Performance Evaluation of Three-Node Tandem Communication Network Model with Feedback for First Two Nodes Having Non Homogeneous Poisson Arrivals

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Abstract

Tandem Queues are widely used in mathematical modeling of random processes describing the operation of Manufacturing systems, supply chains, Computer and telecommunication networks. In many of the communication systems the arrivals are time dependent and can be characterized by a non homogeneous Poisson process. In this paper we developed and analyzed three nodes connected in tandem Queue with feedback for the first and second nodes assuming that arrivals follow non homogeneous Poisson process. Using the difference-differential equations and a probability generating function of the number of packets in the buffer connected to the transmitter the System is analyzed. The System performance is analyzed by deriving expressions for the performance measures of the network like mean content of the buffers, mean delays through put, transmitter utilization with mathematical
illustrations. The sensitivity analysis of the model reveals that the non homogeneous Poisson arrivals and dynamic bandwidth allocation strategy can reduce burstness in buffer and improve quality of service.

References


Index Terms

Computer Science

Communications
Keywords
Feedback  Tandem Network  Non homogeneous Poisson process  Performance measures