1. Record Nr. UNINA9910829939103321

Titolo	Queueing theory 1 : advanced trends / / edited by Vladimir Anisimov, Nikolaos Limnios
Pubbl/distr/stampa	London, England ; ; Hoboken, New Jersey : , : ISTE Ltd. : , : John Wiley & Sons, Incorporated, , [2020] ©2020
ISBN	1-119-75542-5 1-119-75541-7
Edizione	[1st edition.]
Descrizione fisica	1 online resource (335 pages) : illustrations
Disciplina	519.82
Soggetti	Queuing theory
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Cover -- Half-Title Page -- Title Page -- Copyright Page -- Contents -- Preface -- 1 Discrete Time Single-server Queues with Interdependent Interarrival and Service Times -- 1.1. Introduction -- 1.2. The Geo/Geo/1 case -- 1.2.1. Arrival probability as a function of service completion probability -- 1.2.2. Service times dependent on interarrival times -- 1.3. The PH/PH/1 case -- 1.3.1. A review of discrete PH distribution -- 1.3.2. The PH/PH/1 system -- 1.4. The model with multiple interarrival time distributions -- 1.4.1. Preliminaries -- 1.4.2. A queueing model with interarrival times dependent on service times -- 1.5. Interdependent interarrival and service times -- 1.5.1. A discrete time queueing model with bivariate geometric distribution -- 1.5.2. Matrix equivalent model -- 1.6. Conclusion -- 1.7. Acknowledgements -- 1.8. References -- 2 Busy Period, Congestion Analysis and Loss Probability in Fluid Queues -- 2.1. Introduction -- 2.2. Modeling a link under congestion and buffer fluctuations -- 2.2.1. Model description -- 2.2.2. Peaks and valleys -- 2.2.3. Minimum valley height in a busy period -- 2.2.4. Maximum peak level in a busy period -- 2.2.5. Maximum peak under a fixed fluid level -- 2.3. Fluid queue with finite buffer -- 2.3.1. Congestion metrics -- 2.3.2. Minimum valley height in a busy period -- 2.3.3. Reduction of the state space -- 2.3.4. Distributions of t1(x) and V1(x) -- 2.3.5.

Sequences of idle and busy periods -- 2.3.6. Joint distributions of loss periods and loss volumes -- 2.3.7. Total duration of losses and volume of information lost -- 2.4. Conclusion -- 2.5. References -- 3 Diffusion Approximation of Queueing Systems and Networks -- 3.1. Introduction -- 3.2. Markov queueing processes -- 3.3. Average and diffusion approximation -- 3.3.1. Average scheme -- 3.3.2. Diffusion approximation scheme.
3.3.3. Stationary distribution -- 3.4. Markov queueing systems -- 3.4.1. Collective limit theorem in R1 -- 3.4.2. Systems of M/M type -- 3.4.3. Repairman problem -- 3.5. Markov queueing networks -- 3.5.1. Collective limit theorems in RN -- 3.5.2. Markov queueing networks -- 3.5.3. Superposition of Markov processes -- 3.6. Semi-Markov queueing systems -- 3.7. Acknowledgements -- 3.8. References -- 4 First-come First-served Retrial Queueing System by Laszlo Lakatos and its Modifications -- 4.1. Introduction -- 4.2. A contribution by Laszlo Lakatos and his disciples -- 4.3. A contribution by E.V. Koba -- 4.4. An Erlangian and hyper-Erlangian approximation for a Laszlo Lakatos-type queueing system -- 4.5. Two models with a combined queueing discipline -- 4.6. References -- 5 Parameter Mixing in Infinite-server Queues -- 5.1. Introduction -- 5.2. The M./Coxn/8 queue -- 5.2.1. The differential equation -- 5.2.2. Calculating moments -- 5.2.3. Steady state -- 5.2.4. M./M/8 -- 5.3. Mixing in Markov-modulated infinite-server queues -- 5.3.1. The differential equation -- 5.3.2. Calculating moments -- 5.4. Discussion and future work -- 5.5. References -- 6 Application of Fast Simulation Methods of Queueing Theory for Solving Some High-dimension Combinatorial Problems -- 6.1. Introduction -- 6.2. Upper and lower bounds for the number of some k-dimensional subspaces of a given weight over a finite field -- 6.2.1. A general fast simulation algorithm -- 6.2.2. An auxiliary algorithm -- 6.2.3. Exact analytical formulae for the cases k = 1 and k = 2 -- 6.2.4. The upper and lower bounds for the probability P{Y.(r)} -- 6.2.5. Numerical results -- 6.3. Evaluation of the number of "good" permutations by fast simulation on the SCIT-4 multiprocessor computer complex -- 6.3.1. Modified fast simulation method -- 6.3.2. Numerical results -- 6.4. References.
7 Diffusion and Gaussian Limits for Multichannel Queueing Networks -- 7.1. Introduction -- 7.2. Model description and notation -- 7.3. Local approach to prove limit theorems -- 7.3.1. Network of the [GI|M|8]r-type in heavy traffic -- 7.4. Limit theorems for networks with controlled input flow -- 7.4.1. Diffusion approximation of [SM|M|8]r-networks -- 7.4.2. Asymptotics of stationary distribution for [SM|GI|8]r-networks -- 7.4.3. Convergence to Ornstein-Uhlenbeck process -- 7.5. Gaussian approximation of networks with input flow of general structure -- 7.5.1. Gaussian approximation of [G|M|8]r-networks -- 7.5.2. Criterion of Markovian behavior for r-dimensional Gaussian processes -- 7.5.3. Non-Markov Gaussian approximation of [G|GI|8]r-networks -- 7.6. Limit processes for network with time-dependent input flow -- 7.6.1. Gaussian approximation of Mt|M| r-networks in heavy traffic -- 7.6.2. Limit process in case of asymptotically large initial load -- 7.7. Conclusion -- 7.8. Acknowledgements -- 7.9. References -- 8 Recent Results in Finite-source Retrial Queues with Collisions -- 8.1. Introduction -- 8.2. Model description and notations -- 8.3. Systems with a reliable server -- 8.3.1. M/M/1 systems -- 8.3.2. M/GI/1 system -- 8.4. Systems with an unreliable server -- 8.4.1. M/M/1 system -- 8.4.2. M/GI/1 system -- 8.4.3. Stochastic simulation of special systems -- 8.4.4. Gamma distributed retrial times -- 8.4.5. The effect of breakdowns disciplines -- 8.5. Conclusion -- 8.6. Acknowledgments -- 8.7. References -- 9 Strong Stability of Queueing Systems and

Networks: a Survey and Perspectives -- 9.1. Introduction -- 9.2. Preliminary and notations -- 9.3. Strong stability of queueing systems -- 9.3.1. M/M/1 queue -- 9.3.2. PH/M/1 and M/PH/1 queues -- 9.3.3. G/M/1 and M/G/1 queues -- 9.3.4. Other queues -- 9.3.5. Queueing networks.
9.3.6. Non-parametric perturbation -- 9.4. Conclusion and further directions -- 9.5. References -- 10 Time-varying Queues: a Two-time-scale Approach -- 10.1. Introduction -- 10.2. Time-varying queues -- 10.3. Main results -- 10.3.1. Large deviations of two-time-scale queues -- 10.3.2. Computation of H(y, t) -- 10.3.3. Applications to queueing systems -- 10.4. Concluding remarks -- 10.5. References -- List of Authors -- Index -- EULA.

Sommario/riassunto

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 first volume includes ten chapters written by experts well-known in their areas. The book studies the analysis of queues with interdependent arrival and service times, characteristics of fluid queues, modifications of retrial queueing systems and finite-source retrial queues with random breakdowns, repairs and customers' collisions. Some recent tendencies in the asymptotic analysis include the average and diffusion approximation of Markov queueing systems and networks, the diffusion and Gaussian limits of multi-channel queueing networks with rather general input flow, and the analysis of two-time-scale nonhomogenous Markov chains using the large deviations principle. The book also analyzes transient behavior of infinite-server queueing models with a mixed arrival process, the strong stability of queueing systems and networks, and applications of fast simulation methods for solving high-dimension combinatorial problems.