

Probabilistic Analysis of 2-Out-of-3 Redundant System Subject to Degredation

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Abstract

A reliability model for 2-out-of-3 redundant system of identical units is developed considering the concept of degradation of unit after repair. Initially two units work in parallel and one unit is kept as cold standby. There is a single server who attends the system promptly whenever needed. Unit becomes degraded after repair. The system is considered in up-state if any two of original and/or degraded units are operative. The failure and repair times of units are assumed to be mutually independent and uncorrelated random variables. The distribution of failure time of the units is taken as negative exponential while that of repair times are arbitrary with different probability density functions. The system model is analyzed probabilistically in detail using regenerative point technique to obtain reliability and economic measures. A numerical illustration for MTSF, availability and profit is also given for a particular case.

Keywords: Probability, redundant system, degradation, parallel working of units and regenerative point technique.

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