

## MATHEMATICAL MODELING OF QUEUEING SYSTEMS ON THE EXAMPLE OF A RESTAURANT

Dietkina A.I., Kostyuk O.V., Galuza A.A., Tevyasheva O.A.

*National Technical University «Kharkiv polytechnical institute», Kharkiv city*

The queueing theory is devoted to the development of methods of analysis, design, and rational organization of systems related to different spheres of activity, such as communication, transportation, commerce, etc. [1]. Although this theory applies to a wide range of spheres, each queueing system will have common features [2].

The task of the analysis of queueing systems is to determine the number of indicators of their effectiveness, which can be divided into the following groups:

- *indicators that characterize the whole system*: the number of occupied service channels, the number of served requests per unit time, the average waiting time to start service or the number of rejected requests per unit time, etc.;
- *probability characteristics*: the probability of denial of service, probability of service, the probability that a certain number of service channels will be busy;
- *economic indicators*: the cost of losses associated with failures, the economic effect obtained as a result of servicing the request, etc [3][4].

In this work, the main properties and features of the restaurant as a queueing system were analyzed. Thereunder, a series of analytical and simulation modeling of different restaurant systems were carried out to compare the results obtained with each other.

The restaurant queuing system models based on available statistical data for solving optimization problems were designed. Also an example of how a restaurant work simulation model can be used for effective management decisions was added to the work.

### References (translated):

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3. Queueing Systems. Volume 1: Theory / L. Kleinrock–New York: Wiley-Interscience, 1975 – P. 417.
4. An Introduction To Queueing Systems / S. J. Bose–Kanpur: Indian Institute of Technology, 2002 – P. 300.