

2019 URSI International Symposium on Electromagnetic Theory (EMTS 2019)

**San Diego, California, USA
27-31 May 2019**



**IEEE Catalog Number: CFP1911I-POD
ISBN: 978-1-5386-5593-1**

**Copyright © 2019, International Union of Radio Science (URSI)
All Rights Reserved**

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP1911I-POD
ISBN (Print-On-Demand):	978-1-5386-5593-1
ISBN (Online):	978-1-946815-06-4

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

TRANSIENT IMPEDANCE OF THE HORIZONTAL GROUNDING ELECTRODE: SENSITIVITY ANALYSIS OF THE DIRECT TIME DOMAIN ANALYTICAL SOLUTION	1
<i>Silvestar Šesnic ; Dragan Poljak ; Anna Šušnjara ; Sébastien Lalléchère ; Khalil El Khamlichi Drissi</i>	
THEORETICAL AND EXPERIMENTAL INCIDENT FIELD DOSIMETRY FOR GSM BASE STATIONS	4
<i>Marin Galic ; Dragan Poljak</i>	
FUNDAMENTAL PROPERTIES OF MIE RESONANCES IN WATER CYLINDERS – TM AND TE CASE STUDIES	8
<i>Rasmus E. Jacobsen ; Samel Arslanagic ; Andrei V. Lavrinenko</i>	
A NOVEL MODIFIED SILICON MICROMACHINING PROCESS WITH NEAR-ZERO DIELECTRIC LOSS FOR HIGH-EFFICIENCY ANTENNA DESIGN UP TO TERAHERTZ BAND	12
<i>Yue Li ; Peiqin Liu ; Zhijun Zhang</i>	
APPLICATION OF THE METHOD OF FRACTIONAL DERIVATIVES TO THE SOLUTION OF THE PROBLEM OF PLANE WAVE DIFFRACTION BY TWO AXISYMMETRIC STRIPS OF DIFFERENT SIZES	16
<i>K. Karaçuha ; E. I. Veliyev ; V. Tabatadze ; E. Karaçuha</i>	
A COMPARATIVE ANALYSIS OF HIGH FREQUENCY FIELDS ON TRANSIONOSPHERIC PATHS ALONG STRONGLY ANISOTROPIC RANDOM INHOMOGENEITIES OF ELECTRON DENSITY	20
<i>Vadim E. Gherm ; Nikolay N. Zernov ; Charles Rino</i>	
MODELING INTERMITTENCY OF SCINTILLATING TRANSIONOSPHERIC SIGNALS	24
<i>E. V. Makarenkova ; V. E. Gherm</i>	
ANALYTIC DESCRIPTION OF THE COHERENCE PROPERTIES OF HIGH FREQUENCY FIELD IN THE INHOMOGENEOUS STOCHASTIC TRANSIONOSPHERIC CHANNEL WITH ANISOTROPIC RANDOM IRREGULARITIES	28
<i>Nikolay Zernov ; Andrei Driuk</i>	
ASPECTS OF IONOSPHERIC SCINTILLATION DURATION UNDER LOW LATITUDES	32
<i>Bruno J. Affonso ; Caio C. Marques ; André L. A. Silva ; Jonas Sousasantos ; André R. F. Martinon ; Eurico R. De Paula ; Bruno C. Vani ; Alison Moraes</i>	
ON THE AVAILABILITY OF PROCESSES FOR CREATION A THING SPACE FROM A NULL SPACE	36
<i>T. Sengor</i>	
INFLECTIVE SPACES: CONTRIBUTION INTO THE PHYSICAL TRUTH	40
<i>T. Sengor</i>	
LOCATION OF SURFACE WAVE POLES IN SOMMERFELD TYPE INTEGRALS: A MITTAG- LEFFLER EXPANSION APPROACH	44
<i>Kalyan C. Durbhakula ; Deb Chatterjee ; Ahmed M. Hassan</i>	
FDTD ANALYSIS OF TRANSIENT RADIATING AND REFLECTING ELECTROMAGNETIC FIELDS OF FINITE LENGTH MICROSTRIP LINES WITH TERMINAL CROSS-SECTIONS	48
<i>Rakkappan Balasubramanian ; Yasumitsu Miyazaki</i>	
OPTIMIZATION OF BEAM-STEERING METASURFACES USING MODIFIED CROSS- ENTROPY ALGORITHM	52
<i>Khushboo Singh ; Muhammad U. Afzal ; David Bulger ; Maria Kovaleva ; Karu P. Esselle</i>	
WELL-POSEDNESS OF SCATTERING PROBLEMS AT LUMINAL SPACE-TIME INTERFACES	56
<i>Zoé-Lise Deck-Léger ; Nima Chamanara ; Christophe Caloz</i>	
FORWARD AND INVERSE HOMOGENIZATION OF THE ELECTROMAGNETIC PROPERTIES OF A QUASIPERIODIC COMPOSITE	59
<i>Elena Cherkaev ; Sébastien Guenneau ; Niklas Wellander</i>	
BOUNDARY VALUE PROBLEMS FOR THE BI-ANISOTROPIC MAXWELL SYSTEM IN LIPSCHITZ DOMAINS	63
<i>Eric Stachura</i>	
A GENERALIZED MODE-MATCHING METHOD FOR GLIDE-SYMMETRIC STRUCTURES	67
<i>Guido Valerio ; Fatemeh Ghasemifard ; Martin Norgren ; Oscar Quevedo-Teruel</i>	
ON THE OPTIMAL PLASMONIC RESONANCES IN GOLD NANOSPHERES EMBEDDED IN DISPERSIVE MEDIA	71
<i>S. Nordebo ; Y. Ivanenko ; Richard Bayford</i>	

FUNDAMENTAL PROPERTIES OF MIE RESONANCES IN WATER SPHERES	75
<i>Rasmus E. Jacobsen ; Samel Arslanagic ; Andrei V. Lavrinenko</i>	
NON-PASSIVE APPROXIMATION AS A TOOL TO STUDY THE REALIZABILITY OF AMPLIFYING MEDIA	79
<i>Y. Ivanenko ; S. Nordebo</i>	
RF EFFECTS OF UMBRELLA REFLECTOR ANTENNA TOPOLOGY FOR CUBESATS: OPTIMAL FEED POINT, BORESIGHT GAIN LOSS AND GRATING LOBES	83
<i>Vignesh Manohar ; Yahya Rahmat-Samii</i>	
ANALYTICAL FORMULATION FOR LOOP ANTENNAS VALID FROM THE RF TO OPTICAL REGIME: A REVIEW	87
<i>Ryan J. Chaky ; Jogender Nagar ; Arnold F. McKinley ; Mario F. Pantoja ; Douglas H. Werner</i>	
THE FREDHOLM FACTORIZATION IN PRESENCE OF PENETRABLE RECTANGULAR RODS	91
<i>Vito G. Daniele ; Guido Lombardi ; Rodolfo S. Zich</i>	
CAUSAL DYNAMIC CONSTITUTIVE RELATIONS FOR LOSSY DISPERSIVE DIELECTRICS	94
<i>Fatih Erden ; Oleg A. Tretyakov</i>	
MATHEMATICAL FORMULATION OF PHASE RETRIEVAL FOR PHASELESS SPHERICAL NEAR-FIELD ANTENNA MEASUREMENTS WITH PROBE CORRECTION	98
<i>O. Breinbjerg ; J. Fernández Álvarez</i>	
A NOVEL SEMI-ANALYTICAL MODE-MATCHING TECHNIQUE FOR MODELING REALISTIC ELECTROMAGNETIC WELL-LOGGING SENSORS IMMERSSED IN DISSIPATIVE INHOMOGENEOUS MEDIA	102
<i>Lisbeth Saavedra ; Guilherme S. Rosa ; José R. Bergmann</i>	
THEOREM FOR THE RELATION BETWEEN THE $L_1(C,N)$ AND $T_1(L,N)$ NUMBERS	106
<i>Georgi Nikolov Georgiev ; Mariana Nikolova Georgieva-Grosse</i>	
EXCITATION OF EIGENMODE CURRENT FOR MULTIPLE RESONANCE ANTENNA	110
<i>Keisuke Fujita</i>	
SPECTRAL NUMERICAL GREEN'S FUNCTION BASED EIGENANALYSIS FOR CAVITY PERTURBATIONS	113
<i>Hui H. Gan ; Qi I. Dai ; Tian Xia ; Qin S. Liu ; Weng Cho Chew</i>	
EFFICIENT INVERSE SOURCES SOLUTIONS ABOVE LOSSY DIELECTRIC HALFSPACE	116
<i>Thomas F. Eibert</i>	
A 2D/Q-2D SUBDOMAIN FINITE ELEMENT METHOD FOR IRREGULAR POWER/GROUND PLATE-PAIR ANALYSIS WITH WAVEPORT EXCITATION	120
<i>Ping Li ; Li Jun Jiang ; Yao Jiang Zhang ; Shuai Xu ; Hakan Bagci</i>	
HIGH ORDER SCALABLE HYBRIDIZED DISCONTINUOUS GALERKIN METHOD FOR FREQUENCY-DOMAIN ELECTROMAGNETICS	124
<i>Emmanuel Agullo ; Luc Giraud ; Matthieu Kuhn ; Stéphane Lanteri ; Ludovic Moya</i>	
DESIGN OF OPTICAL WAVEGUIDE DEVICES USING FUNCTION-EXPANSION-BASED TOPOLOGY OPTIMIZATION	128
<i>Y. Tsuji</i>	
NEW PROPAGATION REGIMES OF TM WAVES IN A WAVEGUIDE FILLED WITH A NONLINEAR DIELECTRIC METAMATERIAL	131
<i>Yury Shestopalov ; Eugene Smolkin ; Maxim Snegur</i>	
AGAIN ON SPATIAL FOCUSING AND SHAPING OF THE ELECTROMAGNETIC FIELD IN THE ANTENNA RADIATIVE NEAR-FIELD REGION	134
<i>P. Nepa ; G. Manara ; M. R. Pino ; R. G. Ayestarán</i>	
NEAR FIELD UHF RFID READER ANTENNA BASED ON COMPOSITE RIGHT/LEFT HANDED STRUCTURE COMPATIBLE WITH CONFIGURABLE READING	138
<i>R. Siragusa ; E. Perret</i>	
USING THE POWER TRANSFER EFFICIENCY FOR RFID DETECTION IN UNUSUAL SCENARIOS	142
<i>Andrea Michel ; Marcos R. Pino ; Guillermo A. Narciandi ; Manuel Arrebola ; Paolo Nepa</i>	
RF CANCELLATION OF COUPLED TRANSMIT SIGNAL AND NOISE IN STAR ACROSS 1 GHZ BANDWIDTH	146
<i>Satheesh Bojja Venkatakrishnan ; Alexander Hovsepian ; Elias A. Alwan ; John L. Volakis</i>	
SPLIT-STEP WAVELET PROPAGATION MODELLING USING LOCAL OPERATORS	150
<i>Thomas Bonnafont ; Rémi Douvenot ; Alexandre Chabory</i>	
DESIGN OF CHAOTIC REVERBERATION CHAMBERS	154
<i>L. Bastianelli ; F. Moglie ; V. Mariani Primiani ; G. Gradoni</i>	

RECENT CONTRIBUTIONS TO MULTIOBJECTIVE EVOLUTIONARY OPTIMIZATION IN ELECTROMAGNETICS	158
<i>Ronald P. Jenkins ; Douglas H. Werner</i>	
ANTENNA ARRAY OUTPUT POWER MINIMIZATION USING PARTICLE SWARM OPTIMIZATION	161
<i>Nghia Tran ; Farshid Tamjid ; Farhan Quaiyum ; Robab Kazemi ; Aly Fathy ; Ozlem Kilic</i>	
ANALYSIS OF MISALIGNMENT EFFECTS ON LINK BUDGET OF AN IMPLANTABLE ANTENNA	165
<i>Mohammad Haerinia ; Sima Noghianian</i>	
A NOTE ON MEASURES OF HUMAN EXPOSURE TO SIGNALS WITH CONTINUOUS SPECTRA	169
<i>D. Poljak ; L. Pajewski</i>	
BIOMEDICAL ANTENNA CHARACTERIZATION IN-FRONT OF HOMOGENEOUS AND FREQUENCY DEPENDENT INHOMOGENEOUS HUMAN HEAD	171
<i>Md. Rokunuzzaman ; Asif Ahmed ; Thomas Baum ; Wayne S. T. Rowe</i>	
STOCHASTIC SENSITIVITY ANALYSIS OF BIOHEAT TRANSFER EQUATION	175
<i>Anna Šušnjara ; Dragan Poljak ; Frano Rezo ; Josip Matkovic</i>	
ISOGEOMETRIC DISCRETIZATIONS OF THE ELECTRIC FIELD INTEGRAL EQUATION	179
<i>Felix Wolf ; Jürgen Dölz ; Sebastian Schöps ; Stefan Kurz</i>	
ANALYSIS OF CONFORMAL ANTENNAS WITH QUASI-CYLINDRICAL ANISOTROPIC SUBSTRATES USING DISCRETE MODE MATCHING METHOD.....	183
<i>Veenu Kamra ; Achim Dreher</i>	
DESIGN OF HYBRID WIRELESS POWER TRANSFER AND DUAL ULTRAHIGH-FREQUENCY ANTENNA SYSTEM.....	187
<i>Mohammad Haerinia ; Sima Noghianian</i>	
HEXAGONAL ORIGAMI DUAL FREQUENCY ANTENNA.....	191
<i>David Rohde ; Sima Noghianian ; Yi-Hsiang Chang ; Satish K. Sharma</i>	
PACIFIC OCEAN HF NOISE DISTRIBUTIONS OFF SOUTHERN CALIFORNIA.....	195
<i>Kris Buchanan ; Lu Xu ; Chris Dilay ; David Hilton</i>	
SUBWAVELENGTH ROBUST WAVEGUIDING WITH CHIRAL METAMATERIAL WAVEGUIDES	199
<i>Bakhtiyar Orzabayev ; Nadège Kaina ; Romain Fleury</i>	
NON-LOCAL POWER WAVE TRANSFORMATIONS USING OMEGA BIANISOTROPIC HUYGENS' METASURFACE PAIRS.....	203
<i>Ayman H. Dorrah ; Gleb Egorov ; George V. Eleftheriades</i>	
FLOQUET-BLOCH ANALYSIS OF A PRACTICAL FABRY-PEROT HUYGENS' METASURFACE	207
<i>Sherman W. Marcus ; Ariel Epstein</i>	
PERFECT ANOMALOUS REFLECTION AND REFRACTION ACCOMPANIED BY AN IDEAL POLARIZATION CONVERSION: POTENTIAL OF A CHIRAL METASURFACE	211
<i>Hamidreza Kazemi ; Mohammad Albooyeh ; Filippo Capolino</i>	
APPLICATIONS AND POTENTIALS OF RECIPROCAL BIANISOTROPIC METASURFACES	215
<i>Mohammad Albooyeh ; Viktor Asadchy ; Jinwei Zeng ; Hamidreza Kazemi ; Filippo Capolino</i>	
HALF-ORDER THREE-DIMENSIONAL CURL OPERATOR.....	219
<i>Raphael Kastner ; Nader Engheta</i>	
RADAR CROSS SECTION ANALYSIS OF SMALL GROUP TARGET	222
<i>Hiroshi Suenobu ; Tai Tanaka ; Michio Takikawa ; Naofumi Yoneda</i>	
ANGLE OF INCIDENCE-STABLE FSS WITH DSRS ELEMENTS.....	226
<i>Te-Kao Wu</i>	
OPTIMIZING AMPLITUDE DISTRIBUTION IN A FEED ARRAY TO CONTROL SIDE-LOBE LEVELS OF A BEAM-STEERING METASURFACE.....	228
<i>Khushboo Singh ; Muhammad U. Afzal ; David Bulger ; Maria Kovaleva ; Karu P. Esselle</i>	
EXACT GEOMETRICAL OPTICS SCATTERING BY A 45° METAL WEDGE ILLUMINATED BY MULTIPLE PLANE WAVES	232
<i>Piergiorgio L. E. Uslenghi</i>	
A GENERAL APPROACH TO THE ANALYSIS OF COMPLEX WAVES.....	235
<i>Yury Shestopalov</i>	
WIENER-HOPF FORMULATION OF THE SCATTERING BY A PEC WEDGE OVER AN HALF DIELECTRIC GROUNDED SLAB.....	237
<i>Vito Daniele ; Guido Lombardi ; Rodolfo S. Zich</i>	

CAN A DIELECTRIC SPHERE EMULATE THE BEHAVIOR OF A SURFACE IMPEDANCE SPHERE?	241
<i>Dimitrios C. Tzarouchis ; Henrik Wallén ; Pasi Ylä-Oijala ; Ari Sihvola</i>	
OPTICAL METASURFACES BASED ON SPHEROIDAL NANOPARTICLES: THEORY AND APPLICATIONS	245
<i>A. Monti ; A. Alù ; A. Toscano ; F. Bilotti</i>	
ANALOGY BETWEEN ELASTODYNAMIC DISPLACEMENT AND ELECTROMAGNETIC VECTOR POTENTIALS	249
<i>J. W. Neese ; D. R. Jackson ; L. A. Thomsen</i>	
MODERN APPLICATIONS OF THE BATEMAN-WHITTAKER THEORY	252
<i>Ioannis M. Besieris ; Amr M. Shaarawi</i>	
PROPAGATION OVER AN ARBITRARY CONSTANT IMPEDANCE PLANE FOR ARBITRARY PRIMARY SOURCES, EXACT SERIES AND COMPLETE ASYMPTOTICS WITH ERROR FUNCTIONS	256
<i>J. M. L. Bernard</i>	
TM-WAVE PROPAGATION IN A GRADED WAVEGUIDE STRUCTURE	260
<i>Mariana Dalarsson ; Sven Nordebo</i>	
THE MTM-EBG: A FULLY UNIPLANAR, PRINTABLE, AND EMBEDDED SOLUTION FOR MULTI-BAND FUNCTIONALITY IN MICROSTRIP DEVICES AND ANTENNAS	264
<i>Braden P. Smyth ; Stuart Barth ; Jacob A. Brown ; Ashwin K. Iyer</i>	
METASURFACE CLOAKS FOR DECOUPLING CLOSELY SPACED PHASED ANTENNA ARRAYS	268
<i>Hossein Mehrpour Bernety ; Alexander B. Yakovlev ; Harry G. Skinner ; Seong-Youp Suh</i>	
3-D PRINTED CIRCULARLY-POLARIZED LENS ANTENNA OPERATING AT TERAHERTZ FREQUENCIES	271
<i>Geng-Bo Wu ; Yuan-Song Zeng ; Ka Fai Chan ; Shi-Wei Qu ; Chi Hou Chan</i>	
ALL-DIELECTRIC COMPACT SUPERSTRATES FOR HIGH-GAIN RESONANT-CAVITY ANTENNAS: DESIGNS & MEASUREMENTS	274
<i>Affan A. Baba ; Raheel M. Hashmi ; Karu P. Esselle ; Ladislau Matekovits</i>	
PHASE METHOD: A MORE PRECISE BEAM STEERING MODEL FOR PHASE-DELAY METASURFACE BASED RISLEY ANTENNA	278
<i>Junbo Wang ; Yahya Rahmat-Samii</i>	
THE ROLE OF THE STEEPEST-DESCENT PATH IN ELECTROMAGNETICS	282
<i>D. R. Jackson ; Francisco Mesa</i>	
ELECTROQUASISTATIC AND MAGNETOQUASISTATIC EQUATIONS AND FIELDS	286
<i>Arthur D. Yaghjian</i>	
A HISTORY OF LEAKY WAVES AND LEAKY-WAVE ANTENNAS	290
<i>D. R. Jackson ; P. Baccarelli ; P. Burghignoli ; W. Fuscaldo ; A. Galli ; G. Lovat</i>	
MICROSTRIP PATCH ANTENNAS, OVERCOMING DEFICIENCIES AND REALIZING UNEXPECTED PERFORMANCES	294
<i>Lotfollah Shafai ; Navid Rezaadeh</i>	
100 YEARS OF ELECTROMAGNETIC WAVES IN RANDOM MEDIA	296
<i>Akira Ishimaru</i>	
MAXWELL'S VIEW OF ELECTRIC POLARIZATION AS DISPLACEMENT	299
<i>Arthur D. Yaghjian</i>	
SURFACE ELECTROMAGNETICS: HISTORIC DEVELOPMENT AND ANTENNA APPLICATIONS	303
<i>Fan Yang ; Shenheng Xu ; Yahya Rahmat-Samii</i>	
BREACH OF SYMMETRIES IN ROTATING ARRAYS AND METAMATERIALS OBSERVED IN THEIR REST FRAME	306
<i>Ido Kozma ; Ben Z. Steinberg</i>	
A LOW COST MILLIMETER-WAVE PHASED ARRAY	310
<i>Alexander D. Johnson ; Elias A. Alwan ; John L. Volakis</i>	
W-BAND DUAL-LARGE-REFLECTARRAY ANTENNA WITH LOW SENSITIVITY AND BROAD BANDWIDTH CHARACTERISTIC	313
<i>Euncheol Choi ; Sangwook Nam</i>	
ANALYSIS AND DESIGN OF AXIAL CORRUGATED KA-BAND FEED HORN	317
<i>Ila Agnihotri ; Satish K. Sharma</i>	
ANALYSIS AND DESIGN OF A W-BAND CIRCULAR POLARIZED FEED HORN WITH INBUILT POLARIZER FOR LOW F/D OFFSET REFLECTOR ANTENNA	321
<i>Ghanshyam Mishra ; Satish K. Sharma ; Jia-Chi S. Chieh</i>	

DUAL-FOCAL METALENSES BASED ON COMPLETE DECOUPLING OF AMPLITUDE, PHASE AND POLARIZATION	325
<i>He-Xiu Xu ; Menghua Jiang ; Guangwei Hu ; Lei Han ; Ying Li ; Cheng-Wei Qiu</i>	
MANIPULATING SURFACE WAVES AND NANOSCALE FORCES/TORQUES WITH NONRECIPROCAL PLATFORMS.....	329
<i>S. Ali Hassani Gangaraj ; George W. Hanson ; Mário G. Silveirinha ; Mauro Antezza ; Francesco Monticone</i>	
TIME-MODULATED REACTIVE ELEMENTS FOR CONTROL OF ELECTROMAGNETIC ENERGY	332
<i>Grigoriï A. Pitcyn ; Mohammad S. Mirmoosa ; Viktor S. Asadchy ; Sergei A. Tretyakov</i>	
EQUIVALENCE-PRINCIPLE-BASED ACTIVE METASURFACES	336
<i>Paris Ang ; Alex M. H. Wong ; George V. Eleftheriades</i>	
SIMPLE AND INSIGHTFUL COMPUTATION OF SPACE-TIME CRYSTAL DISPERSION DIAGRAMS	340
<i>Zoé-Lise Deck-Léger ; Nima Chamanara ; Christophe Caloz</i>	
MODELING METAMATERIAL ELEMENT IN DIELECTRIC-FILLED WAVEGUIDE-FED METASURFACE ANTENNAS.....	343
<i>Insang Yoo ; David R. Smith</i>	
EMBEDDING PARABOLIC REFLECTOR ON HOLOGRAM FOR REDIRECTING SURFACE LEAKY WAVES INTO FORWARD ONES.....	347
<i>Mohammad Moein Moeni ; Homayoon Oraizi ; Amrollah Amini</i>	
POWER-DEPENDENT INVISIBILITY DEVICES FOR ANTENNA ARRAYS	351
<i>A. Monti ; M. Barbuto ; A. Toscano ; F. Bilotti</i>	
A HIGH-FREQUENCY UNIFORM ASYMPTOTIC SOLUTION FOR ELECTROMAGNETIC FIELD SCATTERING BY A 3D WEDGE INCLUDING GRAZING INCIDENCE SCENARIOS	355
<i>Guilherme S. Rosa ; Flavio J. V. Hasselmann</i>	
DIRECTION-OF-ARRIVAL ESTIMATION FROM SCATTERING PATTERNS IN A SUBWAVELENGTH PERIODIC STRUCTURE OF A CONDUCTIVE SCATTERER.....	359
<i>G. Itami ; T. Itzuka ; Y. Toriumi ; J. Kato ; O. Sakai</i>	
SEAMLESS WAVEGUIDE BENDS WITH IN-LINE METASURFACES	363
<i>Liran Biniashvili ; Ariel Epstein</i>	
MINIATURIZED VIRTUAL ARRAY DUAL BAND LOOP QUASI – YAGI ANTENNA DESIGN FOR 5G APPLICATION	367
<i>F. T. Çelik ; K. Karaçuha</i>	
LITERATURE REVIEW ON RADAR ABSORBERS USING METAMATERIALS	371
<i>Mohamed Edries ; Mohamed A. El-Morsy ; Hesham A. Mohamed ; Sherif S. Hekal ; Hala A. Mansour</i>	
EXTENSION OF SNOEK’S LAW TO HIGHER RF FREQUENCIES BY CONTROLLING NANOMAGNETIC PARTICLE PARAMETERS	375
<i>Quang Nguyen ; Shi Liu ; Amir I. Zaghloul</i>	
ANALYTICAL VERIFICATION OF EFFECTIVE CONSTITUTIVE PARAMETER INCREASING USING METAMATERIAL INSERTS.....	378
<i>Quang Nguyen ; Amir I. Zaghloul</i>	
FROM TRANSFORMATION OPTICS TO TOPOLOGY: LOCAL AND GLOBAL METHODS FOR MATERIAL DESIGN.....	381
<i>S. A. R. Horsley</i>	
ABOUT FIELD EXPRESSIONS FOR THE DIFFRACTION BY AN ANISOTROPIC IMPEDANCE WEDGE AT SKEW INCIDENCE AND RELATIONS WITH G FUNCTION.....	383
<i>J. M. L. Bernard</i>	
TEACHING ELECTROMAGNETICS AND ANTENNAS USING FREE SOFTWARE AND ONLINE CALCULATORS	387
<i>Reyhan Baktur</i>	
GREEN FUNCTION METHODS FOR OPTOELECTRONICS	389
<i>Misha Galperin</i>	
INVESTIGATING MULTIPLE DIFFRACTIONS NEAR OPTICAL BOUNDARIES WITH BIDIRECTIONAL RAY-TRACING AND ANTENNA RECIPROCITY	393
<i>Mehmet Mert Taygur ; Ilya Sukharevsky ; Thomas F. Eibert</i>	
PERFORMANCE TRADEOFFS REVEALED BY MULTI-OBJECTIVE OPTIMIZATION OF MULTI-LAYERED CORE-SHELL NANOPARTICLES.....	397
<i>Sawyer D. Campbell ; Douglas H. Werner</i>	
WIENER-HOPF ANALYSIS OF THE DIFFRACTION BY A HALF-PLANE DIPOLE ARRAY	401
<i>Miguel Camacho ; Filippo Capolino ; Matteo Albani</i>	
QUASI-STATIC DESIGN OF SMALL ULTRA-WIDEBAND ANTENNAS.....	405
<i>Thomas O. Jones</i>	

L-BAND WIDE-ANGLE CIRCULAR POLARIZED SEQUENTIAL ROTATED ANTENNA FOR GPS APPLICATIONS	409
<i>Ghanshyam Mishra ; Satish K. Sharma</i>	
3D PRINTING-BASED LIQUID METAL PATCH ANTENNAS WITH WIDE-BAND FREQUENCY AND MULTI-POLARIZATION RECONFIGURATIONS.....	412
<i>Lingnan Song ; Wuran Gao ; Yahya Rahmat-Samii</i>	
IMAGING OF SUBWAVELENGTH FEATURES IN THE FAR-FIELD USING RESONANT METASURFACES: DESIGN FROM MICROWAVE TO INFRARED FREQUENCIES	416
<i>Elham Baladi ; Mitchell Semple ; Ashwin K. Iyer</i>	
TEXTILE-BASED ULTRA-WIDEBAND TIGHTLY COUPLED DIPOLE ARRAY	420
<i>Matthew W. Nichols ; Alexander D. Johnson ; Elias A. Alwan ; John L. Volakis</i>	
SEMI-ACTIVE MULTIPLE BEAM ARRAYS.....	423
<i>Antoine G. Roederer ; Alexander G. Yarovoy</i>	
DAISY CHAIN MIMO ANTENNA FOR WHOLE AZIMUTH TENS-OF-GIGABIT CONNECTED CARS	427
<i>Nana Narukawa ; Taiki Fukushima ; Kazuhiro Honda ; Koichi Ogawa</i>	
OTA EXPERIMENTS ON THE ANGULAR ACCURACY OF A PHASE MONOPULSE AOA ANTENNA USING THE MEAN IQ-VALUE METHOD IN A RICIAN FADING CHANNEL.....	431
<i>Kazuhiro Honda ; Nana Narukawa ; Koichi Ogawa</i>	
RANGE-DOPPLER AND RADAR CROSS SECTION ROUTINES OF A CIRCULARLY DISTRIBUTED ARRAY	435
<i>Kris Buchanan ; Sara Wheeland ; Drew Overturf</i>	
64 × 64 MIMO ANTENNA ARRANGED IN A DAISY CHAIN ARRAY STRUCTURE AT 50 GBPS CAPACITY.....	439
<i>Nana Narukawa ; Taiki Fukushima ; Kazuhiro Honda ; Koichi Ogawa</i>	
A GROUP-SPARSE COMPRESSED SENSING APPROACH FOR THINNING MULTI-CARRIER FREQUENCY DIVERSE ARRAYS.....	443
<i>Said E. El-Khamy ; Noha O. Korany ; Magdy A. Abdelhay</i>	
ANALYSIS AND MODELING OF 28 GHZ COUPLED-LINE-BASED QUADRATURE COUPLER AND POWER DIVIDERS/COMBINERS FOR 5G COMMUNICATIONS.....	447
<i>Y. S. Lin ; K. S. Lan ; Y. C. Chen</i>	
Author Index	