

**Contents**

01	<b>Stanford Chidziva, Marek Malinowski, Bernard Bladergroen, Sivakumar Pasupathi, Mykhaylo Lototskyy -</b> PEM electrolysis system performance and system safety integration	1
02	<b>Victor Du John H, Jackuline Moni D*, Gracia D</b> - A detailed review on Si, GaAs, and CIGS/CdTe based solar cells and efficiency comparison	9
03	<b>Ayman Mohammed Ibrahim, Imran Mohd Ibrahim, Noor Azwan Shairi</b> - Compact Crescent Slot MIMO Antenna with Quad Bands and High Isolation for LTE and 5G communications	19
04	<b>Stanisław DURAK, Janusz PARTYKA, Mariusz GUSTAW</b> - MV/LV Mobile Station Set with MV shunt equipped with synchronization and MV side automation	26
05	<b>Piotr MAKLES</b> - Practical real-time clock calibration systems	30
06	<b>Marcin SZOTT, Szymon WERMiŃSKI, Marcin JARNUT, Jacek KANIEWSKI</b> - Battery peak-power reduction system of traction substation with two-threshold limitation	35
07	<b>Noureddine HAMOUDA, Badreddine BABES, Sami KAHLA, Cherif HAMOUDA, Amar BOUTAGHANE</b> - Particle Swarm Optimization of Fuzzy Fractional PD <sup>1</sup> +I Controller of a PMDC Motor for Reliable Operation of Wire-Feeder Units of GMAW Welding Machine	40
08	<b>Ahmed Belkhiri, Mohammed Belkhiri</b> - Hardware in the Loop Co-Simulation of an FPGA Based Sine Pulse Width Modulator for Variable Speed AC Drives	47
09	<b>Zaenab MUSLIMIN, Ansar SUYUTI , Elyas PALANTEI, Indrabayu and Indar CHAERAH GUNADIN</b> - A new perspective in power loss reduction of ninety two buses integrated D-STATCOM	53
10	<b>Benzerga DJEMAA, Youcef BENMIMOUN, Mohammed Fethi BEKKARA, Sid-Ahmed KELLAL, Benzerga FELLAH</b> - Comparative study of bacteria sterilization by cold plasma produced by DC generator with positive and negative polarity using atmospheric pressure	58
11	<b>Patrik RESUTIK, Slavomir KASCAK</b> - Heatsink design using iterative calculation and thermal simulation for three-phase inverter	63
12	<b>Milan ŠIMKO, Daniel KORENČIAK, Miroslav GUTTEN, Richard JANUR</b> – Measuring and Diagnostic System for Analysis of Transformer Insulation by Return Voltage Method	67
13	<b>Oleksandr PETROV, Volodymyr POHREBENNYK, Serhii KVATERNIUK, Olena KVATERNIUK, Hanna RAKTYANSKA</b> - Processing multispectral images of the surface of biotissues using fuzzy logic	71
14	<b>Chibuzo NNONYELOU, Chinaza MADUKWE, Kosiso Chukwu MADUKWE</b> - Fully Steerable Collocated First-Order Cardioid Microphone Array Acoustic Beam-Pattern	76
15	<b>Djillalia GUENDOUZ, Abdellah LAIDI</b> - Dimensioning of a non-planar wound inductor of a Buckconverter	81
16	<b>Alberto BORET</b> - On-board electric vehicles electricity production by high-efficiency internal combustion engines	85
17	<b>MEKKAOUI Ali, LAOUER Mohammed, YOUNES Mimoun</b> - Power exchange in smart grids integrating renewable energy	91
18	<b>Sebastian ŁACHECIŃSKI</b> - Support of temporal data on the MS SQL Server and Azure SQL Database platform	95
19	<b>M Przemysław PTAK, Krzysztof GÓRECKI, Jakub HELENIAK</b> - Influence of operation mode of the LED lamp of the HUE type on its electrical and optical parameters	102
20	<b>Krzysztof GÓRECKI, Paweł GÓRECKI</b> - Influence of used thermo-sensitive parameter on measured values of thermal resistance of the IGBT	106
21	<b>Przemysław PTAK, Krzysztof GÓRECKI, Michał GENSIKOWSKI</b> - Comparison of dynamic properties of the selected photometric sensors	110
22	<b>Łukasz A. KADŁUBOWSKI, Piotr KMON</b> - Time of arrival measurement using ring oscillator-based Vernier time-to-digital converter in 28 nm CMOS	115
23	<b>Piotr KACZMARCZYK, Piotr KMON</b> - Design of a Dynamic Comparator with Time-Domain Offset Calibration	119
24	<b>Anna ZIELIŃSKA</b> - Electromobility research: the impact of using renewable energy solutions on the development of electromobility	123
25	<b>Bogdan PERKA, Karol PIWOWARSKI</b> - Analysis of heat exchange between the environment and an electrical cable	127
26	<b>Kamil BARGIEŁ</b> - Modelling of the C <sub>J</sub> -V characteristics of the SiC-JFET	131
27	<b>Karol ANISEROWICZ</b> - Mathematical models of lightning current waveforms	134
28	<b>Radosław BASIŃSKI, Krzysztof SIWEK</b> - Effective two-level algorithm for stabilizing periodic orbits of chaotic systems	140
29	<b>Janusz BARAN, Andrzej JĄDERKO</b> - Wind Turbine Control with Aerodynamic Torque Estimation at High Wind Speed	146
30	<b>Kamila BIAŁEK, Jacek JAKUBOWSKI</b> - Using an electromagnetic graphics tablet to analyse manually-created graphics	150

# PRZEGŁĄD ELEKTROTECHNICZNY Vol 2020, No 12

## Contents

31	Rafał BIAŁEK - Laboratory stands for generating an alternating magnetic field	154
32	Oleksandr BOIKO - Granular metal-dielectric nanocomposites as an alternative to passive SMD	158
33	Paweł CZAJA, Wojciech PLUTA - Influence of the RCD design on its tripping time	162
34	Anna GAWLAK - Assessment of investment effectiveness in medium and low voltage grids using the taxonomic method	166
35	Ryszard GOLEMAN - Performance and characteristics of a hybrid induction motor with magnetic frequency changer	170
36	Ślawomir ISKIERKA, Iwona ISKIERKA - Mathematical and numerical models of the induction hardening process of steel	174
37	Paweł JABŁOŃSKI, Tomasz SZCZEGIELNIAK, Dariusz KUSIAK - A numerical-analytical method of analyzing current busducts with wires of circular cross-section	178
38	Adam JAKUBAS, Ewa ŁADA-TONDYRA, Marcin MAKÓWKA, Mateusz CHYRA, Olga SOCHACKA, Łukasz SUCHECKI - Concept of Using Recycled Raw Materials for the Production of Composite Soft Magnetic for shielding of electromagnetic field	182
39	Artur KACPRZYK, Gabriela KANCLERZ, Urszula SOŁDAJ, Eugeniusz ROKITA, Bartosz LISOWSKI, Grzegorz TATÓŃ - Symptoms related to idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF) – a questionnaire study	186
40	Grzegorz KŁOSOWSKI, Tomasz RYMARCZYK, Paweł TCHÓRZEWSKI, Piotr BEDNARCZUK, Marcin KOWALSKI - Neural hybrid tomograph for monitoring industrial reactors	190
41	Grzegorz KŁOSOWSKI, Tomasz RYMARCZYK, Dariusz WÓJCICKI, Tomasz CIEPLAK, Przemysław ADAMKIEWICZ - Effect of features extraction on improving LSTM network quality in ECG signal classification	194
42	Joanna KOZIEŁ, Michał MAJKA - Analysis of the operation of the selected installation of renewable energy sources	198
43	Joanna KOZIEŁ, Grzegorz KOMARZYNIEC, Andrzej WAC-WŁODARCZYK, Ryszard GOLEMAN - Analysis of the impact of a wind farm on the quality of electricity in the distribution grid	202
44	Anna KOZIOROWSKA, Dorota ADYDAN-KIDACKA, Patrycja KOPACZ, Robert KRASOWSKI - The propagation of the electromagnetic field emitted by medical equipment	206
45	Marek KUCHTA, Jacek JAKUBOWSKI, Roman KUBACKI - Determinants of HPEM and HMP signal environmental measurements	210
46	Marek LIS, Tomasz WALASEK, Krzysztof SZEWCZYK - Magnetic levitation in industrial transport systems	214
47	Dmytro MAMCHUR, Serhii HUSACH - An analysis on induction motor reliability and lifetime estimation methods	218
48	Joanna MICHAŁOWSKA, Krzysztof PRZYSTUPA, Piotr KRUPSKI - Empirical assessment of the MAG welder's exposure to an electromagnetic field	222
49	Andrzej POPENDA - Damping of vibration in an electric drive system with a long elastic coupling	226
50	Krzysztof PRZYSTUPA, Sergei PETRICHENKO, Anna YUSHCHISHINA, Olena MITRYASOVA, Volodymyr POHREBENNYK, Orest KOCHAN - Electric Spark Method of Purification of Galvanic Waste Waters	230
51	Mykhaylo ZAGIRNYAK, Tetyana KORENKOVA, Viktoriya KOVALCHUK - The assessment of the electrohydraulic complex power controllability with different rates of closing pipeline valves	234
52	Damian GZIEŁ, Mariusz NAJGEBAUER - Review of power loss models for magnetic cores operating in power electronic systems	238
53	Andrzej KRAWCZYK, Ewa KORZENIEWSKA - Controversies about the impact of electromagnetic field on biological objects in the light of post-normal science	243
54	Najib TANISH, Vladimir SASO, Borivoje MILOŠEVIĆ, Peter UZUNOV - Study of Influence of Permanent Magnets Inclination on Detent Force in Linear Synchronous Motors	246
55	Assem SHAYAKHMETOVA, Natalya LITVINENKO, Orken MAMYRBAYEV, Waldemar WÓJCICKI - Graph models with multiple Bayesian networks	252