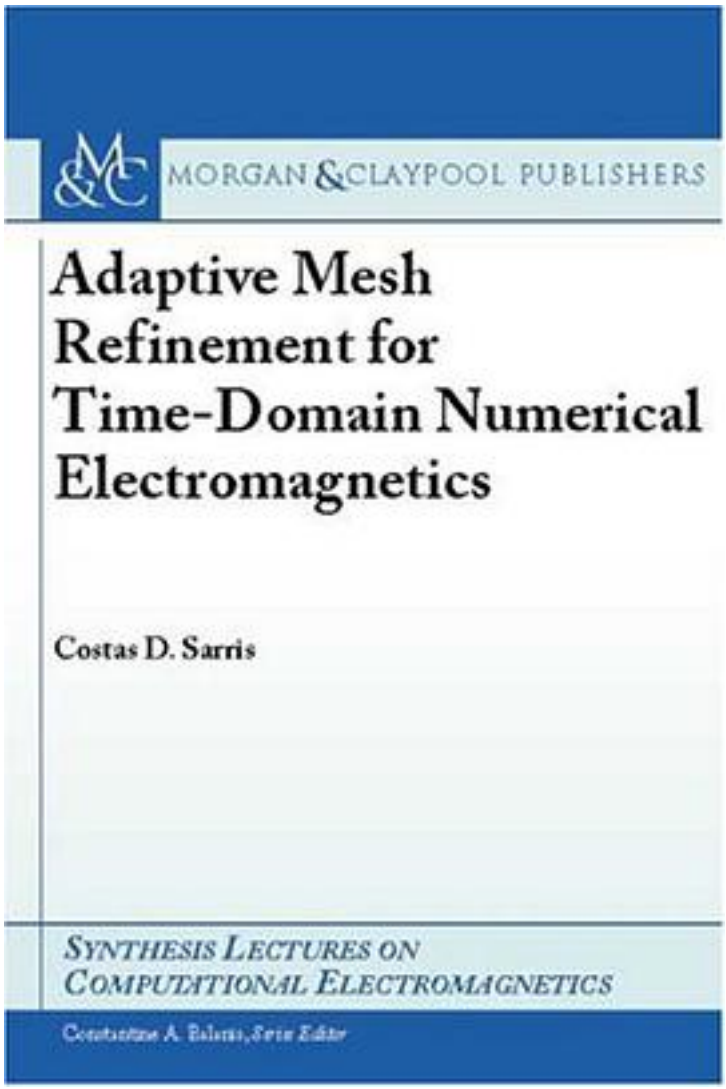
Adaptive Mesh Refinement in Time-Domain Numerical Electromagnetics



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This monograph is a comprehensive presentation of state-of-the-art methodologies that can dramatically enhance the efficiency of the finite-difference time-domain (FDTD) technique, the most popular electromagnetic field solver of the time-domain form of Maxwell's equations. These methodologies are aimed at optimally tailoring the computational resources needed for the wideband simulation of microwave and optical structures to their geometry, as well as the nature of the field solutions they support. That is achieved by the development of robust adaptive meshing approaches, which amount to varying the total number of unknown field quantities in the course of the simulation to adapt to temporally or spatially localized field features. While mesh adaptation is an extremely desirable FDTD feature, known to reduce simulation times by orders of magnitude, it is not always robust. The specific techniques presented in this book are characterized by stability and robustness. Therefore, they are excellent computer analysis and design (CAD) tools. Building on first principles of time-domain electromagnetic simulations, this book presents advanced concepts and cutting-edge modeling techniques in an intuitive way for programmers, engineers, and graduate students. It is designed to provide a solid reference for highly efficient time-domain solvers, employed in a wide range of exciting applications in microwave/millimeter-wave and optical engineering.

作者介绍:

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