Vacation Queueing Models Theory And Applications International Series In Operations Research Management Science

This book constitutes the proceedings of the Third International Conference on Computational Intelligence, Cyber Security, and Computational Models, ICC3 2017, which was held in Coimbatore, India, in December 2017. The 15 papers presented in this volume were carefully reviewed and selected from 63 submissions. They were organized in topical sections named: computational intelligence; cyber security; and computational models.

This book constitutes the refereed proceedings of the 21th International Conference on Distributed and Computer and Communication Networks, DCCN 2018, held in Moscow, Russia, in September 2018. The 50 full papers and the 9 short papers were carefully reviewed and selected from 168 submissions. The papers cover the following topics: computer and communication networks architecture optimization; control in computer and communication networks; performance and QoS/QoE evaluation in wireless networks; analytical modeling and simulation of next-generation communications systems; queueing theory and reliability theory applications in computer networks; wireless 4G/5G networks, cm- and mm-wave radio technologies; RFID technology and

its application in intellectual transportation networks; Internet of Things, wearables, and applications of distributed information systems; probabilistic and statistical models in information systems; mathematical modeling of high-tech systems; mathematical modeling and control problems; distributed and cloud computing systems, big data analytics.

The two-volume set LNAI 7894 and LNCS 7895 constitutes the refereed proceedings of the 12th International Conference on Artificial Intelligence and Soft Computing, ICAISC 2013, held in Zakopane, Poland in June 2013. The 112 revised full papers presented together with one invited paper were carefully reviewed and selected from 274 submissions. The 56 papers included in the second volume are organized in the following topical sections: evolutionary algorithms and their applications; data mining; bioinformatics and medical applications; agent systems, robotics and control; artificial intelligence in modeling and simulation; and various problems of artificial intelligence. The application of auto-repeat facilities in telephone systems, as well as the use of random access protocols in computer networks, have led to growing interest in retrial queueing models. Since much of the theory of retrial queues is complex from an analytical viewpoint, with this book the authors give a comprehensive and updated text focusing on approximate techniques and algorithmic methods for solving the analytically intractable models. Retrial Queueing Systems: A Computational Approach also Presents motivating examples in telephone and computer networks. Establishes a

comparative analysis of the retrial queues versus standard queues with waiting lines and queues with losses. Integrates a wide range of techniques applied to the main M/G/1 and M/M/c retrial queues, and variants with general retrial times, finite population and the discrete-time case. Surveys basic results of the matrix-analytic formalism and emphasizes the related tools employed in retrial queues. Discusses a few selected retrial queues with QBD, GI/M/1 and M/G/1 structures. Features an abundance of numerical examples, and updates the existing literature. The book is intended for an audience ranging from advanced undergraduates to researchers interested not only in queueing theory, but also in applied probability, stochastic models of the operations research, and engineering. The prerequisite is a graduate course in stochastic processes, and a positive attitude to the algorithmic probability.

This book constitutes the refereed proceedings of the 20th International Conference on Analytical and Stochastic Modelling and Applications, ASMTA 2013, held in Ghent, Belgium, in July 2013. The 32 papers presented were carefully reviewed and selected from numerous submissions. The focus of the papers is on the following application topics: complex systems; computer and information systems; communication systems and networks; wireless and mobile systems and networks; peer-to-peer application and services; embedded systems and sensor networks; workload modelling and characterization; road traffic and transportation; social networks; measurements and hybrid techniques; modeling of virtualization; energy-aware optimization; stochastic

modeling for systems biology; biologically inspired network design.

This volume consists of a number of selected papers that were presented at the 9th International Conference on Knowledge, Information and Creativity Support Systems (KICSS 2014) in Limassol, Cyprus, after they were substantially revised and extended. The 26 regular papers and 19 short papers included in this proceedings cover all aspects of knowledge management, knowledge engineering, intelligent information systems, and creativity in an information technology context, including computational creativity and its cognitive and collaborative aspects.

This book constitutes the refereed proceedings of the 9th International Conference on Distributed Computing and Internet Technology, ICDCIT 2013, held in Bhubaneswar, India, in February 2013. The 40 full papers presented together with 5 invited talks in this volume were carefully reviewed and selected from 164 submissions. The papers cover various research aspects in distributed computing, internet technology, computer networks, and machine learning.

This book constitutes the refereed proceedings of the 19th International Conference on Analytical and Stochastic Modelling Techniques and Applications, ASMTA 2012, held in Grenoble, France, in June 2012. The 20 revised full papers presented were carefully reviewed and selected from numerous submissions. The papers are organized in topical sections on queueing systems; networking applications; Markov chains; stochastic modelling.

Queueing analysis is a vital tool used in the evaluation of system performance. Applications of queueing analysis cover a wide spectrum from bank automated teller machines to transportation and communications data networks. Fully revised, this second edition of a popular book contains the significant addition of a new chapter on Flow & Congestion Control and a section on Network Calculus among other new sections that have been added to remaining chapters. An introductory text, Queueing Modelling Fundamentals focuses on queueing modelling techniques and applications of data networks, examining the underlying principles of isolated queueing systems. This book introduces the complex queueing theory in simple language/proofs to enable the reader to quickly pick up an overview to queueing theory without utilizing the diverse necessary mathematical tools. It incorporates a rich set of worked examples on its applications to communication networks. Features include: Fully revised and updated edition with significant new chapter on Flow and Congestion Control as-well-as a new section on Network Calculus A comprehensive text which highlights both the theoretical models and their applications through a rich set of worked examples, examples of applications to data networks and performance curves Provides an insight into the underlying queuing principles and features step-by-step derivation of queueing results Written by experienced Professors in

the field Queueing Modelling Fundamentals is an introductory text for undergraduate or entry-level post-graduate students who are taking courses on network performance analysis as well as those practicing network administrators who want to understand the essentials of network operations. The detailed step-by-step derivation of queueing results also makes it an excellent text for professional engineers.

Matrix analytic methods are popular as modeling tools because they give one the ability to construct and analyze a wide class of queuing models in a unified and algorithmically tractable way. The authors present the basic mathematical ideas and algorithms of the matrix analytic theory in a readable, up-to-date, and comprehensive manner. In the current literature, a mixed bag of techniques is used-some probabilistic, some from linear algebra, and some from transform methods. Here, many new proofs that emphasize the unity of the matrix analytic approach are included.

Advances in Queueing Theory and Network Applications presents several useful mathematical analyses in queueing theory and mathematical models of key technologies in wired and wireless communication networks such as channel access controls, Internet applications, topology construction, energy saving schemes, and transmission scheduling. In sixteen high quality chapters, this work

provides novel ideas, new analytical models, and simulation and experimental results by experts in the field of queueing theory and network applications. The text serves as a state-of-the-art reference for a wide range of researchers and engineers engaged in the fields of queueing theory and network applications, and can also serve as supplemental material for advanced courses in operations research, queueing theory, performance analysis, traffic theory, as well as theoretical design and management of communication networks.

This is a graduate level textbook that covers the fundamental topics in queuing theory. The book has a broad coverage of methods to calculate important probabilities, and gives attention to proving the general theorems. It includes many recent topics, such as server-vacation models, diffusion approximations and optimal operating policies, and more about bulk-arrival and bull-service models than other general texts. * Current, clear and comprehensive coverage * A wealth of interesting and relevant examples and exercises to reinforce concepts * Reference lists provided after each chapter for further investigation This book discusses systematically the many variations of vacation policy. The book discusses a variety of typical vacation model applications. The presentation style is unique compared with the books published in the same field – a "theorem and proof" format is used. Also, this is the first time G1/M/1 multi-server vacation

models, both continuous and discrete, and the optimization and control issues have been presented in book form.

This book constitutes the proceedings of the 13th International Conference on Queueing Theory and Network Applications, QTNA 2018, held in Tsukuba, Japan in July 2018. The 8 full papers together with 10 short papers included in this volume were carefully reviewed and selected from 57 initial submissions. All the papers to be presented disseminate the latest results covering up-to-date research fields such as performance modeling and analysis of telecommunication systems, retrial and vacation queueing models, optimization of queueing systems, modeling of social systems, application of machine learning in queueing models.

Queueing is an aspect of modern life that we encounter at every step in our daily activities. Whether it happens at the checkout counter in the supermarket or in accessing the Internet, the basic phenomenon of queueing arises whenever a shared facility needs to be accessed for service by a]arge number of jobs or customers. The study of queueing is important as it gravides both a theoretical background to the kind of service that we may expect from such a facility and the way in which the facility itself may be designed to provide some specified grade of service to its customers. Our study of queueing was basically motivated by its

use in the study of communication systems and computer networks. The various computers, routers and switches in such a network may be modelled as individual queues. The whole system may itself be modelled as a queueing network providing the required service to the messages, packets or cells that need to be carried. Application of queueing theory provides the theoretical framework for the design and study of such networks. The purpose of this book is to support a course on queueing systems at the senior undergraduate or graduate levels. Such a course would then provide the theoretical background on which a subsequent course on the performance modeHing and analysis of computer networks may be based.

Queueing theory applications can be discovered in many walks of life including; transportation, manufacturing, telecommunications, computer systems and more. However, the most prevalent applications of queueing theory are in the telecommunications field. Queueing Theory for Telecommunications: Discrete Time Modelling of a Single Node System focuses on discrete time modeling and illustrates that most queueing systems encountered in real life can be set up as a Markov chain. This feature is very unique because the models are set in such a way that matrix-analytic methods are used to analyze them. Queueing Theory for Telecommunications: Discrete Time Modelling of a Single Node System is the

most relevant book available on queueing models designed for applications to telecommunications. This book presents clear concise theories behind how to model and analyze key single node queues in discrete time using special tools that were presented in the second chapter. The text also delves into the types of single node queues that are very frequently encountered in telecommunication systems modeling, and provides simple methods for analyzing them. Where appropriate, alternative analysis methods are also presented. This book is for advanced-level students and researchers concentrating on engineering, computer science and mathematics as a secondary text or reference book. Professionals who work in the related industries of telecommunications, industrial engineering and communications engineering will find this book useful as well. This book is dedicated to Jinhua Cao on the occasion of his 80th birthday. Jinhua Cao is one of the most famous reliability theorists. His main contributions include: published over 100 influential scientific papers; published an interesting reliability book in Chinese in 1986, which has greatly influenced the reliability of education, academic research and engineering applications in China; initiated and organized Reliability Professional Society of China (the first part of Operations Research Society of China) since 1981. The high admiration that Professor Cao enjoys in the reliability community all over the world was witnessed by the enthusiastic response of each contributor in this book. The contributors are leading researchers with diverse research perspectives. The research areas of the book iclude a broad range of topics

related to reliability models, queueing theory, manufacturing systems, supply chain finance, risk management, Markov decision processes, blockchain and so forth. The book consists of a brief Preface describing the main achievements of Professor Cao; followed by congratulations from Professors Way Kuo and Wei Wayne Li, and by Operations Research Society of China, and Reliability Professional Society of China; and further followed by 25 articles roughly grouped together. Most of the articles are written in a style understandable to a wide audience. This book is useful to anyone interested in recent developments in reliability, network security, system safety, and their stochastic modeling and analysis.

This book constitutes the proceedings of the 12th International Conference on Queueing Theory and Network Applications, QTNA 2017, held in Qinhuangdao, China, in August 2017. The 19 full papers included in this volume were carefully reviewed and selected from 65 initial submissions. They deal with queueing models; queueing applications; and network models. This book constitutes the refereed proceedings fo the 14th International Scientific Conference on Information Technologies and Mathematical Modeling, named after A. F. Terpugov, ITMM 2015, held in Anzhero-Sudzhensk, Russia, in November 2015. The 35 full papers included in this volume were carefully reviewed and selected from 89 submissions. They are devoted to new results in the queueing theory and its applications, addressing specialists in probability theory, random processes, mathematical modeling as well as engineers dealing with logical and technical design and operational management of telecommunication and computer networks.

Fundamentals of Matrix-Analytic Methods targets advanced-level students in mathematics, engineering and computer science. It focuses on the fundamental parts of Matrix-Analytic

Methods, Phase-Type Distributions, Markovian arrival processes and Structured Markov chains and matrix geometric solutions. New materials and techniques are presented for the first time in research and engineering design. This book emphasizes stochastic modeling by offering probabilistic interpretation and constructive proofs for Matrix-Analytic Methods. Such an approach is especially useful for engineering analysis and design. Exercises and examples are provided throughout the book.

In recent years, our world has experienced a profound shift and progression in available computing and knowledge sharing innovations. These emerging advancements have developed at a rapid pace, disseminating into and affecting numerous aspects of contemporary society. This has created a pivotal need for an innovative compendium encompassing the latest trends, concepts, and issues surrounding this relevant discipline area. During the past 15 years, the Encyclopedia of Information Science and Technology has become recognized as one of the landmark sources of the latest knowledge and discoveries in this discipline. The Encyclopedia of Information Science and Technology, Fourth Edition is a 10-volume set which includes 705 original and previously unpublished research articles covering a full range of perspectives, applications, and techniques contributed by thousands of experts and researchers from around the globe. This authoritative encyclopedia is an all-encompassing, well-established reference source that is ideally designed to disseminate the most forward-thinking and diverse research findings. With critical perspectives on the impact of information science management and new technologies in modern settings, including but not limited to computer science, education, healthcare, government, engineering, business, and natural and physical sciences, it is a pivotal and relevant source of knowledge that will benefit every

professional within the field of information science and technology and is an invaluable addition to every academic and corporate library.

Highlighting the latest advances in stochastic analysis and its applications, this volume collects carefully selected and peer-reviewed papers from the 5th International Conference on Stochastic Methods (ICSM-5), held in Moscow, Russia, November 23-27, 2020. The contributions deal with diverse topics such as stochastic analysis, stochastic methods in computer science, analytical modeling, asymptotic methods and limit theorems, Markov processes, martingales, insurance and financial mathematics, queueing theory and stochastic networks, reliability theory, risk analysis, statistical methods and applications, machine learning and data analysis. The 29 articles in this volume are a representative sample of the 87 high-quality papers accepted and presented during the conference. The aim of the ICSM-5 conference is to promote the collaboration of researchers from Russia and all over the world, and to contribute to the development of the field of stochastic analysis and applications of stochastic models.

This book presents the latest key research into the performance and reliability aspects of dependable fault-tolerant systems and features commentary on the fields studied by Prof. Kishor S. Trivedi during his distinguished career. Analyzing system evaluation as a fundamental tenet in the design of modern systems, this book uses performance and dependability as common measures and covers novel ideas, methods, algorithms, techniques, and tools for the in-depth study of the performance and reliability aspects of dependable fault-tolerant systems. It identifies the current challenges that designers and practitioners must face in order to ensure the reliability, availability, and performance of systems, with special focus on

their dynamic behaviors and dependencies, and provides system researchers, performance analysts, and practitioners with the tools to address these challenges in their work. With contributions from Prof. Trivedi's former PhD students and collaborators, many of whom are internationally recognized experts, to honor him on the occasion of his 70th birthday, this book serves as a valuable resource for all engineering disciplines, including electrical, computer, civil, mechanical, and industrial engineering as well as production and manufacturing.

This two-volume set, CCIS 0269-CCIS 0270, constitutes the refereed post-conference proceedings of the International Conference on Global Trends in Computing and Communication, ObCom 2011, held in Vellore, India, in December 2011. The 173 full papers presented together with a keynote paper and invited papers were carefully reviewed and selected from 842 submissions. The conference addresses all current issues associated with computing, communication and information. The proceedings consists of invited papers dealing with the review of performance models of computer and communication systems and contributed papers that feature topics such as networking, cloud computing, fuzzy logic, mobile communication, image processing, navigation systems, biometrics and Web services covering literally all the vital areas of the computing domains.

gramatKoreaUniversityandtheDepartmentofComputerScienceatKAISTfor ?nancialsupport. We sincerely hope that the readers ?nd the proceedings of ATVA 2008 informative and rewarding.

This book focuses on soft computing and how it can be applied to solve real-world problems arising in various domains, ranging from medicine and healthcare, to supply

chain management, image processing and cryptanalysis. It gathers high-quality papers presented at the International Conference on Soft Computing: Theories and Applications (SoCTA 2020), organized online. The book is divided into two volumes and offers valuable insights into soft computing for teachers and researchers alike; the book will inspire further research in this dynamic field.

Queueing models with the server's vacations and/or priority-based scheduling can be used for the performance evaluation of many computer and communication systems. This book provides a comprehensive and accessible analysis of these queueing models in the framework of M/G/1 systems. The method of imbedded Markov chains, the delay cycle analysis, and the method of supplementary variables are extensively used to study the M/G/1, M/G/1 with vacations, and M/G/1 with priorities. Only a basic understanding of queueing systems is assumed. A comprehensive bibliography of books on queues and teletraffic engineering completes the volume.

Part of a four-volume set, this book constitutes the refereed proceedings of the 7th International Conference on Computational Science, ICCS 2007, held in Beijing, China in May 2007. The papers cover a large volume of topics in computational science and related areas, from multiscale physics to wireless networks, and from graph theory to tools for program development.

Queueing models have been used very effectively for the performance of evaluation of many computer and communication systems. As a continuation of Volume 1: Vacation

and Priority Systems , which dealt with M/G/1-type systems, this volume explores systems with a finite population (M/G/1/N) and those with a finite capacity (M/G/1/K). The methods of imbedded Markov chains and semi-Markov processes, the delay cycle analysis, and the method of supplementary variables are extensively used. In order to maximise the reader's understanding, multiple approaches have been employed, including the derivation of the results by several techniques. This elaborate presentation of new and important research results applicable to emerging technologies is aimed at engineers and mathematicians alike, with a basic understanding or a comprehensive knowledge of queueing systems. It will be of particular interest to researchers and graduate students of applied probability, operations research, computer science and electrical engineering and to researchers and engineers of performance of computers and communication networks. Volume 3: Discrete Time Systems will follow this volume to complete the set.

Reliability technology plays an important role in the present era of industrial growth, optimal efficiency, and reducing hazards. This book provides insights into current advances and developments in reliability engineering, and the research presented is spread across all branches. It discusses interdisciplinary solutions to complex problems using different approaches to save money, time, and manpower. It presents methodologies of coping with uncertainty in reliability optimization through the usage of various techniques such as soft computing, fuzzy optimization, uncertainty, and

maintenance scheduling. Case studies and real-world examples are presented along with applications that can be used in practice. This book will be useful to researchers, academicians, and practitioners working in the area of reliability and systems assurance engineering. Provides current advances and developments across different branches of engineering. Reviews and analyses case studies and real-world examples. Presents applications to be used in practice. Includes numerous examples to illustrate theoretical results.

This book is organized in 2 volumes and 6 parts. Part I is Big Data Analytics, which is about new advances of analysis, statistics, coordination and data mining of big data; Part II is Information Systems Management, which is about the development of big data information system or cloud platform. Part III is Computing Methodology with Big Data, which is about the improvements of traditional computation technologies in the background of big data; Part IV is Uncertainty Decision Making, which is about the decision making methods with various uncertain information, such as fuzzy, random, rough, gray, unascertained. Part V is Intelligence Algorithm. Part VI is Data Security, which is a particularly important aspect in the modern management environment.

This book covers an interdisciplinary approach for understanding mathematical modeling by offering a collection of models, solved problems related to the models, the methodologies employed, and the results using projects and case studies with insight into the operation of substantial real-time systems. The book covers a broad scope in

the areas of statistical science, probability, stochastic processes, fluid dynamics, supply chain, optimization, and applications. It discusses advanced topics and the latest research findings, uses an interdisciplinary approach for real-time systems, offers a platform for integrated research, and identifies the gaps in the field for further research. The book is for researchers, students, and teachers that share a goal of learning advanced topics and the latest research in mathematical modeling.

This book gathers selected papers presented at the International Conference on Advances in Applied Probability and Stochastic Processes, held at CMS College, Kerala, India, on 7–10 January 2019. It showcases high-quality research conducted in the field of applied probability and stochastic processes by focusing on techniques for the modelling and analysis of systems evolving with time. Further, it discusses the applications of stochastic modelling in queuing theory, reliability, inventory, financial mathematics, operations research, and more. This book is intended for a broad audience, ranging from researchers interested in applied probability, stochastic modelling with reference to queuing theory, inventory, and reliability, to those working in industries such as communication and computer networks, distributed information systems, next-generation communication systems, intelligent transportation networks, and financial markets.

Based on the careful analysis of several hundred publications, this book uniformly describes basic methods of analysis and critical results of the theory of retrial queues.

Chapters discuss: analysis of single-server retrial queues, including stationary and transient distribution of the number in the system, busy period, waiting time process, limit theorems, stochastic inequalities, traffic measurement multiserver retrial queues - ergodicity, explicit formulas, algorithmic solutions, limit theorems, approximations advanced single-server and multiserver retrial queues - models with priority subscribers, non-ersistent subscribers, finite source queues Lecturers, researchers, and students in probability, statistics, operations research, telecommunications, and computer systems modeling analysis will find Retrial Queues to be an invaluable resource.

The aim of this book is to reflect the current cutting-edge thinking and established practices in the investigation of queueing systems and networks. This second volume includes eight chapters written by experts wellknown in their areas. The book conducts a stability analysis of certain types of multiserver regenerative queueing systems; a transient evaluation of Markovian queueing systems, focusing on closed-form distributions and numerical techniques; analysis of queueing models in service sectors using analytical and simulation approaches; plus an investigation of probability distributions in queueing models and their use in economics, industry, demography and environmental studies. This book also considers techniques for the control of information in queueing systems and their impact on strategic customer behavior, social welfare and the revenue of monopolists. In addition, applications of maximum entropy

methods of inference for the analysis of a stable M/G/1 queue with heavy tails, and inventory models with positive service time - including perishable items and stock supplied using various algorithmic control policies ((s; S); (r;Q), etc.).

This book presents the latest developments and breakthroughs in fuzzy theory and performance prediction of queuing and reliability models by using the stochastic modeling and optimization theory. The main focus is on analytics that use fuzzy logic, queuing and reliability theory for the performance prediction and optimal design of real-time engineering systems including call centers, telecommunication, manufacturing, service organizations, etc. For the day-to-day as well as industrial queuing situations and reliability prediction of machining parts embedded in computer, communication and manufacturing systems, the book assesses various measures of performance and effectiveness that can provide valuable insights and help arrive at the best decisions with regard to service and engineering systems. In twenty chapters, the book presents both theoretical developments and applications of the fuzzy logic, reliability and queuing models in a diverse range of scenarios. The topics discussed will be of interest to researchers, educators and undergraduate students in the fields of Engineering, Business Management, and the Mathematical Sciences.

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