SOME PERFORMANCE MEASURES FOR VACATION MODELS WITH A BATCH MARKOVIAN ARRIVAL PROCESS

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We consider a single-server infinite capacity queueing system with a batch Markovian arrival process (BMAP). In particular, BMAP's are the batch Poisson arrival process, Markovian arrival process (MAP's), many batch arrival processes with correlated inter-arrival times and batch sizes, and superpositions of these processes. We note that the MAP includes phase-type (PH) renewal processes and non-renewal processes such as the Markov modulated Poisson process (MMPP).

The server applies Kella's vacation scheme, i.e., a vacation policy where the decision of whether to take a new vacation or not, when the system is empty, depends on the number of vacation already taken in the current inactive phase. This exhaustive service discipline includes the single vacation T-policy, T(SV), and the multiple vacation T-policy, T(M). The service times are i.i.d. random variables, independent of the inter-arrival times and the vacation durations. Some important performance measures such as the distribution functions and means of the virtual and the actual waiting time processes are given. Finally, a numerical example is presented.