博士论坛

多模式系统的测试顺序优化

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摘要　　研究了多模式系统的测试顺序优化问题。基于不同模式下测试与故障之间的依赖关系，结合系统故障的先验概率、可用测试的成本以及不同模式的转换费用，构造了该问题的数学描述模型。基于已有的搜索算法提出了一种准多步前向搜索算法，该算法以信息增益为启发策略，可自动获取平均测试费用最少、且能快速实现系统故障检测与隔离的优化测试顺序。最后实例验证了该算法的正确性，证明该算法可解决实际问题。

关键词　　测试性设计　测试排序　测试模式　启发式函数

分类号

Test sequence optimization of multi-mode system

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Abstract

A test sequencing problem of multi-mode system is studied.Based on the dependencies between failure sources and available tests at different mode，combined with the prior probability of failure sources，the cost of tests and of mode changing，a mathematic model on this problem is constructed.To extract an optimal test sequence which ensures to accomplish the system fault detection and isolation quickly under the least average testing cost，a quasi multi-step look-ahead search algorithm is presented.This algorithm is based on the existed one-step look-ahead search algorithm and multi-step look-ahead search algorithm.It employs the information gain as its heuristics and achieves an efficient tradeoff between optimality and computational complexity.A real test case is given to verify the presented approach.The experimental results show that the presented algorithm can efficiently solve practical problems.

Key words　Design For Testability（DFT）　test sequencing　test mode　heuristic function

DOI:

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