



Wireless and Guided Wave Electromagnetics: Fundamentals and Applications (Optics and Photonics)

By Le Nguyen Binh

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Wireless communications allow high-speed mobile access to a global Internet based on ultra-wideband backbone intercontinental and terrestrial networks. Both of these environments support the carrying of information via electromagnetic waves that are wireless (in free air) or guided through optical fibers. **Wireless and Guided Wave Electromagnetics: Fundamentals and Applications** explores the fundamental aspects of electromagnetic waves in wireless media and wired guided media. This is an essential subject for engineers and physicists working with communication technologies, mobile networks, and optical communications.

This comprehensive book:

- Builds from the basics to modern topics in electromagnetics for wireless and optical fiber communication
- Examines wireless radiation and the guiding of optical waves, which are crucial for carrying high-speed information in long-reach optical networking scenarios
- Explains the physical phenomena and practical aspects of guiding optical waves that may not require detailed electromagnetic solutions
- Explores applications of electromagnetic waves in optical communication systems and networks based on frequency domain transfer functions in the linear regions, which simplifies the physical complexity of the waves but still allows them to be examined from a system engineering perspective
- Uses MATLAB® and Simulink® models to simulate and illustrate the electromagnetic fields
- Includes worked examples, laboratory exercises, and problem sets to test understanding

The book's modular structure makes it suitable for a variety of courses, for self-study, or as a resource for research and development. Throughout, the author emphasizes issues commonly faced by engineers. Going a step beyond traditional electromagnetics textbooks, this book highlights specific uses of electromagnetic

waves with a focus on the wireless and optical technologies that are increasingly important for high-speed transmission over very long distances.

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Editorial Review

Review

"The teaching and learning of electromagnetics have in recent years been profoundly influenced by the availability of simple experimental apparatus and very accurate simulation software. This book gives a detailed overview of the main application areas of electromagnetics especially tailored for electrical engineering students. In particular, the book covers a wide range of topics in electromagnetics ranging from guided waves to radiated waves."

?Malin Premaratne, Monash University, Clayton, Victoria, Australia

"This book merges a systematic rigorous mathematical approach with a solid and clear physical view of the electromagnetic phenomena. The book is structured in a very student-oriented way: the chapters can be introduced in different order according to the needs of students and/or instructors. ... an essential guide for engineers and/or practitioners."

?Prof. Ing. Antonio Orlandi, Dipartimento di Ingegneria Industriale e dell'Informazione e di Economia, University of L'Aquila, Rome, Italy

About the Author

Le Nguyen Binh is a technical director at the European Research Center of Huawei Technologies in Munich, Germany. He is the editor, author, or coauthor of eight books in optics and photonics, including:

- Nonlinear Optical Systems: Principles, Phenomena, and Advanced Signal Processing
- Guided Wave Photonics: Fundamentals and Applications with MATLAB®
- Ultra-Fast Fiber Lasers: Principles and Applications with MATLAB® Models
- Optical Fiber Communications Systems: Theory and Practice with MATLAB® and Simulink® Models

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