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Nota di contenuto	DESIGN OF ULTRA WIDEBAND POWER TRANSFER NETWORKS; Contents; About the Author; Preface; 1 Circuit Theory for Power Transfer Networks; 1.1 Introduction; 1.2 Ideal Circuit Elements; 1.3 Average Power Dissipation and Effective Voltage and Current; 1.4 Definitions of Voltage and Current Phasors; 1.5 Definitions of Active, Passive and Lossless One-ports; 1.6 Definition of Resistor; 1.7 Definition of Capacitor; 1.8 Definition of Inductor; 1.9 Definition of an Ideal Transformer; 1.10 Coupled Coils; 1.11 Definitions: Laplace and Fourier Transformations of a Time Domain Function f(t) 1.12 Useful Mathematical Properties of Laplace and Fourier Transforms of a Causal Function 1.13 Numerical Evaluation of Hilbert Transform; 1.14 Convolution; 1.15 Signal Energy; 1.16 Definition of Impedance and Admittance; 1.17 Immittance of One-port Networks; 1.18 Definition: 'Positive Real Functions'; 2 Electromagnetic Field Theory for

Power Transfer Networks: Fields, Waves and Lumped Circuit Models; 2.1 Introduction; 2.2 Coulomb's Law and Electric Fields; 2.3 Definition of Electric Field; 2.4 Definition of Electric Potential; 2.5 Units of Force, Energy and Potential  
 2.6 Uniform Electric Field 2.7 Units of Electric Field; 2.8 Definition of Displacement Vector or 'Electric Flux Density Vector'  $D$ ; 2.9 Boundary Conditions in an Electric Field; 2.10 Differential Relation between the Potential and the Electric Field; 2.11 Parallel Plate Capacitor; 2.12 Capacitance of a Transmission Line; 2.13 Capacitance of Coaxial Cable; 2.14 Resistance of a Conductor of Length  $L$ : Ohm's Law; 2.15 Principle of Charge Conservation and the Continuity Equation; 2.16 Energy Density in an Electric Field; 2.17 The Magnetic Field  
 2.18 Generation of Magnetic Fields: Biot-Savart and Ampere's Law 2.19 Direction of Magnetic Field: Right Hand Rule; 2.20 Unit of Magnetic Field: Related Quantities; 2.21 Unit of Magnetic Flux Density  $B$ ; 2.22 Unit of Magnetic Flux ; 2.23 Definition of Inductance  $L$ ; 2.24 Permeability and its Unit; 2.25 Magnetic Force between Two Parallel Wires; 2.26 Magnetic Field Generated by a Circular Current-Carrying Wire; 2.27 Magnetic Field of a Tidily Wired Solenoid of  $N$  Turns; 2.28 The Toroid; 2.29 Inductance of  $N$ -Turn Wire Loops; 2.30 Inductance of a Coaxial Transmission Line  
 2.31 Parallel Wire Transmission Line 2.32 Faraday's Law; 2.33 Energy Stored in a Magnetic Field; 2.34 Magnetic Energy Density in a Given Volume; 2.35 Transformer; 2.36 Mutual Inductance; 2.37 Boundary Conditions and Maxwell Equations; 2.38 Summary of Maxwell Equations and Electromagnetic Wave Propagation; 2.39 Power Flow in Electromagnetic Fields: Poynting's Theorem; 2.40 General Form of Electromagnetic Wave Equation; 2.41 Solutions of Maxwell Equations Using Complex Phasors; 2.42 Determination of the Electromagnetic Field Distribution of a Short Current Element: Hertzian Dipole Problem  
 2.43 Antenna Loss

## Sommario/riassunto

Combining analytic theory and modern computer-aided design techniques this volume will enable you to understand and design power transfer networks and amplifiers in next generation radio frequency (RF) and microwave communication systems. A comprehensive theory of circuits constructed with lumped and distributed elements is covered, as are electromagnetic field theory, filter theory, and broadband matching. Along with detailed roadmaps and accessible algorithms, this book provides up-to-date, practical design examples including: filters built with microstrip lines in C and X bands; <li

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