

Control of Traffic Intensity in a Queue—A Method Based on SPRTS.S. Rao, *Indian Institute of Management, Bangalore, India*U.N. Bhat, *Southern Methodist University, Dallas, Texas, USA*K. Harishchandra, *Bangalore University, Bangalore, India*

One of the interesting problems in the study of queueing systems is the control of queues. Control can be affected through controllable parameters like service and/arrival rates, number of service channels, the queue discipline etc. In many queueing applications, a performance characteristic of great importance and interest is the traffic intensity ρ . The purpose of a control technique is to signal in time any change in ρ from the design level say ρ_0 , (the change can be in either direction), and to take appropriate action like suitably adjusting the service (arrival) rate to bring ρ back to the design level ρ_0 .

A method based on the Sequential Probability Ratio Test to detect changes in the traffic intensity using the queue length process $Q(t)$ has been proposed here. The procedure is based on the theory of SPRT for a sequence of observations forming a finite Markov Chain due to Phatarfod (1965). The procedure is applicable to the Markovian queueing systems and for systems like $M/G/1$, $GI/M/s$, $M^{(k)}/G/1$ etc, where one can identify an imbedded Markov chain in the underlying process. Extensive numerical methods for evaluating the OC and ASN of the SPRT procedure have also been discussed.

A New Measure in Correlated Queues(Miss) Sharda and (Miss) Indu Garg, *Department of Mathematics, Kurukshetra University, Kurukshetra-132 119, India*

For a continuous time queueing system, with correlated arrivals and statistically independent departures, explicit probabilities of exactly i arrivals and j departures, over a time interval, are obtained. The various events happen at imaginary transition marks and the inter-transition times follow the exponential distribution. A solution is obtained by solving the difference equations recursively. Interesting particular cases are studied.

Transient Behaviour of Markovian Queues with Finite Waiting SpacesO.P. Sharma and U.C. Gupta, *Department of Mathematics, I.I.T., New Delhi, India*

An attempt is made to develop a new technique for studying the transient behaviour of certain queueing systems with finite waiting spaces. We define

$$P_{n,k}(r, t) = \Pr\{n \text{ customers arrive and } k \text{ leave the system after getting served in the time interval } (0, t) \text{ and } r \text{ customers are waiting at time } t\}$$