

2021 IEEE 13th International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives (SDEMPED 2021)

**Virtual Conference
22-25 August 2021**



**IEEE Catalog Number: CFP21SDE-POD
ISBN: 978-1-7281-9298-7**

**Copyright © 2021 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:	CFP21SDE-POD
ISBN (Print-On-Demand):	978-1-7281-9298-7
ISBN (Online):	978-1-7281-9297-0

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

<p>A BAYES OPTIMIZED SVM AND FREQUENCY ESTIMATION FOR DIAGNOSIS OF ECCENTRICITY FAULTS</p> <p style="padding-left: 20px;"><i>I. Aydin, S. Kaner, E. Akin, V. Gurusamy</i></p> <p>A COMPARATIVE STUDY OF CURRENT, VIBRATION AND STRAY MAGNETIC FLUX BASED DETECTION FOR PARALLEL MISALIGNMENT FAULT IN INDUCTION MOTORS</p> <p style="padding-left: 20px;"><i>Taner Goktas, Muslum Arkan, V. Gurusamy</i></p> <p>A MACHINE INTEGRATED ROGOWSKI COIL FOR BEARING CURRENT MEASUREMENT.....</p> <p style="padding-left: 20px;"><i>Stefan Quabeck, Lukas Braun, Niklas Fritz, Severin Klever, Rik W. De Doncker</i></p> <p>HIGHLY RELIABLE REDUCED PART INTEGRATED 2DOF HELICAL WINDING RESOLVER</p> <p style="padding-left: 20px;"><i>F. Zare, F. Tootoonchian, A. Daniar</i></p> <p>ANALYSIS OF PARTIAL DISCHARGES AND FAILURE MECHANISM IN ELECTRICAL MACHINES WITH HAIRPIN WINDING.....</p> <p style="padding-left: 20px;"><i>Lucas Vincent Hanisch, Tim-Hendrik Dietrich, Markus Henke</i></p> <p>BROKEN MAGNET FAULT DETECTION FOR A BLDC MOTOR DRIVE USING MAGNETIC FLUX SIGNATURES ADOPTING HYBRID/CO-SIMULATION-BASED TECHNIQUES.....</p> <p style="padding-left: 20px;"><i>Adil Usman, Bharat Singh Rajpurohit, Vivek Kumar Sharma, Divakar B P, Emmanuel Agamloh</i></p> <p>COMBINED ELECTRICAL FAULTS DETECTION AND DIAGNOSIS USING CURRENT SIGNATURE ANALYSIS.....</p> <p style="padding-left: 20px;"><i>F. Babaa, O. Bennis, F. Kratz, A. Hadri-Hamida</i></p> <p>DESIGN AND CONTROL OF A FAULT TOLERANT PERMANENT MAGNET MOTOR WITH INDEPENDENTLY OPTIMIZED PHASE AND POLE COUNTS</p> <p style="padding-left: 20px;"><i>Shima Hasanpour, Shrikesh Sheshaprasad, Matthew C. Gardner, Matthew Johnson, Bryton Praslicka, Hamid A. Toliyat</i></p> <p>DETECTION AND LOCALIZATION OF INCIPIENT HIGH RESISTANCE CONNECTION FOR ASYMMETRICAL TWELVE-PHASE INDUCTION MOTOR DRIVES.....</p> <p style="padding-left: 20px;"><i>Yasser Gritli, Claudio Rossi, Gabriele Rizzoli, Luca Zarri, Angelo Tani, Domenico Casadei</i></p> <p>ELECTRICAL TESTING FOR DETECTION AND CLASSIFICATION OF OPEN DAMPER BAR AND SHORTED FIELD WINDING FAILURES IN WOUND FIELD SYNCHRONOUS MOTORS</p> <p style="padding-left: 20px;"><i>Muhammad Faizan Shaikh, Jongsan Park, Yonghyun Park, Sang Bin Lee, Jose A. Antonino-Daviu</i></p> <p>END-RING WEAR IN DEEP WELL SUBMERSIBLE MOTOR PUMPS</p> <p style="padding-left: 20px;"><i>Jorge Bonet-Jara, Daniel Morinigo-Sotelo, Oscar Duque-Perez, Luis Serrano-Iribarnegaray, Juan M. Llopis-Gomez, Miguel Ortiz-Gomez, Joan Pons-Llinares</i></p> <p>EXCITER AXIAL AND RADIAL STRAY FLUX ANALYSIS FOR ROTATING DIODES SUPERVISION.....</p> <p style="padding-left: 20px;"><i>P. Tian, C. A. Platero, S. B. Lee, K. N. Gyftakis, J. A. Antonino-Daviu</i></p>	<p>5</p> <p>11</p> <p>17</p> <p>24</p> <p>37</p> <p>44</p> <p>52</p> <p>58</p> <p>65</p> <p>72</p> <p>79</p> <p>86</p>
---	--

FAULT-TOLERANT VARIABLE STRUCTURE CONTROL OF A LOW SPEED 6-PHASE INDUCTION GENERATOR.....	92
<i>O. Bouyahia, F. Betin, A. Yazidi</i>	
IDENTIFICATION OF STATOR INSULATION MATERIAL PARTIAL DISCHARGE PARAMETERS DURING LIFETIME.....	99
<i>A. Qerkini, M. Vogelsberger, W. Grubelnik, T. Wolbank</i>	
INFLUENCE OF THE LOCATION OF A BEARING FAULT IN INDUCTION MOTOR MULTI-SENSOR DIAGNOSTICS.....	106
<i>Marcello Minervini, Lucia Frosini, Gazmend Guri, Andrea Albini</i>	
INVESTIGATION OF A MULTIPHASE WINDING ARRANGEMENT FOR MITIGATING SHORT-CIRCUIT FAULT CURRENTS.....	113
<i>Ahmad Daniar, Matthew C. Gardner</i>	
MCSA VERSUS FLUX MONITORING FOR DEMAGNETIZATION DIAGNOSIS IN AXIAL- FLUX PM GENERATORS.....	119
<i>G. A. Skarmoutsos, K. N. Gytakis, M. Mueller</i>	
MODEL-BASED ON-LINE PROTECTION METHOD FOR BRUSHLESS SYNCHRONOUS GENERATORS.....	126
<i>K. Mahtani, J. M. Guerrero, L. F. Beites, C. A. Platero</i>	
MODELLING OF BROKEN ROTOR BARS AND ECCENTRICITY FAULTS IN SQUIRREL CAGE INDUCTION MACHINES.....	133
<i>Xinyi Yu, Stefan Quabeck, Stephan Schuller, Rik W. De Doncker</i>	
NEW ON-LINE ROTOR GROUND FAULT LOCATION METHOD FOR BRUSHLESS SYNCHRONOUS GENERATORS.....	140
<i>M. A. Pardo, K. Mahtani, C. A. Platero, J. A. Sanchez-Fernandez</i>	
NOVEL GROUND FAULT LOCATION METHOD IN POLES OF SYNCHRONOUS MACHINES.....	146
<i>C. M. Martín, J. M. Guerrero, C. A. Platero</i>	
ONLINE CONDITION MONITORING OF PUMPS BASED ON ADAPTED REFERENCE FRAME THEORY.....	153
<i>Vincent Becker, Martin Eckl, Benedikt Mueller, Sven Urschel, Jose Antonino-Daviu</i>	
RELIABLE FLUX BASED DETECTION OF ROTOR CAGE FAULTS IN INDUCTION MOTORS.....	160
<i>Sang Bin Lee, Jaehoon Shin, Yonghyun Park, Heonyoung Kim, Jongwan Kim</i>	
SIMPLIFIED METHODOLOGY FOR ANALYSIS OF ELECTROMECHANICAL INTERACTIONS IN AC MACHINES AT STEADY-STATE PERFORMANCES.....	167
<i>J. Tulicki, T. J. Sobczyk, M. Sulowicz</i>	
STATIC, DYNAMIC AND MIXED ECCENTRICITY FAULTS DETECTION OF SYNCHRONOUS GENERATORS BASED ON ADVANCED PATTERN RECOGNITION ALGORITHM.....	173
<i>Hossein. Ehya, Arne. Nysveen, Jose. A Antonino-Daviu</i>	
THE PERFORMANCE EVALUATION OF MACHINE LEARNING BASED TECHNIQUES VIA STATOR CURRENT AND STRAY FLUX FOR BROKEN BAR FAULT IN INDUCTION MOTORS.....	180
<i>M. B. Younas, N. Ullah, Taner Goktas, Muslum Arkan, V. Gurusamy</i>	

TRANSFER LEARNING TECHNIQUE FOR AUTOMATIC BEARING FAULT DIAGNOSIS IN INDUCTION MOTORS	186
<i>Marcello Minervini, Slawomir Hausman, Lucia Frosini</i>	
VIBROACOUSTIC BEHAVIOUR OF AN OUTER ROTOR PERMANENT MAGNET SYNCHRONOUS MACHINE.....	193
<i>P. Schwarz, A. Mockel</i>	
A CURRENT HARMONIC MONITORING-BASED ONLINE CONDITION MONITORING METHOD FOR SIC MOSFETS	203
<i>Xiaofeng Ding, Binbin Wang, Jinpo Shi, Xinrong Song</i>	
CLOSED-LOOP JUNCTION TEMPERATURE CONTROL OF SIC MOSFETS IN DC POWER CYCLING FOR ACCURATE RELIABILITY ASSESSMENTS	209
<i>Bhanu Teja Vankayalapati, Bilal Akin</i>	
COMPARATIVE PERFORMANCE EVALUATION OF TWO LED DRIVER ARCHITECTURES FOR RESIDENTIAL LIGHTING APPLICATIONS	216
<i>Fernando Bento, Antonio J. Marques Cardoso</i>	
DIAGNOSIS OF POWER TRANSISTORS OPEN-AND SHORT-CIRCUIT FAULTS IN SRM DRIVES THROUGH CURRENT ERROR ANALYSIS	221
<i>Nasir Ali, Qiang Gao, Ke Ma</i>	
EXCITATION SIGNALS FOR RAPID BATTERY IMPEDANCE SPECTROSCOPY	227
<i>Li Yan, Chris Bingham, Yunrong Lv</i>	
FAULT IDENTIFICATION IN DC-DC CONVERTERS USING SUPPORT VECTOR MACHINES WITH POWER SPECTRUM-BASED FEATURES.....	233
<i>P. Kulkarni, D. Aliprantis, N. Wu, B. Loop</i>	
MODELING AND ANALYSIS OF MULTIPLE OPEN-SWITCH FAULTS IN CONVERTERS SUPPLYING PERMANENT-MAGNET SYNCHRONOUS MACHINES	240
<i>Urs Pecha, Nejila Parspour, Fabian Gieck</i>	
OPEN SWITCH FAULT DIAGNOSIS AND CURRENT SENSOR FAULT TOLERANT CONTROL OF A DC-DC INTERLEAVED BOOST CONVERTER USING GENERALIZED PROPORTIONAL INTEGRAL OBSERVER	247
<i>Muhammad Salman, Meriem Dardouri, Sejir Khojet El Khil, Chiara Boccaletti</i>	
PERFORMANCE ANALYSIS AND RELIABILITY INVESTIGATION OF A HIGH STEP-UP DC-DC CONVERTER.....	254
<i>Iman Talebian, Vafa Marzang, Peyman Alavi, Arash Khoshkbar-Sadigh, Ebrahim Babaei</i>	
SUPERCAPACITORS ONLINE PARAMETERS ESTIMATION AND STATE-OF-HEALTH DETERMINATION IN HYBRID.....	261
<i>Khaled Laadjal, Antonio J. Marques Cardoso</i>	
A COMPREHENSIVE REVIEW OF FAULT-TOLERANT AC MACHINE DRIVE TOPOLOGIES: INVERTER, CONTROL, AND ELECTRIC MACHINE.....	269
<i>Woongkul Lee, Gilsu Choi</i>	
AN IMPROVED FAULT-TOLERANT CONTROL OF A FIVE-PHASE SYNCHRONOUS RELUCTANCE MOTOR CONNECTED TO MATRIX CONVERTER	276
<i>Kotb B. Tawfiq, Mohamed N. Ibrahim, E. E. El-Kholy, Peter Sergeant</i>	

INFLUENCE OF CABLE PARAMETERS ON THE INVERTER FED ELECTRICAL MACHINES TRANSIENT TERMINAL VOLTAGE.....	282
<i>R. Woehrschimmel, M. Vogelsberger, M. Lindahl, T. Wolbank</i>	
LATENCY COMPENSATION OF SD-ADC FOR HIGH PERFORMANCE MOTOR CONTROL AND DIAGNOSIS.....	289
<i>Chen Li, Bhanu Vankayalapati, Bilal Akin</i>	
TRANSFER OF NVH LIMITS FOR HIGHLY-INTEGRATED ELECTRICAL DRIVES BETWEEN END-OF-LINE TEST BENCHES	295
<i>J. A. E. Bonart, P. Huemmer, J.-B. Maurice, F. Trautmann, W.-G. Drossel</i>	
AUTOMATED ANALYSIS OF EIS CURVES FOR PEM FUEL CELLS USING DYNAMIC TIME WARPING.....	303
<i>M. Durand, A. Picot, J. Régnier, C. Turpin, O. Crassous, M. Scohy, R. Stephan, O. Abassie, C. Andrieux</i>	
DATA INCREMENTAL LEARNING FOR FAULT DETECTION AND CLASSIFICATION IN PHOTOVOLTAIC ARRAYS	310
<i>Hamood-Ur-Rehman, Basit Ali, Mazhar Javed</i>	
FAULT DIAGNOSTICS IN SHIPBOARD POWER SYSTEMS USING GRAPH NEURAL NETWORKS.....	316
<i>Roshni Anna Jacob, Soroush Senemmar, Jie Zhang</i>	
GROUND FAULT LOCATION METHOD FOR DC POWER SOURCES.....	322
<i>José M. Guerrero, Kumar Mahtani, Daniel Serrano-Jimenez, Carlos A. Platero</i>	
LEAD ACID HEALTH MONITORING THROUGH IMPEDANCE SPECTROSCOPY ACHIEVED WITH RECYCLED POWER SUPPLY UNIT	329
<i>Truong Phuc Thien Nguyen, Quoc Dung Phan, Pascal Maussion</i>	
LEAD-ACID BATTERY STATE-OF-HEALTH EVALUATION WITH SHORT DISCHARGE METHOD.....	336
<i>Muhammad Mohsin, Antoine Picot, Pascal Maussion</i>	
DETECTION AND IDENTIFICATION OF DEMAGNETIZATION IN PM GENERATORS DURING TRANSIENT CONDITIONS	345
<i>K. N. Gyftakis, T. A. Garcia-Calva, G. A. Skarmoutsos, D. Morinigo-Sotelo, M. Mueller, R. De J. Romero-Troncoso</i>	
DETECTION OF ECCENTRICITY FAULTS IN AIR-CORED C-GEN PM MACHINES FOR WIND TURBINE.....	351
<i>S. Rasid, X. Lian, M. A. Mueller, K. N. Gyftakis</i>	
FAULT DETECTION AND IDENTIFICATION FOR INVERTER-DRIVEN PERMANENT MAGNET SYNCHRONOUS MACHINES	358
<i>Ibrahim M. Allafi, Shanelle N. Foster</i>	
FAULT DIAGNOSIS IN AN AFPM SYNCHRONOUS GENERATOR THROUGH PHASE EMF VOLTAGE SUM	365
<i>A. C. Barmpatza, J. C. Kappatou</i>	
RELIABLE AND ROBUST INTER-TURN SHORT-CIRCUIT FAULT DETECTION IN PMSG WITHOUT CONFUSION WITH HEALTHY OPERATING UNDER LOAD UNBALANCE.....	372
<i>M. Bouzid, I. Bahloul, S. Khojet El Khil</i>	

EXPLORING IMPROVEMENT IN PMSM DRIVE PERFORMANCE AND RELIABILITY ENABLED BY FUTURISTIC POWER ELECTRONICS	381
<i>Alastair P. Thurlbeck, Derek Jackson, Vinson Guov, Yue Cao</i>	
FAULT DIAGNOSIS OF INTER-TURN SHORT CIRCUIT FAULTS IN DUAL THREE-PHASE PMSM DRIVES	388
<i>Ziyu He, Zheng Wang, Chengliang Duan, Xueqing Wang</i>	
FAULT TOLERANT FIVE-LEVEL ACTIVE NPC INVERTER FOR HIGH-RELIABILITY PHOTOVOLTAIC APPLICATIONS	395
<i>Majid T. Fard, Jiangbiao He</i>	
FAULT-TOLERANT CONTROL OF DUAL THREE-PHASE PMSM DRIVES WITH INTER- TURN SHORT-CIRCUIT FAULT	401
<i>Changyu Cao, Zheng Wang, Chengliang Duan, Xueqing Wang</i>	
FUZZY LIFETIME ANALYSIS OF A FAULT-TOLERANT TWO-PHASE INTERLEAVED CONVERTER	407
<i>Tohid Rahimi, Masoud Farhadi, Ka Hong Loo, Josep Pou</i>	
A DIAGNOSIS METHOD OF MULTIPLE FAULTS OF INDUCTION MOTORS BASED ON VIBRATION SIGNAL ANALYSIS	415
<i>A. Kabul, A. Unsal</i>	
ANOMALY INVESTIGATION OF ELECTRIC DRIVE SYSTEMS USING BIG SCATTERED TEST STAND DATA ON THE EXAMPLE OF A PMSM TRACTION DRIVE	422
<i>F. Liebetrau, A. Mockel</i>	
BEARING FAULT ANALYSIS OF BLDC MOTOR INTENDED FOR ELECTRIC SCOOTER APPLICATION	427
<i>K. Kudelina, B. Asad, T. Vaimann, A. Rassolkin, A. Kallaste</i>	
EARLY SHOCK PULSE DETECTION METHOD FOR ROLLING BEARINGS CONDITION MONITORING	433
<i>K. Saarinen, J. Nowak</i>	
OVERVIEW OF BEARING WHITE ETCHING CRACKS DUE TO ELECTRICAL CURRENTS.....	440
<i>Thibaud Plazenet, Thierry Boileau</i>	
THE DETECTION OF BEARING FAULTS FOR INDUCTION MOTORS BY USING VIBRATION SIGNALS AND MACHINE LEARNING	447
<i>Eyup Irgat, Eyup Cinar, Abdurrahman Unsal</i>	
A SOFT SWITCHING INVERTER MINIMIZING BEARING CURRENTS IN 800V ELECTRIC VEHICLE DRIVES.....	457
<i>Michael Eull, Matthias Preindl</i>	
AN AUTOMATED MULTI-DEVICE CHARACTERIZATION SYSTEM FOR RELIABILITY ASSESSMENT OF POWER SEMICONDUCTORS	464
<i>Nathan Zhang, Shi Pu, Bilal Akin</i>	
DESIGN OF AC POWER CYCLING TEST SETUP FOR GAN HEMTS' RELIABILITY ASSESSMENTS	471
<i>Chi Xu, Fei Yang, Bilal Akin</i>	

ESTIMATION OF POSITION AND SHORTED TURNS PERCENTAGE OF AN INTER-TURN SHORT CIRCUIT IN INTERIOR PERMANENT MAGNET SYNCHRONOUS MACHINES BASED ON A CURRENT OBSERVER	477
<i>P. Castro Palavicino, B. Sarlioglu</i>	
HIGHLY RELIABLE REDUCED PART INTEGRATED 2DOF HELICAL WINDING RESOLVER	483
<i>F. Zare, F. Tootoonchian, A. Daniar</i>	
REVIEW ON SWITCHING DEVICE FAULT, PROTECTION, AND FAULT-TOLERANT TOPOLOGIES OF CURRENT SOURCE INVERTER	489
<i>Sangwhae Lee, Feida Chen, Thomas M. Jahns, Bulent Sarlioglu</i>	
BROKEN ROTOR BAR FAILURES DIAGNOSIS WITH SUPERVISED LEARNING AND INFRARED THERMOGRAPHY	499
<i>E. Resendiz-Ochoa, J. M. Enriquez-Ugalde, J. J. Saucedo-Dorantes, L. A. Morales-Hernandez</i>	
IDENTIFICATION OF ANOMALIES IN HIGHLY-INTEGRATED ELECTRIC DRIVES BY SECONDARY EXCITATION MECHANISMS	505
<i>J. A. E. Bonart, J. Eirich, P. Huemmer, W.-G. Drossel</i>	
MONO-DIMENSIONAL DEMODULATION TECHNIQUES FOR DIAGNOSING BROKEN ROTOR BARS FAULTS WITHIN INVERTER-FED INDUCTION MACHINE AT LOW LOAD OPERATION CONDITION	512
<i>H. Khelfi, S. Hamdani</i>	
MULTIDIMENSIONAL AMPLITUDE DEMODULATION TECHNIQUES FOR DIAGNOSIS BROKEN ROTOR BARS FAULT IN AN INDUCTION MACHINE OPERATING AT LOW LOAD CONDITION	518
<i>H. Khelfi, S. Hamdani</i>	
THREE-STATES FAULT DETECTION IN ROLLING BEARINGS OF INDUCTION MOTORS THROUGH THE ANALYSIS OF STRAY FLUX SIGNALS USING THE DWT	525
<i>Israel Zamudio-Ramirez, Roque A. Osornio-Rios, Jonathan Cureño-Osornio, Juan Jose Saucedo-Dorantes, Jose A. Antonino-Daviu</i>	
WAVELET BASED DEMODULATION: A DIAGNOSTIC METHOD FOR RELIABLE ROTOR FAULT INDEX.....	532
<i>Mesaad Albader, Hamid A. Toliyat</i>	

ADDITIONAL PAPER

A RELIABLE INTEGRATED RESOLVER FOR HIGH PRECISION RADIAL-LINEAR POSITION MEASUREMENT.....	539
<i>F. Zare, Z. Nasiri-Gheidari, A. Daniar</i>	

Author Index