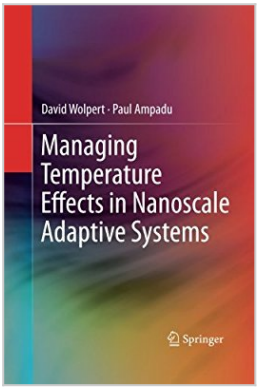

Managing Temperature Effects in Nanoscale Adaptive Systems

By David Wolpert, Paul Ampadu

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This book discusses new techniques for detecting, controlling, and exploiting the impacts of temperature variations on nanoscale circuits and systems. A new sensor system is described that can determine the temperature dependence as well as the operating temperature to improve system reliability. A new method is presented to control a circuit's temperature dependence by individually tuning pull-up and pull-down networks to their temperature-insensitive operating points. This method extends the range of supply voltages that can be made temperature-insensitive, achieving insensitivity at nominal voltage for the first time.

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Managing Temperature Effects in Nanoscale Adaptive Systems By David Wolpert, Paul Ampadu Bibliography

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Editorial Review

From the Back Cover

This book discusses new techniques for detecting, controlling, and exploiting the impacts of temperature variations on nanoscale circuits and systems. It provides a holistic discussion of temperature management, including physical phenomena (reversal of the MOSFET temperature dependence) that have recently become problematic, along with circuit techniques for detecting, controlling, and adapting to these phenomena. A detailed discussion is also included of the general aspects of thermal-aware system design and management of temperature-induced faults. A new sensor system is described that can determine the temperature dependence as well as the operating temperature to improve system reliability. A new method is presented to control a circuit's temperature dependence by individually tuning pull-up and pull-down networks to their temperature-insensitive operating points. This method extends the range of supply voltages that can be made temperature-insensitive, achieving insensitivity at nominal voltage for the first time.

- Provides background on aspects of nanoscale circuits and systems that are affected by temperature, how they are affected by temperature, and what systems can be used to reduce these effects;
- Describes chip implementation details of a new type of temperature sensor that can ensure reliable operation across multiple temperature dependences;
- Includes new methods for achieving temperature insensitivity with example circuits and fabrication-related details such as process variation management.

Users Review

From reader reviews:

Maria Asbury:

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