

2024 International Conference on Electrical Machines (ICEM 2024)

**Torino, Italy
1-4 September 2024**

Pages 1-739



**IEEE Catalog Number: CFP2490B-POD
ISBN: 979-8-3503-7061-4**

**Copyright © 2024 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:	CFP2490B-POD
ISBN (Print-On-Demand):	979-8-3503-7061-4
ISBN (Online):	979-8-3503-7060-7
ISSN:	2381-4802

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

A Slot Model for Loss Estimation in Superconducting AC Electrical Machine Windings.....	1
<i>Inês S. P. Peixoto, Lorenzo Perilli, Federica Graffeo, João F. P. Fernandes, Paulo J. Da Costa Branco, Silvio Vaschetto</i>	
Nonlinear Analytical Solution for Permanent Magnet Synchronous Machines Using Harmonic Modeling	8
<i>Duy-Tinh Hoang, Manh-Dung Nguyen, Su-Min Kim, Woo-Sung Jung, Kyung-Hun Shin, Yong-Joo Kim, Jang-Young Choi</i>	
Nonlinear Modeling and Analysis Considering Coupling Stator Flux of Wound-Rotor Synchronous Motors	15
<i>Manh-Dung Nguyen, Duy-Tinh Hoang, Su-Min Kim, Woo-Sung Jung, Kyung-Hun Shin, Yong-Joo Kim, Jang-Young Choi</i>	
Electromagnetic Design and Structural Analysis of Magnetic-Geared Permanent Magnet Synchronous Motor for Unmanned Underwater Vehicle.....	22
<i>Jang-Hyun Park, Da-Eun Kim, Do-Kwan Hong</i>	
Transfer Learning-Based Modular Neural Network for Multi-Objective Optimization of Interior Permanent Magnet Synchronous Motors.....	29
<i>Nuo Chen, Martin Doppelbauer</i>	
CDC-GANs: Bridging Innovation and Efficiency in E-Machine Design with Advanced Generative Models.....	36
<i>Amir Akbari, David A. Lowther</i>	
LCC-S Compensated Wireless Power Transfer: System Optimization Using Genetic Algorithms.....	43
<i>Matteo Intravaia, Lorenzo Becchi, Marco Bindi, Fabio Corti, Gabriele Maria Lozito, Cristian Garzon Alfonso, Antonio Luchetta, Alberto Reatti</i>	
A Novel Non-Uniform Air-Gap Halbach Magnetic Gear with Modified PM Shape.....	50
<i>Mahdi Nafa, Aran Shoaie, Qingsong Wang</i>	
Electrification of Non-Road Mobile Machinery: A Tool for Motor Selection.....	57
<i>Marco Ferrari, Chunjie Dai, Beltrami Daniele, Uberti Stefano</i>	
Efficiency Improvement in Surface Mounted PMSM by Appropriate Management of Both Fundamental and Switching Frequency Iron Losses	64
<i>Antonios V. Sideris, Georgios K. Sakkas, Antonios G. Kladas</i>	
SPMMs and Enclosures Steady Heat Transfer Modeling Utilizing a 3-D Finite Element Partitioning Technique	70
<i>Themistoklis D. Kefalas, Antonios G. Kladas</i>	
Low Loss Permanent Magnet Motor Design Methodology Using a Particular Infeasibility Driven Genetic Algorithm Technique.....	76
<i>Ioannis Ch. Alonistiotis, Antonios G. Kladas</i>	
Design and Analysis of an Actuator with High Power Density Permanent Magnet Motor for Bipedal Robots	83
<i>Tianran He, Xiaokun Leng, Yangyu Sun, Yucong Wu</i>	

Nonlinear Analytical Model of Large-Scale Doubly-Fed Induction Generator-Motor Based on Coefficient Transfer	89
<i>Lu Sun, Jin Wang, Yiming Ma, Haoyu Kang, Zequan Li, Libing Zhou</i>	
Analysis and Optimization of Unbalanced Magnetic Pull for Eccentric Doubly-Fed Induction Motor	96
<i>Haoyu Kang, Jin Wang, Liyang Liu, Lu Sun, Zequan Li, Libing Zhou</i>	
Manufacturability Oriented Topology Optimization of Interior Permanent Magnet Synchronous Motor	103
<i>Meng Xia, Jing Li, Yang Xiao</i>	
Aspect Ratio Optimization for YASA Machines Under Thermal Constraints	109
<i>Hanju Ding, Yu Wang, Weiwei Geng, Jinrong Zhang, Yaojie Sun, Zi-Qiang Zhu</i>	
Transformer No-Load Losses Calculation Using Machine Learning	116
<i>Miroslav Mrajca, Vladimir Bilek, Jan Barta, Radoslav Cipin</i>	
Deep Learning-Based Automatic Design System for IPMSM with Variable Magnet Properties	123
<i>Yuki Shimizu, Kan Akatsu</i>	
Analysis of Torque Upper Limit of Electrically-Excited Salient Machines by Flux Modulation Theory	129
<i>Yu Zhao, Dawei Li, Ronghai Qu</i>	
Performance Comparison of Double- And Single-Rotor Wound-Field Flux Switching Machines with Concentrated and Toroidal Windings	136
<i>Udochukwu B. Akuru, Zhongze Wu, Wasiq Ullah, Faisal Khan, Wasiullah Khan, Karen S. Garner</i>	
Analysis of Unbalanced Magnetic Force in DC-Biased Current Vernier Reluctance Machines with Odd Rotor Pole Number	142
<i>Yuliang Liu, Shaofeng Jia, Deliang Liang</i>	
Stator Shaping of the Novel Hexane-Type Stator Permanent Magnet Flux Switching Machine	148
<i>Wasiq Ullah, Udochukwu Bola Akuru, Faisal Khan, Mehroz Fatima</i>	
Comparative Study of Flux-Switching PM and EE Machines with Dual Armature Winding Configuration.....	154
<i>Hui Wen, Bingtuo Chen, Wenting Wang, Jiongjiong Cai, Lijian Wu</i>	
Design and Analysis of a Multiple-Torque Components Dual Rotor Axial Flux Permanent Magnet Vernier Machine for Aviation Propulsion Applications	161
<i>Wenlong Liu, Shaofeng Jia, Zhidong Yuan, Qi He</i>	
Design and Analysis of High Performance Flux Reversal Motor with Cross-Pole Shape Stator	167
<i>Yue Yu, Kenji Nakamura</i>	
Seven-Leg VSI SVPWM Technique for Novel Dual-Armature Winding Dual-PM Flux Modulated Machines with Array-Torque Components.....	173
<i>Dongxu Yang, Shaofeng Jia, Deliang Liang</i>	
Performance Analysis of Different Skewed Poles Schemes for a 160W Brushless DC Motor	179
<i>Ling Luo, Wantong Duan, Fei Jiang, Mingle Jin, Shangyu Ren</i>	

Development of a 6/4 Switched Reluctance Motor for Torque Improvement in Solar Water Pumping System.....	186
<i>Suraj Kumar Chaurasiya, Avik Bhattacharya, Sharmili Das</i>	
A Consideration of Continuous Conduction Mode of Switched Reluctance Motors Based on Vector Control Method	193
<i>Kyohei Kiyota, Ryo Kokubu</i>	
Design and Thermal Analysis of a Novel Transverse Flux Permanent Magnet Machine.....	199
<i>Bowen Zhang, Rundong Huang, Zhiping Dong, Yong Chen, Chunhua Liu</i>	
Design and Optimization of High-Speed Switched Reluctance Machines for Aerospace Applications.....	205
<i>Haorui Ge, Hao Hua, Xiaoli Duan, Ruini Li</i>	
Analytical Prediction of Phase Currents of Switched Reluctance Machines.....	211
<i>Haorui Ge, Hao Hua, Wei Hua</i>	
Performance Analysis of Asymmetrical Rewound Six-Phase Permanent Magnet Assisted Synchronous Reluctance Machines	218
<i>Kotb B. Tawfiq, Peter Sergeant, Hatem Zeineldin, Ahmed Al-Durra, Ehab F. El-Sadaany</i>	
A Lumped Parameter Thermal Model for Variable Flux Reluctance Machine Considering Relative Position of DC and AC Windings.....	224
<i>Zhongze Wu, Lai Jin, Wentao Zhang, Xueyi Yan, Haorui Ge, Hao Hua, Wei Hua, Ming Cheng</i>	
Design Considerations for an In-Hub, Direct Drive Traction Motor for a Formula SAE Race Car	231
<i>Christian John Dalli, Michael Galea, Joseph Cilia</i>	
Study of Axial Flux Stator Structures in Additive Manufacturing Material and Soft Magnetic Composite.....	237
<i>Pierluigi Amoroso, Emir Poškovic, Hans Tiismus, Michele Quercio, Luca Ferraris, Alberto Tenconi</i>	
Design and Optimization of PMaSynRM with Short-Circuit Fault Tolerance	244
<i>Vitaliy Sizonenko, Ondrej Vitek, Petr Klíma, Nicola Bianchi</i>	
Open Switch Fault Diagnosis and Localization for Voltage Source Inverters in Synchronous Reluctance Motor Drives.....	251
<i>Muhammad Salman, Pericle Zanchetta, Sejir Khojet El Khil, Chiara Boccaletti</i>	
Inter-Turn Short Circuit Faults and Mitigation Measures for Dual-Three Phase Machines	258
<i>Daniel Walch, Andreas Geiger, Christian Sülthrop</i>	
Influence of Inter-Turn Short Circuits on Clamp Parameters of a Nine-Phase Permanent Magnet Synchronous Machine	265
<i>Michael Ebnicher, Hans-Georg Herzog</i>	
A Review of Modeling and Control of Multi-Phase Induction Motors Under Machine Faults.....	270
<i>Abdulrahman Alharbi, Shafiq Odhano, Andrew Smith, Xu Deng, Barrie Mecrow</i>	
Overview and Challenges of Fault Detection Methods in Electrical Motors for EV Applications	279
<i>Marco Pastura, Mauro Zigliotto</i>	
Open-Phase Natural Fault-Tolerant Scheme Based on Deadbeat Predictive Current Control for Symmetrical Six-Phase Vernier PM Motor	286
<i>Wenbo Dai, Xianglin Li, Jun Dai, Yujian Zhao, Kai Wang, Wei Hua</i>	

Model Order Reduction Based DQ Axis Parameter Extraction Method for IPMSMs	292
<i>Yuan Cheng, Yao Wang, Haodong Sun, Bo Gao, Yi Wang, Shumei Cui</i>	
Design Optimization of Hybrid PM Arrangement of RWAFFPM Motor Considering Irreversible Demagnetization.....	299
<i>Farshid Mahmouditabar, Nick J. Baker, Mohammad Bapiri, Abolfazl Vahedi</i>	
Finite Difference Model for the Calculation of Eddy Current Losses in Foil Windings of Distribution Transformers	305
<i>Marija Vukovic, Damir Žarko</i>	
Reduction of Stator Tooth Magnetic Saturation in Permanent Magnet Machines with Single-Layer Fractional Slot Concentrated Windings	312
<i>Runar Møllerud, Robert Kristoffer Nilssen, Zi-Qiang Zhu</i>	
Impact of Model Fidelity on Control and Performance Analysis of Interior Permanent Magnet Synchronous Machines.....	318
<i>Matteo Pizzuto, Aiswarya Balamurali, Hossain Mohammadi, Narayan C. Kar</i>	
Research on Harmonic Optimization to Reduce UMP Induced by Rotor Eccentricity in PMSMs	324
<i>Xinjie Wen, Haiyang Fang, Dawei Li, Ronghai Qu</i>	
Revised Correction Factors in the Specht's Model for Calculation of the Transformer Inrush Current.....	330
<i>Damir Žarko, Zlatko Hanic</i>	
Moving from a 3D Axial Flux Machine Model to 2D Considering the Impact of End Leakage Flux	337
<i>Vineetha Puttaraj, Sonja Tidblad Lundmark, Torbjörn Thiringer</i>	
Investigation of the Effect of Flux Concentration on Flux Switching Machines.....	344
<i>Mohammad Afrank, Mohammad Amirkhani, Ehsan Farmahini Farahani, Mojtaba Mirsalim, Nick J. Baker</i>	
Topology Optimization of Coaxial Magnetic Gear Based on Reluctance Network Analysis.....	351
<i>Ming Yin, Naidjate Mohammed, Nicolas Bracikowski, Antoine Pierquin, Didier Trichet</i>	
A Synergistic Suppression Method of Noise and Torque Ripple for PM Motor with Axial Heterogeneous Structure	359
<i>Yu Wang, Haiyang Fang, Zicheng Liu, Wendi Pan, Dawei Li, Ronghai Qu</i>	
Novel Stator Topology with Adjustable Stator Tooth Tips to Reduce Partial Losses at High Speeds in a PMSM.....	366
<i>Maximilian Clauer, David Bauer, Nejila Parspour</i>	
Multi-Objective Hierarchical Optimization of Variable Flux Memory Machines with Diverse Operation Conditions.....	373
<i>Hao Hua, Haorui Ge, Wei Hua</i>	
Permanent Magnet Cogging Motor, from Concept to Prototype.....	379
<i>Tomasz Lerch, Szczepan Milewski, Michal Drewniak, Krzysztof Lukawski, Tomasz Kolacz</i>	
The Evaluation of Optimal Ratio of Outer Diameter to Axial Length on Torque Density for the External Rotor PMSM.....	386
<i>Zicheng Yin, Xiaoyan Huang, Ang Liu, Xuanyuan Huang, Ye Ma, Zhuo Chen</i>	
Robust Design of Six-Phase Segmented Switch Reluctance Motor Considering Punching Effect.....	392
<i>Farshid Mahmouditabar, Nick J. Baker</i>	

Effect of Independent Interior and Exterior Tooth Tips in U-Shape Modular Permanent Magnet Machines	399
<i>Joaquín Valenzuela Herrera, Julio Jara Muñoz, Werner Jara Montecinos, Carlos Madariaga Cifuentes, Juan A. Tapia Ladino</i>	
3D Numerical Modeling of Displacement Due to Magnetostriction in Silicon Steel Laminated Core	406
<i>Yanhui Gao, Hiroki Fujita, Shengze Gao, Weimin Guan, Kazuhiro Muramatsu</i>	
Analysis of Cogging Torque of a PMSM Drive and Its Mitigation Via Hybrid Static-Active Filtering and Proportional-Integral Control.....	412
<i>Kevin Hui Chun Cheung, Dunant Halim, Giampaolo Buticchi, Adam Rushworth</i>	
Claw Pole -Single Magnet Rotor Small Synchronous Actuator Motor: Optimal Design Via 3D-MEC with 3D FEM Validation.....	418
<i>Lucian Tutelea, Tiago Staudt, Ion Boldea</i>	
Influence of Slot-Pole Combination on Electromagnetic Performance and Efficiency of Axial Flux Permanent Magnet Motor for Electric Vehicles	425
<i>Chaohui Tang, Weiwei Geng, Hao Chen, Yu Wang, Jianfu Zhang, Shuai Wang</i>	
Flux Density Evaluation of Dual-Core Phase Shifting Transformer in Normal Operating Conditions.....	432
<i>Luca Buono, Gabriele Tresso, Francesco Palone, Simone Sacco, Daniele Difino, Lorenzo Papi, Pierluigi Vacante, Franco Di Bona, Gaia Leone</i>	
Converter-Fed Induction Motor Efficiency Measurements - IEC 60034-2-3.....	439
<i>Matias Tiihonen, Hannu Kärkkäinen, Lassi Aarniovuori, Markku Niemelä, Dong Liu, Jan Barta</i>	
Indirect Efficiency Measurement of Outer-Rotor Inverter-Fed PM Synchronous Machines	446
<i>Daniel Dietz</i>	
Recyclable Electrical Machine Designs: Current Approaches and Perspectives.....	453
<i>Ecem Kasagga, Ayman El-Refaie</i>	
Synchronous Reluctance Rotor Geometry for High-Speed Applications	460
<i>Ville Kivelä, Andrea Beraldi, Riccardo Colombo, Alessandro Castagnini, Giulio Secondo</i>	
Design of a Synchronous PM Motor for e-Bike Applications	467
<i>Chiara Contò, Nicola Bianchi</i>	
Evaluation of Pole-Changing Wound Rotor Synchronous Wind Generator Topologies.....	474
<i>Ryno Gerber, Maarten J. Kamper</i>	
A Single-Phase Outer-Rotor Generator Featuring Permanent Magnets and Conductive Shield	481
<i>Paolo Bolognesi, Luca Papini</i>	
Combination Method and Comparative Analysis of Parallel Hybrid Excitation Machines with Integrated Armature Winding	488
<i>Xiangpei Gu, Nicola Bianchi, Zhuoran Zhang</i>	
Analysing the Performance of a High-Speed Solid Rotor Induction Machine with Copper Coating.....	495
<i>Felipe Ortiz, Janne Nerg, Aki Grönman, Michele Degano, Pia Lindh, Tokzhan Toleukaiyr, Juan Tapia, Juha Pyrhönen</i>	
Rotor Stray Currents in Large Salient-Pole Generators.....	500
<i>Joël Pedneault-Desroches, Kamal Al-Haddad</i>	

Fast Procedure for the Electromagnetic Sizing of Axial Flux PM Motors	507
<i>Matías Jiménez Molina, Federica Graffeo, Silvio Vaschetto, Alberto Tenconi, Andrea Cavagnino</i>	
Parametric Analysis of a Double-Stator Single-Rotor Coreless Axial Flux Machine.....	515
<i>Víctor Ballestín-Bernad, Guillermo Sanz-Sánchez, Jesús Sergio Artal-Sevil, José Antonio Domínguez-Navarro</i>	
Extension of Analytical Methods for AC Copper Loss Estimation in High-Speed Axial Flux Machines with Concentrated Flat Wire Coils	522
<i>Yiwen Ma, Kurt Reutlinger, Alin Stirban, Martin Doppelbauer</i>	
A Review of Recent Topologies of Variable Flux Machines	530
<i>Hesham S Badahdah, Ayman El-Refaie</i>	
A Design of Outer-Rotor Flux-Switching Motor with Segmental Rotors to Improve Torque Density	537
<i>Yudai Koishi, Hiroki Goto</i>	
Influence of the Stator Winding on the Mechanical Eigenfrequencies of Hydro Generators.....	544
<i>Allan De Barros, Wilhelm Weber, Amir Ebrahimi, Babette Schwarz, Bernd Ponick</i>	
Performance Analysis of a 5-MW Design-Optimized Triple-Three-Phase Wound Rotor Synchronous Wind Generator for DC Grids.....	550
<i>Lucky Dube, Karen S. Garner, Maarten J. Kamper</i>	
Flux Weakening and Flux Strengthening Capabilities of Rotary Hybrid Excited Flux Switching Generator for Wave Energy Applications	557
<i>Himayat Ullah Jan, Markus Mueller</i>	
Permanent Magnet Assisted Synchronous Reluctance Machine for a Power-Split Flywheel Storage System	563
<i>Tobias Heidrich, Andreas Möckel, Hendrik Fehr, Albrecht Gensior</i>	
Improved Electrical Braking of Synchronous Machines in Pumped Hydro Storage Plants	570
<i>Kumar Mahtani, Rubén Pascual Jimenez, José M. Guerrero, Carlos A. Platero, Juan I. Perez-Diaz, María D. López</i>	
Torque Ripple Compensation for IPMSM with Minimum Loss	575
<i>Vasyl Varvolik, Paolo Pescetto, Simone Ferrari, Shuo Wang, Michele Degano, Giampaolo Buticchi, Gianmario Pellegrino</i>	
Power Losses and THD Analysis of Current Source Inverters in Motor Drive Applications: A Comparative Study of Control Schemes.....	582
<i>Giovanni Luca Fidone, Giovanni Migliazza, Emilio Carfagna, Fabio Immovilli, Dario Benatti, Emilio Lorenzani</i>	
Extended MTPA-FW Control Technique for PM Electrical Machines with CSI	589
<i>Claudio Bianchini, Giada Sala, Matteo Frigieri, Mattia Vogni, Nicola Giannotta, Elena Macrelli</i>	
Alternative Test System for High Specific Power PMSM Using Passive Rectification and Compensating Capacitors.....	596
<i>Hüseyin Tayyer Canseven, Ilya Petrov, Juha Pyrhönen</i>	
A System-Level Design for Reliability of Integrated Motor Drives.....	603
<i>Soroush Ahooye Atashin, Saeed Peyghami, Pooya Davari, Amol Ramesh Chopade, Norbert Hanigovszki, Frede Blaabjerg</i>	

Achieving Greater Efficiency in Long-Distance Applications: The Novel Implementation and Validation of a Linear Flux-Switching Permanent Magnet Motor	609
<i>J. L. F. Raithel, P. C. J. A. Van Zweeken, B. Cornelisse, A. H. H. Dourleijn, K. E. Blokhuis</i>	
Performance Comparison of Direct Drive Linear Motors: Tubular and Flat Permanent Magnet Vernier Machines.....	616
<i>Alessandro Acquaviva, Sebastiano Acquaviva</i>	
Modeling and Control of a Levitating Linear Motion Platform	622
<i>Atte Putkonen, Sadjad Madanzadeh, Viktor Dodonov, Andrei Zhuravlev, Leonid Chechurin, Rafal P. Jastrzebski</i>	
Analytical Model of Single-Sided Linear Induction Motors for High-Speed Applications.....	630
<i>Simone Rametti, Lucien Pierrejean, André Hodder, Mario Paolone</i>	
Modelling Framework and Insights About a Novel Low-Velocity Segmented Linear Motor Design.....	638
<i>Taiji Endo, Yi Chen Mazumdar, Poul Nielsen, Bryan P. Ruddy</i>	
High-Speed Induction-Machine Squirrel-Cage Rotor Mechanical Design Evaluation	645
<i>Juuso Narsakka, Tuhin Choudhury, Jussi Sopanen, Juha Pyrhönen, Janne Nerg</i>	
Current Distribution in the Damper Bars of the Synchronous Turbo-Generator	653
<i>Gojko Joksimovic, Cesare Ciriani, Aldin Kajevic</i>	
FEA Augmented Equivalent Circuit for Accurate Performance Prediction of Induction Machines	659
<i>Matteo Carbonieri, Daniel Bachinski Pinhal, Jonathan Godbehere, Mircea Popescu</i>	
Multi-Objective Bayesian Optimization of Squirrel-Cage Induction Machine	666
<i>Vladimír Bilek, Jan Bárta, Lassi Aarniovuori</i>	
Investigation of Discrepancies Between Induction Motor Test Results and Design Simulation	673
<i>Georgios Falekas, Zafeirios Kolidakis, Athanasios Karlis</i>	
Surface Vs. Embedded Magnets in Permanent Magnet Outer Rotor Synchronous Motors	680
<i>Daniil Zadorozhniuk, Pia Lindh, Arash Allahyari, Ilya Petrov, Juha Pyrhönen</i>	
Spline-Based Rotor and Stator Optimization of a Permanent Magnet Synchronous Motor.....	687
<i>Michael Wiesheu, Theodor Komann, Melina Merkel, Sebastian Schops, Stefan Ulbrich, Idoina Cortes Garcia</i>	
Effect of Rotor Step Skew on the Demagnetization Ratio of Permanent Magnet Synchronous Machines	693
<i>Daniel Keller, Akif Karayel, Robin Krueger, Hristian Naumoski, Uwe Schaefer, Nejila Parspour</i>	
Investigation on Stator Core Losses in High-Speed PMSM Considering Current Harmonics.....	699
<i>Chendong Liao, Nicola Bianchi, Zhuoran Zhang</i>	
Topology Optimization of a Complete Reluctance Machine with No Initial Information on Its Geometry	706
<i>Théodore Cherrière, Sami Hlioui, Mohamed Gabsi, Luc Laurent, François Louf, Hamid Ben Ahmed</i>	
Optimizing an Interior-Permanent-Magnet Tooth-Coil-Winding Traction Motor for Its Entire Operating Range.....	713
<i>Arash Allahyari, Emine Bostanci, Gamze Odabas, Pia Lind, Lassi Aarniovuori, Juha Pyrhönen</i>	

Advanced Methodology for Magneto-Mechanical Topology Optimization of a Synchronous Reluctance Machine	720
<i>Alessandro Silvestrini, Maya Hage Hassan, Xavier Mininger, Guillaume Krebs, Philippe Dessante</i>	
Parametric Optimization of Flux Barriers for Torque Ripple and Tooth Force Minimization in Permanent Magnet Synchronous Machines.....	727
<i>Andreas Carlsson, Viktor Josefsson, Johan Fagerberg, Kristoffer Ahlgren, Christian Sandström, Gabriele Puccio</i>	
An Interpolation Based Meshed Magnetic Equivalent Circuit for Interior Permanent Magnet Synchronous Machines.....	734
<i>Ahmed Hemeida, Baocheng Guo, Osemwinyen Osaruyi, Florian Martin, Paavo Rasilo, Ayman S. Abdel-Khalik, Anouar Belahcen</i>	
On the Utilization of Radial Vibration Transient Signals for Induction Machine Misalignment Diagnosis.....	740
<i>Jose E. Ruiz-Sarrio, Vicente Biot-Monterde, Carlos Madariaga-Cifuentes, Angela Navarro-Navarro, Jose A. Antonino-Daviu</i>	
Effects of the Inter-Turn Short-Circuit Fault in the Stator Winding of a 5-Phase Induction Motor	746
<i>Mahmoud I. Masoud, Giorgos Skarmoutsos, Wenyue Mu, Zihao Song, Konstantinos N. Gyftakis, Panagiotis A. Panagiotou</i>	
Broken Rotor Bar Fault Detection Using Machine Learning: Optimal Frequency Resolution	754
<i>Semen Koveshnikov, Nada El Bouharrouiti, Karolina Kudelina, Usman Muhammad Naseer, Toomas Vaimann, Anouar Belahcen</i>	
Induction Machine End-Winding Leakage Flux Monitoring Using FBG Magnetostrictive Composite Flux Sensor for Broken Rotor Bar Fault Detection.....	760
<i>Asep Andi Suryandi, Paul Tuohy, Siniša Djurovic</i>	
Vibration-Based Identification of Mechanical Defects in Induction Motor-Driven Systems During the Starting Transient.....	768
<i>Byambasuren Battulga, Muhamad Faizan Shaikh, Taner Goktas, Muslum Arkan, Sang Bin Lee</i>	
3D Multibody Simulation of Realistic Rolling Bearing Defects for Fault Classifier Development.....	775
<i>Milla Vehviläinen, Mikko Tahkola, Janne Keränen, Nada El Bouharrouiti, Pekka Rahkola, Jari Halme, Jenni Pippuri-Mäkeläinen, Anouar Belahcen</i>	
Impact of Controller Bandwidths on Bearing Fault Diagnosis.....	782
<i>Sara Jammoul, Remus Pusca, Raphaël Romary, Nicolas Voyer</i>	
Supervised Contrastive Learning for Electric Motor Bearing Fault Detection.....	789
<i>Hengrui Zhang, Bingnan Wang</i>	
Multisensory Approach to Diagnose Bearing Faults Using Cohen Class Bilinear Distributions	796
<i>Avyner L. O. Vitor, Clayton L. Graciola, Alessandro Goedel, Wesley A. Souza, Marcelo F. Castoldi, Daniel Moriñigo-Sotelo, Oscar Duque-Perez, Tomas A. Garcia-Calva</i>	
Multi-Rate Vibration Signal Analysis for Enhanced Data-Driven Monitoring of Bearing Faults in Induction Machines	803
<i>Nada El Bouharrouiti, Semen Koveshnikov, Tomas Alberto Garcia-Calva, Milla Vehviläinen, Karolina Kudelina, Usman Muhammad Naseer, Toomas Vaimann, Anouar Belahcen</i>	

Impact of an Open-Switch Fault in T-Type Five-Phase Inverters for Induction Motor Drives	810
<i>Luca Vancini, Michele Mengoni, Gabriele Rizzoli, Fabio Crescimbin, Luca Zarri, Angelo Tani</i>	
Assessment of Magnet Manufacturing Tolerances and Their Effects on an Interior Permanent Magnet Traction Machine.....	817
<i>X. Y. Ma, J. Soulard</i>	
On the Effect of Permanent Magnet Eddy Currents During Dynamic Short-Circuits in Traction Motors	824
<i>F. Eichin, M. Kamper, S. Gerber, R. Wang</i>	
A Fault Tolerant Electric Propulsion Unit Based on Bifilar Coils	830
<i>Tadele Lijalem Yirisaw, Andreas Reeh, Wolfram Siegfried Birkmayer, Yves Burkhardt</i>	
Six-Phase Induction Machines: State of the Art on Design, Modeling, Control and Diagnosis.....	837
<i>Mehdi Taherzadeh, Humberto Hénao, Gérard-André Capolino</i>	
Characterization of a Thermal FEA Model for Electrical Machines	844
<i>Akif Karayel, Niklas Damhorst, Daniel Keller, Uwe Schaefer</i>	
Experimental Comparison of Three Direct Winding Cooling Methods	851
<i>Ilya T'Jollyn, Simon Willemarck, Jasper Nonneman, Michel De Paepe</i>	
Multiphysics Thermal Digital Twin of a High Power Density Motor for Automotive Applications.....	858
<i>Riccardo Torchio, Francesco Toso, Filippo Conte, Jacopo Ferretti, Lorenzo Fazzini, Nicola Matteazzi, Paolo Bolognesi, Luca Papini</i>	
Investigation Performance Characteristics of the Flat Fan Nozzle on the Oil Spray Cooling System	866
<i>Payam Shams Ghahfarokhi, Andrejs Podgornovs, Antonio J. Marques Cardoso</i>	
Transient Quality Assessment of a Novel Thermal Modeling Methodology for Electric Machines	871
<i>Jasper Nonneman, Michel De Paepe, Ilya T'Jollyn</i>	
About the Evolution of the Iron Losses: From Sinusoidal to PWM Inverter Supply	878
<i>Aldo Boglietti, Fabio Mandrile, Sandro Rubino, Marco Villani</i>	
Density Analysis Based on Normalized Process Diagrams : A Comparative Review of Ferromagnetic Alloys Produced by Laser Powder Bed Fusion	885
<i>Abilo Andrés Velásquez Salazar, Yuyang Li, Alejandro Ospina Vargas, Meher Zaied, Noureddine Fenineche, Jérôme Favergeon, Thierry Baffie, Salima Bouvier</i>	
Investigating PWM Scheme Effects on Power Loss in a Hairpin-Wound Traction Drive Unit	891
<i>Yaohui Gai, Richard McMahon, Juliette Soulard</i>	
Comparative Analysis of Electric Motor Designs: Traditional Steel Laminations Vs. Soft Magnetic Composite Materials.....	897
<i>Branko Ban, Anton Kersten, Stefan Skoog, Lars Sjöberg, Stjepan Stipetic, Tushar Batra</i>	
Equivalent Resistance Model of the Permanent-Magnet Motor for Predicting Electromagnetic Losses.....	905
<i>Zhaokai Li, Bin Liu, Peter Fransson, Luca Peretti</i>	
A Methodology for Experimentally Deriving Thermal Parameters in Design of Electrical Machines for Short-Duty Transient Operation.....	911
<i>Rafal Wrobel</i>	

Hairpin Winding with Direct Oil Cooling	918
<i>Ilya Petrov, Ilkka Martikainen, Ilkka Poutiainen, Juzer Rangwala, Juha Pyrhönen</i>	
A Feasibility Study of Oil Spray Cooling on the Stator Core Outer Surface of Electric Motors for Automotive Applications.....	925
<i>Yufeng Guo, Yaohui Gai, Edward Griffin, Ali Sadeghianjahromi, Juliette Soulard</i>	
Numerical Analysis of the Local Heat Transfer Coefficient in a Rotating Hollow Rotor Shaft Liquid Cooling System for Electric Traction Motors.....	932
<i>Matthew Lee, Ofelia A. Jianu, Narayan C. Kar</i>	
Evaluation of Convection Heat Transfer Coefficients in Totally Enclosed PMSMs	939
<i>Ankan Dey, Dawei Liang, Zi Qiang Zhu, Liang Chen, Lei Yang</i>	
Performance Comparison of Conventional and Amorphous AM-Built PMSM	946
<i>Klein Carsten, Thorsson Lena, May Christopher, Nienhaus Matthias</i>	
Synchronous Reluctance Motors: Opportunities in the Era of New Materials, Additive Manufacturing, and Machine Learning	953
<i>Davide Angrilli, Enzo Chiricozzi</i>	
Innovative Rotor Winding Geometry for Synchronous Machine by Means of Additive Manufacturing	960
<i>Claudio Bianchini, Nicola Bianchi, Giada Sala, Nicola Giannotta, Ambra Torreggiani</i>	
Rare Earth Magnets Recycling: Study of a Safer and Cost-Effective Technique	967
<i>Emir Poškovic, Luca Ferraris, Fausto Franchini, Andrea Caneschi</i>	
Development of an Axial Flux SRM Through Additive Manufacturing	974
<i>Shahid Hussain, Ants Kallaste, Muhammad Usman Naseer, Hans Tiismus, Toomas Vaimann</i>	
Validation of Electrostatic Shieldings in Traction Motors to Mitigate Capacitive Bearing Currents	980
<i>Silvan Scheuermann, Peter Lego, Martin Doppelbauer</i>	
Experimental-Based Model for Turn-To-Turn PDIV Prediction Dependent on Temperature	986
<i>Leire Elorza Azpiazu, Aritz Egea, Gaizka Almandoz, Gaizka Ugalde, Izaskun Sarasola</i>	
Identification of Thermal Failure Profiles in Stator Winding Insulation by Impedance Spectroscopy	993
<i>Edward J. W. Stone, Panagiotis A. Panagiotou, Johannes Mühlthaler, Andrew R. Mills, Alexis Lambourne, Geraint W. Jewell</i>	
Experimental Comparison of Dual-Winding Configurations in Induction Motors Under Two Different Types of Supply Voltage Unbalance.....	1000
<i>Fernando J. T. E. Ferreira, José Alberto, Anibal T. De Almedia</i>	
A Comparative Study of Stator Winding Technologies for Coreless Axial Flux Permanent Magnet Machines	1007
<i>Federico Marcolini, Giulio De Donato, Fabio Giulii Capponi, Federico Caricchi</i>	
Indirect End Turn Heat Exchanger for Additively Manufactured Electric Machine Conductors	1014
<i>James Pecotich, David Klink, Greg Heins, Behrooz Bahrani</i>	
Toward an Accessible Electrical Conductivity Characterisation Method for Additively Manufactured Conductors	1021
<i>Nick Simpson, Dominic North, Anna Ermakova, Priya Munagala</i>	

Optimization of Printed Synchronous Reluctance Rotor Based on Bézier Curves.....	1028
<i>Daniele Michieletto, Luigi Alberti, Anouar Belahcen</i>	
Detection and Mitigation of Hotspots in Electrical Machine Windings Using 3D Printing Technology	1035
<i>Ahmed Selema, Mohamed N. Ibrahim, Hendrik Vansompel, Peter Sergeant</i>	
Opportunities for AC Loss Reduction in Metal Additive Formed Hairpin Windings.....	1042
<i>Philip Mellor, Nick Simpson, Mircea Popesco</i>	
Sensorless Control with Indirect Field Oriented Speed Estimation for Seven-Phase Induction Machines	1049
<i>Yixuan Wu, Luca Vancini, Michele Mengoni, Luca Zarri, Luca Peretti</i>	
Impact Analysis of FOC-Based Synchronous PWM Strategy on Traction Induction Motor Drives Performance.....	1055
<i>Claudio Nevoloso, Antonino Oscar Di Tommaso, Rosario Miceli, Gioacchino Scaglione, Salvatore Foti, Antonio Testa</i>	
Unified Flux Observer for Induction and Permanent Magnet Synchronous Machines	1062
<i>Rashad Ghassani, Zohra Kader, Maurice Fadel, Pascal Combes</i>	
A Comprehensive Review of Restarting Strategies for Free Running Induction Motor Drives.....	1069
<i>Hamidreza Mosaddegh, Mojtaba Ayaz Khoshhava, Simon Caron, Kamal Al-Haddad</i>	
Medium Voltage Sensorless Induction Motor Drive for Subsea Applications.....	1075
<i>Lorenzo Carbone, Mario Marchesoni, Massimiliano Passalacqua, Luis Vaccaro</i>	
System Analysis of a Braking Energy Recovery Axle of Truck Trailer	1082
<i>Tobias Zeller, Tudor Prisca, Patrick Cujic, Dennis Bank, Martin Doppelbauer</i>	
Design Strategies for Scalable and Modular Aerospace Electrical Machines	1089
<i>Mostafa Ahmadi Darmani, Mukhammed Murataliyev, David Gerada, Chris Gerada</i>	
Electromagnetic and Mechanical Design Optimization of High-Speed PMASynRM Utilizing Different Magnet Combinations for EV Application.....	1096
<i>Praveen Kumar, Robin Wilson, Towhid Chowdhury, Ayman El-Refaie</i>	
Assessing Thermal and Efficiency Aspects of Aluminum Hairpin Motors in Passenger Cars	1103
<i>Michelangelo Raimondo, Gregorio Cutuli, Stefano Nuzzo, Davide Barater</i>	
Design and Scaling Effects of Permanent Magnet Synchronous Machines for Propeller Direct Drives	1110
<i>Jonas Franzki, Markus Henke</i>	
Analysis and Optimization of Polarity Detection Methods for Electric Vehicle Traction IPMSM	1117
<i>Andras Holczer, Francisco D. Freijedo, Radu Bojoi</i>	
Comparative Stability Analysis of IPMSM and SPMSM Machines Under Flux-Weakening Control	1124
<i>Kejin Lu, Zi Qiang Zhu</i>	
Rotor Position Error Compensation in Sensorless IPMSM Motor Drives	1131
<i>S. Foti, A. Testa, C. Nevoloso, A. O. Di Tommaso, R. Miceli</i>	
Geometry Optimization of an Interior Permanent Magnet Machine for Minimal Life Cycle Cost in City, Rural and Highway Driving.....	1139
<i>Elisabet Jansson, Torbjörn Thiringer, Emma Arfa Grunditz</i>	

A New Hybrid Control Strategy in Flux-Weakening Region for High Performance Traction IPMSM	1146
<i>Stefano Montemurro, Matteo F. Iacchetti, Juri Tessaro, Denny Chiono, Jean Paul Junod</i>	
Two-Rated-Power, Dual-Winding, Three-Phase Induction Motor	1153
<i>Fernando J. T. E. Ferreira</i>	
Modelling of Insulation in Concentrated Stator Coils for Characterisation and Material Changes.....	1160
<i>Edward J. W. Stone, Panagiotis A. Panagiotou, Johannes Mühlthaler, Andrew R. Mills, Alexis Lambourne, Geraint W. Jewell</i>	
Evaluation of PCB End-Windings for Low-Voltage Stators of High-Speed Electrical Machines.....	1168
<i>Sridhar Balasubramanian, Hendrik Schefer, Markus Henke, Regine Mallwitz</i>	
A Study on a Compact High-Efficiency Integrated Motor Using Layered Coil Ends and a Quadruple Inverter.....	1177
<i>Koki Takeuchi, Kan Akatsu</i>	
Additively Manufactured and Topology Optimized Heatsink for a Propulsion Motor	1184
<i>Martin Sarap, Ants Kallaste, Toomas Vaimann, Payam Shams Ghahfarokhi</i>	
A Review on Properties of 3D Printed Magnetic Cores for Electrical Machines: Additive Manufacturing Methods and Materials.....	1190
<i>Akbar Mohammadi Ajamloo, Mohamed N. Ibrahim, Peter Sergeant</i>	
Investigation on AC Losses in the End Conductors of Additively Manufactured Hairpin Windings.....	1197
<i>Riccardo Notari, Stefano Nuzzo, Michele Degano, Davide Barater</i>	
Triply Periodic Minimal Surfaces Structure for Efficient Heat Dissipation in Motor Housings: A Convective Potential Analysis	1204
<i>Shaheer Ul Hassan, Mazahir Hussain Shah, Pavel Gruber, Miroslav Chomat</i>	
Six-State Angle Control Strategy for Doubly Salient Electromagnetic Generator System Based on Active Rectifier	1211
<i>Yulong Tao, Weifeng Liu, Huizhen Wang</i>	
Compensation of Current Measurement Error in PMSM Drives Based on Virtual Windings.....	1218
<i>Pingyue Song, Enlin Ma, Yuankui Wang, Tao Wang, Hao Li, Lijian Wu</i>	
A Nonlinear Extended State Observer Design for Torsional Vibrations Estimation in PMSM Drive.....	1225
<i>Matteo Deponti, Dejan Pejovski, Antonino Di Gerlando, Roberto Perini</i>	
Real-Time Rotor Temperature Estimation in Permanent Magnet Synchronous Motor Using Incremental Deep Learning	1232
<i>Elham Shafteeroudbari, Lakshmi Varaha Iyer, Narayan C. Kar</i>	
A Dual SOGI-PLL Based Position Sensorless Control for Doubly Salient Electromagnetic Generator System with Active Rectifier	1238
<i>Weifeng Liu, Yulong Tao, Huizhen Wang, Long Yu, Tao Chen, Xingwei Zhou</i>	
A Novel Voltage Vectors Subset-Based Model Predictive Control for Six-Phase PMSM Drives.....	1245
<i>Gioacchino Scaglione, Claudio Nevoloso, Giuseppe Schettino, Antonino Oscar Di Tommaso, Rosario Miceli, Josef Knobloch, Armin Dietz</i>	
An Efficient Open-Loop Approach to Reliable Starting of Synchronous Reluctance Motor Drives	1252
<i>Devjyoti Roy, Kamalesh Hatua</i>	

Encoderless Field Oriented Control (FOC) with I-F Starting for a Super-High Speed SPMSM (125 Krpm, 30 kW) Compressor Drive	1259
<i>Andy-Sorin Isfanuti, Mihaela-Codruta Ancuti, Ana Popa, Babak Fahimi, Ion Boldea</i>	
Real Time Stator and Magnet Fluxes Estimation Based on Kalman Filters of PMSynRel Motor	1266
<i>Ngoc-Tu Trinh, Ismail Zein, Najla Haje Obeid, Fabien Vidal-Naquet</i>	
Proposal of a Linear Double-Stack Scattered Permanent Magnet Flux Switching Motor.....	1273
<i>Ehsan Farmahini Farahani, Nick J. Baker</i>	
Design and Resonance Analysis of Tubular Structured Dual Stator Linear Oscillating Actuator	1280
<i>Zahoor Ahmad, Ants Kallaste, Toomas Vaimann, Muhammad Usman Sardar</i>	
A Magnetic Constant Torque Mechanism	1287
<i>Gozde Sivka, Dawei Che, Bert Dechant, Colton Bruce, Jonathan Z. Bird</i>	
Design and Analysis of a Linear-Rotary Permanent Magnet Motor with Orthogonal Windings	1294
<i>Yunnan Feng, Yanxin Li, Qinfen Lu, Youtong Fang</i>	
Synchronization Process Analysis of Line Start Permanent Magnet Synchronous Machine	1300
<i>Junli Huang, Shanming Wang, Wenmao Liu</i>	
Multi-Monopole Surface Permanent Magnet Bearingless Motor with DC Suspension Current.....	1308
<i>Hiroya Sugimoto, Shouma Kono, Takahiro Noguchi</i>	
Analysis and Enhanced Modeling of Inductive Displacement Sensor in Active Magnetic Bearing	1315
<i>Mohammad Ali Salahmanesh, Hossein Abootorabi Zarchi, Hamidreza Mosaddegh-Hesar, Salman Abdi Jalebi, Gholamreza Arab Markadeh, Ali Akbar Derakhshi</i>	
A Novel Axial Flux Magnetic Suspension Motor with Hysteresis Rotor for Heart Pumps.....	1321
<i>Bo Gao, Yuan Cheng, Haodong Sun, Shumei Cui</i>	
Comparison of Carbonised Foam to Other Testing Media for Insulation Verification of Hairpin Windings.....	1328
<i>Max R Parker, John D Wale, Ben Hunt</i>	
Order Reduction of a Frequency Magneto-Dynamic Problem for the Calculation of Copper Losses.....	1335
<i>Rémi Jardot, Guillaume Krebs, Anas Lahlou, Francis Roy, Claude Marchand</i>	
PDIV Modeling for Rectangular Wire Turn-To-Turn Insulation of Inverter-Fed Motors at Different Cruising Altitudes.....	1342
<i>Hadi Naderiallaf, Christopher Gerada, Michele Degano, David Gerada</i>	
Semi-Analytical Calculation of AC Copper Loss in Flat Wire Windings Considering PWM Harmonics	1349
<i>Longyu Guo, Yang Lu, Jian Li, Rong-Jie Wang</i>	
Design of Integrated Radiator for Aviation Propulsion Motor Based on Structural Reuse	1355
<i>Zichen Zheng, Xinggang Fan, Dawei Li, Haiyang Fang, Ronghai Qu, Lihao Huang</i>	
Impacts of Stator Current Angle and Rotor Current on Solid Losses of Hairpin Windings in Traction Electrically Excited Synchronous Machines	1362
<i>Ruonan Liu, Junfei Tang, Luca Boscaglia, Bowen Jiang, Nimananda Sharma, Yujing Liu</i>	
Core Loss Model for Non-Sinusoidal Excitations Based on Vector Magnetic Circuit Theory.....	1369
<i>Chengbo Li, Wei Qin, Zheng Wang, Xiang Ma, Wei Wang, Ming Cheng</i>	

Comparison of Interior Permanent Magnet Machine Designs Aimed for City and Highway Driving - Consequences on Loss and Torque Performance from Degradation Due to Laser Cutting.....	1375
<i>Sima Soltanipour, Elisabet Jansson, Torbjörn Thiringer, Joachim Lindström</i>	
Thermal Model Calibration of a Squirrel-Cage Induction Machine.....	1382
<i>Leon Blumrich, Christian Bergfried, Armin Galetzka, Herbert De Gersem, Roland Seebacher, Annette Mütze, Yvonne Späck-Leigsnering</i>	
Generalized Lumped Thermal Circuit for Synchronous Rotating Machines - The Constellation Method	1389
<i>Alejandro Rodríguez González, Blandine Pollet, Anthony Carpentier, James E. Bruns</i>	
Influence of Flux Screen and Clamping Materials on Eddy Current Losses in End Region of High- Power Electrical Machines	1396
<i>Walid Mohand Oussaid, Abdelmounaim Tounzi, Raphael Romary, Abdelkader Benabou, Walid Boughanmi, Daniel Laloy</i>	
A Novel Computational Method for Iron Loss of Interior Permanent Magnet Motor in Wide Speed Range Operations	1402
<i>Thien-Phuoc Nguyen, Anh Thanh Huynh, Min-Fu Hsieh, Trung Duong, Thi-Minh-Dung Tran</i>	
A Comparative Study of AC Winding Loss Calculation for Axial Flux Permanent Magnet Machines Based on Finite Element Analysis.....	1409
<i>Dae Yong Um, Rajesh Kumar, Tushar Batra, Lars Sjöberg, Glynn Atkinson</i>	
Empirical Study on Heat Transfer Coefficients in Lumped Parameter Thermal Network of Direct- Oil Cooled Permanent Magnet Synchronous Motor.....	1416
<i>Jun-Woo Chin, Seojun Park, Jaeyeob Hwang, Deok-Jin Kim, Ho-Chang Jung</i>	
Ripple Correlation Control for a Low-Cost Single-Stage Photovoltaic Water Pumping System	1424
<i>Amir Khazaei, Hamidreza Mosaddegh, Simon Caron, Kamal Al-Haddad</i>	
Performance Comparison of Static Eccentricity Between Squirrel-Cage Induction and Wound-Field Flux Switching Machines	1429
<i>Ogbonnaya I. Okoro, Chiweta E. Abunike, Udochukwu B. Akuru, Uchechi O. Innocent, Ekom E. Okpo, Imo E. Nkan</i>	
Analyzing the Performance of Radial-Flux Permanent Magnet Synchronous Generators with Different Winding Designs for Applications in Wind Turbines.....	1435
<i>R. Iracheta-Cortez, E. Vázquez, W. Durante-Gómez</i>	
Characterization of High-Frequency Impedance-Based Models for Transient Terminal Overvoltage Estimation in Cable-Fed Motor Drive Systems.....	1442
<i>Muhammad Usman Sardar, Toomas Vaimann, Lauri Kütt, Bilal Asad, Ants Kallaste, Karolina Kudelina</i>	
Experimental Verification of an Intermittent Stator Ground Protection in Large MVA Generators	1449
<i>Nader Safari-Shad, Adama Sawadogo, Robert Fecht, Russ Franklin</i>	
Offline Parameter Estimation of Isotropic Permanent Magnet Synchronous Motors Based on Regular Operational Data and Probabilistic Error Analysis	1456
<i>Elia Brescia, Luigi Pio Savastio, Mauro Di Nardo, Francesco De Musso, Giovanni Conte, Andrea Polichetti</i>	
Influence of Moisture on the Frequency Response Analysis of Poles of Synchronous Machines	1463
<i>Kumar Mahtani, Juan De La Morena Marigorta, José M. Guerrero, Carlos A. PlatERO</i>	

Isolation of Induction Motor Rotor Fault Signatures by Stray Magnetic Flux and Torque Monitoring.....	1469
<i>Zihao Song, Panagiotis A. Panagiotou, Jonathan C. Mayo-Maldonado, Ioannis Arvanitakis, Jose A. Antonino-Daviu, Konstantinos N. Gyftakis</i>	
Advanced Analysis of Armature Currents Signals for Sparking Detection in DC Motors and Generators	1477
<i>Jorge E. Salas Robles, Vicente Biot Monterde, Jose A. Antonino-Daviu</i>	
Reliable Detection of Non-Adjacent Broken Rotor Bars Via the Analysis of the Zero-Sequence Flux.....	1484
<i>Marios Salinas, Nikolaos Trachalakis, Panagiotis A. Panagiotou, Konstantinos N. Gyftakis</i>	
Online Identification of Inductance and Flux Linkage for SPMSMs Decoupled from Resistance Voltage Drop and VSI Nonlinearity.....	1490
<i>Ang Liu, Xiaoyan Huang, Zhuo Chen, Huanran Wang, Zhaokai Li</i>	
Data-Driven Inter Turn Short Circuit Fault Detection of a Segmented SRM Based on Multi-Path Convolutional Neural Network and fCWT.....	1496
<i>Arta Mohammad-Alikhani, Farshid Mahmouditabar, Nick J. Baker, Babak Nahid-Mobarakeh</i>	
Detection of Stator Asymmetries in Synchronous Reluctance Motors Through the Analysis of the Stator Current	1502
<i>Angela Navarro-Navarro, Vicente Biot-Monterde, Jose E. Ruiz-Sarrió, Jose Antonino-Daviu</i>	
Rotor Faults Condition Monitoring in Direct on Line Start Permanent Magnet Motors.....	1508
<i>Natalia Fatsea, Tomas A. Garcia-Calva, Daniel Morinigo-Sotelo, Konstantinos N. Gyftakis</i>	
Training Scheme for Convolutional Neural Network Based Multiple Fault Classifier of Permanent Magnet Synchronous Motors Under Variable Speed and Load Conditions.....	1514
<i>Du Nguyen, Van Khang Huynh, Kjell G. Robbersmyr</i>	
Fault Detection of Permanent Magnet Synchronous Motors Employing DQ Current Features and Isolation Forest.....	1521
<i>Konstantinos Koutrakos, Epameinondas Mitronikas</i>	
MWFA Model Based Synthetic Data Creation and Utilization for the Training of XGBoost Based Fault Diagnostic Algorithm of a Squirrel Cage Induction Motor	1528
<i>Bilal Asad, Muhammad Amir Khan, Hadi Ashraf Raja, Toomas Vaimann, Ants Kallaste, Muhammad Usman Naseer</i>	
The Usage of Fuzzy Logic for Detecting Mechanical Faults in Gearboxes of Robotic System.....	1535
<i>Siarhei Autsou, Karolina Kudelina, Toomas Vaimann, Anton Rassõlkin</i>	
Robust Slot Harmonic Extraction in Varying Speed Operations	1542
<i>Dehong Liu, Shinya Tsuruta</i>	
Impact of the Control Strategy of a Multiphase Non-Sinusoidal PMSM with Phase-Shifted Stars on Non-Intrusive Fault Indicators.....	1548
<i>Anthony El Hajj, Eric Semail, Abdelmounaim Tounzi, Jalal Cheaytani</i>	
Impact of Electric and Magnetic Loading on the Electromagnetic Stress of PM Machines.....	1555
<i>Supratap Sengupta, B. G. Fernandes</i>	
Optimal Active Short-Circuit Operation of Permanent Magnet Synchronous Machines and Drives for Aerospace Applications.....	1562
<i>Wei Wang, Jonas Kristiansen Nøland, Pål Keim Olsen, Sondre Westby Johannessen</i>	

Torque and Current Ripple Analysis in Integrated DC-DC Boost Chargers Based on SynRMs and WR-SMs	1569
<i>Gabriele Rizzoli, Luca Vancini, Michele Mengoni, Giacomo Sala, Luca Zarri, Angelo Tani</i>	
Flux Switching Gerotor Pump	1577
<i>Jean-Daniel Alzingre, Christophe Espanet</i>	
Control Techniques for Dual-Three-Phase SPM Drives Including Voltage Limitation Strategies	1582
<i>Gabriele Antonino Cagliari, Giacomo Sala, Antonio Femia, Luca Vancini, Gabriele Rizzoli, Michele Mengoni, Luca Zarri, Angelo Tani</i>	
Influence of Current Harmonics on Electromagnetic Force and Vibration Noise of Electrical Machines	1589
<i>Haitao Liu, Yue Liu, Yongjiang Liu, Yu Qi, Bin Liu, Hui Wu, Ruiren Luo</i>	
Design of High-Speed Linear Induction Motors - Part I: Electromagnetic Modelling	1596
<i>Jaime Renedo Anglada, Suleiman M. Sharkh, Dario Bueno-Baques, Denis Tudor</i>	
Design of High-Speed Linear Induction Motors - Part II: End Effect Reduction	1603
<i>Jaime Renedo Anglada, Suleiman M. Sharkh, Dario Bueno-Baques, Denis Tudor</i>	
A High-Accuracy Torque Estimation Method of IPMSM Based on Search Coils	1610
<i>Kai Yao, Yuan Cheng, Bochao Du, Bo Gao, Qianfan Zhang, Shumei Cui</i>	
A Novel Segmented-Rotor Hybrid-Excited Synchronous Motor for Electric Vehicle Application	1617
<i>Shovan Dey, Baylon G. Fernandes</i>	
Analytical Model of a High Frequency Rotary Transformer in Non-Resonant Topologies	1624
<i>Francesco Tripaldi, Manuele Bertoluzzo, Nicola Bianchi</i>	
Electric Energy Consumption Improvement of Dual-Fluid Power Control System Based on Operating Line Shift Strategy for Heavy Duty EV	1631
<i>Seojun Park, Jun-Woo Chin, Jongin Lee, Deok-Jin Kim, Ho-Chang Jung</i>	
An Innovative Electric Motor Topology Developed for 2- And 3-Wheelers	1638
<i>Shafiqh Nategh, Philippe Farah, Stefano Nuzzo</i>	
A Novel PMSM Rotor Speed and Angle Estimation Based on a Multifunctional Sensor	1644
<i>Marjan Faghieh, Ludwig Brabetz, Mohamed Ayeb</i>	
Finite Element Analysis of an IPM Machine for Charging Operations in Electric Vehicles	1650
<i>Rishabh Raj, Deepak Singh, Shayan Halder, Michela Diana, B. Sai Ram, Yves Thiolier</i>	
Drive Cycle Comparison of a PMSM and an EESM for a Traction Application Utilizing Modular Stator Manufacturing	1656
<i>Alexandra Tokat, Duc-Khanh Nguyen</i>	
Study of a Dual Stator PM Vernier Machine with Concentrated Windings and Low Torque Ripples	1663
<i>Walid Guendouz, Abdelmounaim Tounzi, Toufik Rekioua</i>	
A Novel Torque-Coupled Axial-Flux Permanent Magnet Motor with Magnetic Coupler for Flux Weakening	1670
<i>Zhongxin Wan, Yulong Pei, Feng Chai</i>	
Study on the Feasibility of Double Cage Induction Motors for Electromobility Applications	1677
<i>Felipe Santacruz Benavides, Cesar Gallardo, Carlos Madariaga, Juan A. Tapia, Harold Diaz</i>	

Influence of High-Frequency Operation on the Efficiency of a PMSM Drive	1682
<i>Paisak Poolphaka, Sisuda Chaitongsuk, Ehsan Jamshidpour, Thierry Lubin, Lotfi Baghli, Nouredine Takorabet</i>	
Suppression of Vibration in PMSM Caused by Time-Varying Load for Reciprocating Compressor.....	1689
<i>Soo-Hwan Park, Jae-Hyun Kim, Chi-Sung Park, Yun-Jae Won, Myung-Seop Lim</i>	
Multi-Physics Design and Analysis of Axial Flux Permanent Magnet Motors for In-Wheel Direct-Drive.....	1695
<i>Shuiquan Qiu, Yang Lu, Jian Li</i>	
Comparison of Unbalance Control for High-Speed Active Magnetic Bearing System.....	1702
<i>Haodong Li, Jian Li, Hongwei Xu, Yang Lu</i>	
A Modified Standstill Method Based on DC Step Voltage Test for Doubly-Fed Induction Generator-Motor Parameters Identification	1708
<i>Xianzhuo Zhang, Lin Luo, Jianjun Liu, Jin Wang, Libing Zhou</i>	
Design Optimization of Ferrite-Assisted Synchronous Reluctance Motor with Fluid Flux Barriers and Rectangular Magnets	1715
<i>Vishal M. J., B. G. Fernandes</i>	
Integrated Modern Technologies for Teaching in Electric Engineering Laboratories	1722
<i>Andres Julian Saavedra-Montes, Gabriel Jaime Sanchez-Zuluaga, Carlos Andres Ramos-Paja</i>	
Effect of Eccentricity on Vibration and Noise of External-Rotor PMSM	1729
<i>Jinwen Du, Rui Zhong, Zhongze Wu, Wei Hua, Zheng Wu, Chao Zhang</i>	
Design, Construction and Test of a Magnetically Geared Induction Machine	1735
<i>Badr-El-Boudour Bidouche, Thierry Lubin, Smail Mezani, Franck Vangraefscheppe, Tahar Hamiti</i>	
Analysis of Transient Locked-Rotor Current and Torque of Line-Starting Permanent Magnet Synchronous Motors.....	1742
<i>Johann Pecho, Wilfried Hofmann</i>	
Analytical Model for Predicting Output Voltage Distortion of Salient Pole Synchronous Generators Under Linear Load	1749
<i>Lukas Malfait, Colin Debruyne, Jan Desmet, Jos Knockaert</i>	
Rewinding of Old 44 MVA Hydro Generator Considering Vibrational Forces.....	1756
<i>M. Samet Yakut, Gökem Güllütutan, Nail Tosun, Ozan Keysan</i>	
Utilising the Core Capacitance Achieved Through Ultra-Thin Soft Magnetic Sheets and Insulators	1763
<i>Nail Tosun, Glynn Atkinson, Barrie Mecrow</i>	
Parameter Estimation of Five-Phase Induction Motors from Unbalanced Steady-State Tests	1770
<i>Matheus Perin, Luís A. Pereira, L. F. A. Pereira, G. Nicol</i>	
Modeling and Tuning of Electric Drive Train Capturing Horizontal Mode Resonance	1777
<i>Omer Ikramul Haq, R. S. Kanchan</i>	
Similarity Numbers for the Scaling of Hydroelectric Generator Ventilation Flow.....	1783
<i>David Noelle, Veit Hildebrand, Bastian Diebel, Thilo Dauch, Harald Pfifer</i>	
Numerical Validation of a Thermal ROM of a Hydroelectric Generator Scale Model.....	1791
<i>Federico Torriano, Mathieu Kirouac, Anne-Marie Giroux</i>	

Magnetic Hysteresis Impact on HF Signal Injection	1799
<i>Combes Pascal</i>	
Design and Optimization of a 4–6 Brushless Doubly Fed Reluctance Generator	1805
<i>Stefan Botha, Nkosinathi Gule</i>	
Extending the Service Life of Plain Bearings for Linear Permanent Magnet Machines	1812
<i>Florian G. Poltschak, Richard Thalhammer</i>	
Design Aspects of Winding for Variable Reluctance Resolver.....	1819
<i>Valerii Abramenko, Juhani Stenbäck, Ilya Petrov, Juha Pyrhönen</i>	
2-D FEA Design of a Low-Cost and Self-Powered Sin/Cos Sensor.....	1826
<i>Claudio Bianchini, Ambra Torreggiani, Giada Sala, Andrea Sala, Nicola Giannotta, Matteo Davoli</i>	
Flat Integration of a Segmented Linear Motor Direct Drive to Activate an Active Stick System Façade.....	1833
<i>Florian G. Poltschak, Richard Haider</i>	
Eddy Brake Reaction at Bus Structures of Medium-Large Caliber Electromagnetic Launchers	1840
<i>Nail Tosun, Görkem Gülletutan, Ozan Keysan</i>	
Discretization Study for 2D Axisymmetric Modeling of an Ultrafast Thomson Coil Actuator.....	1847
<i>Philipp Wienkamp, Simon Kimpeler, Frederik Mingers, Willem Leterme, Tim Ballweber</i>	
A Study on Electrical Stress Distribution of Racetrack Coils Used in Ironless Linear Actuators with a Hybrid Modeling Approach.....	1854
<i>Arvin Pourebrahim Shishavan, Siamak Pourkeivannour, Mitrofan Curti, Elena A. Lomonova</i>	
Verification of Load Angle Characteristics of a Novel Counter-Rotating Twin Harmonic PM Machine Using Locked-Rotor Measurements	1861
<i>Michiel Desmedt, Robert Kristoffer Nilssen, Arne Nysveen</i>	
Analysis of AC Winding Resistance Considering Different Conductor Materials in Transverse Flux Permanent Magnet Synchronous Machines.....	1868
<i>Benedikt Kaiser, Andreas Gneiting, Martin Schmid, Nejila Parspour</i>	
A Novel Structure Fan to Reduce Noise and Mechanical Loss of Motors	1875
<i>Makoto Ito, Shinji Sugimoto, Akeshi Takahashi, Shuichi Tamiya</i>	
Application of Structural Composite Materials in Synchronous Reluctance Motors	1882
<i>Andrea Credo, Giuseppe Fabri, Jacopo Brunetti, Francesco Parasiliti</i>	
Power Density Limits of Propulsion Motor for Electric Aircraft: A Study on Insulation Thickness.....	1888
<i>Jundong Wang, Jianning Dong, Mohamad Ghaffarian Niasar, Gangwei Zhu, Pavol Bauer</i>	
Demagnetisation and Performance Study of Neodymium and Ferrite Assisted SynRM.....	1895
<i>Nikhil Manakshya, Zhe Huang, Torbjörn Thiringer</i>	
Optimization and Comparative Analysis of Magnet Shapes in 5-MW PM Vernier Motors for Marine Propulsion	1902
<i>Nima Arish, Maarten J. Kamper, Rong-Jie Wang</i>	
Optimizing Mid-Drive Electric Motor Performance and Cost for Electric Bike Applications.....	1909
<i>Santiago Gonzalez-Garcia, Irving S. Aguilar-Zamorate, Renato Galluzzi, Enrico Cesare Zenerino, Andrea Tonoli</i>	

Improving Motor Torque Estimation and Energy Efficiency for an Electric Vehicle by Compensating the Influences of Initial Permanent Magnet Temperature.....	1916
<i>Hrishikesh Joshi, Markus Seilmeier, Yves Burkhardt, Wilfried Hofmann</i>	
Influence of the Shaft Cooling System on the Performances of a High Speed Wound Rotor Motor: A CFD – Thermal Network Coupled Approach	1923
<i>Francesco Nascimben, Giovanna Cavazzini, Nicola Bianchi</i>	
Consideration of Thermal Ageing in Digital Twins of Automotive-Grade Electric Motors.....	1929
<i>Jon García Urbieta, Unai Linazasoro, Pablo Díaz, Iñigo García, Alejandro García, Sergio Armentia, Antonio J. Rodríguez, Francisco González</i>	
The Development and Application of Impingement Jet Cooling in the Small Traction Synchronous Machine with Permanent Magnets	1936
<i>Lukas Veg, Roman Pechanek, Martin Skalicky</i>	
Thermal Analysis of an Oil Jet Cooled Electric Motor with Hairpin Windings	1942
<i>Steven Vanhee, Jaywant Pawar, Frederik Desmet, Jasper Nonneman, Michel De Paepe</i>	
Robust Optimization of a Stator Tooth Chamfering IPMSM for Electric Power Steering Applications.....	1949
<i>Liyang Liu, Yiming Ma, Ruichi Wang, Zequan Li, Lu Sun, Hang Zhao</i>	
Multi-Objective Optimisation of Axial Flux Permanent Magnet Motor for Super-Car Application.....	1956
<i>Jorge Luis Lora, Bharadwaj Raghuraman, Bruno Ricardo Marques, Dragos Mihai Postariu, Gianmario Pellegrino</i>	
Investigation of Worst-Scenario Rotor Tolerances in Halbach Machines	1963
<i>Yang Li, Z. Q. Zhu, Simon Brockway, Maximilian Manss, Jonathan Lea, Yuan Ren</i>	
Multidisciplinary Design Methodology for Ultra-High-Speed PM Motors	1970
<i>Yulong Cui, Barrie Mecrow, Andrea Cavagnino</i>	
Multi-Objective Optimization of Electromagneticthermal Coupling Performance for High- Torquedensity PMSM Based on Multi-Dimensional Correction Techniques.....	1977
<i>Zequan Li, Jin Wang, Lu Sun, Haoyu Kang, Liyang Liu, Libing Zhou</i>	
A Comparative Analysis on Different Deep Neural Network Models for Magnetic Hysteresis with Distorted Excitation Waveforms.....	1983
<i>Gabriele Maria Lozito, Michele Quercio, Lorenzo Sabino, Antonino Laudani</i>	
Development of a Neural Network Approach to Evaluate Magnetic Losses in Nanocrystalline Transformers.....	1989
<i>Vittorio Bertolini, Lorenzo Sabino, Marco Stella, Antonio Faba, Francesco Riganti Fulginei, Fabio Crescimbeni, Ermanno Cardelli</i>	
A Semi-Supervised Method for Key Performance Indicator Prediction of Electrical Machines Under a Self-Training Framework.....	1995
<i>Nuo Chen, Christian Digel, Martin Doppelbauer</i>	
Modelling of Magnetization Processes of 3D-Printed Fe-Si Components by Means of an Artificial Neural Network Implemented in a FEM Scheme.....	2002
<i>Marco Stella, Antonio Faba, Vittorio Bertolini, Francesco Riganti Fulginei, Lorenzo Sabino, Hans Tiismus, Ants Kallaste, Ermanno Cardelli</i>	

Data-Driven Approaches for Electromagnetic Analysis of Traction Electrical Motors: A Proposal for a Benchmark Problem.....	2009
<i>Luigi Solimene, Simone Ferrari, Costanza Anerdi, Fabio Freschi, Luca Giaccone, Gianmarco Lorenti, Francesco Lucchini, Riccardo Torchio, Piergiorgio Alotto, Gianmario Pellegrino, Maurizio Repetto</i>	
Critical Analysis of Inter-Turn Fault Related Harmonics in the Line Current.....	2016
<i>Jorge Bonet-Jara, Marcello Minervini, Lucia Frosini, Joan Pons-Llinares</i>	
Investigation on Insulation Failure Mechanisms of Stators Used for E-Mobility	2023
<i>Laureen Stahl, Javier Torres, Peter Werle</i>	
Qualitative Predictive Model of the Insulation Condition of HV Electrical Machines Through a Combination of Diagnostic Techniques and NNS.....	2029
<i>Dimosthenis Verginadis, Athanasios Karlis, Michael G. Danikas, Jose-Alfonso Antonino-Daviu</i>	
An Investigation of the Impedance Spectroscopy Suitability for Traction Motor Windings Insulation Health Assessment.....	2037
<i>Dimitrios Chronopoulos, Dimitrios Glykos, Konstantinos N. Gyftakis</i>	
Comparison of Impedance Spectroscopy and Partial Discharge Analysis as Insulation Health Diagnosis Techniques.....	2043
<i>Leire Elorza Azpiazu, Yerai Moreno, Aritz Egea, Gaizka Almandoz, Ainara Angulo Rebollo</i>	
Investigation of Demagnetization in Halbach Machines.....	2050
<i>Yang Li, Z. Q. Zhu, Simon Brockway, Maximilian Manss, Jonathan Lea, Yuan Ren</i>	
A New Approach for Diagnosis Demagnetization in a Permanent Magnet Synchronous Motor for Different Fault Severities Using Current Signals	2057
<i>Pedram Quseiri Darbandeh, Christian Kreischer</i>	
Demagnetization Detection, Misdiagnosis and Impact in Permanent Magnet Generators.....	2064
<i>Alexandros Sergakis, Georgios A. Skarmoutsos, Markus Mueller, Konstantinos N. Gyftakis</i>	
Comparative Behavior Study of Various PMSM Topologies Under Demagnetization Conditions.....	2071
<i>Jérémy Creux, Najla Haje Obeid, Thierry Boileau, Farid Meibody-Tabar</i>	
Improved Support Vector Classifier for Multiple Incipient Faults Diagnosis of a Permanent Magnet Synchronous Generator	2078
<i>Tanzir Ahamed, Thien-Phuoc Nguyen, Huynh Van Khang, Kjell G. Robbersmyr</i>	
Robustness of Grounded-Electrode Approach to Mitigate Bearing Currents in Electric Machines with Semi-Closed Slots	2084
<i>Konstantin Vostrov, Ilya Petrov, Juha Pyrhönen</i>	
Comparison of Time and Frequency Domain Methods for High Frequency Voltage Distribution Simulations in Concentrated Windings	2091
<i>Daan Deruyter, Mehmet Güleç, Peter Sergeant</i>	
Modeling Voltage Distribution Along the Hairpin Windings of an Electrical Machine Using Impedance Fitting.....	2099
<i>Hujun Peng, Ze Luo, Yue Yu, Kay Hameyer</i>	
A Method for Modelling High Frequency Effects in Electrical Machine Windings for the Use in Circuit Simulation Programmes	2106
<i>Jannik Ulbrich, Wilfried Holzke, Amir Ebrahimi</i>	

Improved Methodology for Considering the Frequency-Dependent Behaviour of Electrical Machine Windings in Transient Simulation	2113
<i>Loic Cabrel Kaptoum Kuate, Abdenour Abdelli, François Balavoine, Stéphane Duchesne, Ralph Sindjui</i>	
Intensified Field Winding Heat Transfer Through Triggered Axial Flow in Radial-Radial Ventilated Large Hydro Generators with Interpolar Air Guides	2120
<i>Bastian Diebel, Thilo Dauch, Roland Jester-Zuerker</i>	
High-Speed Electric Machine Frame Design Process Using Topology Optimization.....	2128
<i>Topi Kainulainen, Juuso Narsakka, Jussi Sopanen</i>	
A Holistic Optimization Method for the Electromagnetic Design of Radial-Flux, High-Power-Density Synchronous Reluctance Machines.....	2136
<i>André M. Silva, Miguel Aires, Filipe Correia, Carlos Henggeler Antunes, Fernando J. T. E. Ferreira</i>	
An Experimental-Based Circuit Model of Motor Stator Poles for Impedance Spectroscopy Analysis	2143
<i>Nikitas Ravanis, Antonios Douvaras, Konstantinos N. Gyftakis</i>	
Traction Motor 2D Models with End Winding Leakage Inductance Consideration.....	2149
<i>Sonja Tidblad Lundmark, Torbjorn Thiringer, Emma Arfa Grunditz</i>	
A Scaling Procedure for Electrically-Excited Synchronous Machines Utilizing Flux and Loss Maps	2156
<i>Federica Graffeo, Simone Ferrari, Sandro Rubino, Silvio Vaschetto, Gianmario Pellegrino</i>	
A Comprehensive Study on Different Motor Topologies Used in Passenger Car EV Segment	2164
<i>Shafiq Nategh, Aldo Boglietti, Md Jahirul I.</i>	
Sub-Optimal Flux-Weakening Control of Synchronous Reluctance Motors.....	2170
<i>Andrea Credo, Federico Centi, Giuseppe Fabri, Marco Tursini</i>	
Exploring the Potential of Synchronous Reluctance Machines for Electric Vehicle Application: A Feasibility Study Case	2177
<i>César Gallardo, Carlos Madariaga, Juan A. Tapia, Michele Degano</i>	
Rotor Optimization of a Synchronous Reluctance Machine for Railway Applications.....	2184
<i>Antonio Fiorito, Mukhammed Murataliyev, Lorenzo Carbone, Mauro Di Nardo, Michele Degano, Stefano Nuzzo</i>	
Assessing the Impact of Stator Yoke on the Electromechanical Energy Conversion Performance of Switched Reluctance Machines	2191
<i>Vincenzo Madonna, Cesare Maria Meano, Ken Friis Hansen</i>	
Thermal Modelling Improvement Aspects for Automotive Physically-Integrated Drives	2198
<i>Christian John Dalli, Michael Galea, Joseph Cilia</i>	
Performance and Efficiency Mapping of Externally Excited Synchronous Machines	2204
<i>Andreas Carlsson, Felix Andersson, Irene Santantonio, Viktor Josefsson, Gabriele Puccio, Sandro Rubino</i>	
Life Cycle Assessment of Electric Drivetrains for Sustainable Transport.....	2211
<i>Antonella Accardo, Ezio Spessa, Alejandro Robles Martin, Julia Essl, Moritz Duft, Johann Bachler</i>	

Optimal Design of Cost-Effective E-Machines for Traction: A Case Study of 150kW V-Shaped PMSM	2218
<i>Taha El Hajji, Antti Lehikoinen, Ahmed Hemeida, Anouar Belahcen</i>	
Towards Data-Driven Strand Transposition Simulation of Multistrand Random Windings.....	2223
<i>Joshua Hoole, Philip H. Mellor, Nick Simpson</i>	
Mechanical Modelling of Electric-Machine Core Laminated Stack	2230
<i>Guilhem Drouet, Delphine Brancherie, Pierre Feissel, Ferdinand Frabolot, Edouard Negre</i>	
Thermal Conductance Phenomena Between Two Solids: A Model-Based Analysis in Traction Motors	2237
<i>Vaclav Fiala, Roman Pechanek</i>	
Flux Density Waveform Reconstruction Method for Efficient Finite Element Analysis of Electric Motors	2244
<i>Alessandro Capitano, Giacomo Sala, Stefano Nuzzo, Gabriele Rizzoli, Davide Barater, Giovanni Franceschini</i>	
Stator Slot Design Guidelines for Concentrated Windings with Direct Liquid Cooling Channels for Electrified Aviation.....	2251
<i>Norman Blanken, Ralf Johannes Keuter, Bernd Ponick</i>	
An Electrical Machine Design Procedure Based on Thermo-Electromagnetic Coupling	2258
<i>Xuewen Lian, Michael Galea, Robert Camilleri</i>	
Topology Optimization for Enhancing Electric Machine Performance: A Review	2265
<i>Mohamed Reda Mahmoud, Mohamed N. Ibrahim, Peter Sergeant</i>	
An Adapted Constrained Multi-Objective Bayesian Optimization Under Uncertainties: Application on a Permanent Magnet Assisted Synchronous Reluctance Motor.....	2272
<i>Adán Reyes-Reyes, André Nasr, Delphine Sinoquet, Sami Hlioui</i>	
Analysis of Externally Excited Synchronous Motors Operation Under Joule Losses Minimization Control.....	2279
<i>Alessandro Capitano, Stefano Nuzzo, Giacomo Sala, Davide Barater, Giovanni Franceschini</i>	
Overloadability of Multiphase Permanent Magnet Synchronous Machines.....	2286
<i>Zdenek Frank, Jan Laksar, Karel Hruska</i>	
Handling Torque Constraint in Electric Machine Optimization for Variable Speed Noise Reduction	2293
<i>Martin Glessner, Cédric Marinel</i>	
Effect of Eccentricity on PM Synchronous Machines with Different Rotor Geometries	2299
<i>Alessandro Acquaviva, Sebastiano Acquaviva</i>	
Analysis of Multiphase Permanent Magnet Motors Via Space-Harmonic Model.....	2304
<i>Beñat Arribas, Gaizka Almandoz, Aritz Egea, Javier Poza, Ion Iturbe</i>	
Multipolar Halbach Bonded PM Rotors: Comprehensive Experimental Analysis of Non-Ideal Field Distributions and Manufacturing Imperfections.....	2311
<i>Alessandro Acquaviva, Alessandro Chiappa, Marco Fracchia</i>	
Slot Wedges with Integrated Grounded Electrodes for Suppression of Inverter-Induced Bearing Currents	2318
<i>Konstantin Vostrov, Juha Pyrhönen</i>	

Extended HF Inductance Model of Multi-Salient Motors for HF and Pulse Voltage Signal Injection	2324
<i>Eduardo Rodriguez Montero, Markus Vogelsberger, Thomas Wolbank</i>	
Parasitic Parameters Effect on the Operation of High Frequency Electric Drive System	2332
<i>Fawzy A. Abdo, Kotb B. Tawfiq, Peter Sergeant</i>	
Systematic Approach for EMI Equivalent Model Derivation of Three Phase DC-Fed Motor Drives.....	2339
<i>Pooja Babu, Zhongting Tang, Saeed Peyghami, Frede Blaabjerg, Nicklas Christensen, Pooya Davari</i>	
Analysis of Machine Inductance Variation on Loss Minimization Control.....	2346
<i>Minghao Gao, Guoyu Chu, Abdur Rahman, Rukmi Dutta</i>	
PWM-Induced Losses Estimation in Electrical Motor Driven with GaN-Based Inverter	2353
<i>Fausto Stella, Fabio Mandrile, Salvatore Musumeci, Vincenzo Barba, Marco Palma, Alessandro Acquaviva</i>	
Experimental Identification of the Dq θ Flux Maps of Synchronous Machines.....	2359
<i>Andrei Bojoi, Paolo Pescetto, Simone Ferrari, Gianmario Pellegrino</i>	
Temperature Compensation for Measured Efficiency Maps of an Electric Drive Unit.....	2366
<i>Jonas Gschnell, Edmund Marth, Gerd Bramerdorfer</i>	
Robust Torque Control of Internal Permanent Magnet Motor Using Experimental Flux Maps.....	2373
<i>Ettore Bianco, Fabio Mandrile, Massimiliana Carello, Radu Bojoi</i>	
Comparative Study on Tuning Methods for Variable Speed Drives	2380
<i>Luigi Danilo Tornello, Giacomo Scelba, Giulio De Donato</i>	
Hysteresis Feedback Linearization Control for Interior Permanent Magnet Synchronous Motors	2388
<i>Sadjad Madanzadeh, Wolfgang Gruber, Paolo Pescetto, Rafal P. Jastrzebski</i>	
Sensorless Control for Six-Phase Permanent Magnet Synchronous Machines Based on Back-Electromotive Force Estimation	2396
<i>Luca Vancini, Michele Mengoni, Gabriele Rizzoli, Luca Zarri, Angelo Tani</i>	
Flying Start of a Synchronous Reluctance Machine Based on Opposite Active Voltage Pulses	2403
<i>Luka Pravica, Filip Jukic, Damir Sumina, Igor Erceg</i>	
Optimal Damping of Horizontal Mode Resonance of an Electric Drive Train Using Reactive Torque.....	2410
<i>Omer Ikram Ul Haq, R. S. Kanchan</i>	
Active IGBT Temperature Equalization in Field Oriented Control Motor Drives by Magnetic Energy Management.....	2416
<i>S. Foti, A. Testa, G. Scarcella, G. Scelba, L. D. Tornello</i>	
Measurement-Based Optimal Current Angle Identification of an Electric Drive Unit.....	2424
<i>Jonas Gschnell, Edmund Marth, Gerd Bramerdorfer</i>	
Comparative Analysis and Optimization of Iron Nitride Enabled 800-V PM-Assisted Synchronous Reluctance Traction Motor with Varying Poles for Extended Operating Speed Range.....	2431
<i>Robin Wilson, Praveen Kumar, Ayman El-Refaie</i>	
PM and PM-Less Motors for Electric Vehicles: A Comparative Analysis.....	2438
<i>Fabio Filippini, Marco Pastura, Nicola Bianchi</i>	

Development of an Ultra-Lightweight PM Electrical Motor for Solar-Powered High-Altitude Platform Applications.....	2445
<i>Rafal Wrobel, Thomas C. Werner, Xu Deng, Daniel Noal</i>	
Demagnetization Risk Mitigation for a Traction IPMSM Using Mixed-Magnet Configurations	2452
<i>Bipana K. C, Reza Nasirizarandi, Andrew Botham, Narayan Kar, Hossain Mohammadi</i>	
Design of Hybrid Magnet IPM Machine for Traction Applications	2458
<i>Satoshi Ghiba, Rishabh Raj, Shayan Halder, Kim Bergsro, Simone Ferrari, Gianmario Pellegrino</i>	
High-Frequency Modeling of Bearing and Transmission Currents in Electric Vehicles	2464
<i>Yusa Tombul, Jian Zhang, Jakob Andert</i>	
Design Comparison of Wrapped and non-Wrapped Interior Permanent Magnet Synchronous Machines	2470
<i>Roberto Acquaviva, Simone Ferrari, Mario Silvagni, Andrea Tonoli, Gianmario Pellegrino</i>	
On Comparing Aluminum and Copper in Wound Field Synchronous Motors for Traction Applications.....	2476
<i>Gaia Petrelli, Stefano Nuzzo, Tianjie Zou, Gregorio Cutuli, Davide Barater, Chris Gerada</i>	
Iron Loss Analysis of an Electrically Excited Synchronous Motor Under Space Vector PWM for Automotive Traction Application	2483
<i>Benjamin Wolk, Md Jahirul I., Li-Chun Chien, Shafiqh Nategh, Aldo Boglietti, Philippe Farah</i>	
High-Frequency Brushless Excitation with Bi-Directional Power Flow for Electrically Excited Synchronous Machines.....	2490
<i>Junfei Tang, Bowen Jiang, Luca Boscaglia, Ruonan Liu, Stefan Lundberg, Yujing Liu</i>	
Early Stage Design of an Electric Drive Train for a Heavy Duty Transport Vehicle.....	2497
<i>Erling Gjeset, Martin Bremer, Pia Lindh, Martin Doppelbauer</i>	
Performance Assessment of Ferrite-Assisted Synchronous Reluctance Motors for Traction Applications.....	2504
<i>Simone Ferrari, Gaetano Dilevrano, Kim Bergsro, Tommaso Bertocello, Gianmario Pellegrino</i>	
Comparison of a Direct Drive and a Geared Drive for Electric Light Sport Aircraft.....	2511
<i>Daniel Alban, Lucas Brenner, Dieter Gerling</i>	
A Sustainable Booster Induction Motor for Dual Axle Automotive Applications.....	2519
<i>Md Jahirul I., Amin Motamedi, Shafiqh Nategh, Vedanadam M. Acharya, Prof. Aldo Boglietti, Dheeraj Bobba</i>	
Comparison of e-NVH Performance of Different PMSMs in Electric Vehicle Powertrain.....	2525
<i>Simone Ferrari, Luca Ciravegna, Giorgio De Donno, Enrico Galvagno, Matteo Iannone, Gianmario Pellegrino</i>	
Estimation of PM Temperature Distribution for Flux-Switching PM Machine by Synergy of Lumped-Parameter and Analytical Thermal Models	2532
<i>Dawei Liang, Zi Qiang Zhu, Zhitong Ran, Yang Chen</i>	
Analytical Calculation of the Airgap Flux in PM Vernier Machine Considering Pole Transition Over Slots Effect	2539
<i>Yien Liu, Hailin Huang, Tianjie Zou, Tonghao Pei, Dawei Li, Ronghai Qu</i>	

Duty-Ratio-Based Direct Torque Control Strategy for a Novel Dual-Armature Winding Dual-PM Machine with Array Torque Components.....	2546
<i>Dongxu Yang, Shaofeng Jia, Pengcheng Sun, Deliang Liang</i>	
Analytical Electromagnetic Force of Vernier Permanent Magnet Machine Considering Stator-Tooth Dual Modulation Effects	2552
<i>Yongjian Hao, Xianglin Li, Haoyu Wang, Xianzeng Xu, Kai Wang, Wei Hua</i>	
Design and Prototype Tests of Magnetic-Geared Switched Reluctance Motor for In-Wheel Direct-Drive EVs.....	2558
<i>Keigo Iwaki, Kenji Nakamura</i>	
Switched Reluctance Machines in 800-V Powertrains - A Focus on Voltage Distribution and Electrical Stress	2564
<i>Vincenzo Madonna, Cesare Maria Meano, Ken Friis Hansen</i>	
Two-Phase Commutation Method for Improved Transient Performance of a Dual-Rotor Switched Reluctance Machine	2571
<i>Ruben De Croo, Frederik De Belie</i>	
Minimizing Torque Ripple in 5-Phase Switched Reluctance Machines Using Half-Sinusoidal Current Pulses.....	2578
<i>Ali Akbar Emarloo, Luca Papini, Paolo Bolognesi</i>	
Analytical Modeling of Airgap Fields in Double Magnetic Salient Reluctance Machines with Tangential Field Consideration.....	2586
<i>Rui Zhong, Jinwen Du, Zhongze Wu, Wei Hua, Xingyu Chen, Kaiyuan Zhang</i>	
A Primary-Controlled Wireless Switched Reluctance Motor with Receiving Coil Multiplexing.....	2592
<i>Yuxin Liu, Hao Wen, Tianci Wang, Zhengge Chen, Chunhua Liu</i>	
Electromagnetic Impact of the Cryostat Design in Wind Generators with Superconducting Excitation	2598
<i>Robin Köster, Laurenz Ziegler, Andreas Binder</i>	
Stationary Wave Flux Pump for Energisation in High Temperature Superconducting Machines	2605
<i>Ze Zhao Wen, Hongye Zhang, Markus Mueller</i>	
Electromagnetic Forces in an Air-Cored Superconducting Machine for Direct Drive Wind.....	2612
<i>Markus Mueller, Danqing Chen, Shuangrong You</i>	
Superconducting AC Machines and Cryogenic Power Electronics for Reliable and Power-Dense Energy Conversion	2619
<i>Abdallah Uosef, Lorenzo Mantione, Marco Bassani, Ines Peixoto, Lucia Frosini, Carlo Concari, Silvio Vaschetto</i>	
Design of a Cryogen-Free HTS Excitation Coil for a Homopolar Alternator	2627
<i>Laurenz Ziegler, Robin Köster, Andreas Binder</i>	
Considerations on Matrix-Based, Analytical Temperature Prediction Tools for Electrical Machines.....	2634
<i>Xuewen Lian, Michael Galea, Robert Camilleri</i>	
Thermal Modelling of Advanced Rotor Cooling Solutions for Traction Applications	2641
<i>Alessandro Guiducci, Stefano Nuzzo, Davide Barater, Giovanni Franceschini, Rafal Wrobel</i>	
Hollow Direct Air Cooled Rotor Windings: Experimental Verification	2648
<i>Samuel Estenlund, Avo Reinap</i>	

A Single-Platform Analysis of Selected Cooling Variants of Electric Machines.....	2655
<i>Zaynah Ahmad, Rafal Wrobel, Thomas C. Werner, Volker Pickert</i>	
A Sensor Fusion Based Temperature Estimation Model for Oil-Cooled Windings.....	2662
<i>Juri Tessaro, Matteo F. Iacchetti, Stefano Montemurro, Samuele Barachetti, Marco Cossale, Luca Favre</i>	
Quantitative Analysis of Magnetic Flux Density Spectrum Influence on Iron Losses in Electrical Machine Steel Sheets.....	2669
<i>Alexandre Giraud, Franck VanGraefscheppe</i>	
Core Loss Tracking of Stator Core Testing Via Inverse Jiles-Atherton Hysteresis Model	2675
<i>Leonardo Colombo, Avo Reinap, Jason Ryan, Pontus Fyhr</i>	
Determination of Current Transducer Phase Delay and Its Effect on PWM-Induced Losses Calculation in Laminated Ferromagnetic Materials	2683
<i>Igor Sirotic, Stjepan Stipetic, Marinko Kovacic</i>	
Stress-Dependent Iron Loss in Segmented Laminations Considering Surface Roughness	2691
<i>Yan Zhu, Barrie Mecrow, Glynn Atkinson, Xu Deng, Guohai Liu</i>	
Computationally Efficient Evaluation of PWM-Induced Losses in Inverter-Fed High Speed Permanent Magnet Machines*	2698
<i>Jiarui Liu, Xinggang Fan, Dawei Li, Ronghai Qu, Ziyi Liang</i>	
Direct-Drive Wind Turbine Generator Vibration Induced by High-Order Air-Gap Nonuniformity	2705
<i>Fergus Hall, Alasdair McDonald</i>	
Mechanical Design Considerations of a Light-Weight Rotor for Brushless Double Fed Machines.....	2712
<i>Malihe Heidary, Salman Abdi, Hamidreza Mosaddegh-Hesar, Xiaodong Liang, Ehsan Abdi, Richard McMahan</i>	
Design Optimization of Hybrid Excitation Flux Switching Generator for Micro Hydroelectric System	2719
<i>Yasushi Kato, Reo Nagase, Naoki Yamamoto, Yoshiki Yasuda, Akio Yamagiwa, Takashi Kosaka</i>	
Improved Equivalent Model-Based Control PMLSG for Maximum Energy Harvesting in Irregular Waves for Direct-Driven Wave Energy Converters.....	2725
<i>Jiyu Zhang, Lei Huang, Jianlong Yang, Haitao Liu, Shiquan Wu, Zihao Mou</i>	
Design and Optimization of a 4-6 Brushless Doubly Fed Induction Generator	2732
<i>Stefan Botha, Nkosinathi Gule</i>	
Stray Fluxes Amplitude and Phase Shift Monitoring for Interturn Short Circuits Detection in Induction Motors	2739
<i>Marcello Minervini, Jorge Bonet-Jara, Vanesa Fernandez-Cavero, Lorenzo Mantione, Lucia Frosini</i>	
Comparison of Field Winding Inter-Turn Short Circuit Fault Identification Methods in a Salient Pole Hydro Generator.....	2746
<i>Yongdong Lu, Andrew M Knight, Om P Malik</i>	
Detection of Inter-Turn Short-Circuits in Permanent Magnet Machines Based on Rogowski & Search Coil Based Monitoring	2752
<i>Johannes Mühlthaler, Bastian Lehner, Andreas Reeh</i>	

Ground Fault Detection Method for Doubly-Fed Induction Generators with Crowbar Circuits	2760
<i>José M. Guerrero, Aitor Blázquez-Campanon, Jesus Mauricio Pérez-García, Kumar Mahtani, Aritz Iturregi, D. Marene Larruskain</i>	
Line-Start Permanent Magnet Synchronous Motors Stator Fault Diagnostics Immune to Unbalanced Supply Voltages	2767
<i>D. S. B. Fonseca, Hugo R. P. Antunes, Antonio J. Marques Cardoso</i>	
Online Fault Diagnosis for Multiple Open-Circuit Faults in Multiphase Drives with Current Harmonics	2773
<i>René Lenz, Andreas Kugi, Wolfgang Kemmetmüller</i>	
Hybrid Open-Circuit Fault Detection Algorithm for Two-Level Three-Phase Automotive Interior Permanent Magnet Synchronous Machine Drives.....	2780
<i>Esther Altemir, Andres Sierra-Gonzalez, Elena Trancho, Fernando Alvarez-Gonzalez, Edorta Ibarra</i>	
Ground Fault Detection and Faulty Electric Machine Recognition in Parallel-Connected Variable Speed Drives.....	2787
<i>José M. Guerrero, Jesus Mauricio Pérez-García, Aitor Blázquez-Campanon, Victor Valverde, Pablo Eguía</i>	
Broken Bar Detection of Axial-Flux Induction Machines Through Advanced Transient Current Signature Analysis.....	2793
<i>Carlos Madariaga-Cifuentes, Jose E. Ruiz-Sarrío, Jose A. Antonino-Daviu, Cesar Gallardo, Juan A. Tapia</i>	
Hydro-Generator Electrical Signature Analysis for Detection of Hydraulic Instabilities.....	2799
<i>Ghofril Kahwati, Arthur Favrel, Arezki Merkhouf, Anne-Marie Giroux</i>	
Influence of a Combined Star-Delta Winding on the Operation Behavior of a Line Start Permanent Magnet Synchronous Machine	2805
<i>Tobias Knapp, Wilfried Hofmann</i>	
Line-Start Permanent Magnet Machines for Low-Power Applications.....	2812
<i>Jan Bárta, Marek Toman, Petr Losak, Lassi Aarniovuori, Ondrej Vitek</i>	
Analytical Design Optimization of Permanent Magnet Assisted Synchronous Reluctance Machines - Part I: Magnetic Model	2819
<i>Gianvito Gallicchio, Mauro Di Nardo, Francesco Cupertino</i>	
Analytical Design Optimization of Permanent Magnet Assisted Synchronous Reluctance Machines - Part II: Results.....	2826
<i>Gianvito Gallicchio, Mauro Di Nardo, Francesco Cupertino</i>	
A Saturation Model Based on a Simplified Equivalent Magnetic Circuit for Permanent Magnet Machines	2833
<i>Francesco Lelli, Marko Hinkkanen, Fabio Giulii Capponi</i>	
High Efficiency Closed-Loop Startup Strategy for Sensorless Permanent Magnet Motor Drive.....	2840
<i>Nektarios Karakasis, Athanasios Sarigiannidis, Nikolaos Tsakalakis, Steve Bartz</i>	
Vertical Vibration Control for Half-Vehicle with In-Wheel Motor-Suspension Integrated System Under Braking Condition	2846
<i>Chao Xing, Nicola Bianchi, Yueying Zhu, Jiaying Wang, Yier Lin, Marco Pastura</i>	

Efficiency Improvement in PMSMs Considering Alternative Rotors for Elevator Applications	2853
<i>Savvas Maiopoulos, Georgios Sakkas, Antonios Kladas</i>	
Impact of SMC Property on Axial Flux Machine Employing Ferrite PM in Traction Applications	2860
<i>Ren Tsunata, Masatsugu Takemoto, Jun Imai, Tatsuya Saito, Tomoyuki Ueno</i>	
Comparative Study of Synchronous Reluctance Motor and Switched Reluctance Motor for Forklift Applications.....	2867
<i>Yujie Yuan, Yawei Wang, Yuhang Cheng, Jianbo Sun, Kai Guo, Nicola Bianchi, Ronghai Qu</i>	
Pressure Controller Design in Electrified Hydraulics for Off-Highway Machinery.....	2874
<i>Matteo Beligoj, Luigi Alberti, Marco Zava, Alessandro Termini</i>	
A Unified Design Theory and Approach for AC Hairpin Windings	2881
<i>Shaohong Zhu, Krzysztof Paciuira</i>	
Loss Minimization Control of PMSM for Electrified Non-Road Mobile Machinery Using Flux and Loss Maps.....	2889
<i>Chunjie Dai, Hadhiq Khan, Amr A. Abbas, Paavo Rasilo, Tatiana Minav</i>	
Design of High Power Density IPM Machines with Fractional Or Integral Slot for Off-Highway Vehicles	2897
<i>Claudio Bianchini, Nicola Bianchi, Luca Cinti, Matteo Davoli, Giada Sala</i>	
Wound Rotor Synchronous Motor Design for a Mining Application	2904
<i>Giampaolo Devito, Stefano Nuzzo, Davide Barater, Francesco Puglisi, Mauro Giacalone, Henrik Grop, Dmitry Svechkarenko</i>	
Topology Analysis of Electric Machines for a Specific Mission Profile in Aviation Applications	2911
<i>Arsham Asgari, Markus Henke</i>	
Global Sensitivity and Uncertainty Analysis for Thermal Design of Axially Laminated Synchronous Reluctance Machine.....	2918
<i>Shruti Singh, Eero Scherman, Ilya Petrov, Peter Sergeant, Juha Pyrhönen</i>	
Design of High Efficiency Wound Field Synchronous Motor for Short-Distance Electric Mobility in Given Driving Cycle	2925
<i>Vu-Khanh Tran, Byoung-Gun Park, Pil-Wan Han, Sarbajit Paul, Jae-Gil Lee, Yon-Do Chun</i>	
Comparison of Gear-Drive and Direct-Drive Systems for In-Wheel Motors.....	2932
<i>Akeshi Takahashi, Tetsuya Suto, Makoto Ito, Ryuichiro Iwano, Takafumi Hara</i>	
Performance Study of Surrogate Models for Large-Scale Optimization.....	2939
<i>Hiroyuki Sano, Ryoma Utsunomiya, Taizo Senda, Koji Tani, Takashi Yamada</i>	

Author Index