INSTITUT DE STATISTIQUE
UNIVERSITE CATHOLIQUE DE LOUVAIN

STATISTICS SEMINAR

Tetyana KADANKOVA,
University of Hassselt,
Belgium

"Busy period, time of the first loss of a customer and the number of the customers in the $M^{\mu}|G^{\delta}|1|B$ queuing system"

Friday, Februari 27, 2009
14:30
Room : c 115 (STAT)

Abstract

Queuing systems with finite waiting room have wide applications in the performance evaluation, telecommunications, and manufacturing systems. The aim of our work was to derive the most important performance measurements of several queuing systems of this type. More precisely, we consider the $M^{\mu}|G^{?}|1|B$ and $G^{?}|M^{\mu}|1|B$ queuing systems with finite waiting room and their modifications.
Evolution of the number of the customers in such systems is described by a process with two reflecting boundaries. In general case this process is a difference of two renewal processes. Reflections from the upper boundary are generated by the supremum (infimum) of the process. Reflections from the lower boundary govern the server's behavior.
In general such processes are not Markovians, but by adding a complementary linear component (in some literature called age process), we obtain a Markov process, which describes functioning of the queuing system. Studying main characteristics of the system results to the investigating of the two-boundary functionals of the governing process. For the queuing systems of $M^{\mu}|G^{?}|1|B$, $G^{?}|M^{\mu}|1|B$ type the governing process is the difference of the compound Poisson process and the compound renewal process complemented with the age process. We determine the Laplace transforms of busy period, time of the first loss of the customer and the number of the customers in the system. Additionally, we consider a special case, when the governing process has unit negative jumps. It means that the customers arrive not in batches but one-by-one. In this case we derive more tractable results.

You are welcome to the coffee break after the seminar (room : c 105)

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INSTITUT DE STATISTIQUE, 20 VOIE DU ROMAN PAYS , 1348 LOUVAIN-LA-NEUVE, BELGIUM
Tel 32(10) 47 43 14 Telefax: 32(10) 47 30 32 E-mail : ISSEC@STAT.UCL.AC.BE