

<http://appel.zcu.cz>



polypress

ISBN 978-80-261-0813-9



9 788026 108139

2019 International Conference on Applied Electronics

IEEE Catalog Number CFP1969A-PRT | ISBN 978-80-261-0813-9 | ISSN 1803-7232

24th

2019 International Conference on

Applied Electronics

Pilsen, 10 – 11 September 2019

IEEE Catalog Number CFP1969A-PRT | ISBN 978-80-261-0813-9 | ISSN 1803-7232

Department of Applied Electronics and Telecommunications
University of West Bohemia – Faculty of Electrical Engineering



24th

2019 International Conference on

Applied Electronics

Pilsen, 10 – 11 September 2019

IEEE Catalog Number CFP1969A–PRT | ISBN 978–80–261–0813–9 | ISSN 1803–7232

Department of Applied Electronics and Telecommunications
University of West Bohemia – Faculty of Electrical Engineering



2019 International Conference on Applied Electronics

© **University of West Bohemia, 2019**

Published by the University of West Bohemia, Pilsen, September 2019

Editor Jiří Pinker
Design Jaroslav Fiřt
Cover photo Zdeněk Kubík

Copyright and Reprint Permission

Libraries are permitted to make photocopies. Other copying, reprint, or reproduction requests should be addressed to

University of West Bohemia
FEL - KAE
Univerzitni 8
306 14 Pilsen
Czech Republic
email: appel@fel.zcu.cz

Additional copies of this publication are available from

University of West Bohemia
FEL - KAE
Univerzitni 8
306 14 Pilsen
Czech Republic
email: appel@fel.zcu.cz

ISBN 978–80–261–0813–9 (Print)

ISBN 978–80–261–0812–2 (Online)

ISSN 1803–7232 (Print)

ISSN 1805–9597 (Online)

IEEE Catalog Number CFP1969A–PRT (Print)

IEEE Catalog Number CFP1969A–ART (Online)

Preface

The international conference "Applied Electronics" is a regular event, organized yearly from 1996 by the Faculty of Electrical Engineering – part of the University of West Bohemia. Our aim is to provide a forum for researchers and practitioners interested in advances in the wide scope of electronic circuits and systems, especially in applications of theoretical research.

This is the 24th year of the conference. All the papers have been reviewed for acceptance by the members of the International Program Committee in a double-blind reviewing procedure. The accepted papers are published in the Proceedings in the form in which they were received. The organizers assume no liability for the accuracy of information herein.

I would like to thank the members of the Program Committee for their careful reviews of the submitted papers.

Our thanks belong to the Institute of Electrical and Electronics Engineers – Industrial Electronics Society (IEEE – IES) and to the Czechoslovakia Section of IEEE for their technical co-sponsorship, and to the University of West Bohemia for its support.

I must also express my gratitude and appreciation to all those who prepared this conference, especially to the members of the Organizing Committee.



Chairman

Organizing Committee AE 2019

Department of Applied Electronics and Telecommunications
University of West Bohemia – Faculty of Electrical Engineering

Programme Committee

Akcım N., Gazi University, Turkey	Krstić D., University of Nis, Serbia
Baudoin G., ESIEE, Paris, France *	Kurt E., Gazi University, Ankara, Turkey
Beresik R., Armed Forces Academy, Slovakia	Michal V., ST-Ericsson, Grenoble, France
Biolek D., University of Defence, Brno, Czech Republic *	Minaei S., Dogus University, Istanbul, Turkey *
Bizon N., University of Pitesti, Romania *	Mischie S., Politehnica Univ. of Timisoara, Romania
Bozzo M., INFN, Genoa – Italy, CERN, Switzerland	Mottok J., Regensburg Univ. of Applied Sciences, Germany *
Brandstetter P., Technical University of Ostrava, Czech Rep.	Ondracek O., Slovak Technical Univ., Bratislava, Slovakia
Cetin E., Pamukkale University, Denizli, Turkey	Oproescu M., University of Pitesti, Romania *
Cevik U., Cukrova University, Adana, Turkey	Orphanoudakis F., Hellenic Open Univ., Patras, Greece *
Cicekoglu O., Bogazici University, Istanbul, Turkey *	Petrzela J., Brno University of Technology, Czech Republic
Davies A., King 's College London and Kingston Univ., U.K. *	Pichotka M., Czech Technical Univ., Prague, Czech Rep.
Dokladalova E., ESIEE, Paris, France	Rastocny K., University of Zilina, Slovakia
Fiorucci E., University of L 'Aquila, Italy *	Rath G., University of Leoben, Austria
Fotopoulos V., Hellenic Open University, Greece *	Salem A., Ain Shams University, Cairo, Egypt
Grzemba A., HDU Deggendorf, Germany	Sazak B. S., Pamukkale University, Denizli, Turkey
Haasz V., Czech Technical University, Prague, Czech Rep. *	Stojanovic R., University of Montenegro, Serbia *
Herencsar N., Brno University of Technology, Czech Rep. *	Stopjakova V., Slovak Technical University, Bratislavam Slovakia
Hospodka J., Czech Technical University, Prague, Czech Rep.	Teodorescu H.-N., Rom. Acad. and G. A. Tech. Univ. of Iasi, Romania *
Hribik J., Slovak Technical University, Bratislava, Slovakia	Trpkovska M., S.–E. European Univ., Tetovo, North Macedonia
Chang P., National Changhua University of Education, Taiwan *	Tutanescu I., University of Pitesti, Romania
Jaikla W., King Mongkut's Inst. of Tech., Ladkrabang, Thailand	Tysler M., Slovak Academy of Sciences, Bratislava, Slovakia
Jilek J., Carditech, King-Drew Med. Center, Culver City, U.S.A.	Wilkie B. A., Brunel University, London, U.K.
Krist P., University of West Bohemia, Pilsen, Czech Republic	Zaev E., Ss. Cyril and Methodius University, North Macedonia

* IEEE member

Organizing Committee

Brezinova H., Firt J., Kubik Z., Pavlicek V., Pinker J., Skala J., Stork M., Weissar P.

Conference Chairs

General Chairman	Jiri Pinker
Technical Committee	Milan Stork
Publication	Jaroslav Firt
Finances	Vaclav Koucky
E-media	Petr Weissar
Secretary	Hana Brezinova

Table of Contents

Rymus J.	Simulating ADAS Sensors, their Placement and Environment (Invited Lecture – Abstract)	1
Barri D., Jakovenko J.	Design and Optimization of an Active OTA-C Filter Based on STOHE Algorithm	3
Belik M.	Calculation of Solid Particle Trajectory Inside Electrical Separator Based on Measured Values	9
Bhajana V., Drabek P.	A Novel ZCS/ZVS Bidirectional DC-DC Converter for Energy Storage Applications	15
Brtnik B., Matousek D.	Active-RC Filters Suitable as Antialiasing and/or Reconstruction Filters	21
De S., Niklas M., Rooney B., Mottok J., Brada P.	Towards Translation of Semantics of Automotive Interface Description Models from Franca to AUTOSAR Frameworks	25
Doskocil R., Krivanek V., Bergeon Y., Kornelly T.	Mobile Phone as a Sensor for Robot Navigation System	31
Dragoun J., Talla J., Kosan T.	Converter Power Losses Computation by FPGA-Based HIL Simulator	39
Draxler K., Hlavacek J., Styblikova R.	Calibration of Instrument Current Transformer Test Sets	43
Eroglu H.	Design and Implementation of a High Voltage Source for Biphasic Electrical Stimulators	47
Freitas L., Nogueira A., Melgar M.	Data Validation System Using QR Code and Meaningless Reversible Degradation	51
Gheltu S.	Correlations of the Vowel Formants in Romanian and Emotional Effects on Formants	55
Glasberger T., Kosan T., Molnar J.	Rack Mounted Low-Profile Indirect Frequency Converter	59
He Y., Chiang H., Chen J., Chang P.	The Inaccuracy of Compensation System of Spindle Thermal Growth in Machine Tool Application and its Solution	63
Holota R., Koucky V., Krist P., Valenta P., Masek B.	Electronic System for Controlled Modification of Temperature Field in Sheet Metal Blanks	67
Hrbcek J., Bubenikova E., Janota A.	Development of the Short Time Signals Processing Unit Using an Embedded System	71
Jicinsky M., Mares J., Verespejova L., Chovanec M.	Speech Processing in Diagnosis of Vocal Chords Diseases	75
Jilek J., Stork M.	Assessment of Three Multiple Cuff Blood Pressure Devices	79

Kenyeres M., Kenyeres J.	Distributed Network Size Estimation Executed by Average Consensus Bounded by Stopping Criterion for Wireless Sensor Networks	83
Kenyeres M., Kenyeres J.	On Comparative Study of Deterministic Linear Consensus-Based Algorithms for Distributed Summing	89
Kovar P., Puricer P., Morong T., Sturc F.	Digital Up and Down Converter for High Performance VHF and UHF Transceiver	95
Kubik Z., Skala J.	Electromagnetic Interference from DC/DC Converter of Photovoltaic System	99
Matousek D., Brtnik B.	Rationalisation of the Fibonacci Charge Pump	103
Mischie S., Pazsitka R.	Designing a MSP430 Bootloader	107
Niedermaier M., Fischer F., Merli D., Sigl G.	Network Scanning and Mapping for IIoT Edge Node Device Security	111
Peniak P., Bubenikova E.	Validation of IoT Secure Communication Gateway for Constrained Devices	117
Petrzela J.	Circuit Equivalent to Rucklidge System	123
Pichlik P.	Evaluation of Phase Shift in Electric Drive by Kalman Filter for Wheel Slip Control	127
Ponomarenko S., Zaleshin A.	About One Pseudolinear Approximation of Exponent	131
Ponomarenko S., Zaleshin A.	Sample and Hold Passive Mixer	135
Scharfenberg G., Elis L., Hofmann G.	New Design Methodology – Using VHDL-AMS Models to Consider Aging Effects in Automotive Mechatronic Circuits for Safety Relevant Functions	141
Sido J., Konopík M., Reismüllerová J.	Deep Learning for Text Data on Mobile Devices	147
Skarolek P., Lettl J.	Tracking Deadtime Algorithm for GaN DC/DC Converter	151
Stork M., Mayer D.	Modified Tellegen Principle Used for Power and Energy Systems Modeling	155
Stork M., Novak J., Broz P.	Cardiac Mathematical Models for Exercise Testing on Treadmill Ergometer	161
Stork M., Pinker J., Weissar P.	Adaptive Control System for Autonomous Vehicle Path Following	165
Teodorescu H.	Chirps for Radar Based on Reciprocal Time, Essential Discontinuities and Chaotic Generators	169
Teodorescu H., Cojocaru V., Katashev A.	Multi-Criterial Assessment of the Uniformity of the Electrical Potential of Micro-Films	173
Vertat I., Dudacek L.	Multidimensional Cross Parity Check Codes as a Promising Solution to CubeSat Low Data Rate Downlink	177

Wagner P., Wilhelm T., Sailer A.	Analyzing Multi-Core Timing Effects on Control Systems via Co-Simulation	183
Zdansky J., Medvedik M.	Performing Safety Functions to Monitor the Protected Area Using a Light Curtain	187
Zdansky J., Valigursky J.	Influence of Distributed SRCS Architectures on Dependability and Safety of Realised Safety Functions	193