

2018 Progress in Applied Electrical Engineering (PAEE 2018)

**Koscielisko, Poland
18-22 June 2018**



**IEEE Catalog Number: CFP18H21-POD
ISBN: 978-1-5386-6092-8**

**Copyright © 2018 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:	CFP18H21-POD
ISBN (Print-On-Demand):	978-1-5386-6092-8
ISBN (Online):	978-1-5386-6091-1

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

MODELING OF THE EFFECT OF GRAIN SIZE ON HYSTERESIS CURVES USING THE TAKACS MODEL	1
<i>A. Jakubas</i>	
THE INFLUENCE OF DSP PARAMETERS ON THE EVALUATED TRANSFER FUNCTION OF TRANSFORMER WINDING FOR PSEUDO-WHITE NOISE EXCITATION	5
<i>M. Kuniewski, P. Zydror, L. Fusnik</i>	
NUMERIC AND MEASUREMENT ANALYSIS OF EARTHING RESISTANCE IN LAYERED SOIL INCLUDING GEM MATERIAL	9
<i>K. Sobolewski</i>	
CLUSTER ANALYSIS FOR LONG-TERM POWER QUALITY DATA IN MINING ELECTRICAL POWER NETWORK.....	14
<i>M. Jasinski, K. Borkowski, T. Sikorski, P. Kostyla</i>	
STABILITY STUDIES OF OFFSHORE GRIDS	19
<i>M. Piekars, S. Robak</i>	
APPLICATION OF THE EXTENDED PHASE-RESOLVED PD PATTERNS FOR ANALYSIS OF PD ACTIVITY IN EPOXY RESIN INSULATION.....	25
<i>P. Zydror, M. Bonk, J. Roehrich, P. Mikrut, B. Szafraniak</i>	
MODELING DYNAMIC HYSTERESIS CURVES OF LA(FE, CO, SI)₁₃ COMPOUND	29
<i>P. Gebara, R. Gozdur, K. Chwastek</i>	
THE CONCEPT OF A TEXTRONIC SYSTEM LIMITING BACTERIAL GROWTH	33
<i>E. Lada-Tondyra, A. Jakubas</i>	
SOFTWARE CONTROLLER FOR BALANCING OF CURRENT DISTRIBUTION IN INTERLEAVED CONVERTERS	37
<i>M. Gwozdz</i>	
A METHOD OF EARTH FAULT LOOP IMPEDANCE MEASUREENT WITHOUT UNWANTED TRIPPING OF RCDS	42
<i>R. Roskoz, E. Musial, S. Czapp</i>	
SELECTION OF COGENERATION GAS ENGINES USING MULTI-CRITERIA DECISION AID METHODS.....	46
<i>K. Karbowa, B. Wnukowska, M. Czosnyka</i>	
IMPROVING VOLTAGE LEVELS IN LOW-VOLTAGE NETWORKS WITH DISTRIBUTED GENERATION - CASE STUDY	51
<i>R. Kowalak, S. Czapp</i>	
AN IMPROVED EMTP-ATP SIMULATION MODEL FOR ELECTRIC ARC ANALYSES – SWITCHING OVERVOLTAGE STUDIES	57
<i>P. Oramus, T. Chmielewski, T. Kuczek, M. Florkowski</i>	
SELECTED ASPECTS OF NUMERICAL MODELS AND COST COMPARISON ANALYSIS OF SURGE PROTECTION DEVICE	62
<i>M. Borecki, J. Starzynski</i>	
ENERGY CONVERSION SYSTEM FOR WIND AND WATER TURBINES BASED ON GENERATOR WITH MODULATED MAGNETIC FLUX	66
<i>M. Krystkowiak, M. Gwozdz</i>	
AVERAGED MAGNETIC FIELD INTENSITY IN THE VICINITY OF OVERHEAD HIGH VOLTAGE LINES	71
<i>M. Jaworski, M. Szuba, W. Grycan</i>	
RECEPTION AND EXPLOITATION TESTS OF PHOTOVOLTAIC INSTALLATIONS	77
<i>P. Czaja</i>	
USING MEASURED HYSTERESIS LOOP FAMILY IN CALCULATING THE EDDY CURRENT LOSSES	82
<i>M. Bereznicki, P. Jablonski, M. Najgebauer</i>	
ENERGY EFFICIENCY AS A BASE OF THE ENERGY ECONOMY IN A MODERN INDUSTRIAL PLANTS	86
<i>M. Czosnyka, B. Wnukowska, K. Karbowa</i>	
METHODS OF CALCULATION THE MAGNETIC FORCES ACTING ON PARTICLES IN MAGNETIC FLUIDS	92
<i>E. Kurgan, P. Gas</i>	

THE PEPPER HUMANOID ROBOT IN FRONT DESK APPLICATION.....	97
<i>A. Gardecki, M. Podpora, R. Beniak, B. Klin</i>	
ANALYSIS OF ELECTRICAL POWER QUALITY PARAMETERS AT THE HIGH VOLTAGE LEVEL	104
<i>M. Latka, M. Nowak</i>	
EVALUATION OF THE IMPACT OF THE RATE OF CHANGE OF ELECTRICAL PARAMETERS IN THE LV NETWORK ON THE OPERATION OF THE DISTRIBUTED NETWORK CONTROL SYSTEM.....	109
<i>R. Jedrychowski, K. Sereja, S. Adamek, P. Pijarski, M. Wancerz</i>	
PROGRAMMABLE BROAD-BAND POWER ELECTRONICS CURRENT SOURCE WITH GAN TRANSISTORS IN POWER STAGE	115
<i>D. Matecki, M. Gwozdz</i>	
STUDY OF THE TRANSFORMER RECTIFIER UNIT COMPATIBLE WITH THE CONCEPT OF A MORE ELECTRIC AIRCRAFT	120
<i>L. Setlak, R. Kowalik</i>	
FUZZY LOGIC GRID SYNCHRONIZATION TECHNIQUE FOR SINGLE-PHASE SYSTEMS	126
<i>T. Binkowski</i>	
NEURAL MODEL AND SIMULATION OF THE POLISH POWER SYSTEM DEVELOPMENT IN MATLAB AND SIMULINK ENVIRONMENT	131
<i>J. Tchorzewski, L. Czapski</i>	
PREDICTION OF INFLUENCE OF MAGNETIC ANISOTROPY ON SPECIFIC TOTAL LOSS IN ELECTRICAL STEEL WITH GOSS TEXTURE	136
<i>W. Pluta</i>	
DESIGN OF A HIGH-FREQUENCY IMPROVED CURRENT-FED QUASI Z-SOURCE INVERTER BASED ON SiC DEVICES	140
<i>P. Trochimink, M. Zdanowski, P. Majczak, J. Rablowski</i>	
POWER QUALITY IN RESIDENTIAL AND PUBLIC GRIDS	146
<i>W. Grycan, G. Wisniewski</i>	
IMPLEMENTATION OF NON-INTEGER SMOOTHING FILTERING IN ANALYSIS OF POLYSOMNOGRAPHY DATA.....	152
<i>A. Kawala-Janik, J. Kolanska-Pluska, B. Grochowicz, W. Bauer, B. Nazimek, M. Zolubak, T. Sobolewski</i>	
CHALLENGES TO THE POLISH POWER SYSTEM DUE TO THE IMPLEMENTATION OF ELECTRIC VEHICLES	157
<i>J. Widzinska, L. Nogal</i>	
SYSTEMIC METHOD OF THE ANN IMPROVEMENT USING EVOLUTIONARY ALGORITHM INSPIRED BY QUANTUM SOLUTIONS BASED ON THE ELECTRICAL POWER EXCHANGE.....	166
<i>J. Tchorzewski, D. Rucinski</i>	
INVESTIGATION OF THE BREAKDOWN BEHAVIOR OF SILICONE GEL INSULATION IN MV APPLICATION.....	171
<i>J. Banaszczyk, B. Adamczyk, P. Piekarski</i>	
CONTROL SYSTEM OF A PROTOTYPE MEASUREMENT SYSTEM FOR THE IDENTIFICATION OF ULTRA-LOW PHOTONIC EMISSION OF ORGANIC MATERIALS	176
<i>P. Nawara, M. Gliniak, E. Popardowski, M. Szczuka, K. Trzyniec</i>	
MODELING OF A SUPERCAPACITOR CHARGING CIRCUIT USING TWO EQUIVALENT RC CIRCUITS AND FORWARD VS. BACKWARD FRACTIONAL-ORDER DIFFERENCES	181
<i>W. Czuczwska, K. Latawiec, R. Stanislawski, M. Lukaniszyn, R. Kopka, M. Rydel</i>	
PSPICE MODELING OF THE INRUSH CURRENT IN A 10 KVA SUPERCONDUCTING TRANSFORMER	187
<i>P. Surdacki, L. Jaroszynski, L. Wozniak</i>	
ANALYSIS OF THE POWER OF A THREE-PHASE RECTIFIER IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE IEEE 1459-2010 NORM.....	191
<i>J. Bartman, T. Kwater, D. Sobczynski</i>	
THERMAL CHANGES OF THE INDUCTION MOTOR FOR DIFFERENT POWER FREQUENCIES	196
<i>B. Twarog, J. Bartman</i>	
IMPACT OF LIGHT SOURCE SPECTRUM IN LABORATORY TEST OF COMMERCIALLY AVAILABLE PHOTOVOLTAIC PANELS	202
<i>D. Sobczynski</i>	
ELECTROMAGNETIC AND TEMPERATURE FIELDS CALCULATIONS IN THE FERROMAGNETIC MEDIUM.....	207
<i>R. Pekala, B. Kwiatkowski, T. Kwater</i>	

INFLUENCE OF HIGH CURRENT IMPULSES AND 50 HZ AC BURSTS ON THE TEMPERATURE OF LOW-VOLTAGE METAL-OXIDE SURGE ARRESTERS	213
<i>B. Szafraniak, M. Bonk, L. Fusnik, P. Zydron</i>	
TRANSIENT CURRENT AND VOLTAGE WAVEFORMS WHEN SWITCHING ON A CAPACITIVE CIRCUIT WITH A VACUUM CIRCUIT BREAKER	217
<i>J. Budzisz, P. Pierz</i>	
COMPARISON OF REACTIVE POWERS CALCULATION ALGORITHMS FOR A SINGLE-PHASE AC CIRCUIT WITH NONLINEAR LOAD	222
<i>M. Wcislik</i>	
SECURITY SYSTEMS OF POWER CONVERTER INTERFACE WITH SUPERCONDUCTING MAGNETIC ENERGY STORAGE FOR ELECTRIC POWER DISTRIBUTION.....	228
<i>M. Parchomiuk, K. Zymmer, A. Domino</i>	
IMPACT OF THE RIPPLE OUTPUT VOLTAGE OF THE BRIDGE RECTIFIER ON THE EQUIVALENT PARAMETERS OF THE AC CIRCUIT IN CONTINUOUS MODE.....	232
<i>P. Strzabala, M. Wcislik</i>	
RESEARCHES OF PLASMA TEMPERATURE DISTRIBUTION IN DISCHARGE LAMPS POWERED BY DIFFERENT FREQUENCIES OF ELECTRIC ENERGY.....	239
<i>K. Tomczuk, L. Hemka</i>	
THE EFFECT OF STATIC MAGNETIC FIELD ON CHEMICAL PROPERTIES OF SEWAGE SLUDGE DURING BIOLOGICAL TREATMENT	243
<i>M. Gliniak, T. Drozdz, A. Lis, P. Nawara, M. Szczuka</i>	
CONTROL STRATEGIES FOR ISOLATED HIGH-FREQUENCY MODULAR DC/DC CONVERTER IMPLEMENTED IN PROGRAMMABLE LOGIC ARRAY	248
<i>M. Szymczak, P. Grzejszczak, R. Barlik</i>	
THE ELECTRICITY CONSUMPTION IN SELECTED SECTORS OF THE POLISH ECONOMY	255
<i>M. Kott, A. Bujak, J. Kott</i>	
MODELING OF FLAT INDUCTOR - WORKPIECE HEATING SYSTEMS FOR DESIGN OF INDUCTION HEATERS	260
<i>M. Wesolowski, A. Czaplicki</i>	
INFLUENCE OF SECTIONALIZING SWITCHES PLACEMENT ON THE CONTINUITY OF CUSTOMERS POWER SUPPLY.....	265
<i>W. Bachorek, M. Benesz</i>	
THREE-PHASE ACTIVE POWER FILTER WITH T-NPC TYPE INVERTER	270
<i>T. Adrikowski, D. Bula, M. Pasko</i>	
ALGORITHM OF DETECTION AND LOCATION OF THE TAG FOR ACOUSTO-MAGNETIC ELECTRONIC ARTICLE SURVEILLANCE SYSTEM.....	275
<i>A. Gulczynski, J. Biemacki</i>	
EVALUATION OF THERMAL DAMAGE OF HEPATIC TISSUE DURING THERMOTHERAPY BASED ON THE ARRHENIUS MODEL.....	280
<i>P. Gas, E. Kurgan</i>	
Author Index	