft operations, nuclear power plant control, maintenance, and the supervisory control of process control systems, such as oil refineries. The book concludes with a discussion of model parameterization and validation and recommends a number of lines of research needed to strengthen model development and application.

First International Conference, ICDHM 2007, Held as Part of HCI International 2007, Beijing, China, July 22-27, 2007, Proceedings

Network Performance Modeling and Simulation

Molecular Modeling for the Design of Novel Performance Chemicals and Materials

High-Performance Modelling and Simulation for Big Data Applications

Performance Modeling in the Design Process

Modeling, Design, and Optimization of Net-Zero Energy Buildings

This open access book was prepared as a Final Publication of the COST Action IC1406 “High-Performance Modelling and Simulation for Big Data Applications (cHiPSet)“ project. Long considered important pillars of the scientific method, Modelling and Simulation have evolved from traditional discrete numerical methods to complex data-intensive continuous analytical optimisations. Resolution, scale, and accuracy have become essential to predict and analyse natural and complex systems in science and engineering. When their level of abstraction raises to have a better discernment of the domain at hand, their representation gets increasingly demanding for computational and data resources. On the other hand, High Performance Computing typically entails the

effective use of parallel and distributed processing units coupled with efficient storage, communication and visualisation systems to underpin complex data-intensive applications in distinct scientific and technical domains. It is then arguably required to have a seamless interaction of High Performance Computing with Modelling and Simulation in order to store, compute, analyse, and visualise large data sets in science and engineering. Funded by the European Commission, cHiPSet has provided a dynamic trans-European forum for their members and distinguished guests to openly discuss novel perspectives and topics of interests for these two communities. This cHiPSet compendium presents a set of selected case studies related to healthcare, biological data, computational advertising, multimedia, finance, bioinformatics, and telecommunications.

Tackling the questions that systems designers care about, this book brings queueing theory decisively back to computer science. The book is written with computer scientists and engineers in mind and is full of examples from computer systems, as well as manufacturing and operations research. Fun and readable, the book is highly approachable, even for undergraduates, while still being thoroughly rigorous and also covering a much wider span of topics than many queueing books. Readers benefit from a lively mix of motivation and intuition, with illustrations, examples and more than 300 exercises – all while acquiring the skills needed to model, analyze and design large-scale systems with good performance and low cost. The exercises are an important feature, teaching research-level counterintuitive lessons in the design of computer systems. The goal is to train readers not only to customize existing analyses but also to invent their own.

We are pleased to present the proceedings of Performance TOOLS 2003, the 13th International Conference on Modelling Techniques and Tools for Computer Performance Evaluation. The series of TOOLS conferences has provided a forum for our community of performance engineers with all their diverse interests. TOOLS 2003, held in Urbana, Illinois during September 2–5, 2003, was the most recent meeting of the series, which in the past has been held in the following cities: 1984 Paris 1992 Edinburgh 2000 Chicago 1985 Sophia-Antipolis 1994 Vienna 2002 London 1987 Paris 1995 Heidelberg 2003 Urbana 1988 Palma 1997 Saint Malo 1991 Turin 1998 Palma

TheproceedingsoftheTOOLSconferenceshavebeenpublishedbySpringer- Verlag in its LNCS series since 1994.

TOOLS2003wasthesecondconferenceintheseriestobeheldinthestateof Illinois, USA. It was one of four component conferences that met together under the umbrella of the 2003 Illinois Multiconference on Measurement, Modelling, and Evaluation of Computer-Communication Systems. Other conferences held inconjunctionwithTOOLS2003werethe10thInternationalWorkshoponPetri Nets and Performance Models (PNPM 2003), the International Conference on the Numerical Solution of Markov Chains (NSMC 2003), and the 6th Inter- tional Workshop on Performability Modeling of Computer and Communication Systems (PMCCS-6). The format allowed for a number of joint components in the programs: the three keynote speakers, the tool demonstrations, the tutorials, and the social events were all shared by the participants of the multiconference. Moreover, the PNPM, TOOLS, and NSMC tracks of the multiconference ran concurrently, so that attendees could choose to attend whichever sessions of those component conferences they wished.

Probability, Markov Chains, Queues, and Simulation provides a modern and

authoritative treatment of the mathematical processes that underlie performance modeling. The detailed explanations of mathematical derivations and numerous illustrative examples make this textbook readily accessible to graduate and advanced undergraduate students taking courses in which stochastic processes play a fundamental role. The textbook is relevant to a wide variety of fields, including computer science, engineering, operations research, statistics, and mathematics. The textbook looks at the fundamentals of probability theory, from the basic concepts of set-based probability, through probability distributions, to bounds, limit theorems, and the laws of large numbers. Discrete and continuous-time Markov chains are analyzed from a theoretical and computational point of view. Topics include the Chapman-Kolmogorov equations; irreducibility; the potential, fundamental, and reachability matrices; random walk problems; reversibility; renewal processes; and the numerical computation of stationary and transient distributions. The M/M/1 queue and its extensions to more general birth-death processes are analyzed in detail, as are queues with phase-type arrival and service processes. The M/G/1 and G/M/1 queues are solved using embedded Markov chains; the busy period, residual service time, and priority scheduling are treated. Open and closed queueing networks are analyzed. The final part of the book addresses the mathematical basis of simulation. Each chapter of the textbook concludes with an extensive set of exercises. An instructor's solution manual, in which all exercises are completely worked out, is also available (to professors only). Numerous examples illuminate the mathematical theories Carefully detailed explanations of mathematical derivations guarantee a valuable pedagogical approach Each chapter concludes with an extensive set of exercises

Deformation-Based Processing of Materials

Computer Performance Evaluation. Modelling Techniques and Tools

Performance Modeling and Design of Computer System South Asian Edition

Probability, Markov Chains, Queues, and Simulation

Digital Human Modeling

Performance Modeling and Analysis of Bluetooth Networks

This book constitutes the refereed proceedings of the First International Conference on Digital Human Modeling, DHM 2007, held in Beijing, China in July 2007. The papers thoroughly cover the thematic area of digital human modeling, addressing the following major topics: shape and movement modeling and anthropometry, building and applying virtual humans, medical and rehabilitation applications, as well as industrial and ergonomic applications.

This book describes methods to improve software performance and safety using advanced mathematical and computational analytics. The main focus is laid on the increase of software reliability by preventive and predictive maintenance with efficient usage of modern testing resources. The editors collect contributions from international researchers in the field.

Here, in capsule form, are some lessons learned trying to integrate performance modeling into the design process. Performance modeling should play a central role in system design; ignore it at your peril. The role of performance modeling is not the same in all design projects. Clearly specify performance goals and what factors will affect performance; they try to model

those factors. Obtaining the data for the models can be a major problem; ongoing measurement projects are always worthwhile. Prototypes can be valuable data gathering tools if they are instrumented for this purpose. Anticipate the effect of environment on the system you are designing, and the effects of the system on the environment. Including the performance analyst on the design team from the beginning; if he is perceived as an outsider, he is more likely to be ignored, especially if decisions have already been made. Practical, real-world solutions are given to potential problems covering the entire system life cycle. This book describes how to map real-life systems (databases, data centers, and e-commerce applications) into analytic performance models. The authors elaborate upon these models and use them to help the reader better understand performance issues.

A Compositional Approach to Performance Modelling

Performance Modelling of Communication Networks and Computer Architectures

Propulsion and Power

Performance Modeling and Engineering

Advanced Computer Performance Modeling and Simulation

Fundamentals of Building Performance Simulation

Until now, developers and researchers interested in the design, operation, and performance of Bluetooth networks have lacked guidance about potential answers and the relative advantages and disadvantages of performance solutions. Performance Modeling and Analysis of Bluetooth Networks: Polling, Scheduling, and Traffic Control summarizes t

Molecular modeling (MM) tools offer significant benefits in the design of industrial chemical plants and material processing operations. While the role of MM in biological fields is well established, in most cases MM works as an accessory in novel products/materials development rather than a tool for direct innovation. As a result, MM engineers and

Addresses the major issues involved in computer design and architectures. Dealing primarily with theory, tools, and techniques as related to advanced computer systems, it provides tutorials and surveys and relates new important research results. Each chapter provides background information, describes and analyzes important work done in the field, and provides important direction to the reader on future work and further readings. The topics covered include hierarchical design schemes, parallel and distributed modeling and simulation, parallel simulation tools and techniques, theoretical models for formal and performance modeling, and performance evaluation techniques.

With the growing need for effective communication networks in telecommunications and distributed computer systems, system designers need to be aware of the developments of sophisticated models for evaluating system performance. This book is ideally designed for performance engineers and system designers with the main focus of the text on queueing network models.

Foundations of Software and System Performance Engineering

Behavior, Performance, Modeling, and Control

Methodologies and Applications
A Statistical Approach
Quantitative Modeling of Human Performance in Complex, Dynamic Systems
Selected Results of the COST Action IC1406 cHiPSet

Fundamentals of Building Performance Simulation pares the theory and practice of a multi-disciplinary field to the essentials for classroom learning and real-world applications. Authored by a veteran educator and researcher, this textbook equips graduate students and emerging and established professionals in engineering and architecture to predict and optimize buildings' energy use. It employs an innovative pedagogical approach, introducing new concepts and skills through previously mastered ones and deepening understanding of familiar themes by means of new material. Covering topics from indoor airflow to the effects of the weather, the book's 19 chapters empower learners to: Understand the models and assumptions underlying popular BPS tools Compare models, simulations, and modelling tools and make appropriate selections Recognize the effects of modelling choices and input data on simulation predictions And more. Each subject is introduced without reference to particular modelling tools, while practice problems at the end of each chapter provide hands-on experience with the tools of the reader's choice. Curated reading lists orient beginners in a vast, cross-disciplinary literature, and the critical thinking skills stressed throughout prepare them to make contributions of their own. Fundamentals of Building Performance Simulation provides a much-needed resource for new and aspiring members of the building science community. This book makes the argument that performance modeling and simulation have become central issues in computer science and engineering, in part due to applications to the structures comprising the Internet. Dealing primarily with theory, tools and techniques as related to communications systems, the volume provides tutorials and surveys and relates new important research results. Each chapter presents background information, describes and analyzes important work done in the field and provides direction to the reader on future work and further readings. The topics covered include traffic models for A TM networks, simulation environments, analytical methods, interprocessor communications, and an evaluation of process architectures. This is the first book presenting a stochastic extension of

process algebra, PEPA; this is shown to be suitable for specifying a Markov process, which can then be applied to performance modelling. The method, which is illustrated with case studies taken from the area of communication systems, can readily be used to construct a variety of models that can be analysed using standard numerical techniques. One of the major advantages of PEPA over the standard methods for specifying stochastic performance models is the inherent apparatus for reasoning about the structure and behaviour of models. In the later chapters this apparatus is exploited to define four equivalence relations over PEPA components. Each of these notions of equivalence has intrinsic interest from a process algebra perspective. However, they are also demonstrated to be useful in a performance modelling context. To conclude the book, a section has been added surveying recent results in the area and discussing open questions.

The book is written for engineers and students who wish to address the preliminary design of gas turbine engines, as well as the associated performance calculations, in a practical manner. A basic knowledge of thermodynamics and turbomachinery is a prerequisite for understanding the concepts and ideas described. The book is also intended for teachers as a source of information for lecture materials and exercises for their students. It is extensively illustrated with examples and data from real engine cycles, all of which can be reproduced with GasTurb (TM). It discusses the practical application of thermodynamic, aerodynamic and mechanical principles. The authors describe the theoretical background of the simulation elements and the relevant correlations through which they are applied, however they refrain from detailed scientific derivations.

Human Performance Modeling in Aviation

Workload Modeling for Computer Systems Performance Evaluation

The Mathematical Basis of Performance Modeling

Modeling Microprocessor Performance

Performance by Design

Polling, Scheduling, and Traffic Control

As computers become more complex, the number and complexity of the tasks facing the computer architect have increased. Computer performance often depends in complex way on the design parameters and intuition that must be supplemented by performance studies to enhance design productivity. This book introduces computer

architects to computer system performance models and shows how they are relatively simple, inexpensive to implement, and sufficiently accurate for most purposes. It discusses the development of performance models based on queuing theory and probability. The text also shows how they are used to provide quick approximate calculations to indicate basic performance tradeoffs and narrow the range of parameters to consider when determining system configurations. It illustrates how performance models can demonstrate how a memory system is to be configured, what the cache structure should be, and what incremental changes in cache size can have on the miss rate. A particularly deep knowledge of probability theory or any other mathematical field to understand the papers in this volume is not required.

Deformation Based Processing of Materials: Behavior, Performance, Modeling and Control focuses on deformation based process behaviors and process performance in terms of the quality of the needed shape, geometries, and the requested properties of the deformed products. In addition, modelling and simulation is covered to create an in-depth and epistemological understanding of the process. Other topics discussed include ways to efficiently reduce or avoid defects and effectively improve the quality of deformed parts. The book is ideal as a technical document, but also serves as scientific literature for engineers, scientists, academics, research students and management professionals involved in deformation based materials processing. Covers process behaviors, such as non-uniform deformation, unstable deformation, material flow phenomena, and process performance Includes modelling and simulation of the entire deformation process Looks at control of the preferred deformation, undesirable material flow, avoidance and reduction of defects, and improving the dimensional accuracy, surface quality and microstructure construction of the produced products

Business Process Modeling, Simulation and Design, Third Edition provides students with a comprehensive coverage of a range of analytical tools used to model, analyze, understand, and ultimately design business processes. The new edition of this very successful textbook includes a wide range of approaches such as graphical flowcharting tools, cycle time and capacity analyses, queuing models, discrete-event simulation, simulation-optimization, and data mining for process analytics. While most textbooks on business process management either focus on the intricacies of computer simulation or managerial aspects of business processes, this textbook does both. It presents the tools to design business processes and management techniques on operating them efficiently. The book focuses on the use of discrete event simulation as the main tool for analyzing, modeling, and designing effective business processes. The integration of graphic user-friendly simulation software enables a systematic approach to create optimal designs.

A book for experts and practitioners, emphasizing the intuition and reasoning behind definitions and derivations related to evaluating computer systems performance.

Modeling and Simulation of Computer Networks and Systems

Performance and Information Modeling

Computer Architecture Performance Evaluation Methods

Performance Modeling and Design of Backscatter RFID Systems

Part I: An Overview of Performance Evaluation · Common Mistakes and How to Avoid Them· Selection of Techniques and Metrics· MEASUREMENT TECHNIQUES AND TOOLS· Types of Workloads· Workload Characterization Techniques· Monitors· Ratio GamesPart II: Probability Theory and Statistics · Summarizing Measured Data· Simple Linear Regression Models· Other Regression ModelsPart III: Experimental Design and Analysis · One-Factor Experiments· Two-Factor Full Factorial Design without Replications· Two-Factor Full Factorial Design with ReplicationsPart IV: Simulation· Analysis of Simulation Results· Testing Random-Number Generators· Commonly Used DistributionsPart V: Queuing Models· Analysis of a Single Queue· Operational Laws · Convolution Algorithm