On a single server queue with phase type service and optional phase type server vacations based on exhaustive service under a single vacation policy

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Abstract
We analyze a single server queue with modified Bernoulli schedule server vacations based on exhaustive service. Unlike other vacation policies, we assume that only at the completion of service of the last customer in the system, the server has the option to take a vacation or to remain idle in the system waiting for the next customer to arrive. Further, it is assumed that whenever the server takes a vacation, it is always a single vacation. Two models are considered. In one, we assume one phase service and two phase vacations and in the other we assume two phase service and one phase vacation. We obtain explicit steady state PGF for queue size distribution, the expected number of customers in the queue and the expected waiting time of the customer at a random epoch. Some particular case are discussed and some earlier known results of the single server queue have been derived as a particular case.