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综合模块化航电软件仿真测试环境研究

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A Framework of Simulation Testing Environment for Integrated Modular Avionics Software

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摘要 | 参考文献 | 相关文章

摘要 伴随着综合模块化航空电子(IMA)软件在新一代飞机上的应用,其高复杂性、高度综合的特点以及分层的健康监控和故障管理模式给软件测试提出了挑战。传统的仿真测试环境在应对IMA软件测试中难以满足RTCA DO-178B中规定的对验证过程结果的验证的要求。本文在分析IMA软件特点的基础上,根据DO-178B的要求,综合国外的发展情况和国内的研究进展情况,研究综合模块化航电软件仿真测试环境需求,提出了基于软件故障注入的综合模块化航电软件灰盒仿真测试环境方案,并给出优势分析。该仿真测试环境方案以IMA软件为测试对象,应用软件故障注入技术和代码插装技术满足测试规范文件的要求。其具有通用灵活、适配性强、强实时性等特点,为中国新一代航电软件的系统验证和测试奠定了基础。

关键词: 综合模块化航空电子 软件 灰盒测试 仿真测试环境 软件故障注入 DO-178B

Abstract: It is difficult for the traditional software testing environment to meet the requirements of integrated modular avionics (IMA) software testing and verification of the verification process results in RTCA-DO-178B. It is also difficult for the traditional software testing environment to achieve the goals of functional testing and validation of the IMA software, which includes testability design, health monitoring and redundancy management functions. This paper analyzes the characteristics of integrated modular avionics software, and describes the requirements of the testing environment aimed for IMA software testing. Then, it proposes a program of IMA software grey-box testing environment based on software fault injection. This program is more general, flexible and strong real-time than the traditional software testing environment.

Keywords: integrated modular avionics software gray-box testing simulation testing environment software fault injection DO-178B

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