Analysis of Single Server Retrial Queue with Batch Arrivals, Two Phases of Heterogeneous Service and Multiple Vacations with N–Policy

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Abstract—We consider a single server retrial queue with batch arrivals, two phases of heterogeneous service and multiple vacations with N- policy. The primary arrivals find the server busy or doing secondary job (vacation) will join orbit (group of repeated calls). If the number of repeated calls in orbit is less than N, the server does the secondary job repeatedly until the retrial group size reaches N. At the secondary job completion epoch, if the orbit size is at least N, then server remains in the system to render service either for primary calls or for repeated calls. For the proposed model, we carry out steady state system size distribution of number of customers in retrial group. We discuss its application of the proposed model to the analysis of a communication protocol like SMTP (Simple Mail Transfer Protocol), TCP/IP (Transmission Control Protocol/Internet Protocol) and etc.

Keywords—N-Policy multiple vacations, Retrial queue, TCP/IP protocol, SMTP protocol.

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