
PIER 4

**Progress In
Electromagnetics
Research**

PIER 1

Progress in Electromagnetics Research

Jin Au Kong

PIER 2

**Finite Element and Finite Difference Methods in
Electromagnetic Scattering**

Michael A. Morgan

PIER 3

Polarimetric Remote Sensing

Jin Au Kong

PIER 4

Progress in Electromagnetics Research

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Progress In Electromagnetics Research

Chief Editor

Jin Au Kong

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PREFACE

PIER 4 is a regular volume in the series on PROGRESS IN ELECTROMAGNETICS RESEARCH (PIER) which publishes special volumes addressing specific current research topics as well as regular volumes containing wide ranging topics.

In this volume of PIER 4, eleven chapters are included. Chapter 1 is authored by Dr. R. W. P. King on the topic of radiation efficiency of a vertical electric dipole above a half-space medium. In Chapter 2, microstrip antennas are modelled as a generalized transmission line which is employed to determine the impedance and radiation characteristics of various patch shapes. Chapter 3 addresses the modelling of lossy microstrips with finite thickness by using the spectral domain Green's function to formulate a multiconductor transmission line analysis. In Chapter 4, Dr. Censor presents application-oriented relativistic electrodynamics axiomatically, and Chapter 5 is devoted to the electromagnetic field analysis for electrical machine design.

The propagation of low-frequency electromagnetic waves in the terrestrial environment with special reference to whistler is investigated by Dr. Lu in Chapter 6. In Chapter 7, a neural network method is devised for high range resolution target classification, and in Chapter 8 the Fourier-Bessel expansion method is developed for reflectors with elliptical apertures. With the conjugate-gradient and the fast Fourier transform method, Chapter 9 treats the problem of scattering from flat metallic periodic structures. Scattering from a cylinder in the presence of an interface is studied in Chapter 10 with the bymoment method. In Chapter 11, the finite-difference time-domain (FDTD) technique is discussed in relation to the issues of absorbing boundary conditions (ABC), the use of triangular grids, and application to problems involving frequency dispersive materials.

The production and realization of this volume bear the efforts of Anh Lieu, Son V. Nghiem, and Murat E. Veysoglu.

J. A. Kong

*Cambridge, Massachusetts
August, 1990*

CONTRIBUTORS TO THE VOLUME

- S. M. Ali, *Massachusetts Institute of Technology*
Cambridge, Massachusetts 02139, USA
- R. G. Atkins, *Massachusetts Institute of Technology*
Cambridge, Massachusetts 02139, USA
- G. Bedrosian, *General Electric Company*
Schenectady, New York 12301, USA
- A. K. Bhattacharyya, *University of Saskatchewan*
Saskatoon, S7N 0W0 Canada
- A. C. Cangellaris, *University of Arizona*
Tucson, Arizona 85721, USA
- M. F. Catédra, *Universidad de Cantabria*
39005 Santander, Spain
- D. Censor, *Ben Gurion University of the Negev*
P.O.Box 635, 84105 Beer Sheva, Israel
- M. V. K. Chari, *General Electric Company*
Schenectady, New York 12301, USA
- G. M. Cotzas, *General Electric Company*
Schenectady, New York 12301, USA
- J. D'Angelo, *General Electric Company*
Schenectady, New York 12301, USA
- R. Garg, *Radar Center, IIT*
Kharagpur, 721302 India
- J. F. Kiang, *IBM Thomas J. Watson Research Center*
Yorktown Heights, New York 10598, USA

- C. S. Kim, *University of California, Los Angeles*
Los Angeles, California 90024-1594, USA
- R. W. P. King, *Harvard University*
Cambridge, Massachusetts 02138, USA
- J. A. Kong, *Massachusetts Institute of Technology*
Cambridge, Massachusetts 02139, USA
- A. Konrad, *General Electric Company*
Schenectady, New York 12301, USA
- C. F. Lee, *Massachusetts Institute of Technology*
Cambridge, Massachusetts 02139, USA
- R. Lee, *The University of Arizona*
Tucson, Arizona 85721, USA
- B. W. Lu, *Institute of Electronics*
Beijing 100080, China
- Y. Rahmat-Samii, *University of California, Los Angeles*
Los Angeles, California 90024-1594, USA
- L. Shafai, *University of Manitoba*
Winnipeg, R3T 2N2, Canada
- M. R. Shah, *General Electric Company*
Schenectady, New York 12301, USA
- R. T. Shin, *Massachusetts Institute of Technology*
Cambridge, Massachusetts 02139, USA
- R. P. Torres, *Universidad de Cantabria*
39005 Santander, Spain

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