

1. Record Nr.	UNINA9910270923403321
Autore	Stumpf Martin
Titolo	Electromagnetic reciprocity in antenna theory // Martin Stumpf
Pubbl/distr/stampa	Hoboken, New Jersey : , : John Wiley and Sons, , [2018] [Piscataway, New Jersey] : , : IEEE Xplore, , [2017]
ISBN	1-119-46640-7 1-119-46641-5 1-119-46642-3
Descrizione fisica	1 PDF (130 pages)
Disciplina	621.382/4
Soggetti	Electromagnetic theory Reciprocity theorems Antennas (Electronics)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	""Electromagnetic Reciprocity in Antenna Theory""; ""Contents""; ""Introduction""; ""1: Basic Prerequisites""; ""1.1 Laplace Transformation""; ""1.2 Time Convolution""; ""1.3 Time Correlation""; ""1.4 EM Reciprocity Theorems""; ""1.4.1 Reciprocity Theorem of the Time-Convolution Type""; ""1.4.2 Reciprocity Theorem of the Time-Correlation Type""; ""1.4.3 Application of the Reciprocity Theorems to an Unbounded Domain""; ""1.5 Description of the Antenna Configuration""; ""1.5.1 Antenna Power Conservation""; ""1.5.2 Antenna Interface Relations""; ""2: Antenna Uniqueness Theorem"" ""2.1 Problem Description"" ""2.2 Problem Solution""; ""3: Forward-Scattering Theorem in Antenna Theory""; ""3.1 Problem Description""; ""3.2 Problem Solution""; ""4: Antenna Matching Theorems""; ""4.1 Reciprocity Analysis of the Time-Correlation Type""; ""4.1.1 Transmitting State""; ""4.1.2 Receiving State""; ""4.1.3 Equivalent Matching Condition""; ""5: Equivalent Kirchhoff Network Representations of a Receiving Antenna System""; ""5.1 Reciprocity Analysis of the Time-Convolution Type""; ""5.1.1 Equivalent Circuits for Plane-Wave Incidence"" ""5.1.2 Equivalent Circuits for a Known Volume-Current Distribution""

6: The Antenna System in the Presence of a Scatterer"; "6.1 Receiving Antenna in the Presence of a Scatterer"; "6.2 Transmitting Antenna in the Presence of a Scatterer"; "6.2.1 Analysis Based on the Reciprocity Theorem of the Time-Convolution Type"; "6.2.2 Analysis Based on the Reciprocity Theorem of the Time-Correlation Type"; "7: EM Coupling Between Two Multiport Antenna Systems"; "7.1 Description of the Problem Configuration"; "7.2 Analysis Based on the Reciprocity Theorem of the Time-Convolution Type"; "7.3 Analysis Based on the Reciprocity Theorem of the Time-Correlation Type"; "8: Compensation Theorems for the EM Coupling Between Two Multiport Antennas"; "8.1 Description of the Problem Configuration"; "8.2 Analysis Based on the Reciprocity Theorem of the Time-Convolution Type"; "8.2.1 The Change in Scenario ()"; "8.2.2 The Change in Scenario ()"; "8.3 Analysis Based on the Reciprocity Theorem of the Time-Correlation Type"; "8.3.1 The Change in Scenario ()"; "8.3.2 The Change in Scenario ()"; "9: Compensation Theorems for the EM Scattering of an Antenna System"; "9.1 Description of the Problem Configuration"; "9.2 Reciprocity Analysis"; "9.2.1 Compensation Theorems in Terms of Electric Current-excited Sensing EM Fields"; "9.2.2 Compensation Theorems in Terms of Voltage-Excited Sensing EM Fields"; "9.2.3 Power Reciprocity Expressions"; "Appendix A: Lercha's Uniqueness Theorem"; "A.1 Problem of Moments"; "A.2 Proof of Lercha's Theorem"; "References"; "Index "

Sommario/riassunto

Provides a self-contained account on applications of electromagnetic reciprocity theorems to multiport antenna systems

The reciprocity theorem is among the most intriguing concepts in wave field theory and has become an integral part of almost all standard textbooks on electromagnetic (EM) theory. This book makes use of the theorem to quantitatively describe EM interactions concerning general multiport antenna systems. It covers a general reciprocity-based description of antenna systems, their EM scattering properties, and further related aspects.

Beginning with an introduction to the subject, *Electromagnetic Reciprocity in Antenna Theory* provides readers first with the basic prerequisites before offering coverage of the equivalent multiport circuit antenna representations, EM coupling between multiport antenna systems and their EM interactions with scatterers, accompanied with the corresponding EM compensation theorems.

In addition, the text:

- Presents basic prerequisites including the definition of the notation, integral transformations, and EM reciprocity theorems in their general form
- Explores multiport antenna forward-scattering theorem, multiport antenna matching theorem and uniqueness theorem
- Supplements each chapter with a solved illustrative example

Electromagnetic Reciprocity in Antenna Theory is an excellent text for EMC and antenna researchers and students of the subject as well.