



# DSP Integrated Circuits (Academic Press Series in Engineering)

*Lars Wanhammar*

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*DSP Integrated Circuits* establishes the essential interface between theory of digital signal processing algorithms and their implementation in full-custom CMOS technology. With an emphasis on techniques for co-design of DSP algorithms and hardware in order to achieve high performance in terms of throughput, low power consumption, and design effort, this book provides the professional engineer, researcher, and student with a firm foundation in the theoretical as well as the practical aspects of designing high performance DSP integrated circuits.

Centered around three design case studies, *DSP Integrated Circuits* thoroughly details a high-performance FFT processor, a 2-D Discrete Cosine Transform for HDTV, and a wave digital filter for interpolation of the sampling frequency. The case studies cover the essential parts of the design process in a top-down manner, from specification of algorithm design and optimization, scheduling of operations, synthesis of optimal architectures, realization of processing elements, to the floor-planning of the integrated circuit.

- Details the theory and design of digital filters - particularly wave digital filters, multi-rate digital filters, fast Fourier transforms (FFT's), and discrete cosine transforms (DCT's)
- Follows three complete "real-world" case studies throughout the book
- Provides complete coverage of finite word length effects in DSP algorithms
- In-depth survey of the computational properties of DSP algorithms and their mapping to optimal architectures
- Outlines DSP architectures and parallel, bit-serial, and distributed arithmetic
- Presents the design process in a top-down manner and incorporates numerous problems and solutions

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