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Introduction to Analog-to-Digital Converters
Principles and Circuit Implementation

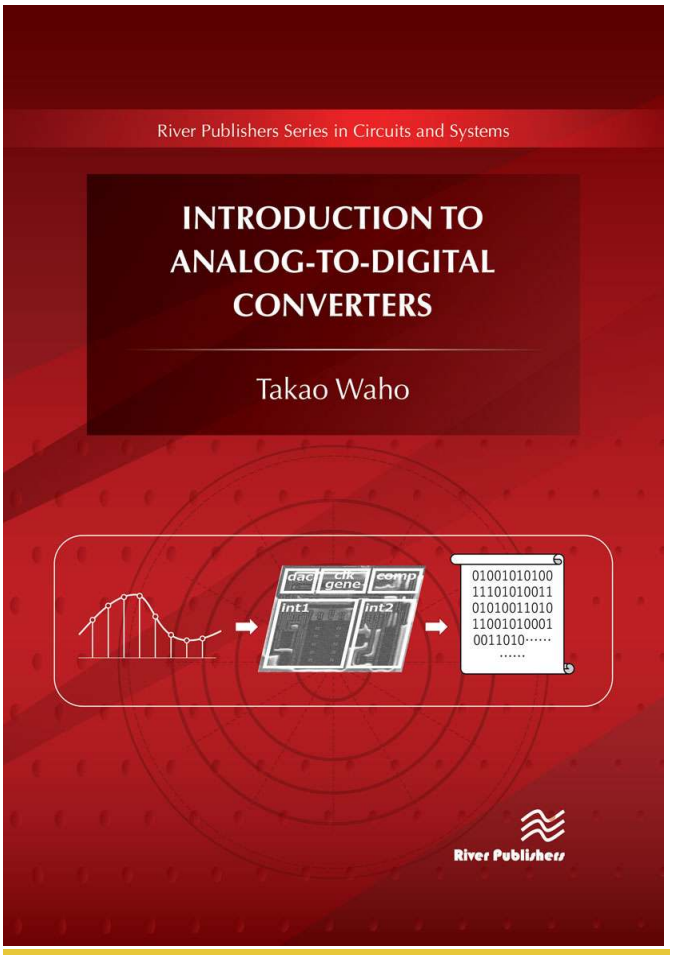
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Analog-to-digital (A/D) and digital-to-analog (D/A) converters, or data converters in short, play a critical role as interfaces between the real analog world and digital equipment. They are now indispensable in the field of sensor networks, internet of things (IoT), robots, and automatic driving vehicles, as well as high-precision instrumentation and wideband communication systems. As the world increasingly relies on digital information processing, the importance of data converters continues to increase.

The primary purpose of this book is to explain the fundamentals of data converters for students and engineers involved in this fascinating field as a newcomer. The selected topics are as follows:

- Sampling and quantization
- Sample-and-hold (S/H) circuits and comparators
- Architectures and circuit implementations of D/A converters
- Architectures and circuit implementations of Nyquist-rate and oversampling A/D converters
- Recent trends based on scaled-down CMOS technology

Introduction to Analog-to-Digital Converters is not only for circuit designers, but also for engineers who are trying to develop their target by using A/D converters. The book will also help students who have learned the basics of analog circuit design to understand the state-of-the-art data converters. It is desirable for readers to be familiar with basic analog IC design and digital signal processing using z-transform.



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Data converter, A/D converter (flash, successive approximation, pipelined, time-interleaved, hybrid), D/A converter, sampling (S/H circuit, thermal noise, bootstrap switch, jitter), Sigma-Delta modulator (MASH, continuous-time, decimation filter), digital calibration

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