Evaluation of Lyapunov Exponent for Stochastic Dynamic Models of Queueing Systems¹

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The problem of evaluation of Lyapunov exponent in queueing system analysis based on models and methods of idempotent algebra is considered. General existence conditions for the limit that determines Lyapunov exponent are given, and examples of evaluation of the limit for systems with matrices of particular types are presented. A method of evaluation of Lyapunov exponent is proposed based on some appropriate decomposition of the system matrix. A general approach to modeling of a wide class of queueing networks is considered, and examples of the models are given. It is shown how to find the value of mean growth rate of the system state vector through the evaluation of Lyapunov exponent. Results of evaluation of the mean growth rate for the models under consideration are presented.

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