

论文

## 空时自适应处理的通用平台设计与实现

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摘要

该文利用多个高性能数字信号处理器, 结合FPGA和通用处理器, 实现了一个空时自适应处理(STAP)的通用实时平台系统。借鉴Valiant(1990)提出的BSP模型, 采用多重流水线, 提出一个空时自适应处理(STAP)计算模型。该模型可以弥补STAP算法和实际并行系统的差距, 为开发提供了统一框架; 同时, 方便了对算法的性能评估。在基于该模型的具体开发过程中, 选择可扩展簇式多处理机结构作为系统硬件架构, 采用数据块静态分配方案进行算法的分解与映射, 并采取一系列通信和程序优化的方法。结果表明, 系统能满足实时要求, 可扩展性好, 方便类似系统的系列开发。

关键词 [数字信号处理](#) [并行处理](#) [空时自适应处理](#) [通用实时平台](#)

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## A Universal Real-Time Platform for Space-Time Adaptive Processing

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Abstract

A universal real-time platform for a Space-Time Adaptive Processing (STAP) is developed. The platform is composed of multi-DSPs, FPGA and a general-purpose processor. Refined from the Bulk Synchronous Parallel model (BSP) by Valiant(1990), an STAP computation model is brought forward. The model provides a bridge between STAP algorithms and real parallel systems. Moreover, it can be applied to performance evaluation. During the course of development, scalable cluster-organized multi-processors structure is adopted as hardware architecture. And data-block static allocating is taken as the mapping scheme. Afterwards, some optimization methods about communication and programming are introduced. This system can meet the real-time requirement, its scalability is good, and it facilitates the development of similar systems.

Key words [DSP](#) [Parallel processing](#) [Space-time adaptive processing](#) [Universal real-time platform](#)

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