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OPERATIONAL COST MODELS FOR AN EARTH STATION SYSTEM USING 2-PARALLEL AND 4- PARALLEL CONFIGURATIONS

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Abstract

Operational cost is important in any system. In the case of the earth station system, operational cost is very crucial. The operational cost can be divided into three costs: maintenance, failure, and replacement costs. There are many complex subsystems incorporated in the earth station system, for instance a high-power amplifier, modulators, and antennas, to name a few. In this research, only the replacement cost was considered. Moreover, there are many replacement methods that are available. These replacement methods implicitly influence both the replacement and the replacement costs. The aim of this research is to provide a new cost model based on which replacement method yields the lowest cost. Two replacement methods are involved in this research: failure-triggered and age-based. The failure-triggered and the age-based replacement methods were considered because these methods are the most used in previous research work. Furthermore, three types of cost models were also considered, and they were linear, polynomial, and exponential operational cost models. The outcomes show that the failure-triggered and age-based replacement methods of 2-parallel configuration of polynomial and linear operational cost models yielded the lowest RMSE value of 2.5. Therefore, both polynomial and linear operational cost models of the 2-parallel configuration were the most optimal operational cost models. © (2024), (International Islamic University Malaysia-IIUM). All rights reserved.

Author Keywords

Age-based; Earth station system; Failure-triggered; Operational cost; Polynomial cost model

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