We develop approximations to compute the steady-state performance measures of a multi-server queue receiving state-dependent Poisson arrivals and general service and abandonment-time distributions. Such models can be used to capture call centers that vary customer arrival rate by providing delay time estimates to callers. The first model creates a completely Markovian queueing system making use of the hazard-rate function of the original abandonment-times. The second approximation extends this by considering a scaled-up single server queue to incorporate the impact of general service times in the analysis. We conduct extensive numerical experiments to assess the accuracy of their predictions.

Keywords: Call centers, impatient customers, level-crossing method, scaling