

研发、测试

基于ARM920T内核的FFT算法的高效实现

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摘要 随着ARM体系结构的发展, ARM处理器已经可以胜任许多DSP应用。为了充分挖掘ARM处理器数字信号处理能力, 结合ARM内核设计特点设计了基4-FFT算法的高效ARM程序。代码设计中, 对寄存器分配和指令调度作了精细地控制, 提出了ARM汇编中浮点数的定点格式存储和计算方法, 充分利用桶形移位器和5级流水线, 避免了流水线互锁问题。实验结果表明优化后的程序指令周期总数减少并且运算精度很高。这些优化方法对ARM程序优化具有实际指导意义。

关键词 [代码优化](#) [ARM内核](#) [流水线互锁](#) [FFT](#) [浮点数](#)

分类号

High-efficient implementation of FFT algorithm based on ARM920T core

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Abstract

With the development of the architecture of ARM, ARM processor can be used in many DSP applications. In order to thoroughly explore the ability of DSP in ARM processor, the high-efficient ARM program of radical 4-FFT is designed according to the architecture characters of ARM core. In the process of code designing, instruction scheduling and register allocation are controlled subtly and the fixed-point number's storage format and computing method of float number are provided. Barrel shifter and 5-level pipeline are fully utilized and pipeline interlock is avoided. The experimental results indicate that the instruction cycles of optimized code are greatly shortened and the result is more precise. These methods of code optimization have practical meaning to optimization of ARM programs.

Key words [code optimization](#) [ARM core](#) [pipeline interlock](#) [FFT](#) [floating number](#)

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