



The Power and Beauty of Electromagnetic Fields

Frederic R. Morgenthaler

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Unique, multi-level textbook is adaptable to introductory, intermediate, and advanced levels

This revolutionary textbook takes a unique approach to electromagnetic theory, comparing both conventional and modern theories. It explores both the Maxwell-Poynting representation as well as the Alternate representation, which the author demonstrates is generally simpler and more suitable for analyzing modern electromagnetic environments. Throughout the text, students and researchers have the opportunity to examine both of these theories and discover how each one can be applied to solve problems.

The text is divided into four parts:

- Part I: Basic Electromagnetic Theory includes Maxwell's equations, quasistatics, power and energy, stress and momentum, and electromagnetic wave theorems and principles
- Part II: Four-Dimensional Electromagnetism includes four-dimensional vectors and tensors and energy-momentum tensors
- Part III: Electromagnetic Examples includes statics and quasistatics, accelerating charges, plane waves, transmission lines, waveguides, antennas and diffraction, and ferrites
- Part IV: Backmatter includes a summary, appendices, and references

Designed to accommodate a broad range of interests and backgrounds, the text's companion DVD enables readers to reconfigure the material as an introductory-, intermediate-, or advanced-level text. Moreover, the text and its DVD offer a broad range of features that make it possible for readers to quickly grasp new concepts and apply them in practice:

- Practice problems provide the opportunity to solve real-world problems using electromagnetic theory
- Forty animations illustrate electric and magnetic field transients
- Line drawings and computer-generated mathematical figures clarify complex concepts and procedures.
- Maxima, a powerful symbolic mathematics program, helps readers explore four-dimensional electromagnetic theory as well as perform numerical and graphical analyses

Adaptable to multiple levels, this text can be used for both undergraduate and graduate coursework. It is also recommended as a reference for researchers in such fields as electrical engineering, laser physics, materials science, and biomedical engineering.

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