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Abstract
In this study, two economic discrete replacement models for a single-unit system which is subject to shocks are discussed.

In the model 1, the external shocks are classified, depending on its effect to the system, into two types: non-lethal and lethal shocks. A non-lethal shock does damage to the system in the sense that it increases the failure rate of the system by a certain amount, while a lethal shock causes the system into instantaneous failure. Without external shocks, the failure rate also increases with age due to aging process. The system is replaced at the time instant of the nth non-lethal shock, or on failure, whichever occurs first. Introducing relative costs, the long-run expected cost per unit time is derived as a criterion of optimality and the optimal number found by minimizing that cost. It is shown that, under certain conditions, there exists a finite and unique optimal number .

In the model 2, the enternal shocks arrive and act on a system according to a homegeneous Poisson process with intensity . A shock occurs can introduce some damage to the system, and the after-effect of a shock on the system lasts for only a fixed period of time . If the time lag between two successive shocks is shorter than this period of time, the system will fail at the second time; otherwise, the system will function as normal after the second shock. The economic design of components based on a costing model show that, under certain conditions, there exists a finite and unique optimal number .
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