

Performance Assessment of Three Unit Redundant System with Environmental and Human Failure Using Copula Approach

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Abstract : We have studied the reliability measures of a system, which consists of two subsystems i.e. subsystem-1 and subsystem-2 in series configuration under different types of failure. The subsystem-1 has three identical units in parallel configuration and operating under 2-out-of-3: G policy and connected to subsystem-2 in series configuration. Each subsystem has different types of failure and repair rates. An important cause for failure of system is unsuitability of the environmental conditions, like overheating, weather conditions, heavy rainfall, storm etc. The environmental failure is taken into account in the proposed repairable system. Supplementary variable technique is used to study of system and some traditional measures such as; availability, reliability, MTTF and profit function are obtained for different values of parameters. In the proposed model, some particular cases of failure rates are explicitly studied.

Keywords : environmental failure, human failure, availability, MTTF, reliability, profit analysis, Gumbel-Hougaard family copula

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