

The 80th Birthday of Vladimir Rykov

The Editor-in-chief of our journal and full member of the Informatization Academy, Professor Vladimir Rykov became eighty on January 2018. Rykov got his bachelor and master degree in 1960 from the Lomonosov Moscow State University (MSU). In his diploma project, supervised by A.N. Kolmogorov, Rykov studied the properties of trajectories of random processes and simultaneously with R. Dobrushin found the condition for absence of jumps in them. After the graduation in 1960 Rykov has begun his career in the MSU



Computer Center, then he has worked for ten years at the Central Research and Development Institute of Complex Automation (CRICA), and for more than 35 year he is Professor at the department of Applied Mathematics and Computer Modeling in Gubkin State University of Oil and Gas. At the same time, he gives lectures at the Department of Applied Probability and Informatics of the Peoples' Friendship University of Russia and has actively collaborated before with the RAS Kharkevich Institute for Information Transmission Problems. During two years he has been teaching as invited professor at the mathematical department in Kettering University (USA).

Scientific interests of Vladimir Rykov are related mostly to studies on the theory of controllable queuing systems, stochastic networks and reliability. During the period of his work at CRICA (1961–1969) he has actively participated in research into the issues of reliability and in the development of theoretical methods of industrial control. He has authored one of the first publications on choosing the optimal time between the maintenance repairs [1]. Applied problems led him to studying the controllable queuing systems [2]. The conditions for optimality of priorities in queuing systems were established in collaboration with O. Bronshtein [3]. For the queuing systems, this rule was published in monographs, and in the English-language literature it is known as the $c\mu$ -rule. The interest in theoretical studies manifested itself in the works on the controllable Markov processes with finite state space for which it was shown that Markov strategies provide optimal control with respect to long-run and discounted cost criteria for Markov process with additive functionals [4]. Various applied aspects of control over the queuing systems were reported at different conferences and discussed in numerous publications. The proof of validity of the rule of optimal priority service in a wider class of all Markov strategies [5] and extension of this rule to the case of optimal customer service in the system with branching flows of customers [6] have made a valuable contribution to the theory of controllable systems. All these investigations have formed the basis of his PhD thesis, that was defended in Central Economics and Mathematics Institute (CEMI) of Russian Academy of Science in 1966. These results were published in the review "Controllable queuing systems" in "Itogi nauki i tehniki, Teorija Veroyatn. Math. Statist. Teoretich. Cybern" [7] in 1975 and further in 1995 jointly with M.Yu.Kitaev in CRC Press as a monograph "Controlled queuing systems" [8].

By extending these investigations Rykov has established the general conditions for monotonicity of optimal policies for controllable queuing systems [9]. The continuation of studies in this direction have enabled to find the solution of the so-called slow server problem in a general case of arbitrary number of heterogeneous servers [10, 11]. This allows to compare the

performance of systems with heterogeneous servers with respect to optimal and various heuristic service disciplines [12], which underlie the design of protocols of information and communication networks and these studies are still carried out.

Another field of Rykov's studies is represented by the theory of regenerative processes. In Russia he was the first who introduced and considered the regenerative processes with several types of regeneration points and jointly with M.A. Yastrebenetsky proved the ergodicity theorem for them [13] and found use in the studies of complex systems of various classes. Later these processes in English papers were called as the semi-regenerative processes. The development of this theory and introduction of the theory of decomposable semi-regenerative processes extended further this direction of research [14]. Their analysis and application were reflected in some of the subsequent works. For example, the $GI/GI/1/\infty$ system was studied using methods of the theory of decomposable semi-regenerative processes [15, 16]. These methods were then used for decomposition and analysis of complex hierarchical systems [17, 18], as well as polling systems [19]. Based on series of these investigations Rykov represented in 1990 the doctoral thesis "Decomposable semi-regenerative processes and their application for queuing problems investigation", for which he got the doctor of sciences degree in physics and mathematics from Lomonosov Moscow State University.

Later queuing systems were studied in a series of works, where for the open and closed networks the well-known multiplicative representation of stationary probabilities was extended to the case of networks with dependent service times [20, 21]. For the systems with dynamic multi-address connection the model of transparent customers has been proposed in 2001 and multiplicative representation for its steady state probabilities has been done in [22].

Other interests of prof. Rykov reflected themselves in a series of publications devoted to the relation between the periodic Poisson processes and the almost lack of memory distributions and to their statistical analysis [23, 24].

In the last time prof. Rykov turns to the investigation of reliability of complex systems. Series of works jointly with his students and colleagues has been devoted to the study of the problem of systems' reliability characteristics' sensitivity to the shapes of some initial distributions see [25, 26] and the bibliography therein).

Vladimir Rykov has been member of Organizing and Program Committees of many conferences, including almost all conferences of Mathematical methods in Reliability (MMR) and many others. Rykov is the author of more than 260 publications in scientific journals, conference proceedings, a series of reviews, teaching books, and the aforementioned monograph. He also edited conference proceedings and translated from English and edited five monographs.

The Editorial Board of "Reliability: Theory and Applications " congratulates Vladimir Rykov on his eighty anniversary and wishes him good health and further creative advances.

RT&A EditorIAI Board Members

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