## **2022 International Conference on Applied Electronics (AE 2022)**

Pilsen, Czech Republic 6 – 7 September 2022



IEEE Catalog Number: CFP2269A-POD ISBN: 978-1-6654-9483-0

## Copyright © 2022 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:
 CFP2269A-POD

 ISBN (Print-On-Demand):
 978-1-6654-9483-0

 ISBN (Online):
 978-1-6654-9482-3

ISSN: 1803-7232

## Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-040

Phone: (845) 758-0400 Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



## **Table of Contents**

Bergmann B.	Understanding ionizing energy losses after charged particle and neutron impact in semiconductors with hybrid pixel detectors	1
Abdulhameed A., Kubík Z.	Design and Modelling of Printed Log Periodic Dipole Array Antenna with Different Feeding Methods	5
Al-Anbagi H., Vertat I.	Collaborative Network of Ground Stations with a Virtual Platform to Perform Diversity Combining	9
Andel J., Šimák V.	Hardware support for research of the sensor fusion of inertial sensors	15
Asanza V., Landivar J., Ormaza C., Ojeda V., Avilés J., Peluffo-Ordónez D.	Trilateration-based Indoor Location using Supervised Learning Algorithms	19
Asanza V., Montesdeoca G., Chica K., Peluffo-Ordónez D.	Analysis of Sorting Algorithms Using a WSN and Environmental Pollution Data based on FPGA	25
Avotina L., Bumbure L., Goldmane A., Vanags E., Romanova M., Sorokins H., Zaslavskis A., Kizane G., Dekhtyar Y.	Thermal behaviour of magnetron sputtered tungsten and tungsten-boride thin films	29
Barri D.	Precise Model of the Effective Threshold Voltage Changes in the DLS MOSFETs for Different Gate Angles Compared with Measured Data	33
Bhajana V., Drabek P.	Improved Non-Isolated Bidirectional DC-DC Converter Assisted with an Active Resonant Network	39
Biel Z., Šuňal M., Kuľha P.	Application of inverter parallel operation strategy in railway auxiliary converters	45
Cetin S., Yenil V., Dere U.	An Efficient Wireless Power Transfer System for An Implantable Deep Brain Stimulation	49
Danko M., Hock O., Sedo J.	Design of goniophotometer with the automated measuring system	53
Frauenschläger T., Mottok J.	Security-Gateway for SCADA-Systems in Critical Infrastructures	57
Frivaldsky M.	Evaluation of thermal performance of automotive inverter with laminar busbars	63
He Y., Chiang H., Chang P.	Investigation of Force-Sensor-Integrated Motorized Spindles and Diagnosis of Unbalanced Tool Operation	69
Hock O., Danko M., Sedo J.	Resolver interface comparison	75
Holček R., Franko M., Šuňal M.	Compensation of input impedance by digital control, for high voltage convertor	79
Husoy J.	A Simplified Normalized Subband Adaptive Filter (NSAF) with NLMS-like complexity	83
Jahanbakhshi M., Hayati M., Veřtát I.	Prototype of compact Microstrip lowpass filter for active phased antenna array with ultra-wide stopband using funnel shaped resonator	89
Jilek J., Stork M.	Home Blood Pressure Monitors For 21st Century	93
Kehl Z., Glasberger T., Polacek L.	Design of new generation of binary IO card for modular microprocessor control system	97

Kiraz E., Hatik F., Gunel S.	Standalone Antenna Measurement System	101
Klčo P., Koniar D., Hargaš L., Paškala M.	Automated detection of soldering splashes using YOLOv5 algorithm	107
Maier R., Mottok J.	Causality and Functional Safety - How Causal Models Relate to the Automotive Standards ISO 26262, ISO/PAS 21448, and UL 4600	111
Matoušek D., Černý O.	IO-Link Master Bridge	117
Michal V.	Floating Voltage Sensing Based on ceramic capacitor Ferroelectric Derating	121
Michal V.	Regulated Cascode Current Mirror with Improwed Voltage Swing	125
Pittermann M., Blahnik V., Straka M.	Model Study of Cooperating Traction Substations at 25 kV Traction Catenary without Superior Power Distribution Control	129
Pozzobon E., Renner S., Mottok J., Matousek V.	An optimized Bitsliced Masked Adder for ARM Thumb-2 Controllers	133
Reindl A., Langer T., Meier H., Niemetz M.	Comparative Reliability Analysis for Single and Dual CAN (FD) Systems	137
Siahkamari H., Jahanbakhshi M., Lotfi S.	New Approach In Designing Hexagonal-Shaped Antenna Based On Area Analysis	143
Skarolek P., Lettl J.	GaN Based Inverter Current-Collapse Loss Decrease Using 5-segment Modulation	147
Stork M., Hammerbauer J.	Recursive Sine Wave Digital Oscillator with New Method Used for Amplitude Control	153
Stork M., Novak J.	Anaerobic Threshold Approximation with Minimum Number of Blood Samples	157
Štengl J., Komrska T., Burian P.	Fast Real-Time Data Exchange among Distributed Control System of STATCOM Installation	161
Šuňal M., Biel Z., Pčola M.	Implementation of charger current sharing method in railway application using CAN bus	167
Talla J., Janouš Š., Streit L., Suchý O.	LQR Control of Input LC filter of a Tram with On-board Energy Storage System	171
Teodorescu H.	Lambert Function in the Determining of the Noise Equilibrium Frequency for Radiation Detectors	175
Teodorescu H.	Seismic Energy Harvester for High Current Emergency Applications	179
Valenta P., Georgiev V., Mašek B., Skála J., Koucký V., Hammerbauer J., Krauz J.	The speed up of vibrating hydraulic jaws by smart control of electric solenoids	183
Veřtát I., Pokorný M., Masopust J.	Electronic Control Board for Phased Antenna Array Research and Prototyping	187
Vins M., Sirovy M.	Economic Evaluation of Battery Energy Storage Integration into Plant with Cyclic Load	193
Yenil V., Cetin S.	An Improved Pulse Density Modulation Control for A Semi Active Rectifier in Wireless Power Transfer with LC/S Compensation	197