# 粗粒度多核系统任务级多线程调度研究

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摘　要：多核系统是当今处理器发展的主方向，如何合理高效进行任务调度，确保全部处理核心处于有效工作状态是当今多核系统研究的一个重要方向.多核任务调度的关键难点在于发掘任务并行性，为解决这一问题，本文借鉴指令级多线程思想，结合多核系统中任务的粗粒度特性，提出了一种新型的粗粒度多线程多核体系结构，建立了多线程取指策略、资源分配策略和线程切换机制，同步完成了这一结构多线程调度器电路设计.围绕此调度器构建了一个粗粒度多核计算平台，并在 FPGA 芯片上进行硬件实现，实验结果表明，该设计方案相对于单线程使多核计算平台的任务并行度平均提高约 34.29%.

关键词：多核技术；多任务并行；同时多线程；粗粒度

# Research on task-level multi-thread scheduling for coarse-grained multi-core systems

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Abstract：Nowadays Multi-core system is the main direction of processor development. How to reasonably perform task scheduling and ensure that all processing cores are in effective working state is an important direction of multi-core system research. The key difficulty of multi-core task scheduling is to explore the parallelism of tasks. To solve this problem, this paper draws on the instruction-level multi-threading idea and combines the coarse-grained characteristics of tasks in multi-core systems to propose a new coarse-grained multi-threaded multi-core architecture. A multi-threaded fetching strategy, resource allocation strategy and thread switching mechanism are established, and the multi-threaded scheduler circuit design of this structure is completed. A coarse-grained multi-core computing platform is built around this scheduler, and implemented on the FPGA. The results show that the design scheme improves the task parallelism of the multi-core computing platform by about 34.29% on average compared with single-threaded.

Key words：multi-core technology; multitasking parallel; multithread; coarse-grain

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