

IEEE TRANSACTIONS ON ENERGY CONVERSION



IEEE POWER & ENERGY SOCIETY

DECEMBER 2019

VOLUME 34

NUMBER 4

ITCNE4

(ISSN 0885-8969)

Best Papers and Star Reviewers 1719

PAPERS

Modeling of the Enthalpy Transfer Using Electric Circuit Equivalents: Theory and Application to Transients of Multi-Carrier Energy Systems	<i>T. Lan and K. Strunz</i>	1720
Performance Analysis of Medium-Voltage Grid Integration of PV Plant Using Modular Multilevel Converter	<i>A. B. Acharya, M. Ricco, D. Sera, R. Teodorescu, and L. E. Norum</i>	1731
Non-Ideal Proportional Resonant Control for Modular Multilevel Converters Under Sub-Module Fault Conditions	<i>P. Hu, Z. He, S. Li, and J. M. Guerrero</i>	1741
Novel Criterion for Reluctance Torque Utility of Permanent Magnet Motors	<i>A. Takahashi and W. Hatsuse</i>	1751
Analysis of Electromagnetic Excitations in an Integrated Centrifugal Pump and Permanent Magnet Synchronous Motor	<i>H. Kim, A. Posa, J. Nerg, J. Heikkinen, and J. T. Sapanen</i>	1759
Comparison of Virtual Oscillator and Droop Controlled Islanded Three-Phase Microgrids	<i>Z. Shi, J. Li, H. I. Nurdin, and J. E. Fletcher</i>	1769
ADV Preview Based Nonlinear Predictive Control for Maximizing Power Generation of a Tidal Turbine With Hydrostatic Transmission	<i>X. Yin and X. Zhao</i>	1781
Comparative Study of Winding Configurations of a Five-Phase Flux-Switching PM Machine	<i>H. Chen, X. Liu, A. M. EL-Refaie, J. Zhao, N. A. O. Demerdash, and J. He</i>	1792
Comparison and Design Optimization of a Five-Phase Flux-Switching PM Machine for In-Wheel Traction Applications	<i>H. Chen, X. Liu, N. A. O. Demerdash, A. M. EL-Refaie, J. Zhao, and J. He</i>	1805
Design and Analysis of Virtual Synchronous Machines in Inductive and Resistive Weak Grids	<i>J. Roldán-Pérez, A. Rodríguez-Cabero, and M. Prodanovic</i>	1818
Small-Signal Converter Admittance in the pn -Frame: Systematic Derivation and Analysis of the Cross-Coupling Terms	<i>G. Amico, A. Egea-Álvarez, P. Brogan, and S. Zhang</i>	1829
Optimal Design of a Converter-Machine System on a Load Profile Applied to a CAES System	<i>O. Maisonnave, N. Bernard, L. Moreau, R. Aubrée, M. F. Benkhoris, and T. Neu</i>	1839
An Enhanced Hybrid Battery Model	<i>T. Kim, W. Qiao, and L. Qu</i>	1848
Novel Directed Graph Approach for Connection Optimization of the Asymmetric-Paths Winding	<i>Y. Liang, Z. Guo, D. Wang, and X. Bian</i>	1859
Saturable and Decoupled Constant-Parameter VBR Model for Six-Phase Synchronous Machines in State-Variable Simulation Programs	<i>N. Amiri, S. Ebrahimi, J. Jatskevich, and H. W. Dommel</i>	1868
Constrained Model Predictive Control in Nine-Phase Induction Motor Drives	<i>I. González-Prieto, I. Zoric, M. J. Duran, and E. Levi</i>	1881
Analysis and Suppression of Induced Voltage Pulsation in DC Winding of Five-Phase Wound-Field Switched Flux Machines	<i>Z. Wu, Z. Q. Zhu, W. Hua, S. Akehurst, X. Zhu, W. Zhang, J. Hu, H. Li, and J. Zhu</i>	1890
A Simplified Deadbeat Based Predictive Torque Control for Three-Level Simplified Neutral Point Clamped Inverter Fed IPMSM Drives Using SVM	<i>X. Zhang, G. H. B. Foo, T. Jiao, T. Ngo, and C. H. T. Lee</i>	1906
Nonlinear Multidisciplinary Design Approach for Axial-Flux Eddy Current Brakes	<i>M. Gulec, M. Aydin, J. Nerg, P. Lindh, and J. J. Pyrhönen</i>	1917
Vibration of Induction Machine Supplied With Voltage Containing Subharmonics and Interharmonics	<i>P. Gnaniński, M. Pepliński, L. Murawski, and A. Szeleziński</i>	1928

(Contents Continued on Back Cover)



A Novel Parallel Hybrid Excited Machine With Enhanced Flux Regulation Capability	S. Cai, Z. Q. Zhu, J.-C. Mipo, and S. Personnaz	1938
A Generalized Equivalent Magnetic Network Modeling Method for Vehicular Dual-Permanent-Magnet Vernier Machines	D. Cao, W. Zhao, J. Ji, L. Ding, and J. Zheng	1950
An Enhanced Model Predictive Control Using Virtual Space Vectors for Grid-Connected Three-Level Neutral-Point Clamped Inverters	W. Alhosaini, Y. Wu, and Y. Zhao	1963
Optimal SuDoKu Reconfiguration Technique for Total-Cross-Tied PV Array to Increase Power Output Under Non-Uniform Irradiance	S. Krishna G and T. Moger	1973
Investigation Into Multi-Layer Fractional-Slot Concentrated Windings With Unconventional Slot-Pole Combinations	A. Tassarolo, C. Ciriani, M. Bortolozzi, M. Mezzarobba, and N. Barbini	1985
A Distributed Fixed-Time Secondary Controller for DC Microgrid Clusters	S. Sahoo, S. Mishra, S. M. Fazeli, F. Li, and T. Dragičević	1997
Modeling of VSCs Considering Input and Output Active Power Dynamics for Multi-Terminal HVDC Interaction Analysis in DC Voltage Control Timescale	W. Zheng, J. Hu, and X. Yuan	2008
Investigation of Doubly Salient Structure for Permanent Magnet Vernier Machines Using Flux Modulation Effects	D. Jang and J. Chang	2019
A Unified Distributed Control Strategy for Hybrid Cascaded-Parallel Microgrid	W. Yuan, Y. Wang, X. Ge, X. Hou, and H. Han	2029
Advanced Design Optimization Technique for Torque Profile Improvement in Six-Phase PMSM Using Supervised Machine Learning for Direct-Drive EV	H. Dhulipati, E. Ghosh, S. Mukundan, P. Korta, J. Tjong, and N. C. Kar	2041
Step-Signal-Injection-Based Robust MTPA Operation Strategy for Interior Permanent Magnet Synchronous Machines	J. Xia, Y. Guo, Z. Li, J. Jatskevich, and X. Zhang	2052
Design of an Improved Dual-Stator Ferrite Magnet Vernier Machine to Replace an Industrial Rare-Earth IPM Machine	Z. S. Du and T. A. Lipo	2062
A Geometric Interpretation of Reference Frames and Transformations: dq0, Clarke, and Park	C. J. O'Rourke, M. M. Qasim, M. R. Overlin, and J. L. Kirtley	2070
Torque Pulsation Reduction in Fractional-Slot Concentrated-Windings IPM Motors by Lowering Sub-Harmonics	G. Liu, F. Zhai, Q. Chen, and G. Xu	2084
Modeling of a Modular Multilevel Converter With Embedded Energy Storage for Electromagnetic Transient Simulations	N. Herath, S. Filizadeh, and M. S. Toulabi	2096
A Rotor Flux Observer of Permanent Magnet Synchronous Motors With Adaptive Flux Compensation	C. Wu, X. Sun, and J. Wang	2106
Rotor Shape Optimization of Claw-Pole Alternator to Reduce Acoustic Noise Caused by Electromagnetic Forces	Z. Shuguang, H. Xiaorui, Z. Yaodan, and W. Shuanglong	2118
Analysis of the Interturn Short Circuits of Stator Field Windings in Multiphase Angular Brushless Exciter at Nuclear Power Plant	L. Hao, J. Chang, L. Hu, X. Wang, W. Zong, and L. Gui	2126
Comparative Study on Two Modular Spoke-Type PM Machines for In-Wheel Traction Applications	H. Zhang, W. Hua, D. Gerada, C. Gerada, Y. Li, and G. Zhang	2137
Unified Solver Based Real-Time Multi-Domain Simulation of Aircraft Electro-Mechanical-Actuator	Z. Huang, C. Tang, and V. Dinavahi	2148
Multiobjective Design Optimization of Generalized Multilayer Multiphase AC Winding	A. M. Silva, F. J. T. E. Ferreira, M. V. Cistelecan, and C. H. Antunes	2158
An Improved Floating Interleaved Boost Converter With the Zero-Ripple Input Current for Fuel Cell Applications	Q. Li, Y. Huangfu, L. Xu, J. Wei, R. Ma, D. Zhao, and F. Gao	2168
Brushless Doubly Fed Machine Magnetic Field Distribution Characteristics and Their Impact on the Analysis and Design	M. E. Matheka, S. Ademi, and R. A. McMahon	2180
High-Frequency Electric Machines for Boundary Layer Ingestion Fan Propulsor	A. Yoon, J. Xiao, D. Lohan, F. Arastu, and K. Haran	2189
Real-Time Multi-FPGA Simulation of Energy Conversion Systems	M. Milton, A. Benigni, and A. Monti	2198
Direct Torque Control Scheme for a Four-Level-Inverter Fed Open-End-Winding Induction Motor	V. B. R. and S. G.	2209
Designing and Basic Experimental Validation of the World's First MW-Class Direct-Drive Superconducting Wind Turbine Generator	X. Song, C. Böhre, P. Brutsaert, J. Krause, A. Ammar, J. Wiezorek, J. Hansen, A. V. Rebsdorf, M. Dhalle, A. Bergen, T. Winkler, S. Wessel, M. T. Brake, J. Kellers, H. Pütz, M. Bauer, H. Kyling, H. Boy, and E. Seitz	2218
2-D Analytical Model for Outer-Rotor Consequent-Pole Brushless PM Machines	A. Ghaffari, A. Rahideh, H. Moayed-Jahromi, A. Vahaj, A. Mahmoudi, and W. L. Soong	2226
Distributed Cooperative Secondary Control for Islanded Microgrid With Markov Time-Varying Delays	C. Zhao, W. Sun, J. Wang, Q. Li, D. Mu, and X. Xu	2235
Joint Control of Three-Level DC-DC Converter Interfaced Hybrid Energy Storage System in DC Microgrids	U. Manandhar, B. Wang, X. Zhang, G. H. Beng, Y. Liu, and A. Ukil	2248
Performance Improvement of Permanent-Magnet Synchronous Motor Through a New Online Predictive Controller	M. H. Vafaie	2258
Fault-Tolerant Control of PMSM With Inter-Turn Short-Circuit Fault	J. Zhang, W. Zhan, and M. Ehsani	2267
Rotor Stress Analysis for High-Speed Permanent Magnet Machines Considering Assembly Gap and Temperature Gradient	G. Du, W. Xu, J. Zhu, and N. Huang	2276