

# **2014 International Conference on Applied Electronics**

**(AE 2014)**

**Pilsen, Czech Republic  
9 - 10 September 2014**



**IEEE Catalog Number: CFP1469A-POD  
ISBN: 978-1-4799-4869-7**

## Table of Contents

### Plenary lecture

Maloberti F.	High-Speed Analog-to-Digital Converters Using Nanometer CMOS Technology (abstract)	<b>1</b>
Abdel Raheem G., Usama S., Khaled S.	Simple and Accurate Approach for Pseudo Random Code Regeneration	<b>B#5</b>
Arbet D., Stopjakova V.	Influence of the Oscillation Frequency Value on the Efficiency of Oscillation-Based Tests	<b>7</b>
Atasoyu M., Alaybeyoglu E., Kuntman H.	Reconfigurable Filter Structure Designed for Different Positioning Systems	<b>11</b>
Bauer J., Posta P., Fligl S., Lettl J.	Universal Embedded Controller for Matrix Converter	<b>15</b>
Benabid S., Aghdam E.	Design and Simulation of a 6th Order Continuous-Time Sigma-Delta Modulator Using Integrated LC Filter in a Standard CMOS Technology	<b>21</b>
Benes P.	Improving the Safety of Human-Robot Cooperation with Control of Joint Stiffness	<b>27</b>
Beresik R., Puttera J., Nebus F.	Seismic Sensor System for Security Applications Based on MEMS Accelerometer	<b>31</b>
Biolek D., Biolkova V., Kolka Z.	Memristor Pinched Hysteresis Loops: Touching Points, Part I	<b>37</b>
Biolek D., Biolkova V., Kolka Z.	Memristor Pinched Hysteresis Loops: Touching Points, Part II	<b>41</b>
Bizon N., Raducu M., Oproescu M., Constantinescu L.	Energy Efficiency of the PV Panels Using a MPPT Controller with Improved Search Speed - Part I: Modeling of the PV Power System under Extremum Seeking Control	<b>45</b>
Bizon N., Raducu M., Oproescu M., Constantinescu L.	Energy Efficiency of the PV Panels Using a MPPT Controller with Improved Search Speed - Part II: Simulation Results	<b>51</b>
Borsky M., Pollak P.	The Optimization of PLP Feature Extraction for LVCSR Recognition of MP3 Data	<b>55</b>

Buchta L., Pohl L.	Dead-Time Compensation Strategy with Adaptive Harmonic Compensator	<b>59</b>
Burian P.	Compact Version of Cartesian Genetic Programming	<b>63</b>
Dijemeni E., Roberts D.	Desktop Based Real Time Oxygen Auto-Ventilation and Gas Monitoring System for Homecare Respiratory Application	<b>67</b>
Dobias M., Stastny J.	Subband Optimization for EEG-Based Classification of Movements of the Same Limb	<b>71</b>
Dudacek K., Ledvina J., Vavricka V.	Development of a HART Compatible HART Line Powered Communication Module	<b>75</b>
Duricek M., Krajcovic T.	Interactive Hybrid Control-Flow Checking Method	<b>79</b>
Fiala P., Linhart R.	High Performance Polyphase FIR Filter Structures in VHDL Language for Software Defined Radio Based on FPGA	<b>83</b>
Frivaldsky M., Dobrucký B., Spanik P., Koscelnik J.	A Novel B3C Converter	<b>87</b>
Frivaldsky M., Spanik P., Drgona P., Koscelnik J.	Indirect Investigation of Heat Transfer of Electronic System	<b>93</b>
Hargas L., Koniar D., Hrianka M., Durdik P., Banovcin P.	Moving Object Searching Based on Virtual Instrumentation	<b>99</b>
Harvanova V., Krajcovic T.	Wireless Home Monitoring System - Design and Evaluation	<b>103</b>
Hofmann G., Scharfenberg G.	Applicability of the ISO 26262 for Functional Safety for Motorbikes	<b>107</b>
Hrusak J., Stork M., Mayer D.	Nonlinear Stabilization of Oscillators by State Space Energy Error Feedback	<b>113</b>
Chandra Shaker P., Srinivasulu A.	Quadrature Oscillator Using Operational Transresistance Amplifier	<b>117</b>
Ionescu L., Mazare A., Anton C., Stoian C.	The Hardware Implementation of a Quantum Computation System Emulator	<b>121</b>

Iqbal F., Ata S.	CMOS 5GHz Low Noise Amplifier for 802.11ac	<b>B#5</b>
Janik D., Kosan T., Sadsky J., Peroutka Z.	Implementation of SVPWM Algorithm without Trigonometric Functions	<b>131</b>
Jara M., Blahnik V., Peroutka Z., Talla J., Matuljak I.	Control of H-Bridge Power Inverter with LCL Filter	<b>135</b>
Jarzebowicz L., Judek S.	3D Machine Vision System for Inspection of Contact Strips in Railway Vehicle Current Collectors	<b>139</b>
Jilek J., Stork M.	Wrist Cuff Method Determines Mean Arterial Pressure in Dual-Cuff Blood Pressure System	<b>145</b>
Judek S.	Control System for Contactless Electrical Energy Transfer with Varying Air Gap	<b>149</b>
Koscelnik J., Sedo J., Dobrucky B.	Modeling of Resonant Converter with Nonlinear Inductance	<b>153</b>
Kubak J., Stastny J., Kujan P.	Programmable PWM Modulator Optimized for High Speed for OPWM Test Platform	<b>157</b>
Kubik Z., Skala J., Nikolayev D.	3D FEM Simulation of Small Stripline for EMC Testing	<b>161</b>
Kus V., Josefova T.	Effect of Dead Times on the Values of Input Current Harmonics Drawn from the Grid by a Voltage-Source Active Rectifier	<b>165</b>
Kutilek P., Hejda J., Socha V., Vlckova K., Cerny R.	Evaluation of the Relative Position of the Head and Shoulders in Neurological Practice	<b>169</b>
Kysela M., Dolezal I.	A Motion Detection System of the Patient in the Bed Using the NiTi Pressure Sensors	<b>173</b>
Lahoda J.	Phase Coupled Oscillators Based on Dissipation Normal Form – Mathematical Model of Swimming Fish	<b>177</b>
Laskody T., Prazenica M., Kascak S.	Space Vector Pulse Width Modulation for Two-Phase Two-Stage Matrix Converter with Four Legs	<b>181</b>
Linhart R., Fiala P.	Measuring RF Circuits Response Using Software Defined Radio System	<b>185</b>

Lozek M., Havlickova N., Havlik J.	Adaptive Mechanical Model of Cardiovascular System: Regulatory Processes	<b>189</b>
Majer L., Mihalov J., Stopjakova V., Zalusky R., Brenkus J., Uram M.	An RF Network Combiner Towards a Wireless Multi-Communication System for Smart Households	<b>193</b>
Matousek D., Brtnik B.	Matrix Method Derived from Graph Method of SI Circuit Solution	<b>197</b>
Matousek Z., Ochodnický J., Babjak M.	M-FSK Intra-Pulse Modulation Analysis by Subspectral Decomposition Method	<b>201</b>
Matousek Z., Ochodnický J., Sostronek M., Kurdy J.	Small Loop Antennas Parameters Measurement in GTEM Cell	<b>205</b>
Merz C., Kupris G., Niedernhuber M.	Design and Optimization of a Radio Frequency Energy Harvesting System for Energizing Low Power Devices	<b>209</b>
Moldaschl J., Broulim J., Palocko L.	Boost Power Factor Correction Topology with Average Current Control	<b>213</b>
Moldaschl J., Broulim J., Palocko L.	Principle of Power Factor Corrector with Critical Conduction Mode	<b>217</b>
Muzikova V., Glasberger T., Smidl V., Peroutka Z.	Comparison of Full-Model and Reduced-Model EKF Based Position and Speed Estimators for Sensorless DTC of Permanent Magnet Synchronous Machines	<b>221</b>
Nagy L., Stopjakova V., Satka A.	Design of E/D-Mode InAlN/GaN HFET Inverter and its Robustness Analysis	<b>225</b>
Novak M., Kosek M., Eichler J.	Effective Approximation of Transfer Characteristics of Low Frequency Amplifier	<b>229</b>
Oklapi E., Deubzer M., Schmidhuber S., Lalo E., Mottok J.	Optimization of Real-Time Multicore Systems Reached by a Genetic Algorithm Approach for Runnable Sequencing	<b>233</b>

Osipov D.	2.2ppm/°C Bandgap Voltage Reference with High-Order Temperature Compensation	<b>239</b>
Palacky P., Oplustil J., Kalvar D., Uchoc M., Sprlak R.	Two Stepped System of Converters with Accumulation of Electrical Energy	<b>243</b>
Pichlik P., Zoubek O., Zdenek J.	Measuring Device for Measurement of Train Dynamic Motion during Wheel Slip	<b>247</b>
Pospisil T., Novak J.	New Method of CAN Nodes Health Monitoring	<b>251</b>
Puricer P., Kovar P.	Empirical Model of the ADS-B Channel for Airport Area	<b>255</b>
Safarova V., Hes L., Militky J.	An Approach to Electrical Resistance Measurement Eliminating Contact Resistance Problem	<b>259</b>
Sharma R., Honc D., Dusek F.	Sensor Fusion for Prediction of Orientation and Position from Obstacle Using Multiple IR Sensors: An Approach Based on Kalman Filter	<b>263</b>
Sivakumari K., Srinivasulu A., Venkata Reddy V.	A High Slew Rate, Low Voltage CMOS Class-AB Amplifier	<b>267</b>
Storek D.	Rendering Moving Sound Source for Headphone-Based Virtual Acoustic Reality: Aspects of Signal Processing Implementation	<b>271</b>
Stork M., Hrusak J., Mayer D.	High Spectral Quality Sinusoidal Oscillator with Energy Based Amplitude Control	<b>277</b>
Stork M., Tolar D.	Wireless Electronic Systems for Physiological Parameters Measuring	<b>281</b>
Stork M., Vancura V.	Hidden Pacemaker Pulses Detection Based on Wavelet and Hilbert-Huang Transform	<b>285</b>
Svoboda P., Novak M., Bubla V., Pokorny P.	Apparatus for Feedback Control of Electrospinning Process	<b>289</b>
Teodorescu H.	Iterated Maps with Exponential Slopes for Nonlinear Dynamics Generation	<b>293</b>
Tsujimura T., Hashimoto T., Izumi K.	Genetic Reasoning for Finger Sign Identification Based on Forearm Electromyogram	<b>297</b>

Ukte A., Kizilkaya A., Elbi M.	Statistical Multirate High-Resolution Signal Reconstruction Using the Empirical Mode Decomposition Based Denoising Approach	<b>303</b>
Usama S., Tohamy A.	Denoising for RF Signal in OFDM System with AWGN Channels	<b>B#5</b>
Vale-Cardoso A., Araujo H., Guimaraes H.	A Feed-Forward Approach for DC Cancellation in Fully- Differential Instrumentation Amplifiers	<b>311</b>
Viteckova S., Kutilek P., Kauler J., Svoboda Z.	Fuzzy Expert System for Determining the Human Gait Phase	<b>315</b>