



ORIGINAL ARTICLE

LOGIC DIAGRAM TECHNIQUE FOR RELIABILITY EVALUATION OF A NON-SERIES PARALLEL SYSTEM WITH ARBITRARY FAILURE PROBABILITY DISTRIBUTIONS

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Abstract: Here, the use of Logic Diagram Technique has been made to determine the reliability of a non-series parallel system of seven components. In this system, two components are connected in parallel at the centre of the structure and the other five components are connected in series in two different parallel paths. The maximum flow of information has been passed through these two parallel components. The system has been converted into a simple parallel-series system and the paths which dominate over the other paths are discarded as these paths have no effect on reliability. The use of Weibull and Gamma distributions has been made for the random variables associated with the failure rates of the components. The reliability measures are evaluated by using simple probability laws. The arbitrary values of the parameters (scale and shape) associated with different failure times are considered to examine the behaviour of reliability measures. It is observed that the MTSF and reliability keep on increasing with the increase of scale parameter while their values decrease when there is an increase in shape, rate parameters and operating time. The real-life application of the study can be visualized in electronic systems such as cell phones and computers.

Key words: Non-series parallel system, Logic diagram technique, Reliability measures, Weibull and Gamma failure laws.

Cite this article

S. Malik, S.C. Malik and N. Nandal (2022). Logic Diagram Technique for Reliability Evaluation of a Non-Series Parallel System with Arbitrary Failure Probability Distributions. *International Journal of Agricultural and Statistical Sciences*. DocID: <https://connectjournals.com/03899.2022.18.1345>