QMIPS

Quantitative
Modeling
In
Parallel
Systems

Routing Among Different Nodes Where Servers Break Down Without Losing Jobs

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Abstract Jobs generated by a single Poisson source can be routed through N alternative gateways, modelled as parallel $M/M/1$ queues. The servers are subject to random breakdowns which leave their corresponding queues intact, but may affect the routing of jobs during the subsequent repair periods. The marginal equilibrium queue size distributions are determined by spectral expansion. This can be done, at least in principle, for any number of queues. Several routing strategies are evaluated and compared empirically. In the special case $N = 2$, it lay also be possible to find the joint distribution of the number of jobs in the two queues.

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