Queueing Systems (2023) 104:1–2
https://doi.org/10.1007/s11134-023-09877-9

EDITORIAL

Editorial

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Received: 8 May 2023 / Revised: 9 May 2023 / Accepted: 9 May 2023 /
Published online: 23 May 2023

For the journal 'Queueing Systems: Theory and Applications' special issues are of crucial importance. Special issues come in various flavours. In the first place, they could relate to a specific theme within queueing theory, or to the connection with an adjacent discipline or application area. In the second place, we sometimes set up a 'Festschrift' to honor a colleague who has been important for the community. And finally there are special issues related to workshops or conferences. In this editorial I'll comment on the special issues that are currently planned, and I briefly discuss potential future special issues.

The first special issue that has been planned is on *Gaussian Queues*, edited by, besides myself, Krzysztof Dębicki (University of Wrocław, Poland), who is a QUESTA editorial board member, and Enkelejd Hashorva (Université de Lausanne, Switzerland). While we typically think of queues as resources in which discrete entities ('customers') arrive, reside in a waiting room as long as no server is available, and are served, a prominent subfield of queueing theory studies resources that are fed by a general scalar-valued stochastic process. We obtain a queue (to be interpreted as a workload process, or a storage process) by reflecting this stochastic process at 0, or, put differently, by imposing the so-called Skorokhod map on it. This special issue is about Gaussian processes reflected at 0, in the literature often referred to as Gaussian queues. The most prominent example of a Gaussian queue is reflected Brownian motion, a model that allows explicit analysis. As soon as we consider more general Gaussian input processes, such as fractional Brownian motion, the analysis becomes notoriously hard. Virtually all results in this area are of an asymptotic nature, often describing the tail of the workload distribution. In this special issue, leading experts are invited to contribute to the theory of Gaussian queues.

The topic of the second special issue is: *Product Forms, Stochastic Matching, and Redundancy*. The guest editors are two of QUESTA's editorial board members: Kristy Gardner of Amherst College (Amherst MA, USA) and Pascal Moyal of the University of Lorraine (Nancy, France). From a queueing-theoretical standpoint, the topics of stochastic matching and dispatching with redundancy are closely tied together by

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the fact that, under various matching policies or service disciplines, both classes of models have similar product-form stationary distributions. There has been a wave of influential papers on product form in the 1970s and 1980s, and by then it was generally believed that we had understood the boundaries of the 'product form domain'. Recently, however, it was discovered that the class of product-form models was significantly broader than we thought. This special issue is intended for papers in this domain. The models under investigation are of great importance in a wide range of applications, ranging from telecommunication networks to healthcare systems, and from supply chains to assemble-to-order systems.

The third planned special issue is specifically on *reflected Brownian motion* (RBM). I co-edit it with three guest editors: Sandro Franceschi of Télécom SudParis (Paris, France), Hélène Guérin of the Université de Montréal (Montreal, Canada), and Kilian Raschel of the Université de Tours and CNRS (Tours, France). The three of them organised in April 2023 a conference in Roscoff, France, to commemorate that 40 years ago reflected Brownian motion was 'invented' as a natural limiting model for queues of various types. Concretely, as an example, a wide class of queueing models of the conventional M/G/1 type converges in the heavy-traffic regime to RBM. In the spirit of the conference, the special issue explicitly intends to reflect the diversity of RBM-related topics: from the historical beginnings of the study of RBM to new developments and applications. Importantly, the call for articles is open to all (not only to the conference participants, that is), and the deadline is 30 September 2023.

There are various ideas for additional special issues. Two major conferences will be held this summer, which may lead to spin-offs in the form of special issues. In the first place there is the bi-annual INFORMS Applied Probability Society Conference in Nancy, to be held at the University of Lorraine in Nancy (France) at the end of June (28–30 June 2023), and a month later the European Conference on Queueing Theory, to be held in Lisbon, Portugal (19–21 July 2023). We are also exploring the idea of setting up a special issue on topics at the interface of queueing and operations management. The special issues witness the vitality of the queueing community, and its strong connections to various surrounding disciplines.