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Eugene H. Dshalalow, 150 W University Blvd, Melbourne, FL 32901, and **Ahmed I. Merie*** (amerie2013@my.fit.edu), 150 W University, Melbourne, FL 32901. *FLUCTUATION ANALYSIS IN QUEUES WITH SEVERAL OPERATIONAL MODES AND PRIORITY CUSTOMERS.*

We consider a class of queues with a single server who operates in four different modes, attends two queues, and dependent on circumstances, processes two different queues simultaneously. The server capacity is $r > 1$, when serving primary customers. When the primary queue drops below r and unless it is empty the server continues working in a slower mode and takes on a secondary queue simultaneously. There are different switching policies that specify when the server works on one or two queues. There are elements of a non-cooperative stochastic game when the server attends two queues. The main tools pertain to recent results in fluctuation theory, namely . level-crossing techniques applied to piece-wise linear jump processes. One of the objectives in the paper is to model processes that occurs in software, computer, and electrical engineering, and argue that methods of fluctuation theory produce closed form functionals. Key words: Single-server queueing systems, fluctuation theory, marked point processes, stochastic games, semi-regenerative processes. AMS Subject Classification: 60K10, 60K25, 60G51, 60G55, 60K05, 60G57. (Received July 06, 2017)