maintenance appears to have a better performance advantage over concurrent maintenance because, unlike concurrent maintenance wherein the service time is an increasing function of the arrival rate, the service time in periodic maintenance is independent of the arrival rate. Also, we showed that periodic maintenance possesses a nice property that it is stable under a pulse situation as long as a proper maintenance period (i.e. T_{cycle} in the analysis) is selected. In an effort to identify this proper maintenance period, we first derived its upper and lower bounds for obtaining a steady state system. Then, we derived an optimal maintenance period to optimise the system response time. Finally, we derived the condition which must be satisfied in order for the system to recover from a pulse situation.

In conclusion, the contributions of the paper are (a) deriving the maximum allowable value of the arrival rate under which concurrent and periodic maintenance strategies may be used to guarantee a stable system and deriving conditions under which one strategy may be more preferable than the other in terms of the system throughput based on a given average arrival rate, and (b) showing that the variance of the service time in periodic maintenance is higher than that of concurrent maintenance and, thus, justifying the statement that concurrent maintenance is more suitable for real-time systems where variance of the service time is a factor, and, in the case where throughput is more a factor than the variance of the service time (and hence periodic maintenance is used), deriving an optimal periodic maintenance period (T_{cycle}^{opt} in the paper) for optimising the average response time.

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Announcements

7–11 SEPTEMBER 1992

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