

APPLIED COMPUTATIONAL ELECTROMAGNETICS SOCIETY JOURNAL

**November 2019
Vol. 34 No. 11
ISSN 1054-4887**

The ACES Journal is abstracted in INSPEC, in Engineering Index, DTIC, Science Citation Index Expanded, the Research Alert, and to Current Contents/Engineering, Computing & Technology.

The illustrations on the front cover have been obtained from the research groups at the Department of Electrical Engineering, The University of Mississippi.

THE APPLIED COMPUTATIONAL ELECTROMAGNETICS SOCIETY
<http://aces-society.org>

EDITORS-IN-CHIEF

Atef Elsherbeni
Colorado School of Mines, EE Dept.
Golden, CO 80401, USA

Sami Barmada
University of Pisa, ESE Dept.
56122 Pisa, Italy

ASSOCIATE EDITORS: REGULAR PAPERS

Mohammed Hadi
Kuwait University, EE Dept.
Safat, Kuwait

Alistair Duffy
De Montfort University
Leicester, UK

Wenxing Li
Harbin Engineering University
Harbin 150001, China

Maokun Li
Tsinghua University
Beijing 100084, China

Mauro Parise
University Campus Bio-Medico of Rome
00128 Rome, Italy

Yingsong Li
Harbin Engineering University
Harbin 150001, China

Riyadh Mansoor
Al-Muthanna University
Samawa, Al-Muthanna, Iraq

Antonio Musolino
University of Pisa
56126 Pisa, Italy

Abdul A. Arkadan
Colorado School of Mines, EE Dept.
Golden, CO 80401, USA

Salvatore Campione
Sandia National Laboratories
Albuquerque, NM 87185, USA

Wei-Chung Weng
National Chi Nan University, EE Dept.
Puli, Nantou 54561, Taiwan

Alessandro Formisano
Seconda Universita di Napoli
81031 CE, Italy

Piotr Gas
AGH University of Science and Technology
30-059 Krakow, Poland

Long Li
Xidian University
Shaanxa, 710071, China

Marco Arjona López
La Laguna Institute of Technology
Torreon, Coahuila 27266, Mexico

Paolo Mezzanotte
University of Perugia
I-06125 Perugia, Italy

Luca Di Rienzo
Politecnico di Milano
20133 Milano, Italy

Lei Zhao
Jiangsu Normal University
Jiangsu 221116, China

Sima Noghanian
University of North Dakota
Grand Forks, ND 58202, USA

Qiang Ren
Beihang University
Beijing 100191, China

Nunzia Fontana
University of Pisa
56122 Pisa, Italy

Atif Shamim
King Abdullah University of Science and Technology (KAUST)
Thuwal 23955, Saudi Arabia

Stefano Selleri
DINFO – University of Florence
50139 Florence, Italy

Lijun Jiang
University of Hong Kong, EEE Dept.
Hong, Kong

Shinichiro Ohnuki
Nihon University
Tokyo, Japan

Kubilay Sertel
The Ohio State University
Columbus, OH 43210, USA

Steve J. Weiss
US Army Research Laboratory
Adelphi Laboratory Center (RDRL-SER-M)
Adelphi, MD 20783, USA

Jiming Song
Iowa State University, ECE Dept.
Ames, IA 50011, USA

Amedeo Capozzoli
Univerita di Napoli Federico II, DIETI
I-80125 Napoli, Italy

Yu Mao Wu
Fudan University
Shanghai 200433, China

Maokun Li
Tsinghua University, EE Dept.
Beijing 100084, China

EDITORIAL ASSISTANTS

Matthew J. Inman
University of Mississippi, EE Dept.
University, MS 38677, USA

Shanell Lopez
Colorado School of Mines, EE Dept.
Golden, CO 80401, USA

Madison Le
Colorado School of Mines, EE Dept.
Golden, CO 80401, USA

Allison Tanner
Colorado School of Mines, EE Dept.
Golden, CO 80401, USA

EMERITUS EDITORS-IN-CHIEF

Duncan C. Baker

EE Dept. U. of Pretoria
0002 Pretoria, South Africa

Allen Glisson

University of Mississippi, EE Dept.
University, MS 38677, USA

Ahmed Kishk

Concordia University, ECS Dept.
Montreal, QC H3G 1M8, Canada

Robert M. Bevensee

Box 812
Alamo, CA 94507-0516, USA

Ozlem Kilic

Catholic University of America
Washington, DC 20064, USA

David E. Stein

USAF Scientific Advisory Board
Washington, DC 20330, USA

EMERITUS ASSOCIATE EDITORS

Yasushi Kanai

Niigata Inst. of Technology
Kashiwazaki, Japan

Alexander Yakovlev

University of Mississippi, EE Dept.
University, MS 38677, USA

Levent Gurel

Bilkent University
Ankara, Turkey

Mohamed Abouzahra

MIT Lincoln Laboratory
Lexington, MA, USA

Ozlem Kilic

Catholic University of America
Washington, DC 20064, USA

Erdem Topsakal

Mississippi State University, EE Dept.
Mississippi State, MS 39762, USA

Sami Barmada

University of Pisa, ESE Dept.
56122 Pisa, Italy

Fan Yang

Tsinghua University, EE Dept.
Beijing 100084, China

Rocco Rizzo

University of Pisa
56123 Pisa, Italy

William O'Keefe Coburn

US Army Research Laboratory
Adelphi, MD 20783, USA

EMERITUS EDITORIAL ASSISTANTS

Khaled ElMaghoub

Trimble Navigation/MIT
Boston, MA 02125, USA

Christina Bonnington

University of Mississippi, EE Dept.
University, MS 38677, USA

Anne Graham

University of Mississippi, EE Dept.
University, MS 38677, USA

Kyle Patel

Colorado School of Mines, EE Dept.
Golden, CO 80401, USA

Mohamed Al Sharkawy

Arab Academy for Science and Technology, ECE Dept.
Alexandria, Egypt

NOVEMBER 2019 REVIEWERS: REGULAR PAPERS

Marinko Barukcic	MuhibUr Rahman
Mehmet Belen	Zbynek Raida
Fangyuan Chen	C.J. Reddy
Manohar Deshpande	Vince Rodriguez
Joseph Diener	Tayyab Shabbir
Pasquale Dottorato	Yan Shi
Ozgur Ergul	Hari Singh
Andrey Grigoryev	Javad Soleiman Meiguni
Amir Hajiaboli	Abhay Srivastava
Mourad Ibrahim	Sellakkutti Suganthi
Tianqi Jiao	Yi Sui
Fatih Kaburcuk	Yuvaraja T.
Ashutosh Kedar	Yogesh Thakare
Rakhesh Kshetrimayum	Xuezhe Tian
Ali Lalbakhsh	Hossein Torkaman
Yue Li	Christopher Trueman
Neng-Wu Liu	Krushna Kanth V.
Hend Malhat	Qi Wu
Riyadh Mansoor	Run Xiong
Naobumi Michishita	Huanhuan Yang
Mohammad Neshati	Traianos Yioultsis
Elangovan P.	John Young
Karthikkeyan P.	Huapeng Zhao
Andrew Peterson	Theodoros Zygiridis
Mohammd Pourbagher	

THE APPLIED COMPUTATIONAL ELECTROMAGNETICS SOCIETY JOURNAL

Vol. 34 No. 11

November 2019

TABLE OF CONTENTS – REGULAR PAPERS

FDTD Modeling of Coils for Wireless Charging Applications Santosh Pokhrel, Gregory Moss, and Jamesina J. Simpson	1620
Application of Barycentric Subdivision Method for Singularity Integration in Method of Moments Chunwang Xiang, Xunwang Dang, Maokun Li, Fan Yang, and Shenheng Xu.....	1629
Propagating and Scattering of the Electromagnetic Vortex Generated by a Spiral Parabolic Antenna Bihuan Yin, Zi He, and Rushan Chen	1637
Fan-Type AMC Surface for Broadband Low-RCS Applications Xueyan Song, Lei Chen, Zehong Yan, and Yanyan Li	1645
Full and Independent Manipulation of Co- and Cross-polarized Waves with Metasurface Jianxun Su, Jiayi Liu, Zengrui Li, and Lamar Y. Yang	1653
An Effective Iterative Algorithm to Correct the Probe Positioning Errors in a Non-Redundant Plane-Rectangular Near-Field to Far-Field Transformation Francesco D'Agostino, Flaminio Ferrara, Claudio Gennarelli, Rocco Guerriero, and Massimo Migliozi	1662
A Novel Finite Element Mesh Truncation Technology Accelerated by Parallel Multilevel Fast Multipole Algorithm and its Applications Sheng Zuo, Yu Zhang, Daniel G. Doñoro, Xunwang Zhao, and Qifeng Liu	1671
Broadband Tracking of Characteristic Modes Jianbin Zhu, Weiwen Li, and Liangcai Zhang	1679
The Application of Chirp Z-Transform in Fast Computation of Antenna Array Pattern Cheng Zhang, Anyong Qing, and Yang Meng.....	1685
X-Band Isoflux Concentric Circular Antenna Arrays for Image Data Download from LEO Satellites to Ground Stations May A. El-Hassan, Khalid F. A. Hussein, Asmaa E. Farahat, and Kamal H. Awadalla	1694
Single Layer Transmit-array with Beam-Steering and Polarization Switching Xiaochun Liu, Qiming Yu, Xiangkun Kong, Zhengyu Huang, Borui Bian, Shaobin Liu, and Jixuan Liu	1704

A W-Band Dual-Polarization Slot Array Antenna with Low Sidelobe Level Hao Luo, Yu Xiao, Wenhao Tan, Luoning Gan, and Houjun Sun	1711
Broad-Band I-Shaped SIW Slot Antenna for V-Band Applications M. Nandakumar and T. Shanmugnantham.....	1719
A Bowtie Slotted Quad-Band Notched UWB Antenna with Defected Ground Structure Aisha Javed, Syeda I. Naqvi, Farzana Arshad, Yasar Amin, and Hannu Tenhunen.....	1725
A Compact Dual-band MIMO Antenna for 5G Mobile Communications Jianxun Su, Zhengyu Dai, Jianhe Du, Jiayong Yu, Zeqiang Chen, and Zengrui Li	1731
Anti-Jamming Front-End Design of Satellite Navigation Receiver Fan Wang, Haipeng Liu, and Chuanfang Zhang.....	1739
Improved Gaussian Process Modelling of On-Axis and Off-Axis Monostatic RCS Magnitude Responses of Shoulder-Launched Missiles Warren P. du Plessis and Jan P. Jacobs	1750
An Analytical Approach for a Miniaturized Unequal Wilkinson Power Divider with Filtering Response Yalda Torabi and Gholamreza Dadashzadeh	1757
Active Inductor Design for Reconfigurable Bandpass Microstrip Filter Applications Mehmet A. Belen and Peyman Mahouti	1764
Analysis of Lossy Multiconductor Transmission Lines (MTL) Using Adaptive Cross Approximation (ACA) Abdul Mueed, Yang Zhao, Yan Wei, Zhibo Zhu, and Qi Liang Liu	1769
Rotary Coupling Magnetic Field Characteristics of a Two-Degree-of-Freedom Direct Drive Induction Motor Haichao Feng, Jikai Si, Zhiping Cheng, Caixia Gao, and Wenping Cao.....	1777