ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

12. Probability and Statistics

1991 MS Classification: 60

Shmygevskyy, Mykola, National Technical University, Kyiv, Ukraine

On a generalization of Jackson's law for network in random environment

Queuing networks with input flows controlled by Markov chain $\eta(t)$ are considered. It means that moments of call's input coincide with ones of Markov chain jumps. The rate of service time is directly proportional to a number of calls in the node. If the call is serviced in k-th node, then it enters in m-th node with probability $\mathrm{p_{km}}$ and leaves the network with probability $1-\sum \mathrm{p_{km}} = \mathrm{p_{kr+1}}$, $P = \|\mathrm{p_{km}}\|^{r}{}_{1}$ is the switching matrix, r is the number of network's nodes. Stationary distribution of queuing network mentioned above hasn't a multiplicative form. Thus Jackson's law is not true for this network ([1]). It is proposed a generalization of Jackson's law when the uncorrelated property substitutes the independence one. For the networks a sufficient condition of noncorrelatedness is found. It is necessary that Laplace transformations expressed in terms of infinitesimal characteristics and ergodic distribution of $\eta(t)$ degenerate to 0 at the spectrum of switching matrix.

Reference: 1. E. A. Lebedev, and A. A. Chechelnitsky, Limit theorems for some class of the service networks, Frontiers in Pure and Applied Probability, vol. 2, part 6, (1994), 374–381.