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A systematic treatment of the finite element method

"Anyone interested in the state of the art in finite element formulations will find this book an interesting read. In particular, I would strongly recommend it to those members of the electromagnetic community who are involved in high-frequency applications."

-Measurement Science and Technology

The finite element method is one of the preeminent simulation techniques for obtaining solutions to boundary-value problems in mathematical physics. It has applications in a variety of engineering and scientific studies, such as antennas, radar, microwave engineering, high-speed/high-frequency circuits, wireless communication, electro-optical engineering, remote sensing, bioelectromagnetics, and geoelectromagnetics. This Second Edition of an essential text teaches the finite element method for electromagnetic analysis. It offers engineers a methodical way to quickly master this very powerful technique for solving practical, often complicated, engineering problems.

This book provides the first systematic treatment of this numerical analysis technique for electromagnetics, including a brief overview of the two classic methods-the Ritz variational method and Galerkin's method-which form the foundation of the finite element function. Employing an example to introduce the concept of the finite element method and describe the essential steps of the technique, the author lays the groundwork for a broad-based understanding of the finite element method's usefulness. He completes his coverage by describing the finite element analysis of one-, two-, and three-dimensional problems, developing for each problem a rigorous finite element solution in general form from which solutions to specific problems can be deduced.