

# **2018 Applications of Electromagnetics in Modern Techniques and Medicine (PTZE 2018)**

**Raclawice, Poland  
9-12 September 2018**



IEEE Catalog Number: CFP18RPE-POD  
ISBN: 978-1-5386-6937-2

**Copyright © 2018 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. 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:	CFP18RPE-POD
ISBN (Print-On-Demand):	978-1-5386-6937-2
ISBN (Online):	978-1-5386-6936-5

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# Table of Contents

---

<i>Attenuation of high frequency electromagnetic waves by polymer composites with waste materials</i>	
Bambynek Damian, Jabłoński Paweł, Jakubas Adam .....	9
<i>Reduction of electromagnetic disturbances emission generated by LED lighting fixture</i>	
Bednarek Karol, Typańska Dorota, Misiorni Jakub, Pietkiewicz Arkadiusz .....	13
<i>Interdisciplinary modelling of transient processes in local electric power systems including long supply lines of distributed parameters</i>	
Chaban Andriy, Lis Marek, Szafraniec Andrzej, Chrzan Marcin, Levoniuk Vitaliy .....	17
<i>Electromechanical oscillatory processes analysis in high voltage switch in power grid</i>	
Chaban Andriy, Szafraniec Andrzej, Levoniuk Vitaliy .....	21
<i>Study of efficiency of tribo-electrostatic separation of finely dispersed carbon powders</i>	
Chabecki Piotr, Ivashchyshyn Fedir, Bordun Ihor .....	25
<i>Signals for magnetic field therapy and a method for their preparation</i>	
Chudorliński Jerzy, Książek Leszek .....	29
<i>Impact of pulsed electric field on the colour of wine made from grapes Marechal Foch variety</i>	
Gałązka-Czarnecka Ilona, Korzeniewska Ewa, Czarnecki Andrzej .....	33
<i>Influence of pulsed electric field on the content of polyphenolic compounds in wine</i>	
Gałązka-Czarnecka Ilona, Korzeniewska Ewa, Czarnecki Andrzej .....	37
<i>The method of noise reduction in systems with two signals paths</i>	
Tomasz Dróżdż, Aleksander Gąsiorski, Zdzisław Posyłek .....	41
<i>Classification of data streams containing abnormal information</i>	
Duraj Agnieszka, Chomątek Łukasz .....	45
<i>Detection of outliers in the financial time series using ARIMA models</i>	
Duraj Agnieszka, Ludwicka Magdalena .....	49
<i>Inverter with 280 kHz frequency to induction levitation of metal melting in a vacuum</i>	
Aleksander Gąsiorski, Paweł Kiełbasa, Zdzisław Posyłek .....	53

<i>Application of natural luminescence for assessment of hard coal quality</i> Gliniak Maciej, Knaga Jarosław, Tomasik Marcin, Lis Anna, Popardowski Ernest, Gliniak Matylda .....	57
<i>Application of natural luminescence for analysis of the radionuclide migration path during hard coal combustion</i> Gliniak Maciej, Knaga Jarosław, Tomasik Marcin, Lis Anna, Popardowski Ernest, Gliniak Matylda .....	61
<i>Using natural and modified waste rocks for phenol removal from wastewater</i> Jabłońska Beata .....	65
<i>Analytical approach to boundary integral formulation for the laplace/poisson equations in circular regions</i> Jabłoński Paweł .....	69
<i>Laboratory setup with squirrel-cage motors for wind turbine emulation</i> Jąderko Andrzej, Baran Janusz .....	73
<i>Fuzzy logic controller for robot manipulator control system</i> Jakubiec Beata .....	77
<i>The reaction of garden cress (<i>Lepidium sativum L.</i>) to microwave radiation</i> Jakubowski Tomasz .....	81
<i>Neurotherapeutic applications of electromagnetic fields</i> Jankowska Milena, Szczygieł Marcin, Wyszkowska Joanna .....	85
<i>Optimization of the structure of the hybrid power plants</i> Kamiński Jacek, Kasprzyk Leszek, Pietracho Robert, Tomczewski Andrzej .....	89
<i>Memristors – the principle of operation and the areas of applications</i> Kasprzyk Leszek, Bednarek Karol, Kłos Jarosław W., Miesczak Szymon .....	93
<i>Modelling of lithium-ion batteries exploitation parameters in electric vehicles</i> Kasprzyk Leszek, Domeracka Agnieszka .....	97
<i>Assessment of the electromagnetic hazards associated with the occurrence of the contact current while using radiotelephones</i> Kieliszek Jarosław, Wyszkowska Joanna .....	101
<i>The impact of the difficulty of the office logical task on the level of employee mental involvement</i> Kielska Paweł, Dróżdż Anna, Trzynieć Karolina, Juliszewski Tadeusz, Dróżdż Tomasz .....	105

<i>Position for calibrating resistance strain gauges</i>	
Kielbasa Paweł, Grodny Krzysztof, Dróżdż Tomasz, Korenko Marosz, Findura Pavel .....	109
<i>System for automatic measurement of topsoil layer compaction and its spatial identification within the research area</i>	
Kielbasa Paweł, Kurpaska Sławomir, Zagórda Miroslaw, Dróżdż Tomasz .....	113
<i>Assessment of the potential of using photon emission to identify selected qualitative features of organic matter</i>	
Paweł Kielbasa, Tomasz Dróżdż, Piotr Nawara, Magdalena Dróżdż, Karolina Trzyniec .....	117
<i>Evaluation of the use of autonomous driving systems and identification of spatial diversity of selected soil parameters</i>	
Kielbasa Paweł, Zagórda Miroslaw, Oblicki Marek, Posyłek Zdzisław, Dróżdż Tomasz .....	121
<i>Magnetophosphenes – case study</i>	
Korzeniewska Ewa, Krawczyk Andrzej, Łada-Tondrya Ewa .....	125
<i>Assessment of pilling effect on the laser modified textile substrates</i>	
Korzeniewska Ewa, Sekulska-Nalewajko Joanna, Gocławski Jarosław, Walczak Maria .....	129
<i>The algorithms in tracking photovoltaic systems</i>	
Korzeniewska Ewa, Szczęsny Artur, Zawiślak Rafał, Seme Sebastian .....	133
<i>Electromagnetic field calculations of multimodule electromechanical device for drilling process – main motor calculations</i>	
Kowol Paweł, Szczygieł Marcin, Burlikowski Wojciech, Trawiński Tomasz .....	137
<i>Electrical stimulation therapy – history and contemporary applications</i>	
Krawczyk Andrzej, Wyszyńska Elżbieta, Wiśniewska Sylwia, Mróz Józef, Korzeniewska Ewa, Murawski Piotr, Wojak Magdalena .....	141
<i>Systematic temperature measurement errors, caused by heat dissipation along the shield of industrial thermometer</i>	
Kurytnik Igor Piotr, Dróżdż Tomasz, Kiełbasa Paweł, Juszkiej Zbigniew .....	146
<i>Selected applications of modern textronic systems</i>	
Łada-Tondrya Ewa, Jakubas Adam .....	150
<i>Simulation model of the microwave-vacuum drying process of selected fruits and vegetables</i>	
Lis Stanisław, Łapczyńska-Kordon Bogusława, Tomasik Marcin .....	155

<i>The intensity of the electromagnetic fields in the coverage of GSM 900, GSM 1800 DECT, UMTS, WLAN in built-up areas</i>	Mazurek Paweł A., Michałowska Joanna, Kozieł Joanna, Gad Radosław, Wdowiak Artur .....159
<i>Optimization of SAR coefficient for dipole antennas array with regard to local hyperthermia</i>	Miaskowski Arkadiusz, Gas Piotr, Szczygiel Marcin .....163
<i>Prognosis of the electromagnetic field parameters of numerically controlled machine tools in industrial conditions</i>	Michałowska Joanna, Tofil Arkadiusz, Józwik Jerzy .....167
<i>Control and diagnostics of an AC servo drive in selected operation modes</i>	Olesiak Krzysztof .....171
<i>Analysis of ultra-weak photon emission from craft beers</i>	Oziembłowski Maciej, Dróżdż Magdalena, Nawara Piotr, Trzyniec Karolina, Popardowski Ernest, Nawirska-Olszańska Agnieszka .....175
<i>Feature extraction for human cell nuclei in histopathology images</i>	Pławiak-Mowna Anna, Mazurkiewicz Małgorzata .....179
<i>An influence of design parameters on dynamic and static behaviour of brushless DC Motors</i>	Popenda Andrzej .....183
<i>Analysis of disturbance time in UPS operation</i>	Przystupa Krzysztof .....187
<i>Analysis of the quality of uninterruptible power supply using a UPS</i>	Krzysztof Przystupa, Joanna Kozieł .....191
<i>Electrical parameters of chosen organs of abdominal cavity and their influence on electromagnetic waves propagation</i>	Przytulski Andrzej .....195
<i>Generalizations of Arbelos and Their Applications</i>	Różański Michał, Samulewicz Alicja, Szczygiel Marcin, Wituła Roman .....199
<i>Distributed system architecture for the remote monitoring of a flood embankment</i>	Rymarczyk Tomasz, Cieplak Tomasz, Tchórzewski Paweł, Kłosowski Grzegorz, Sikora Jan .....204

<i>The use of multisensor electrodes in ERT for area monitoring</i> Rymarczyk Tomasz, Tchórzewski Paweł, Adamkiewicz Przemysław, Niderla Konrad, Cieplak Tomasz .....	208
<i>Elastic net method in the image reconstruction infiltration of water in the embankment</i> Rymarczyk Tomasz, Kozłowski Edward, Kłosowski Grzegorz, Rymarczyk Paweł, Adamkiewicz Przemysław, Sikora Jan .....	212
<i>Application of a neural EIT system to control the processes</i> Rymarczyk Tomasz, Kłosowski Grzegorz, Cieplak Tomasz, Kozłowski Edward .....	216
<i>A hybrid tomography system for the analysis of wall dampness</i> Rymarczyk Tomasz, Oleszek Michał, Szumowski Jakub, Tchórzewski Paweł, Adamkiewicz Przemysław, Sikora Jan .....	220
<i>Influence of the measurement method and reconstruction algorithm in the analysis of the airbrick moisture</i> Rymarczyk Tomasz, Kozłowski Edward, Kłosowski Grzegorz, Adamkiewicz Przemysław .....	224
<i>The prototype ultrasound tomography device to analyze the properties of processes</i> Rymarczyk Tomasz, Gołąbek Michał, Bożek Piotr, Adamkiewicz Przemysław, Maj Michał, Sikora Jan .....	228
<i>Effective ultrasound and radio tomography imaging algorithm for three-dimensional problems</i> Rymarczyk Tomasz, Sikora Jan, Adamkiewicz Przemysław, Polakowski Krzysztof .....	232
<i>Architecture of a mobile system for the analysis of biomedical signals based on electrical tomography</i> Rymarczyk Tomasz, Nita Paweł, Vejar Andres, Woś Michał, Oleszek Michał, Adamkiewicz Przemysław .....	236
<i>Mathematical analysis of topological derivative for electrical impedance tomography</i> Rymarczyk Tomasz, Szulc Katarzyna .....	240
<i>Application of a distributed industrial tomography system for the analysis of technological processes</i> Rymarczyk Tomasz, Niderla Konrad, Kozłowski Edward, Kłosowski Grzegorz, Tchórzewski Paweł .....	244
<i>Implementation of modified image reconstruction algorithms in electrical tomography</i> Rymarczyk Tomasz, Kania Konrad, Stefaniak Barbara .....	248
<i>Influence of variable electromagnetic field on the energy and germination capacity of Cannabis sativa L. subsp. culta Serebr</i> Sadowska Urszula, Źabiński Andrzej, Tabor Sylwester .....	252

<i>What kind of impact is more important? ...role of altmetrics indicators</i> Sygocki Witold, Korzeniewska Ewa .....	256
<i>Analysis of methods for measuring earth resistance and soil resistivity</i> Szczęsny Artur, Korzeniewska Ewa .....	260
<i>Analysis of the effectiveness of the prototype PV tracking system</i> Tomasik Marcin, Knaga Jarosław, Lis Stanisław, Gliniak Maciej .....	264
<i>Torque speed characteristics of torsional torque generator for supporting drilling processes</i> Tomasz Trawiński, Adam Kochan .....	268
<i>Numerical analysis of cathodic protection for traction poles</i> Wantuch Agnieszka .....	272
<i>Quantum computing for clustering big datasets</i> Kamil Wereszczyński, Agnieszka Michalcuk, Henryk Josiński, Andrzej Polański .....	276
<i>The impact of a wind turbine characteristics on the annual energy performance at given wind speed distribution</i> Wrobel Krzysztof, Tomczewski Krzysztof, Sliwinski Artur, Tomczewski Andrzej .....	281
<i>Cooperation of the process of charging the electric vehicle with the photovoltaic cell</i> Zielińska Anna, Skowron Mikołaj, Bień Andrzej .....	285
<i>Challenges in differentiating between attention disorders based on EEG recordings in neurofeedback therapy</i> Żołubak Magda, Pelc Mariusz, Kawala-Janik Aleksandra .....	289
Index of Authors .....	293