

1. Record Nr.	UNINA9910465343803321
Titolo	Advances in FDTD computational electrodynamics : photonics and nanotechnology // Allen Taflove, editor ; Ardavan Oskooi and Steven G. Johnson, Coeditors
Pubbl/distr/stampa	Boston : , : Artech House, , 2013 [Piscataway, New Jersey] : , : IEEE Xplore, , [2013]
ISBN	1-60807-171-5
Descrizione fisica	1 online resource (639 p.)
Collana	Artech House antennas and propagation library
Disciplina	537.6
Soggetti	Nanophotonics Maxwell equations - Numerical solutions Photonics - Mathematical models Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographic references and index.
Nota di contenuto	<p>""Advances in FDTD Computational Electrodynamics Photonics and Nanotechnology""; ""Contents""; ""Preface""; ""Chapter 1 Parallel-Processing Three-Dimensional Staggered-Grid Local-Fourier-Basis PSTD Technique""; ""1.1 INTRODUCTION""; ""1.2 MOTIVATION""; ""1.3 LOCAL FOURIER BASIS AND OVERLAPPING DOMAIN DECOMPOSITION""; ""1.4 KEY FEATURES OF THE SL-PSTD TECHNIQUE""; ""1.4.1 FFT on a Local Fourier Basis""; ""1.4.2 Absence of the Gibbs Phenomenon Artifact""; ""1.5 TIME-STEPPING RELATIONS FOR DIELECTRIC SYSTEMS""; ""1.6 ELIMINATION OF NUMERICAL PHASE VELOCITY ERROR FOR A MONOCHROMATIC EXCITATION""</p> <p>""1.7 TIME-STEPPING RELATIONS WITHIN THE PERFECTLY MATCHED LAYER ABSORBING OUTER BOUNDARY""""1.8 REDUCTION OF THE NUMERICAL ERROR IN THE NEAR-FIELD TO FAR-FIELD TRANSFORMATION""; ""1.9 IMPLEMENTATION ON A DISTRIBUTED-MEMORY SUPERCOMPUTING CLUSTER""; ""1.10 VALIDATION OF THE SL-PSTD TECHNIQUE""; ""1.10.1 Far-Field Scattering by a Plane-Wave-Illuminated Dielectric Sphere""; ""1.10.2 Far-Field Radiation from an Electric Dipole Embedded within a Double-Layered Concentric Dielectric</p>

Sphere"; "1.11 SUMMARY"; "REFERENCES"

"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-Wave Source

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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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