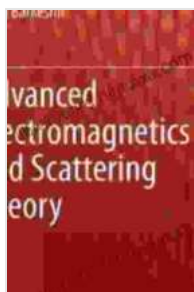


Advanced Electromagnetics and Scattering Theory: A Comprehensive Guide

Electromagnetism, the study of the interaction between electric and magnetic fields, is a fundamental force that shapes our universe. From the smallest subatomic particles to the vast expanse of galaxies, electromagnetism governs a wide range of phenomena, including light, electricity, and magnetism.



Advanced Electromagnetics and Scattering Theory

by David Serge

★★★★★ 5 out of 5

Language : English

File size : 16891 KB

Text-to-Speech : Enabled

Screen Reader : Supported

Enhanced typesetting : Enabled

Word Wise : Enabled

Print length : 589 pages



Scattering theory, on the other hand, deals with the interaction of electromagnetic waves with objects and surfaces. It finds applications in areas such as radar, remote sensing, and optical communications.

Advanced Electromagnetics

This section of the book delves into the advanced concepts of electromagnetics, building upon the fundamentals covered in introductory courses.

- **Maxwell's Equations:** The cornerstone of electromagnetism, Maxwell's equations describe the behavior of electric and magnetic fields in both static and time-varying situations.
- **Wave Propagation:** The book explores the propagation of electromagnetic waves in various media, including free space, waveguides, and optical fibers.
- **Antennas:** Learn about the principles of antenna design and their applications in wireless communication systems.

li>**Metamaterials** The book investigates the fascinating properties of metamaterials, artificially engineered materials with tailored electromagnetic responses.

- **Photonics:** Discover the science behind the manipulation and control of light, with applications in optical communication, imaging, and sensing.

Scattering Theory

The book then transitions to scattering theory, examining the interaction of electromagnetic waves with objects and surfaces.

- **Scattering from Simple Objects:** The book begins by exploring the scattering of electromagnetic waves from simple objects, such as spheres and cylinders.
- **Scattering from Complex Objects:** The book then delves into the more complex case of scattering from objects with intricate shapes and multiple scattering mechanisms.

- **Radar:** Learn about the principles of radar and its applications in object detection and tracking.
- **Remote Sensing:** Discover how scattering theory is used in remote sensing techniques to obtain information about the Earth's surface and atmosphere.
- **Inverse Scattering:** Explore the techniques used to reconstruct the shape and properties of an object from scattered waves.

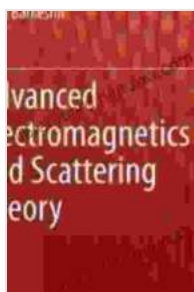
Applications

The book concludes by showcasing the wide range of applications of electromagnetics and scattering theory in various fields:

- **Wireless Communication:** Learn how electromagnetic waves are used for wireless communication, including cellular networks and satellite communications.
- **Microwave Engineering:** Discover the applications of electromagnetics in microwave devices, such as amplifiers, filters, and antennas.
- **Optics:** Explore the role of electromagnetics in optical systems, including lasers, lenses, and fiber optics.
- **Biomedical Engineering:** Learn about the use of electromagnetics in medical imaging, such as MRI and ultrasound.
- **Geophysics:** Discover how electromagnetic waves are used to probe the Earth's interior and study geological formations.

Advanced Electromagnetics and Scattering Theory provides a comprehensive and engaging look at the fundamental concepts and advanced topics in these fields. With its clear explanations, illustrative examples, and practical applications, this book is an invaluable resource for students, researchers, and engineers alike.

Unlock the secrets of electromagnetism and scattering theory today and embark on a journey of discovery that will transform your understanding of the world around you.



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