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Nota di contenuto	ADVANCED MODELING IN COMPUTATIONAL ELECTROMAGNETIC COMPATIBILITY; CONTENTS; PREFACE; PART I: FUNDAMENTAL CONCEPTS IN COMPUTATIONAL ELECTROMAGNETIC COMPATIBILITY; 1. Introduction to Computational Electromagnetics and Electromagnetic Compatibility; 1.1 Historical Note on Modeling in Electromagnetics; 1.2 Electromagnetic Compatibility and Electromagnetic Interference; 1.2.1 EMC Computational Models and Solution Methods; 1.2.2 Classification of EMC Models; 1.2.3 Summary Remarks on EMC Modeling; 1.3 References; 2. Fundamentals of Electromagnetic Theory; 2.1 Differential Form of Maxwell Equations 2.2 Integral Form of Maxwell Equations 2.3 Maxwell Equations for Moving Media; 2.4 The Continuity Equation; 2.5 Ohm's Law; 2.6 Conservation Law in the Electromagnetic Field; 2.7 The Electromagnetic Wave Equations; 2.8 Boundary Relationships for Discontinuities in Material Properties; 2.9 The Electromagnetic Potentials; 2.10 Boundary Relationships for Potential Functions; 2.11 Potential Wave Equations; 2.11.1 Coulomb Gauge; 2.11.2 Diffusion Gauge; 2.11.3 Lorentz Gauge; 2.12 Retarded Potentials; 2.13 General Boundary Conditions and

Uniqueness Theorem; 2.14 Electric and Magnetic Walls
2.15 The Lagrangian Form of Electromagnetic Field Laws
2.15.1 Lagrangian Formulation and Hamilton Variational Principle;
2.15.2 Lagrangian Formulation and Hamilton Variational Principle in Electromagnetics;
2.16 Complex Phasor Notation of Time-Harmonic Electromagnetic Fields;
2.16.1 Poynting Theorem for Complex Phasors;
2.16.2 Complex Phasor Form of Electromagnetic Wave Equations;
2.16.3 The Retarded Potentials for the Time-Harmonic Fields;
2.17 Transmission Line Theory;
2.17.1 Field Coupling Using Transmission Line Models
2.17.2 Derivation of Telegrapher's Equation for the Two-Wire Transmission Line
2.18 Plane Wave Propagation;
2.19 Radiation;
2.19.1 Radiation Mechanism;
2.19.2 Hertzian Dipole;
2.19.3 Fundamental Antenna Parameters;
2.19.4 Linear Antennas;
2.20 References;
3 Introduction to Numerical Methods in Electromagnetics;
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3.1.1 Frequency and Time Domain Modeling;
3.2 Overview of Numerical Methods: Domain, Boundary, and Source Simulation;
3.2.1 Modeling of Problems via the Domain Methods: FDM and FEM
3.2.2 Modeling of Problems via the BEM: Direct and Indirect Approach
3.3 The Finite Difference Method;
3.3.1 One-Dimensional FDM;
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3.4.1 Basic Concepts of FEM;
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3.5 The Boundary Element Method;
3.5.1 Integral Equation Formulation;
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3.5.3 Computational Example for 2D Static Problem;
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4 Static Field Analysis;
4.1 Electrostatic Fields;
4.2 Magnetostatic Fields;
4.3 Modeling of Static Field Problems
4.3.1 Integral Equations in Electrostatics Using Sources

Sommario/riassunto

This text combines the fundamentals of electromagnetics with numerical modeling to tackle a broad range of current electromagnetic compatibility (EMC) problems, including problems with lightning, transmission lines, and grounding systems. It sets forth a solid foundation in the basics before advancing to specialized topics, and allows readers to develop their own EMC computational models for applications in both research and industry.
