

CORRECTED PHASE-TYPE APPROXIMATIONS FOR THE WORKLOAD OF THE MAP/G/1 QUEUE WITH HEAVY-TAILED SERVICE TIMES

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In many applications, significant correlations between arrivals of load-generating events make the numerical evaluation of the load of a system a challenging problem. Here, we construct very accurate approximations of the workload distribution of the MAP/G/1 queue that capture the tail behavior of the exact workload distribution and provide a small relative error. Motivated by statistical analysis, we assume that the service times are a mixture of a phase-type and a heavy-tailed distribution. With the aid of perturbation analysis, we derive our approximations as a sum of the workload distribution of the MAP/PH/1 queue and a heavy-tailed component that depends on the perturbation parameter. We refer to our approximations as *corrected phase-type approximations*, and we exhibit their performance with a numerical study.