

**2013 XVIIIth International
Seminar/Workshop on Direct and
Inverse Problems of Electromagnetic
and Acoustic Wave Theory**

(DIPED 2013)

**Lviv, Ukraine
23-26 September 2013**



IEEE Catalog Number: CFP13458-POD
ISBN: 978-1-4799-1167-7

CONTENTS

Plenary Session

| | |
|--|----|
| <i>R. S. Zaridze, I. M. Petoev, V. A. Tabatadze, B. V. Poniava,</i> The method of auxiliary sources for antenna synthesis problems | 13 |
| <i>B. Z. Katsenelenbaum, N. N. Voitovich,</i> Antiradar protection of bodies by surfaces with impedance and dielectric coatings | 20 |
| <i>L. Angermann, V. V. Yatsyk,</i> Eigenoscillations and energy generated by nonlinear cubically polarisable layers | 24 |
| <i>O. Piddubniak, N. Piddubniak, K. Sujecki,</i> Sound radiation from aircraft during takeoff | 28 |

Propagation in Complex Media

| | |
|--|----|
| <i>Ye. A. Antonenko, V. A. Katrich, A. I. Karpov,</i> The microstrip resonator for measurement of dielectric constant | 37 |
| <i>Y. V. Antonenko, A. V. Gribovsky,</i> Electrodynamic characteristics of a double screen of finite thickness with coaxial-sector aperture of different geometrics ... | 41 |
| <i>S. L. Berdnik, V. A. Katrich, M. V. Nesterenko and S. V. Pshenichnaya,</i> Electrodynamic characteristics of a three-element vibrator-slot structure in a rectangular waveguide | 45 |
| <i>Y. V. Shepilko,</i> Scattering of H-polarized electromagnetic wave by grooved dihedral wedge co-axially coupled with dielectric covered metal slotted cylinder | 49 |
| <i>N. Sydorchuk,</i> Amplification of electromagnetic radiation from 3D photonic crystals with quantum-dot gain material inclusions | 55 |
| <i>N. Vaso,</i> Interaction of normally incident polarized light with strained layered structure “dielectric-metal” | 59 |
| <i>V. A. Karlov, V. F. Borulko, M. V. Andreev,</i> Properties of oblique E-crosses for six-port measurements | 63 |
| <i>E. A. Gevorkyan,</i> On the radiation of charged particle moving in a waveguide with anisotropic magneto dielectric filling | 69 |
| <i>V. F. Borulko,</i> Bragg transformations in corrugated circular waveguides | 72 |
| <i>V. F. Borulko,</i> Asymptotic solution for Bragg mode conversion in corrugated rectangular waveguide | 77 |

Antenna Design

| | |
|---|----|
| <i>B. M. Levin, S. O. Chulski,</i> Calculation of transparent antenna with triangle | 85 |
| <i>Zeeshan Ahmad, Muhammad Tahir, Iftikhar Ali,</i> Analysis of beamforming algorithms for antijams | 89 |

| | |
|--|-----|
| <i>K. Tavzarashvili, G. Ghvedashvili, T. Gogua,</i> Computer simulation of nanoplasmonic antennas | 97 |
| <i>B. M. Levin, T. R. Rechels,</i> Experimental study of a transparent antenna | 101 |
| <i>C. M. Dikmen, S. Çimen, G. Çakir,</i> A reduced RCS ultra wide band antenna with eye geometry | 104 |
| <i>S. L. Berdnik, V. A. Katrich, M. V. Nesterenko and Yu. M. Penkin,</i> Spherical antenna excited by a slot in an impedance end-wall of a rectangular waveguide | 111 |
| <i>O. A. Yeliseyev,</i> Autocollimation of Gaussian beam reflected by nonrectangular reflect array | 115 |
| <i>Syed Imran Hussain Shah, Shahid Bashir,</i> Miniaturization of microstrip patch antenna with multiband response for portable communication systems | 119 |
| <i>D. B. Kuryliak, O. M. Sharabura,</i> Axially-symmetric excitation of conical monopole antenna | 124 |

Inverse Problems and Antenna Synthesis

| | |
|---|-----|
| <i>O. O. Drobakhin, G. G. Sherstyuk,</i> Resolution of inverse aperture synthesis in near-field and intermediate zone of the horn antenna radiation | 129 |
| <i>O. O. Drobakhin, G. G. Sherstyuk,</i> Recognition multifrequency microwave images of simple objects behind dielectric wall using neural networks | 133 |
| <i>M. I. Andriychuk, N. N. Voitovich,</i> Antenna synthesis according to power radiation pattern with condition of norm equality | 137 |
| <i>L. Klakovych, O. Helei,</i> Synthesis of antenna system of parallel cylindrical radiators according to the given amplitude directivity pattern | 141 |
| <i>S. M. Vovk, V. F. Borulko,</i> Solution of antenna inverse problem by penalty residual function and quasi-extent regularizer | 144 |

Analytical and Numerical Methods

| | |
|---|-----|
| <i>M. N. Georgieva-Grosse, G. N. Georgiev,</i> On the zeros of Kummer function: basic properties and their application in the theory of the azimuthally magnetized circular ferrite waveguide | 151 |
| <i>A. Muzychuk, S. Litynskyj,</i> On the generalized solutions of mixed problems for the wave equation, obtained by using Laguerre integral transformation | 161 |
| <i>O. O. Bulatsyk,</i> Complex polynomials representation of solutions to the antenna synthesis problem by the power pattern | 166 |
| <i>Yu. P. Topolyuk,</i> Stability of the solutions in problems with free phase | 171 |
| <i>T. Qiao, J. F. Zhang, T. J. Cui,</i> An efficient solution for the parallelization of the multilevel fast multipole algorithm | 175 |
| <i>V. M. Teslyuk, Y. I. Lukomskiyi,</i> Parallel implementation of Newton's method | 179 |

| | |
|--|-----|
| <i>A. R. Sydor, Recurrent expressions for modelling time reliability indices of compound electromagnetic systems</i> | 182 |
|--|-----|

EM Field Application

| | |
|--|-----|
| <i>V. Jeladze, V. Tabatadze, M. Prishvin, L. Bibilashvili, R. Zaridze, Human exposure simulation in big scenarios using MAS</i> | 187 |
| <i>L. Bibilashvili, M. Prishvin, V. Jeladze, R. Zaridze, Comparative analysis of exposure simulation results for a man, woman and child models</i> | 193 |
| <i>N. Kvavadze, N. Tsereteli, K. Kvavadze, Development of strong motion acceleration and VLF electromagnetic detectors network in Georgia</i> | 197 |
| <i>N. Kvavadze, K. Kvavadze, VLF propagation study in low ionosphere</i> | 201 |
| <i>V. M. Teslyuk, V. V. Beregovskyi, A. I. Pukach, Development of smart house system model based on colored Petri nets</i> | 205 |
| <i>P. Denysyuk, T. Teslyuk, Main algorithm of mobile robot system based on the microcontroller Arduino</i> | 209 |

Acoustics

| | |
|--|-----|
| <i>Yun Lu, Ch. Statz, M. Mütze, S. Hegler, D. Plettemeier, Noise mitigation and extraction of scatters in acoustic imaging by compressed sensing</i> | 215 |
| <i>O. Piddubniak, N. Piddubniak, S. Brzozowska, Analysis of acoustic echo-signal from gas pipeline with long crack</i> | 219 |
| <i>O. Piddubniak, N. Piddubniak, O. Krasnyk, Sound radiation from T junction of city roads</i> | 226 |
| <i>V. F. Chekurin, O. Z. Kravchyshyn, Interaction of normally incident SH-wave with an inhomogeneously strained elastic layer</i> | 233 |
| <i>H. Lasota, Time-domain dipole fields in acoustics and electromagnetics</i> | 237 |
| <i>Ya. I. Kunets, V. V. Matus, V. O. Mishchenko, Determination of longitudinal waves in elastic media with distributed thin inclusions of low contrast</i> | 242 |
| <i>V. Mykhas'kiv, I. Zhdadynskyi, Ch. Zhang, Time-harmonic interaction effects for a periodic system of coplanar cracks in 3D elastic solids</i> | 246 |
| <i>A. Synyavskyy, On the solvability of inverse transmission eigen-values problem for wave equation with a spherically-symmetric piecewise-constant wave speed</i> | 250 |

Author Index

255