

Analysis of a Markovian feedback queue with multi-class customers and its application to the weighted round-robin queue

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ABSTRACT

We consider an M/G/1 Markovian feedback queue with multi-class customers. We derive functional equations for the stationary distribution of the queue size and the total response time. A system of linear equations is also derived for the moments of the queue size and the total response time distributions. The mean and the variance of the queue size and the total response time can be computed by solving the system of linear equations. By using the Markovian feedback queue with multi-class customers, we also investigate the M/PH/1 weighted round-robin queue. Numerical examples are given to show that moments of the queue sizes and of the total response times can be easily computed for the weighted round-robin queue. As the service quantum shrinks to zero, the moments of the queue sizes and the total response times converge to some limits which should be the moments of the corresponding discriminatory processor sharing queue.