

首页 | 期刊介绍 | 编委会 | 编辑部介绍 | 投稿指南 | 期刊订阅 | 广告合作 | 留言板 | 联系我们 |

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周转件构成的可修复系统的可靠性分析

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Reliability Analysis of Repairable System Composed by Unlimited Repairable Parts

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摘要

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摘要 系统在运行期间因部件失效而发生故障, 进行更换维修后, 系统部件的使用时间分布发生变化, 系统可靠性指标的值也随之变化, 对此情况下系统可靠性分析方法进行了研究。将一定范围内同类部件的整体看作系统, 并考察全部由周转件构成的系统, 通过对各个时刻系统内部件的使用时间以及维修次数分布建立数学模型, 得到了系统可靠度随系统运行时间的增加而减小, 系统部件更换率随系统运行时间增加而增加的结论。并通过航空公司的实际数据对结果进行了验证。分析结果为备件采购计划、部件梯次使用计划和维修策略的制订具有重要意义。

关键词: 可靠性 系统可靠度 系统部件更换率 周转件




Abstract: System often faults due to parts failure during operation. After replacement, values of system reliability indexes change, which is caused by the change of age distribution of system parts. And system reliability analysis method is studied. System is regarded as a set of all the same parts in a range, and it is assumed that system was composed of repairable parts which are all the same. Mathematical model of system parts is built, and results of system reliability descending with running time, system replacement ratio ascending are gotten. These results, which are important to the spare parts purchasing, cascade utilization of parts and maintenance policy making, are illustrated by actual data from the airline company.

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