



# Electrical Impedance: Principles, Measurement, and Applications (Series in Sensors)

By Luca Callegaro

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**Electrical Impedance: Principles, Measurement, and Applications (Series in Sensors)** By Luca Callegaro

**Electrical Impedance: Principles, Measurement, and Applications** provides a modern and much-needed overview of electrical impedance measurement science and its application in metrology, sensor reading, device and material characterizations. It presents up-to-date coverage of the theory, practical methods, and modeling. The author covers the main impedance measurement techniques, stressing their practical application. The book includes a large set of measurement setup schematics, and diagrams and photos of standards and devices. It also offers an extensive list of references to both historical and recent papers on devices, methods, and traceability issues.

- Reviews the main definitions of the quantities related to impedance, some theorems of particular interest, the issue of impedance representation, and introduces the problem of impedance definition
- Lists devices, appliances, circuits, and instruments employed as building blocks of impedance measurement setups
- Classifies the main impedance measurement methods, including details on their implementation when a specific impedance definition is chosen
- Discusses the increasing use of mixed-signal electronics in impedance measurement setups
- Covers applications including details on the measurement of electromagnetic properties of materials
- Introduces impedance metrology, including artifact impedance standards, and the realization and reproduction of SI impedance units

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### **Editorial Review**

#### **Review**

"This book is very well written and provides an excellent source for the engineer or metrologist who needs to make impedance measurements on materials or devices. It provides a good background on all the commonly used methods and contains essential practical methods to ensure accurate measurements. Having all this information in one book is very convenient for the experimentalist. If you perform impedance-based measurements, this book is well worth owning."

*IEEE Electrical Insulation Magazine*, November/December 2013

### **Users Review**

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