Instability of nonhomogeneous queueing networks

Evsey Morozov [1]

Insitute for Applied Mathematical Research, Karelian Research Centre RAS
Department of Applied Mathematics and Cybernetics, Petrozavodsk University
and
Institute for Informatics and Mathematical Modelling of Technological Processes
Kola Science Centre, Apatity

We establish sufficient instability conditions for nonhomogeneous Jackson-type networks and for multiclass open networks. Also we show that these conditions are necessary for instability of feedforward regenerative networks (of both types). We separate two cases: strong instability and weak instability. In the first case, the basic queueing processes (queue-size, workload) increase infinitely with probability 1 when time increases. In the second case, they increase generally, in probability. The proof in the second case holds for regenerative network and is based on a characterization of the embedded renewal process of the regeneration points.

Keywords: Jackson-type network, multiclass network, instability assumptions, nonhonogeneous stations, regenerative process, queue-size process, workload process

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