Equilibrium joining probabilities for an M/G/1 queue

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Abstract

We study the customers’ Nash equilibrium behavior in a single server observable queue with a Poisson arrival process and general service times. Each customer takes one decision: to join or not to join. Furthermore, he takes it upon arrival and no future regrets. The customers are homogenous with respect to their waiting cost linear function and with the reward associated with service completion. The cost of joining depends of others’ behavior, and therefore a strategic game is formed here. A full recursive algorithm for computing the (possibly mixed) Nash equilibrium strategy is presented. Its output is queue dependent joining probabilities. We demonstrate that depending on the service distribution, this equilibrium is sometimes unique while at other times it is not. Also, the ‘follow the crowd’ phenomenon holds in times, as is the case regarding the ‘avoid the crowd’ phenomenon.

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