

Analog circuit design for process variation-resilient systems-on-a-chip

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Abstrak

This book describes several techniques to address variation-related design challenges for analog blocks in mixed-signal systems-on-chip. The methods presented are results from recent research works involving receiver front-end circuits, baseband filter linearization, and data conversion. These circuit-level techniques are described, with their relationships to emerging system-level calibration approaches, to tune the performances of analog circuits with digital assistance or control. Coverage also includes a strategy to utilize on-chip temperature sensors to measure the signal power and linearity characteristics of analog/RF circuits, as demonstrated by test chip measurements.

Describes a variety of variation-tolerant analog circuit design examples, including from RF front-ends, high-performance ADCs and baseband filters. Includes built-in testing techniques, linked to current industrial trends. Balances digitally-assisted performance tuning with analog performance tuning and mismatch reduction approaches. Describes theoretical concepts as well as experimental results for test chips designed with variation-aware techniques.