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Steady state analysis of $E_m/M/1$ retrial queues with threshold strategy

We deal with a single server queueing system with repeated calls (see [1, 2]) in which interarrival intervals of primary calls have have Erlang distribution with the density $\lambda_j \frac{(\lambda_j x)^m}{(m-1)!}$, where $\lambda_j > 0, m \geq 1$ and j is the number of customers in the orbit at the beginning of interarrival interval. The service time distribution is exponential with intensity μ for both primary and repeated calls. The explicit formulae for the limiting distribution of the system state for both the system with finite and infinite number of waiting places in the orbit are obtained by using the phase method. These results are utilized to solve an optimization problem with a threshold strategy for primary calls which means that the rate of input flow changes when the number of customers in the orbit reaches some threshold. As a objective function we took the functional which takes into account the profit from the customers have been served, the fine for the lost customers and paying for the switching of the input flow.

References

[1] G. I. Falin, J. G. C. Templeton, *Retrial Queues*, Chapman & Hall, London, 1997.
[2] J. R. Artalejo, A. Gomes-Corral, *Retrial Queueing Systems. A Computational Approach*, Springer, Berlin, 2008.