系统工程与电子技术 2012, 34(9) 1957-1965 DOI: 10.3969/j.issn.1001-506X.2012.09.36 ISSN: 1001-506X CN: 11-2422/TN

可靠性

基于Bayes序贯检验的长周期系统动态试验方法

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摘要：

提出了一套基于正态分布贝叶斯序贯检验的试验设计方法，为长周期、多指标系统的小子样动态试验次数的确定提供了理论依据。该方法以待检系统的单次抽样检验合格概率为统计观测值，从假设多次抽样后的该观测值序列服从正态分布开始分析，应用正态分布贝叶斯序贯验后加权检验理论对多指标系统的序贯抽样检验过程进行设计，给出了验前信息处理、贝叶斯序贯试验及序贯截尾方案设计、序贯截尾风险增量上界计算、以及系统各指标综合合格概率估算的具体实现方法。系统仿真实验的结果表明，该方法是可行的。

关键词： 质量控制与可靠性管理 动态试验方法 序贯检验 长周期系统

Dynamic test methodology for long-working systems based on Bayesian sequential test theory

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Abstract:

A test design methodology based on normal distribution Bayesian sequential test theory is proposed. It provides the theoretical basis for the determination of test number of a small sample size dynamic test for long-working systems with different types of technical specifications. It takes the conformity probabilities of single sample test for the target system as statistical observed values, and assumes that the observed values series from different dynamic tests of target systems are conformed to normal distribution. Then the multi-specification sequential test process of target systems can be designed by using Bayesian sequential posterior odd test theory on normal distribution. And the detailed realization procedures on handling priori information, designing the Bayesian sequential testing and sequential censor solution, calculating the upper bound of increased sequential censor risks, and valuating the overall conformity probability of each technical specification are given. Finally, a simulation example by applying the approach is given, and the corresponding test results show that the approach is feasible.

Keywords: quality control and reliability management dynamic test methodology sequential test long-working systems

收稿日期 修回日期 网络版发布日期

DOI: 10.3969/j.issn.1001-506X.2012.09.36

基金项目:

通讯作者:

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参考文献：

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