

ABSTRACT

Optimal Preventive Maintenance Policies of an M/M/1

Queueing System. (December 1995)

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There have been many publications dealing with preventive maintenance policies for stochastically deteriorating systems. However, there has been a lack of research on optimal maintenance of the server in the queueing system with a server subject to breakdowns. In this research, we consider optimal replacement policies for the server of an M/M/1 queueing system.

We assume that the server lifetime follows a phase-type distribution. We consider two cases of problems: in one, the phases are known with certainty, and in the other, the phases are not known. For each case, three types of replacement policies of interest are proposed. We take into account the occupancy of the system, as well as the server age or deterioration phase, in considering preventive replacement.

We develop an algorithm to find an optimal control limit for each policy under the long-run average cost criterion for the known phases case, and under the expected total discounted cost criterion for the unknown phases case. We will give illustrative examples and compare the control limit policies.