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Optimal hysteresis strategies and convergence rate for queues with repeated calls

We deal with a retrial queue of the type $M/M/1$ in which intensity of primary calls depends on the number of customers in the orbit [1, 2]. The intensities of repeated calls and the service process are supposed to be constant. Variable character of the input flow rate allows to consider the system under different strategies. In the report we are dealing with hysteresis strategy which means that there are two different levels (say the first and the second ones) and the two modes for the input flow. When the number of customers in the orbit reaches the second level from below the input flow starts to follow the second mode and it follows the first mode when the number of customers in the orbit reaches the first level from above. We consider both truncated model (i.e., the number of places in the orbit is limited) and model with unlimited orbit. The optimization problems consist in finding optimal position for the levels to maximize some objective function. The explicit formulae for steady state distribution of the customers in the system are obtained which enables us to propose an effective solving algorithm for optimization problems. The convergence rate of steady state distribution of truncated model to the appropriate distribution of non-truncated one is obtained as well.

References

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