OPTIMIZATION PROBLEMS FOR RETRIAL QUEUES WITH UNRELIABLE SERVER

E.A. LEBEDEV, M.M. SHARAPOV
Taras Shevchenko National University, Kyiv, Ukraine
leb@unicyb.kiev.ua, sharapov@unicyb.kiev.ua

Annotation. A class of queues with retrial calls and one unreliable server is considered. For the introduced queues a condition for the existence of a stationary regime is found as well as an explicit vector-matrix formulas are obtained. The rate of the remainder decreasing to zero has an exponential upper estimation.
Key words: retrial queues, unreliable server, stationary regime.

The paper deals with a class of queues with retrial calls and one unreliable server. The main feature of such models is that if at the arrival moment of a call the server is busy or out of order, then the call goes to the orbit and becomes a source of retrial calls. The considered class of models has a wide range of applications in the design of modern information processing systems [1-2].

For the introduced queues with retrial calls, the following main problems have been solved: a condition for the existence of a stationary regime is found; an explicit vector-matrix formulas are obtained for calculating stationary probabilities; the problem of estimating the accuracy of calculating the normalizing constant has been solved. The results obtained are applied to calculate such important characteristics of the queue as blocking probability, occupancy rate, etc. These results also make it possible to propose efficient algorithms for solving optimization problems for the choice of model parameters. Algorithms work is demonstrated on a large number of numerical examples.

References.
1. Artalejo, J.R., Gomez-Corral, A., Retrial queueing systems. // Springer-Verlag (2008).
2. Lebedev, E.A., Ponomarev, V.D., Retrial queues with variable service rate // Cybernetics and Systems Analysis. – Vol. 47, No. 3 (2011), p. 434-441.