基于猴群算法的 3D NoC IP 核测试优化方法

许川佩　　1，2　，陈　玄　　1，2

(1 桂林电子科技大学 电子工程与自动化学院，广西 桂林 514004;

2 广西自动检测技术与仪器重点实验室，广西 桂林 514004)

摘　要：如何对三维片上网络（three Dimensional Network-on-Chip，3D NoC）资源内核的测试进行优化以缩短测试时间，提高资源利用率是当前 3D NoC 测试面临的主要问题之一.本文针对 3D NoC IP 核测试优化问题，开展 TSV 位置与 IP 核测试数据分配方案协同优化研究.在带宽、功耗和 TSV 数量约束下，将 TSV 位置方案和 IP 核测试数据分配方案作为寻优变量，采用猴群算法进行寻优.算法通过爬和望跳过程进行局部搜索并结合翻过程在不同领域进行搜索从而找到最优解，加入精英保留策略以确保算法收敛性，使算法搜索结果更为准确.以 ITC’02 电路为实验对象，实验结果表明，该算法能够有效地优化 3D NoC 资源分配，缩短测试时间，提高资源利用率.

关键词：三维片上网络；IP 核测试优化；猴群算法；

IP Cores Test Optimization Method of 3D NoC Based on Monkey Algorithm

XU Chuan-pei　　1,2　，CHEN Xuan　　1,2

(1 School of Electronic Engineering and Automation, Guilin University of Electronic Technology, Guilin 541004, China；

2 Guangxi Key Laboratory of Automatic Detection Technology and Instrument, Guilin 541004, China)

Abstract：How to optimize the test of the three-dimensional network-on-chip (3D NoC) resource core to shorten test time and increase resource utilization is one of the major problems that the 3D NoC testing faced. This work focuses on 3D NoC IP core test optimization issues, and conducts collaborative optimization research on TSV location and IP core test data distribution schemes. Under the constraints of bandwidth, power consumption and TSV quantity, the TSV location scheme and IP core test data distribution scheme are used as optimization variables and Monkey Algorithm(MA) is used to optimize. The algorithm performs local search through the climb and watch-jump process and searches in different fields with the somersault process to find the optimal solution. The elite retention strategy is added to ensure the convergence of the algorithm and the algorithm search result is more accurate. Taking the ITC’02 circuit as the experimental object, the experimental results show that the algorithm can effectively optimize the 3D NoC resource allocation, shorten the test time, and improve resource utilization.

Key words：three-dimensional network-on-chip(3D NoC); IP core test optimization; monkey algorithm;

作者简介：

许川佩　女，（1968-），博士，教授.研究方向为集成电路测试.

陈　玄（通讯作者）　，（1993-），硕士研究生.研究方向为集成电路测试.E-mail:chy811255@163.com.