

Applications of stochastic recursive equations and branching processes in queueing networks with stationary ergodic driving sequences

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Abstract

We introduce a class of nonlinear multidimensional stochastic recursive equations in which the coefficients are stationary ergodic (not necessarily independent). Under appropriate conditions, an explicit ergodic stationary solution for these equations is obtained and the convergence to this stationary regime is established. The recursive equations extend branching processes with migration. We use these results to obtain explicit expressions for average queue sizes in various queueing models in which driving sequences may be general stationary ergodic:

- (i) We analyze queueing systems with stationary ergodic vacations. We present in particular some recent results (jointly with Robin Groenevelt) on polling systems.
- (ii) We then present recent work on discrete time infinite server queues and networks of such queues with stationary ergodic batch sizes.