1. Record Nr. UNINA9910648493303321

Autore	Sevgi Levent
Titolo	Electromagnetic modeling and simulation [[electronic resource] /] / Levent Sevgi
Pubbl/distr/stampa	Hoboken, New Jersey : , : John Wiley & Sons, Inc., , [2014] [Piscataqay, New Jersey] : , : IEEE Xplore, , [2014]
ISBN	1-118-87711-X 1-118-71644-2 9781118716410
Descrizione fisica	1 online resource (666 pages)
Collana	IEEE Press series on electromagnetic wave theory
Classificazione	SCI022000
Disciplina	621.380285/53
Soggetti	Electromagnetism - Computer simulation
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Preface xvii -- About the Author xxvii -- Acknowledgments xxix -- 1 Introduction to MODSIM 1 -- 1.1 Models and Modeling, 2 -- 1.2 Validation, Verifi cation, and Calibration, 5 -- 1.3 Available Core Models, 7 -- 1.4 Model Selection Criteria, 9 -- 1.5 Graduate Level EM MODSIM Course, 11 -- 1.5.1 Course Description and Plan, 11 -- 1.5.2 Available Virtual EM Tools, 12 -- 1.6 EM-MODSIM Lecture Flow, 12 -- 1.7 Two Level EM Guided Wave Lecture, 17 -- 1.8 Conclusions, 19 -- References, 19 -- 2 Engineers Speak with Numbers 23 -- 2.1 Introduction, 23 -- 2.2 Measurement, Calculation, and Error Analysis, 24 -- 2.3 Significant Digits, Truncation, and Round-Off Errors, 27 -- 2.4 Error Propagation, 28 -- 2.5 Error and Confi dence Level, 29 -- 2.5.1 Predicting the Population's Confidence Interval, 33 -- 2.6 Hypothesis Testing, 36 -- 2.6.1 Testing Population Mean, 38 -- 2.6.2 Testing Population Proportion, 39 -- 2.6.3 Testing Two Population Averages, 39 -- 2.6.4 Testing Two Population Proportions, 39 -- 2.6.5 Testing Paired Data, 40 -- 2.7 Hypothetical Tests on Cell Phones, 41 -- 2.8 Conclusions, 45 -- References, 45 -- 3 Numerical Analysis in Electromagnetics 47 -- 3.1 Taylor's Expansion and Numerical Differentiation, 47 -- 3.1.1 Taylor's Expansion and Ordinary Differential Equations, 50 -- 3.1.2 Poisson and Laplace Equations, 52

Postulation, 494 -- 14.5.2 Review of Analytical Models, 496 -- 14.5.3 The FDTD Model, 499 -- 14.5.4 Discretization and Dey-Mittra Approach, 502 -- 14.5.5 The WedgeFDTD Package and Examples, 505 -- 14.5.6 Wedge Diffraction and FDTD versus MoM, 510 -- 14.6 Conclusions, 512 -- References, 512 -- 15 Parabolic Equation Method 515 -- 15.1 Introduction, 516 -- 15.2 The Parabolic Equation (PE) Model, 518 -- 15.3 The Split-Step Parabolic Equation (SSPE) Propagation Tool, 520 -- 15.4 The Finite Element Method-Based PE Propagation Tool, 528 -- 15.5 Atmospheric Refractivity Effects, 531 -- 15.6 A 2D Surface Duct Scenario and Reference Solutions, 533 -- 15.7 LINPE Algorithm and Canonical Tests/Comparisons, 538 -- 15.8 The GrSSPE Package, 558 -- 15.9 The Single-Knife-Edge Problem, 566 -- 15.10 Accurate Source Modeling, 571 -- 15.11 Dielectric Slab Waveguide, 580 -- 15.11.1 Even and Odd Symmetric Solutions, 582 -- 15.11.2 The SSPE Propagator and Eigenvalue Extraction, 584 -- 15.11.3 The Matlab-Based DiSLAB Package, 585 -- 15.12 Conclusions, 591 -- References, 591 -- 16 Parallel Plate Waveguide Problem 595 -- 16.1 Introduction, 595 -- 16.2 Problem Postulation and Analytical Solutions: Revisited, 599 -- 16.2.1 Green's Function in Terms of Mode Summation, 602 -- 16.2.2 Mode Summation for a Tilted/Directive Antenna, 604.
16.2.3 Eigenray Representation, 606 -- 16.2.4 Hybrid Ray + Image Method, 613 -- 16.3 Numerical Models, 613 -- 16.3.1 Split Step Parabolic Equation Model, 613 -- 16.3.2 Finite-Difference Time-Domain Model, 617 -- 16.3.3 Method of Moments (MoM), 622 -- 16.4 Conclusions, 638 -- References, 639 -- Appendix A Introduction to MATLAB 643 -- Appendix B Suggested References 653 -- Appendix C Suggested Tutorials and Feature Articles 655 -- Index 659.

Sommario/riassunto

"Electromagnetic modeling is essential to the design and modeling of antenna, radar, satellite, medical imaging, and other applications. In Electromagnetic Modeling and Simulation, author Levent Sevgi explains techniques for solving real-time complex physical problems using MATLAB-based short scripts and comprehensive virtual tools. The book thoroughly covers the physics, mathematical background, analytical solutions, and code development of electromagnetic modeling. Access to online MATLAB scripts and coding tools render this book an ideal resource for electrical engineers and researchers"--
"Provides the reader with first steps in EM MODSIM as well as tools for medium and high-level code developers and users"--