

Electrical Engineering

SECOND EDITION

EMBEDDED MULTIPROCESSORS

Scheduling and Synchronization

Sundararajan Sriram • Shuvra S. Bhattacharyya

Embedded Multiprocessors: Scheduling and Synchronization, Second Edition presents architectures and design methodologies for parallel systems in embedded digital signal processing applications. It discusses application modeling techniques for multimedia systems, the incorporation of interprocessor communication costs into multiprocessor scheduling decisions, and a modeling methodology (the synchronization graph) for multiprocessor system performance analysis. The book also applies the synchronization graph model to develop hardware and software optimizations that can significantly reduce the interprocessor communication overhead of a given schedule.

This edition updates the background material on existing embedded multiprocessors, including single-chip multiprocessors. It also summarizes the new research on dataflow models for signal processing that has been carried out since the publication of the first edition.

This book explores the optimization of interprocessor communication and synchronization in embedded multiprocessor systems. It shows you how to design multiprocessor computer systems that are streamlined for multimedia applications.

FEATURES

- Focuses on multiprocessor implementations of signal processing applications specified as dataflow graphs
- Describes unique techniques for optimizing communication and synchronization
- Integrates arbitrary scheduling strategies with alternative optimization algorithms to address specific subproblems associated with implementing a given schedule
- Provides several examples of practical applications that demonstrate the relevance of the techniques described

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Sriram
Bhattacharyya



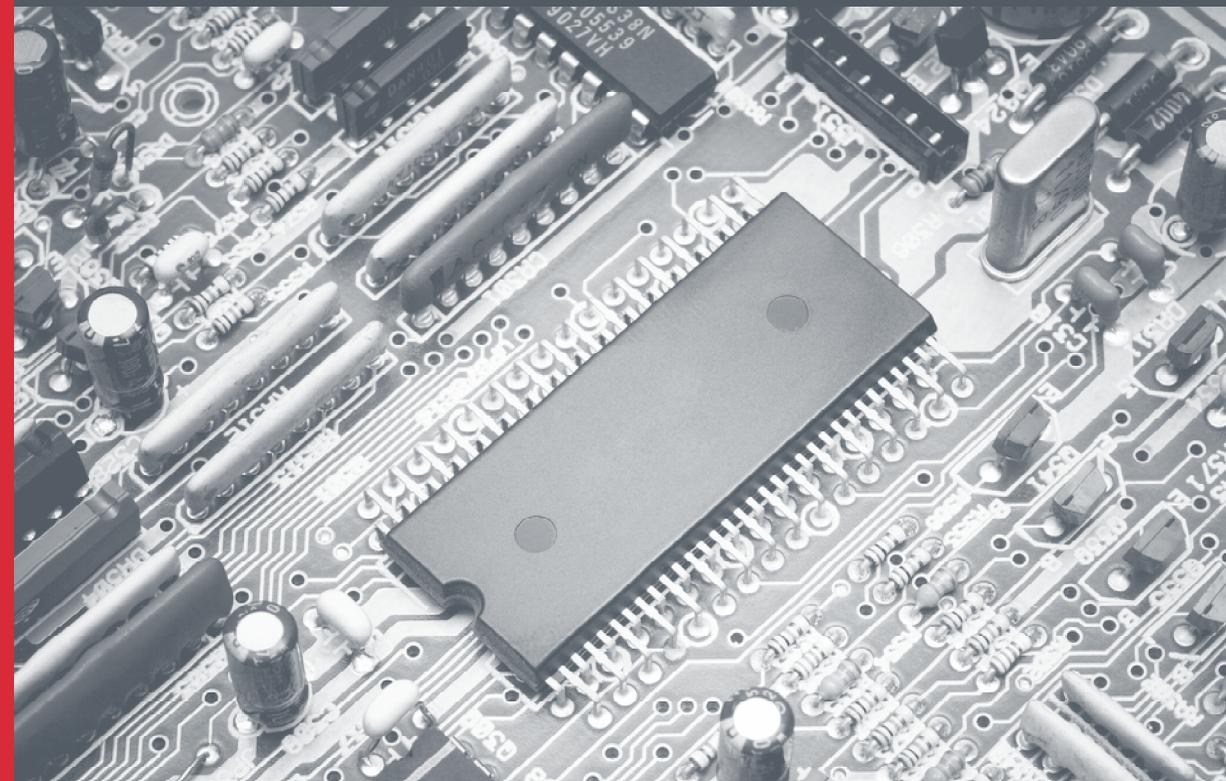
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Scheduling and Synchronization



Sundararajan Sriram
Shuvra S. Bhattacharyya



NEW!

Optimize interprocessor communication and synchronization
in embedded multiprocessor systems

EMBEDDED MULTIPROCESSORS

Scheduling and Synchronization, Second Edition

Sundararajan Sriram • Texas Instruments, Palo Alto, California, USA

Shuvra S. Bhattacharyya • University of Maryland, College Park, USA

A volume in the **Signal Processing and Communications Series** • Series edited by **K.J. Ray Liu**, University of Maryland, College Park, USA

Techniques for Optimizing Multiprocessor Implementations of Signal Processing Applications

An indispensable component of the information age, signal processing is embedded in a variety of consumer devices, including cell phones and digital television, as well as in communication infrastructure, such as media servers and cellular base stations. Multiple programmable processors, along with custom hardware running in parallel, are needed to achieve the computation throughput required of such applications.

Reviews important research in key areas related to the multiprocessor implementation of multimedia systems

Embedded Multiprocessors: Scheduling and Synchronization, Second Edition presents architectures and design methodologies for parallel systems in embedded digital signal processing (DSP) applications. It discusses application modeling techniques for multimedia systems, the incorporation of interprocessor communication costs into multiprocessor scheduling decisions, and a modeling methodology (the synchronization graph) for multiprocessor system performance analysis. The book also applies the synchronization graph model to develop hardware and software optimizations that can significantly reduce the interprocessor communication overhead of a given schedule.

Chronicles recent activity dealing with single-chip multiprocessors and dataflow models

This edition updates the background material on existing embedded multiprocessors, including single-chip multiprocessors. It also summarizes the new research on dataflow models for signal processing that has been carried out since the publication of the first edition.

Harness the power of multiprocessors

This book explores the optimization of interprocessor communication and synchronization in embedded multiprocessor systems. It shows you how to design multiprocessor computer systems that are streamlined for multimedia applications.

“While some of the methods [this book] describes are relatively simple, most are quite sophisticated. Yet examples are given that concretely demonstrate how these concepts can be applied in practical hardware architectures. Moreover, there is very little overlap with other books on parallel processing. The focus on application-specific processors and their use in embedded systems leads to a rather different set of techniques. I believe that this book defines a new discipline. It gives a systematic approach to problems that engineers previously have been able to tackle only in an ad hoc manner.”

—Edward A. Lee, University of California, Berkeley, USA

FEATURES

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