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Domain Analysis in Antenna Characterizations: Concept, Formulation, and Applications; Chapter 2 High-Order FDTD Methods; Chapter 3 GPU Acceleration of FDTD Method for Simulation of Microwave Circuits; Chapter 4 Recent FDTD Advances for Electromagnetic Wave Propagation in the Ionosphere; Chapter 5 Phi Coprocessor Acceleration Techniques in Computational Electromagnetic Methods Chapter 6 Domain Decomposition Methods for Finite Element Analysis of Large-Scale Electromagnetic Problems Chapter 7 High-Accuracy Computations for Electromagnetic Integral Equations; Chapter 8 Fast Electromagnetic Solver Based on Randomized Pseudo-Skeleton Approximation; Chapter 9 Computational Electromagnetics for the Evaluation of EMC Issues in Multicomponent Energy Systems; Chapter 10 Manipulation of Electromagnetic Waves Based on New Unique Metamaterials: Theory and Applications; Chapter 11 Time-Domain Integral Equation Method for Transient Problems Chapter 12 Statistical Methods and Computational Electromagnetics Applied to Human Exposure Assessment About the Authors; Index; 1.1 INTRODUCTION; 1.2 ANTENNA RADIATION ANALYSIS IN THE SPECTRAL DOMAIN; 1.3 OBTAINING THE PLANE WAVE SPECTRUM FROM FAR-FIELD PATTERNS AND RADIATED POWER; 1.4 PLANE WAVE SPECTRUM COMPUTATION VIA FAST FOURIER TRANSFORM; 1.5 COORDINATE TRANSFORMATIONS FOR GENERALIZED SIMULATION AND MEASUREMENT SYSTEMS; 1.6 THEORETICAL VALIDATION OF NEAR-FIELD PREDICTION; 1.7 SOME PRACTICAL EXAMPLES; REFERENCES; 2.1 FOURTH ORDER DIFFERENCES IN FDTD DISCRETE SPACE 2.2 SEAMLESS HYBRID S24/FDTD SIMULATIONS 2.3 ABSORBING BOUNDARY CONDITIONS; 2.4 POINT CURRENT AND FIELD SOURCES; 2.5 PLANE WAVE SOURCES; 2.6 PEC MODELING; 2.7 ADVANCED FORMS OF HIGH-ORDER FDTD ALGORITHMS; REFERENCES; 3.1 INTRODUCTION; 3.2 FDTD CODE FOR MICROWAVE CIRCUIT SIMULATION; 3.3 FDTD CODE USING CUDA; 3.4 NUMERICAL RESULTS; REFERENCES; 4.1 INTRODUCTION; 4.2 CURRENT STATE OF THE ART; 4.3 FDTD EARTH-IONOSPHERE MODEL OVERVIEW; 4.4 NEW MAGNETIZED IONOSPHERIC PLASMA ALGORITHM; 4.5 STOCHASTIC FDTD (S-FDTD); 4.6 INPUT TO FDTD/S-FDTD EARTH-PLASMA IONOSPHERE MODELS; 4.7 CONCLUSIONS; REFERENCES 5.1 INTRODUCTION 5.2 ENVIRONMENT REQUIREMENTS AND SETTINGS; 5.3 CODE DEVELOPMENT; 5.4 NUMERICAL RESULTS; REFERENCES; 6.1 FETI METHODS WITH ONE AND TWO LAGRANGE MULTIPLIERS; 6.2 FETI-DP METHODS WITH ONE AND TWO LAGRANGE MULTIPLIERS; 6.3 LM-BASED NONCONFORMAL FETI-DP METHOD; 6.4 CE-BASED NONCONFORMAL FETI-DP METHOD; 6.5 FETI-DP METHOD ENHANCED BY THE SECOND-ORDER TRANSMISSION CONDITION; 6.6 HYBRID NONCONFORMAL FETI/CONFORMAL FETI-DP METHOD; 6.7 NUMERICAL EXAMPLES; 6.8 SUMMARY; REFERENCES; 7.1 NORMALIZED RESIDUAL ERROR; 7.2 HIGH-ORDER TREATMENT OF SMOOTH TARGETS; 7.3 THE DIPOLE ANTENNA 7.4 HIGH-ORDER TREATMENT OF WEDGE SINGULARITIES

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## Sommario/riassunto

This new resource covers the latest developments in computational electromagnetic methods, with emphasis on cutting-edge applications. This book is designed to extend existing literature to the latest development in computational electromagnetic methods, which are of interest to readers in both academic and industrial areas. The topics include advanced techniques in MoM, FEM and FDTD, spectral domain method, GPU and Phi hardware acceleration, metamaterials, frequency and time domain integral equations, and statistics methods in bio-electromagnetics.

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