

Stochastic Repair and Replacement with a Single Repair Channel

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Abstract : This paper examines the behavior of a system, which upon failure is either replaced with certain probability p or imperfectly repaired with probability q . The system is analyzed using Kolmogorov's forward equations method; the analytical expression for the steady state availability is derived as an indicator of the system's performance. It is found that the analysis becomes more complex as the number of imperfect repairs increases. It is also observed that the availability increases as the number of states and replacement probability increases. Using such an approach in more complex configurations and in dynamic systems is cumbersome; therefore, it is advisable to resort to simulation or heuristics. In this paper, an example is provided for demonstration.

Keywords : repairable models, imperfect, availability, exponential distribution

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