

一种支持多种工作模式的可重构计算单元的设计

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摘要: 针对高密度计算领域的的数据特点, 为目标多核计算系统设计了一种可重构计算单元, 其通过内部运算部件的运算路径重构, 可以实现多种乘加运算功能, 并对高密度计算领域中常见的矩阵乘法、快速傅里叶变换等算法进行了针对性的加速设计, 并能够支持多种工作模式. 该设计已经在 Xilinx Virtex-7 XC7V2000TFLG1925-1 FPGA 芯片上进行了原型验证, 测试结果表明, 对高密度计算领域的典型数据粒度, 该可重构计算单元的计算效率满足设计要求.

关键词: 可重构; 计算单元; 流运算; 存储运算; 硬件加速

Design of a Reconfigurable Computing Unit With Multiple Working Modes

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Abstract: In this paper, a coarse-grained reconfigurable computing unit (RCU) is designed for the heterogeneous multi-core system (HMCS) which is applied to high density computing field. As a reconfigurable computing unit, RCU can achieve a variety of functions and work in different modes. The architecture of RCU is also optimized for some common complex algorithms, such as matrix calculation, FFT and etc. At last, the hardware prototype of RCU is implemented on the FPGA and the experimental results show that the performance has achieved the performance requirements.

Key words: reconfigurable; computing unit; stream computing; storage computing; hardware acceleration

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