

1. Record Nr.	UNINA9910139970503321
Autore	Nitsch Jurgen
Titolo	Radiating non-uniform transmission line systems and the partial element equivalent circuit method [[electronic resource] /] / Jurgen Nitsch, Frank Gronwald and Gunter Wollenberg
Pubbl/distr/stampa	Hoboken, NJ, : J. Wiley, c2009
ISBN	1-282-38498-8 9786612384981 0-470-68242-6 0-470-68241-8
Descrizione fisica	1 online resource (350 p.)
Altri autori (Persone)	GronwaldFrank WollenbergGunter
Disciplina	621.38131 621.382/24
Soggetti	Electromagnetic compatibility - Mathematical models Electric lines - Mathematical models Electronic circuit design - Data processing Electronic apparatus and appliances - Design and construction - Data processing
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 and index.
Nota di contenuto	RADIATING NONUNIFORM TRANSMISSION-LINE SYSTEMS AND THE PARTIAL ELEMENT EQUIVALENT CIRCUIT METHOD; Contents; Preface; References; Acknowledgments; List of Symbols; Introduction; References; 1 Fundamentals of Electrodynamics; 1.1 Maxwell Equations Derived from Conservation Laws - an Axiomatic Approach; 1.1.1 Charge Conservation; 1.1.2 Lorentz Force and Magnetic Flux Conservation; 1.1.3 Constitutive Relations and the Properties of Space time; 1.1.4 Remarks; 1.2 The Electromagnetic Field as a Gauge Field - a Gauge Field Approach 1.2.1 Differences of Physical Fields that are Described by Reference Systems 1.2.2 The Phase of Microscopic Matter Fields; 1.2.3 The Reference Frame of a Phase; 1.2.4 The Gauge Fields of a Phase; 1.2.5 Dynamics of the Gauge Field; 1.3 The Relation Between the Axiomatic

Approach and the Gauge Field Approach; 1.3.1 No ether Theorem and Electric Charge Conservation; 1.3.2 Minimal Coupling and the Lorentz Force; 1.3.3 Bianchi Identity and Magnetic Flux Conservation; 1.3.4 Gauge Approach and Constitutive Relations; 1.4 Solutions of Maxwell Equations; 1.4.1 Wave Equations
 1.4.1.1 Decoupling of Maxwell Equations 1.4.1.2 Equations of Motion for the Electromagnetic Potentials; 1.4.1.3 Maxwell Equations in the Frequency Domain and Helmholtz Equations; 1.4.1.4 Maxwell Equations in Reciprocal Space; 1.4.2 Boundary Conditions at Interfaces; 1.4.3 Dynamical and Nondynamical Components of the Electromagnetic Field; 1.4.3.1 Helmholtz's Vector Theorem, Longitudinal and Transverse Fields; 1.4.3.2 Nondynamical Maxwell Equations as Boundary Conditions in Time; 1.4.3.3 Longitudinal Part of the Maxwell Equations; 1.4.3.4 Transverse Part of the Maxwell Equations
 1.4.4 Electromagnetic Energy and the Singularities of the Electromagnetic Field 1.4.5 Coulomb Fields and Radiation Fields; 1.4.6 The Green's Function Method; 1.4.6.1 Basic Ideas; 1.4.6.2 Self-Adjointness of Differential Operators and Boundary Conditions; 1.4.6.3 General Solutions of Maxwell Equations; 1.4.6.4 Basic Relations Between Electromagnetic Green's Functions; 1.5 Boundary Value Problems and Integral Equations; 1.5.1 Surface Integral Equations in Short; 1.5.2 The Standard Electric Field Integral Equations of Antenna Theory and Radiating Nonuniform Transmission-Line Systems
 1.5.2.1 Pocklington's Equation 1.5.2.2 Hallen's Equation; 1.5.2.3 Mixed-Potential Integral Equation; 1.5.2.4 Schelkunoff's Equation; References; 2 Nonuniform Transmission-Line Systems; 2.1 Multiconductor Transmission Lines: General Equations; 2.1.1 Geometric Representation of Nonuniform Transmission Lines; 2.1.1.1 Local Coordinate System; 2.1.1.2 Tangential Surface Vector; 2.1.1.3 Volume and Surface Integrals; 2.1.2 Derivation of Generalized Transmission-Line Equations; 2.1.2.1 Continuity Equation; 2.1.2.2 Reconstruction of the Densities; 2.1.3 Mixed Potential Integral Equation
 2.1.3.1 Thin-Wire Approximation

Sommario/riassunto

High frequencies of densely packed modern electronic equipment turn even the smallest piece of wire into a transmission line with signal retardation, dispersion, attenuation, and distortion. In electromagnetic environments with high-power microwave or ultra-wideband sources, transmission lines pick up noise currents generated by external electromagnetic fields. These are superimposed on essential signals, the lines acting not only as receiving antennas but radiating parts of the signal energy into the environment. This book is outstanding in its originality. While many textbooks rephrase