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Uncertainty Propagation in Retrial Queues

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During the last years, there have been significant contributions to retrial queues. These kinds of queueing models are considered as an effective instrument in modeling and analysis of several computer systems telephone switching systems, telecommunication networks and so on. These queues are such systems that incoming customers finding the server occupied must leave the service area to join the retrial group for some random time and attempt again. An extensive amount of literature can be found in Falin **[1]**.

In this work, we investigate the M/G/1 retrial queue under Bernoulli schedule **[2]**, where the retrial times are distributed according to a general distribution with finite moments. This model is specifically characterized by the fact that only the customer at the head of the orbit can get access to be served when the waiting space and server are idle. A non-preemptive priority is given to waiting customers over retrying ones.

In the classical modeling, the performance measures of such queueing models are obtained for intersect parameter values. However, the parameter values are determined through a few number of observations, and they are subject to uncertainty in their evaluation. This parametric uncertainty resulting from imprecise information about the parameter, is known as epistemic uncertainty **[3]**. This lack of knowledge in the input factors leads to propagate uncertainties into the model output measures and such study is of concern in this work, to do this, we perform a global senstivity analysis by estimating the Sobol' indices and, an uncertainty propagation by means of polynomial chaos expansion. Particulary, we estimate statistical charaacteristics of uncertain performances measures of the system being studied. Several numerical results are provided and compared to Monte Carlo simulation ones.

References

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