

## Computation and optimization of a working breakdown queue with second optional service/ Dong-Yuh Yang, Yi-Hsuan Chen

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Abstrak

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This paper considers an M/M/1 queue with second optional service, in which the server is subject to working breakdowns and repairs. All arriving customers require the first essential service, whereas only a portion of them require a second optional service. In case where the server may break down while providing the first (essential) or second (optional) service, the server continues operation at a reduced level rather than ceasing service entirely. The stability condition for this queue is derived in explicit form. The matrix-geometric method is used to compute the stationary probability distribution of the system size and various system performance measures. The genetic algorithm is applied to a cost optimization problem with the aim of optimizing service rates by minimizing the expected cost per unit time. Finally, a numerical example is presented for illustrative purposes.