



Maxwell's Equations

By Paul G. Huray

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Maxwell's Equations By Paul G. Huray

An authoritative view of Maxwell's Equations that takes theory to practice

Maxwell's Equations is a practical guide to one of the most remarkable sets of equations ever devised. Professor Paul Huray presents techniques that show the reader how to obtain analytic solutions for Maxwell's equations for ideal materials and boundary conditions. These solutions are then used as a benchmark for solving real-world problems. Coverage includes:

- An historical overview of electromagnetic concepts before Maxwell and how we define fundamental units and universal constants today
- A review of vector analysis and vector operations of scalar, vector, and tensor products
- Electrostatic fields and the interaction of those fields with dielectric materials and good conductors
- A method for solving electrostatic problems through the use of Poisson's and Laplace's equations and Green's function
- Electrical resistance and power dissipation; superconductivity from an experimental perspective; and the equation of continuity
- An introduction to magnetism from the experimental inverse square of the Biot-Savart law so that Maxwell's magnetic flux equations can be deduced

Maxwell's Equations serves as an ideal textbook for undergraduate students in junior/senior electromagnetics courses and graduate students, as well as a resource for electrical engineers.

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Editorial Review

Review

“This is a very useful and pedagogically well-written book which covers subjects of nonrelativistic electromagnetism

from its initial historical beginnings to modern theoretical concepts and various technological applications.”

(*Zentralblatt MATH*, 1 December 2012)

About the Author

Paul G. Huray is Professor of Electrical Engineering at the University of South Carolina where he has taught courses in engineering physics, electromagnetics, signal integrity, the mathematical methods of physics, advanced thermodynamics, and computer communications. Professor Huray introduced the first electromagnetics course to focus on signal integrity, and that program has produced more than eighty practicing signal integrity engineers now employed in academia, industry, and government. He earned his PhD in physics at the University of Tennessee in 1968, conducted research in the Solid State, Chemistry and Physics Divisions at the Oak Ridge National Laboratory, and has worked part-time for the Intel Corporation in developing the physical basis for barriers to circuits with bit rates up to 100 GHz. He has also worked at the Centre d'Études Nucléaires de Grenoble, at Technische Universität Wien, and at the White House Office of Science and Technology Policy.

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