**Madan, Kailash C.**

**An M/G/1 queue with second optional service.** (English) Zbl 0942.90008

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Summary: We study an M/G/1 queue with second optional service. Poisson arrivals with mean arrival rate $\lambda(>0)$ all demand the first 'essential' service, whereas only some of them demand the second 'optional' service. The service times of the first essential service are assumed to follow a general (arbitrary) distribution with distribution function $B(v)$ and that of the second optional service are exponential with mean service time $1/\mu_2$ $(\mu_2 > 0)$. The time-dependent probability generating functions have been obtained in terms of their Laplace transforms and the corresponding steady state results have been derived explicitly. Also the mean queue length and the mean waiting time have been found explicitly. The well-known Pollaczec–Khinchine formula and some other known results including M/D/1, M/$E_k$/1 and M/M/1 have been derived as particular cases.

**MSC:**

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60K25 Queueing theory (aspects of probability theory)



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first essential service; second optional service; supplementary variable technique

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