One of the very fundamental implicit principles of sensing is detecting changes. As any change causes variation of the phase of electrical signals used for sensing, any technique that can rapidly and accurately detect the phase change would serve as a good candidate for sensing. RF interferometry is such an attractive sensing technique. It is basically a phase-sensitive detection process, capable of quickly resolving any measured physical quantity within a fraction of the operating wavelength.

This book is devoted to the theory, analysis and design of RF interferometric sensors using RF integrated circuits. It also presents the measurement of displacement and velocity as a way to demonstrate the sensing ability of the RF interferometry and to illustrate its many possible applications in sensing. Although the book is succinct, the material is very much self-contained and presented in a way that allows readers with an undergraduate background in electrical engineering or physics with some experiences or graduate courses in RF circuits to understand and implement the technique easily.

The book is useful for engineers, physicists and graduate students who work in sensing areas, particularly those involving radio waves. It is also useful for those involved in RF system design. It is our sincere hope that the book can serve not only as a reference for the development of RF interferometric sensors, at least as the first step in this endeavor, but also for a possible generation of innovative ideas that can benefit many existing sensing applications or be implemented for other new applications.

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