FPGA 软件半实物仿真测试环境研究与框架设计

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摘　要：针对当前 FPGA 软件测试工作中，仿真测试和实物测试存在的效率低、覆盖率无法保障、充分性差等问题，提出了一种新的测试环境框架用于 FPGA 软件测试，采用真实的 FPGA 芯片运行被测 FPGA 软件，同时构建执行器 FPGA 模拟被测 FPGA 的外部设备与接口环境，构建被测 FPGA 软件的外设行为仿真模型，将原来仅用于仿真测试的 Testbench 测试脚本解析为测试数据，将仿真模型和测试数据移植到执行器 FPGA 中，从而实现了 FPGA 软件的半实物仿真测试.最后基于该框架开发了原型验证系统，并在测试项目中取得了较好的效果.

关键词：FPGA 软件测试；测试环境；半实物测试；仿真测试；实物测试

Research on framework design of semi-physical simulation testing environment for FPGA software

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Abstract：According to the shortcomings of low efficiency, insufficient coverage in current simulation testing and physical testing method of FPGA software testing, a design of FPGA semi-physical testing environment based on simulation testing case was proposed. The real FPGA chip was used for running the design under test, the testbench used in simulation testing were parsed and processed into FPGA transmission signals and testing data, and an executor FPGA was designed to simulate the behavior and interface of the external device. Then the testing data and simulation model were transplanted into the executor FPGA to connect the FPGA under test. The design framework was validated by a semi-physical testing environment verification platform, and good results had been achieved.

Key words：FPGA software testing; testing environment; semi-physical testing; simulation testing; physical testing

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