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SYSTEM AVAILABILITY AND RELIABILITYSUBJECT TO COMMON-CAUSE TIME-VARYING FUZZY RATES

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ABSTRACT

This study presents a method for calculating the availability and reliability of a system depicted by block diagram, we use the Marshall and Olkin formulation of the multivariate exponential distribution. That is, the components are subject to failure by Poisson failure processes that govern simultaneous failure of a specific subset of the components. A model is proposed for the analysis of systems subject to common-cause time to simultaneous failure and the time to repair of each state follow Rayleigh distribution with unknown parameters which can be represented by triangular fuzzy numbers estimated using the statistical data then we introduce the procedures to determine the availability function, the reliability function. The method for calculating the system availability and reliability requires that a procedure exists for determining the system availability and reliability from component availabilities and reliabilities, under the statistically independent component assumption. A numerical example has been studied in detail to illustrate the model and to get analytic and graphical results.

KEYWORDS: System Availability, System Reliability, Common-Cause Failures, Fuzzy Rayleigh Distribution