

IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS

MAY 2016

VOLUME 63

NUMBER 5

ITIED6

(ISSN 0278-0046)

PAPERS

Multiphase Systems

- A General Active Capacitor Voltage Regulating Method for L-Level M-Cell N-Phase Flying Capacitor Multilevel Inverter With Arbitrary DC Voltage Distribution *J. Amini, A. H. Viki, A. Radan, and M. Moallem* 2659
- A Resilient Framework for Fault-Tolerant Operation of Modular Multilevel Converters *A. Ghazanfari and Y. A.-R. I. Mohamed* 2669
- Design and Analysis of a New Evaluation Circuit for Capacitors Used in a High-Power Three-Phase Inverter *K. Hasegawa, I. Omura, and S.-i Nishizawa* 2679
- The Essential Role and the Continuous Evolution of Modulation Techniques for Voltage-Source Inverters in the Past, Present, and Future Power Electronics *J. I. Leon, S. Kouro, L. G. Franquelo, J. Rodriguez, and B. Wu* 2688
- Study of a Novel Equivalent Model and a Long-Feeder Simulator-Based Active Power Filter in a Closed-Loop Distribution Feeder *X. Sun, R. Han, L. Yang, H. Shen, Y. Tian, X. Guo, and Z. Chen* 2702

Machines and Drives

- Stator-Winding Thermal Models for Short-Time Thermal Transients: Definition and Validation *A. Boglietti, E. Carpaneto, M. Cossale, and S. Vaschetto* 2713
- A Linear Quadratic Regulator-Based Optimal Direct Thrust Force Control of Linear Permanent-Magnet Synchronous Motor *M. A. M. Cheema, J. E. Fletcher, D. Xiao, and M. F. Rahman* 2722
- A Space-Vector PWM-Based Voltage-Balancing Approach With Reduced Current Sensors for Modular Multilevel Converter *A. Dekka, B. Wu, N. R. Zargari, and R. L. Fuentes* 2734
- Parasitic Currents in Stray Paths of Some Topologies of YASA AFPM Machines: Trend With Machine Size *A. Di Gerlando, G. M. Foglia, M. F. Iacchetti, and R. Perini* 2746
- Multilevel Dodecagonal Voltage Space Vector Structure Generation for Open-End Winding IM Using a Single DC Source *M. Bobby, S. Pramanick, R. S. Kaarthik, S. A. Rahul, K. Gopakumar, and L. Umanand* 2757
- Multiphysics Design and Optimization of High-Speed Permanent-Magnet Electrical Machines for Air Blower Applications *Z. Huang and J. Fang* 2766
- Robustness Analysis of Deadbeat-Direct Torque and Flux Control for IPMSM Drives *J. S. Lee and R. D. Lorenz* 2775
- Power Transfer Performance and Cutting Force Effects of Contactless Energy Transfer System for Rotary Ultrasonic Grinding *X. Zhu, B. Lin, L. Liu, and Y. Luan* 2785
- Fiber Bragg Grating Sensor for Electric Field Measurement in the End Windings of High-Voltage Electric Machines *F. Marignetti, E. de Santis, S. Avino, G. Tomassi, A. Giorgini, P. Malara, P. De Natale, and G. Gagliardi* 2796
- An SVPWM Scheme for the Suppression of Zero-Sequence Current in a Four-Level Open-End Winding Induction Motor Drive With Nested Rectifier-Inverter *B. Venugopal Reddy and V. T. Somasekhar* 2803
- Carrier Signal Injection-Based Sensorless Control for Permanent-Magnet Synchronous Machine Drives Considering Machine Parameter Asymmetry *P. L. Xu and Z. Q. Zhu* 2813

(Contents Continued on Page 2657)



A PUBLICATION OF THE IEEE INDUSTRIAL ELECTRONICS SOCIETY



Single-Phase Electronics

Frequency-Dependent Resistance of Litz-Wire Square Solenoid Coils and Quality Factor Optimization for Wireless Power Transfer *Q. Deng, J. Liu, D. Czarkowski, M. K. Kazimierzczuk, M. Bojarski, H. Zhou, and W. Hu* 2825

Lyapunov-Function and Proportional-Resonant-Based Control Strategy for Single-Phase Grid-Connected VSI With LCL Filter *H. Komurcugil, N. Altin, S. Ozdemir, and I. Sefa* 2838

Integrated Auto-Reconfigurable Power-Supply Network With Multidirectional Energy Transfer for Self-Reliant Energy-Harvesting Applications *R. Bondade, Y. Zhang, B. Wei, T. Gu, H. Chen, and D. B. Ma* 2850

Wide ZVS Range Asymmetric Half-Bridge Converter With Clamp Switch and Diode for High Conversion Efficiency *C.-O. Yeon, J.-B. Lee, I.-O. Lee, and G.-W. Moon* 2862

Power Calculation for Direct Power Control of Single-Phase Three-Level Rectifiers Without Phase-Locked Loop *J. Ma, W. Song, S. Jiao, J. Zhao, and X. Feng* 2871

A CLCL Resonant DC/DC Converter for Two-Stage LED Driver System *Y. Wang, Y. Guan, D. Xu, and W. Wang* 2883

High Step-Up/Step-Down Soft-Switching Bidirectional DC–DC Converter With Coupled-Inductor and Voltage Matching Control for Energy Storage Systems *H. Wu, K. Sun, L. Chen, L. Zhu, and Y. Xing* 2892

1-MHz LLC Resonant DC Transformer (DCX) With Regulating Capability *X. Wu, H. Chen, and Z. Qian* 2904

Equivalent Noise Source: An Effective Method for Analyzing Common-Mode Noise in Isolated Power Converters *L. Xie, X. Ruan, and Z. Ye* 2913

A Common Grounded Z-Source DC–DC Converter With High Voltage Gain *H. Shen, B. Zhang, D. Qiu, and L. Zhou* 2925

Renewable Energy Systems

Design and Analysis of a High-Efficiency DC–DC Converter With Soft Switching Capability for Renewable Energy Applications Requiring High Voltage Gain *M. Das and V. Agarwal* 2936

Highly Efficient Asymmetrical PWM Full-Bridge Converter for Renewable Energy Sources *W.-J. Cha, J.-M. Kwon, and B.-H. Kwon* 2945

Energy-Conscious Warm-Up of Li-Ion Cells From Subzero Temperatures *S. Mohan, Y. Kim, and A. G. Stefanopoulou* 2954

A New Transformerless Buck–Boost Converter With Positive Output Voltage ... *S. Miao, F. Wang, and X. Ma* 2965

Robotics and Mechatronics

Synchronization Motion Tracking Control of Multiple Underactuated Ships With Collision Avoidance *K. D. Do* 2976

Coordinated Insertion Control for Inclined Precision Assembly *D. Xing, F. Liu, F. Qin, and D. Xu* 2990

Actuators and Motors

Double-Sided Iron-Core PMLSM Mover Teeth Arrangement Design for Reduction of Detent Force and Speed Ripple *S.-U. Chung and J.-M. Kim* 3000

FPCB Micromirror-Based Laser Projection Availability Indicator *H. Zuo and S. He* 3009

Application of Linear Active Disturbance Rejection Controller for Sensorless Control of Internal Permanent-Magnet Synchronous Motor *B. Du, S. Wu, S. Han, and S. Cui* 3019

Control and Signal Processing

Comparative Performance of Wiener Filter and Adaptive Least Mean Square-Based Control for Power Quality Improvement *M. Badoni, A. Singh, and B. Singh* 3028

Disturbance Observer-Based Antiwindup Control for Air-Breathing Hypersonic Vehicles *H. An, J. Liu, C. Wang, and L. Wu* 3038

Control of Cascaded DC–DC Converter-Based Hybrid Battery Energy Storage Systems—Part II: Lyapunov Approach *N. Mukherjee and D. Strickland* 3050

An Electric Vehicle Load Management Application of the Mixed Strategist Dynamics and the Maximum Entropy Principle *A. Ovalle, J. Fernandez, A. Hably, and S. Bacha* 3060

Designing Inverters’ Current Controllers With Resonance Frequencies Cancellation *C. Citro, P. Siano, and C. Cecati* 3072

Automotive Power-Line Communication Channels: Mathematical Characterization and Hardware Emulator .. *L. Guerrieri, G. Masera, I. S. Stievano, P. Bisaglia, W. R. Garcia Valverde, and M. Concolato* 3081

Lateral Path Tracking Control of Autonomous Land Vehicle Based on ADRC and Differential Flatness *Y. Xia, F. Pu, S. Li, and Y. Gao* 3091

| | | |
|---|--|------|
| Analysis of Finite-Control-Set Model Predictive Current Control With Model Parameter Mismatch in a Three-Phase Inverter | <i>H. A. Young, M. A. Perez, and J. Rodriguez</i> | 3100 |
| An Integrative Control Method for Bio-Inspired Dolphin Leaping: Design and Experiments | <i>J. Yu, Z. Su, Z. Wu, and M. Tan</i> | 3108 |
| <i>Diagnosis and Monitoring</i> | | |
| Disturbance Ratio for Optimal Multi-Event Classification in Power Distribution Networks | <i>M. D. Borrás, J. C. Bravo, and J. C. Montaña</i> | 3117 |
| Benchmarking the Performance of Boost-Derived Converters Under Start-Up and Load Transients | <i>I. G. Zurbriggen and M. Ordóñez</i> | 3125 |
| An Intelligent Fault Diagnosis Method Using Unsupervised Feature Learning Towards Mechanical Big Data | <i>Y. Lei, F. Jia, J. Lin, S. Xing, and S. X. Ding</i> | 3137 |
| Stator Interturn Fault Detection in Permanent-Magnet Machines Using PWM Ripple Current Measurement | <i>B. Sen and J. Wang</i> | 3148 |
| <i>Instrumentation and Sensors</i> | | |
| Dipole-Coil-Based Wide-Range Inductive Power Transfer Systems for Wireless Sensors | <i>B. H. Choi, V. X. Thai, E. S. Lee, J. H. Kim, and C. T. Rim</i> | 3158 |
| Non-Zero Intercept Frequency: An Accurate Method to Determine the Integral Temperature of Li-Ion Batteries | <i>L. H. J. Rajmakers, D. L. Danilov, J. P. M. van Lammeren, T. J. G. Lammers, H. J. Bergveld, and P. H. L. Notten</i> | 3168 |
| Simultaneous Temperature Compensation and Synchronous Error Elimination for Axial Displacement Sensors Using an Auxiliary Probe | <i>S. Zheng, Y. Wang, and H. Ren</i> | 3179 |
| <i>Intelligent Systems</i> | | |
| An Efficient Tracking System by Orthogonalized Templates | <i>X. Yang, M. Wang, L. Zhang, F. Sun, R. Hong, and M. Qi</i> | 3187 |
| <hr/> | | |
| LETTERS | | |
| Comment on “A Unified State-Space Model of Constant-Frequency Current-Mode Controlled Power Converters in Continuous Conduction Mode” | <i>G. Herbst</i> | 3198 |
| <hr/> | | |
| SPECIAL SECTION ON DIAGNOSIS AND PROGNOSIS FOR COMPLICATED INDUSTRIAL SYSTEMS—PART II | | |
| Diagnosis and Prognosis for Complicated Industrial Systems—Part II | <i>S. Yin, S. X. Ding, and D. Zhou</i> | 3201 |
| Optimal Actuator Fault Detection for a TGSCM System Based on Disturbance Compensation | <i>M. Zhong, S. Li, and Y. Zhao</i> | 3205 |
| Aging Detection Capability for Switch-Mode Power Converters | <i>J. K. Mann, S. Perinpanayagam, and I. Jennions</i> | 3216 |
| Online Model-Based Condition Monitoring for Brushless Wound-Field Synchronous Generator to Detect and Diagnose Stator Windings Turn-to-Turn Shorts Using Extended Kalman Filter | <i>S. Nadarajan, S. K. Panda, B. Bhangu, and A. K. Gupta</i> | 3228 |
| Two-Channel False Data Injection Attacks Against Output Tracking Control of Networked Systems | <i>Z.-H. Pang, G.-P. Liu, D. Zhou, F. Hou, and D. Sun</i> | 3242 |
| An Adaptive, Advanced Control Strategy for KPI-Based Optimization of Industrial Processes | <i>S. Dominic, Y. A. W. Shardt, S. X. Ding, and H. Luo</i> | 3252 |
| Robust Model-Based Fault Diagnosis for PEM Fuel Cell Air-Feed System | <i>J. Liu, W. Luo, X. Yang, and L. Wu</i> | 3261 |
| Hidden Markov Models for the Prediction of Impending Faults | <i>A. Soualhi, G. Clerc, H. Razik, M. El badaoui, and F. Guillet</i> | 3271 |
| Soft-Sensor-Based Flow Rate and Specific Energy Estimation of Industrial Variable-Speed-Driven Twin Rotary Screw Compressor | <i>M. Järvisalo, T. Ahonen, J. Ahola, A. Kosonen, and M. Niemelä</i> | 3282 |
| Weighted Data-Driven Fault Detection and Isolation: A Subspace-Based Approach and Algorithms | <i>Z. Chen, H. Fang, and Y. Chang</i> | 3290 |
| A Hybrid Feature Selection Scheme for Reducing Diagnostic Performance Deterioration Caused by Outliers in Data-Driven Diagnostics | <i>M. Kang, Md. R. Islam, J. Kim, J.-M. Kim, and M. Pecht</i> | 3299 |
| A Review on Recent Development of Spacecraft Attitude Fault Tolerant Control System | <i>S. Yin, B. Xiao, S. X. Ding, and D. Zhou</i> | 3311 |
