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""Chapter 2 Unconditionally Stable Laguerre Polynomial-Based FDTD Method""""2.1 INTRODUCTION""; ""2.2 FORMULATION OF THE CONVENTIONAL 3-D LAGUERRE-BASED FDTD METHOD""; ""2.3 FORMULATION OF AN EFFICIENT 3-D LAGUERRE-BASED FDTD METHOD""; ""2.4 PML ABSORBING BOUNDARY CONDITION""; ""2.5 NUMERICAL RESULTS""; ""2.5.1 Parallel-Plate Capacitor: Uniform 3-D Grid""; ""2.5.2 Shielded Microstrip Line: Graded Grid in One Direction""; ""2.5.3 PML Absorbing Boundary Condition Performance""; ""2.6 SUMMARY AND CONCLUSIONS""; ""REFERENCES""
""Chapter 3 Exact Total-Field/Scattered-Field Plane-WaveSource Condition""""3.1 INTRODUCTION""; ""3.2 DEVELOPMENT OF THE EXACT TF/SF FORMULATION FOR FDTD""; ""3.3 BASIC TF/SF FORMULATION""; ""3.4 ELECTRIC AND MAGNETIC CURRENT SOURCES AT THE TF/SF INTERFACE""; ""3.5 INCIDENT PLANE-WAVE FIELDS IN A HOMOGENEOUS BACKGROUND MEDIUM""; ""3.6 FDTD REALIZATION OF THE BASIC TF/SF FORMULATION""; ""3.7 ON CONSTRUCTING AN EXACT FDTD TF/SF PLANE-WAVE SOURCE""; ""3.8 FDTD DISCRETE PLANE-WAVE SOURCE FOR THE EXACT TF/SF FORMULATION""; ""3.9 AN EFFICIENT INTEGER MAPPING""
""3.10 BOUNDARY CONDITIONS AND VECTOR PLANE-WAVE POLARIZATION""""3.11 REQUIRED CURRENT DENSITIES J_{inc} AND M_{inc} ""; ""3.12 SUMMARY OF METHOD""; ""3.13 MODELING EXAMPLES""; ""3.14 DISCUSSION""; ""REFERENCES""; ""Chapter 4 Electromagnetic Wave Source Conditions""; ""4.1 OVERVIEW""; ""4.2 INCIDENT FIELDS AND EQUIVALENT CURRENTS""; ""4.2.1 The Principle of Equivalence""; ""4.2.2 Discretization and Dispersion of Equivalent Currents""; ""4.3 SEPARATING INCIDENT AND SCATTERED FIELDS""; ""4.4 CURRENTS AND FIELDS: THE LOCAL DENSITY OF STATES""

Sommario/riassunto

This book presents the current state-of-the-art in formulating and implementing computational models of light with materials such as silicon and gold at the nanoscale. Maxwell's equations are solved using the finite-difference time-domain (FDTD) technique. It will help you understand the latest developments in computational modeling of nanoscale optical microscopy and microchip lithography. You will also explore cutting-edge details in modeling nanoscale plasmonics, including nonlocal dielectric functions, molecular interactions, and multi-level semiconductor gain. Other topics include nanoscale biophotonics, especially for detecting early-stage cancers, and quantum vacuum, including the Casimir effect and blackbody radiation.

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