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Nota di contenuto	Cover; Title Page; Copyright; Contents; About the Editors; List of Contributors; Preface; Chapter 1 Smart Sensor Design; 1.1 Introduction; 1.2 Smart Sensors; 1.2.1 Interface Electronics; 1.2.2 Calibration and Trimming; 1.3 A Smart Temperature Sensor; 1.3.1 Operating Principle; 1.3.2 Interface Electronics; 1.3.3 Recent Work; 1.4 A Smart Wind Sensor; 1.4.1 Operating Principle; 1.4.2 Interface Electronics; 1.4.3 Recent Work; 1.5 A Smart Hall Sensor; 1.5.1 Operating Principle; 1.5.2 Interface Electronics; 1.5.3 Recent Work; 1.6 Conclusions; References Chapter 2 Calibration and Self-Calibration of Smart Sensors 2.1 Introduction; 2.2 Calibration of Smart Sensors; 2.2.1 Calibration Terminology; 2.2.2 Limited Validity of a Calibration; 2.2.3 Specifics of Smart Sensor Calibration; 2.2.4 Storing Calibration Data in the Sensor; 2.2.5 Calibration in the Production Process; 2.2.6 Opportunities for Smart Sensor Calibration; 2.2.7 Case Study: A Smart Temperature Sensor; 2.3 Self-Calibration; 2.3.1 Limitations of Self-Calibration; 2.3.2 Self-Calibration by Combining Multiple Sensors; 2.3.3 Self-Calibrating Sensactors

2.3.4 Case Study: A Smart Magnetic Field Sensor; 2.3.5 Null-Balancing Sensactors; 2.3.6 Case Study: A Smart Wind Sensor; 2.3.7 Other Self-Calibration Approaches; 2.4 Summary and Future Trends; 2.4.1 Summary; 2.4.2 Future Trends; References; Chapter 3 Precision Instrumentation Amplifiers; 3.1 Introduction; 3.2 Applications of Instrumentation Amplifiers; 3.3 Three-OpAmp Instrumentation Amplifiers; 3.4 Current-Feedback Instrumentation Amplifiers; 3.5 Auto-Zero OpAmps and InstAmps; 3.6 Chopper OpAmps and InstAmps; 3.7 Chopper-Stabilized OpAmps and InstAmps; 3.8 Chopper-Stabilized and AZ Chopper OpAmps and InstAmps; 3.9 Summary and Future Directions; References; Chapter 4 Dedicated Impedance-Sensor Systems; 4.1 Introduction; 4.2 Capacitive-Sensor Interfaces Employing Square-Wave Excitation Signals; 4.2.1 Measurement of Single Elements; 4.2.2 Energy-Efficient Interfaces Based on Period Modulation; 4.2.3 Measurement of Capacitive Sensors with High Speed and High Resolution; 4.2.4 Measurement of Grounded Capacitors: Feed-Forward Active Guarding; 4.3 Dedicated Measurement Systems: Detection of Micro-Organisms; 4.3.1 Characterization of Conductance Changes Due to Metabolism; 4.3.2 Impedance Measurements with a Relaxation Oscillator; 4.4 Dedicated Measurement Systems: Water-Content Measurements; 4.4.1 Background; 4.4.2 Capacitance Versus Water Content; 4.4.3 Skin and Proximity Effects; 4.4.4 Dedicated Interface System for Water-Content Measurements; 4.5 Dedicated Measurement Systems: A Characterization System for Blood Impedance; 4.5.1 Characteristics of Blood and Electrical Models; 4.5.2 In-vivo Blood Analysis System; 4.5.3 Experimental Results; 4.6 Conclusions; References; Chapter 5 Low-Power Vibratory Gyroscope Readout

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Sommario/riassunto

Uses a multidisciplinary approach to review recent developments in the field of smart sensor systems, providing complete coverage of all important system and design aspects, their building blocks and methods of signal processing. The book systematically deals with topics over the whole range of sensor technology: from the theory and constraints of basic elements, the applied techniques and electronic, up to the level of application-orientated issues. It firstly looks at designing smart sensors and smart sensor systems, with measurement techniques at system level, such as

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