

2016 International Conference on Signals and Electronic Systems (ICSES 2016)

**Krakow, Poland
5-7 September 2016**



**IEEE Catalog Number: CFP1657D-POD
ISBN: 978-1-5090-2668-5**

**Copyright © 2016 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 publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP1657D-POD
ISBN (Print-On-Demand):	978-1-5090-2668-5
ISBN (Online):	978-1-5090-2667-8

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

Preface	vi
Plenary Lectures	1
Bogusław Cyganek : <i>Tensor Based Signal Processing - Introduction and Recent Advances</i>	3
Gerhard P. Fettweis : <i>A 5G Hardware Platform - The Tomahawk MPSoC Concept</i>	3
Themis Prodromakis : <i>Memristive Devices and Applications: A paradigm shift for nano electronics</i> . . .	3
1 Analog and Digital Signal Processing	5
Nikolay Prokopenko, Nikolay Butyrlagin, Nikolay Chernov, Vladislav Yugai : <i>Basic Linear Elements of k-valued Digital Structures</i>	N/A
Tomasz Golonek : <i>Analog Circuits Specifications Testing by Means of Fast Fourier Transformation</i> . . .	13
Krzysztof Wawryn, Robert Suszynski, Jacek Marciniak : <i>A Competitive WTA ANN for Classification a Calorific Value of a Coal Fuel in Combustion Chambers Using FPAA</i>	19
Ireneusz Gosciniaik : <i>Extended Class of Linear Feedback Shift Registers</i>	23
Krzysztof Duda : <i>Computationally Efficient Signal Reconstruction from Zero-crossing Sampling by the Three Points DFTs</i>	29
Paweł Turcza : <i>A Wavelet-Based Compression for Neural Recording System</i>	33
Paweł Sniatala, Andrzej Handkiewicz, Joao Goes, Nuno Paulino, Joao Oliveira : <i>Fully Differential Sigma-Delta Modulator Structure for Current-Mode Sensors</i>	37
Eugeniusz Kornatowski : <i>Amplitude Detection of Power Transformer Tank Vibrations Signal</i>	41
Agnieszka Lisicka, Piotr Kmon : <i>Frequency Bandwidth Correction Circuit for Multichannel Integrated Electronics Dedicated to Neurobiology Experiments</i>	47
Tomasz Maka : <i>A Comparative Study of Onset Detection Methods in the Presence of Background Noise</i>	51
Przemysław Korohoda, Roman Rumian : <i>Design of the Mutually Cancelling Narrow Passband and Stop-band Filters – a Case Study</i>	57
Tomasz Zielinski, Katarzyna Ostrowska : <i>Application of Bertocco-Yoshida Interpolated DFT Algorithm to NMR Data Analysis</i>	63
Marta Kolasa, Tomasz Talaśka, Rafał Długosz : <i>Triangular Neighborhood Function for Self-Organizing Neural Networks Implemented in the CMOS 130nm Technology</i>	68
Jacek Kołodziej, Jacek Stępień, Ryszard Golański, Witold Machowski, Juliusz Godek : <i>Recovery Synchronization in ANS-DM Demodulator</i>	73
2 Speech and Image Processing, Coding and Recognition	79
Robert Wielgat, Anita Lorenc : <i>Speech Inversion by Dynamic Time Warping Method</i>	81
Daniel Król : <i>Optimization of Signal Processing System for Precision Measurements Using Maximum Length Sequences</i>	85

Adrian Dziembowski, Adam Grzelka, Dawid Mieloch, Olgierd Stankiewicz, Marek Domański : <i>Depth map upsampling and refinement for FTV systems</i>	89
Krzysztof Wegner, Olgierd Stankiewicz, Marek Domański : <i>Novel Depth-Based Blending Technique for Improved Virtual View Synthesis</i>	93
Łukasz Mik, Anita Lorenc : <i>Kinematic Analysis of Articulatory Movements in Polish Affricates Consonants</i>	99
Paweł Gardziński, Krzysztof Kowalak, Łukasz Kamiński, Sławomir Maćkowiak : <i>Human Silhouette Segmentation using Discrete Poisson Equation and Extended Watershed Algorithm</i>	103
Jarosław Samelak, Jakub Stankowski, Marek Domanski : <i>Adaptation of the 3D-HEVC coding tools to arbitrary locations of cameras</i>	107
Md. Akmol Hussain, Akbar Sheikh Akbari, Bruhanth Mallik : <i>Colour Constancy using Sub-blocks of the Image</i>	113
Marek Domański, Adrian Dziembowski, Adam Grzelka, Dawid Mieloch : <i>Optimization of camera positions for free-navigation applications</i>	118
Jakub Stankowski, Tomasz Grajek, Damian Karwowski, Krzysztof Klimaszewski, Olgierd Stankiewicz, Krzysztof Wegner : <i>Computational complexity tradeoffs in HEVC motion estimation</i>	124
3 Analysis and Modeling of Circuits and Systems	129
Nikolay Prokopenko, Ilya Pakhomov, Anna Bugakova, Nikolay Butyrlagin : <i>Zero level of BiJFet-Differential Difference Operational Amplifiers and Methods of its Decrease in Conditions of Low Temperatures and Radiation Effect</i>	131
Nikolay Prokopenko, Nikolay Butyrlagin, Anna Bugakova, Ilya Pakhomov : <i>The Differential Difference Amplifiers of Sensor Systems with Input Transistors of Various Physical Nature</i>	135
Zbigniew Galias : <i>Topological chaos in the parallel inductor-capacitor-memristor circuit</i>	139
Grzegorz Pastuszak : <i>High-Speed Architecture of the CABACProbability Modeling for H.265/HEVC Encoders</i>	143
Jozef Tutaj, Bogdan Fijalkowski : <i>Computer Simulation of an Integrated AC-DC Rectifier with Reverse Conducting Transistors</i>	147
Szczepan Moskwa, Sławomir Koziel, Zbigniew Galias : <i>Minimization of Power Supply-Interruption-Related Costs In Power Distribution Grids Using Evolutionary Methods</i>	153
Michał Kaczmarek, Przemysław Koralewicz : <i>Hardware in the Loop Simulations of Industrial Application Using System on the Chip Architecture</i>	157
Andrzej Szromba : <i>Shunt Active Power Filter Control Using Signal of Load Equivalent Conductance in Asymmetrical Three-Phase Systems Under Nonsinusoidal Conditions</i>	161
Jacek Jasielski, Wojciech Kołodziejski, Stanisław Kuta : <i>Cancellation of Common-Mode Output Signal in Class-BD Audio Amplifiers</i>	167
Bartłomiej Garda, Maciej J. Ogorzalek : <i>Modelling the Generic TiO₂ Memristor with the Parasitic Components</i>	173
4 Application of Electronic Systems	177
Adama Samake, Piotr Kocanda, Andrzej Kos : <i>A New Idea of Effective Cooling of Integrated Circuits</i> .	179
Wojciech Mysiński, Adam Cudak : <i>Application of Fuzzy Logic for a Gap-Width Controller Used in Electro-Discharge Machining</i>	183
Jarosław Bułat, Andrzej Głowacz : <i>Vision-Based Navigation Assistance For Visually Impaired Individuals Using General Purpose Mobile Devices</i>	189
Michał Baszynski, Adam Ruszczyk, Przemysław Rydygier : <i>Wireless energy transfer for industrial applications</i>	195

Damian Bereska, Krzysztof Daniec, Witold Ilewicz, Karol Jedrasiak, Roman Koteras, Aleksander Nawrat, Marcin Pacholczyk : <i>Influence of Temperature on Measurements of 3-Axial Accelerometers and Gyroscopes</i>	200
Jakub Nikonowicz, Paweł Kubczak, Łukasz Matuszewski : <i>Hybrid Detection Based on Energy and Entropy Analysis as a Novel Approach for Spectrum Sensing</i>	206
Mieczysław Zając, Maciej Sułowicz : <i>Wavelet Detectors for Extraction of Characteristic Features of Induction Motor Rotor Faults</i>	212
Ireneusz Brzozowski, Piotr Bratek, Piotr Dziurdzia, Wojciech Gelmuda, Andrzej Kos, Jacek Ostrowski, Dominik Rzepka : <i>Breath Sensor Based on Conductive Foam</i>	219
Paweł Biernacki : <i>Software correction of speed measurement determined by phone GPS module in runner applications</i>	225
5 Embedded Systems	229
Andrzej Pulka, Łukasz Golly : <i>Some Issues Concerning Design Space Exploration in Time Predictable Embedded Systems</i>	231
Piotr Chodorowski, Mirosław Chmiel : <i>IEC 61131-3 compliant PLC structure based on FPGA multi-core solution</i>	237
Tomasz Golonek, Marian Kotas, Piotr Jantos : <i>Home Ultrasound Device for Heart Beats Monitoring Based on ARM Microcontroller</i>	243
Mirosław Chmiel, Wojciech Kloska, Jan Mocha, Dariusz Polok : <i>FPGA-based two-processor CPU for PLC</i>	247
Adam Milik, Mirosław Chmiel, Edward Hryniewicz : <i>Multiple Core PLC CPU with Tight Thread Synchronization</i>	253
6 Communication Systems, Network and Transmission	259
Nikolay Prokopenko, Nikolay Butyrlagin, Anna Bugakova, Ilya Pakhomov : <i>The Multifunctional Programmable Multiplexer of Potential Signals of Sensors</i>	261
Juliusz Godek, Ryszard Golański, Witold Machowski, Jacek Kołodziej and Jacek Stępień : <i>Proposition of the full synchronization method for transmission systems with variable duration of bits</i>	265
Jerzy Dabrowski, Fahad Qazi : <i>Spectrum Sensing for Cognitive Radio Based on Flexible RF Filtering</i>	269
Robert Choderek, Agnieszka Choderek : <i>TFD-Capable Dynamic QoS Assurance Using a Variable Time Horizon Based on Scene Changes</i>	275
Marcin Niemiec, Radosław Kotaba, Daniel Iziourov and Andrzej Pach : <i>Error Detection in Software and Hardware Encryption</i>	281
Author Index	287
List of Reviewers	289