

IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS

JULY 2016

VOLUME 63

NUMBER 7

ITIED6

(ISSN 0278-0046)

PAPERS

Multiphase Systems

An Inductively Filtered Multiwinding Rectifier Transformer and Its Application in Industrial DC Power Supply System	Y. Li, F. Yao, Y. Cao, W. Liu, F. Liu, S. Hu, L. Luo, Z. Zhang, Y. Chen, G. Zhou, and C. Rehtanz	3987
Model-Based Control for a Three-Phase Shunt Active Power Filter	R. Guzman, L. G. de Vicuña, J. Morales, M. Castilla, and J. Miret	3998
System-Wide Harmonic Mitigation in a Diesel-Electric Ship by Model Predictive Control	E. Skjong, J. A. Suul, A. Rygg, T. A. Johansen, and M. Molinas	4008
Phase Current-Balance Control Using DC-Link Current Sensor for Multiphase Converters With Discontinuous Current Mode Considered	J. Han and J.-H. Song	4020
Effective Voltage Balance Control for Bipolar-DC-Bus-Fed EV Charging Station With Three-Level DC-DC Fast Charger	L. Tan, B. Wu, V. Yaramasu, S. Rivera, and X. Guo	4031

Machines and Drives

A DSP-Based Resolver-To-Digital Converter for High-Performance Electrical Drive Applications	M. Caruso, A. O. Di Tommaso, F. Genduso, R. Miceli, and G. R. Galluzzo	4042
Wide Speed Range Sensorless Operation of Brushless Permanent-Magnet Motor Using Flux Linkage Increment	G. Haines and N. Ertugrul	4052
A Method of Constraint Handling for Speed-Controlled Induction Machines	Z. Hu and K. Hameyer	4061
Linear Control of Switching Valve in Vehicle Hydraulic Control Unit Based on Sensorless Solenoid Position Estimation	X. Zhao, L. Li, J. Song, C. Li, and X. Gao	4073
Performance Comparison of Doubly Salient Reluctance Machine Topologies Supplied by Sinewave Currents	X. Y. Ma, G. J. Li, G. W. Jewell, Z. Q. Zhu, and H. L. Zhan	4086
An Improved Sideband Current Harmonic Model of Interior PMSM Drive by Considering Magnetic Saturation and Cross-Coupling Effects	W. Liang, W. Fei, and P. C.-K. Luk	4097
Analytical On-Load Subdomain Field Model of Permanent-Magnet Vernier Machines	Y. Oner, Z. Q. Zhu, L. J. Wu, X. Ge, H. Zhan, and J. T. Chen	4105
Open-End Winding Induction Machine Fed by a Dual-Output Indirect Matrix Converter	J. Riedemann, J. C. Clare, P. W. Wheeler, R. Blasco-Gimenez, M. Rivera, and R. Peña	4118
Iron Loss Analysis of the Permanent-Magnet Synchronous Machine Based on Finite-Element Analysis Over the Electrical Vehicle Drive Cycle	V. Ruuskanen, J. Nerg, M. Rilla, and J. Pyrhönen	4129
Comparison of Two Different IPM Traction Machines With Concentrated Winding	G. Dajaku, H. Hofmann, F. Hetemi, X. Dajaku, W. Xie, and D. Gerling	4137

(Contents Continued on Page 3985)



A PUBLICATION OF THE IEEE INDUSTRIAL ELECTRONICS SOCIETY



<i>Single-Phase Electronics</i>		
Sampling Effect Characterization of Digital SPWM of VSI in Time Domain	<i>M. Kumar and R. Gupta</i>	4150
Combined LMS–LMF-Based Control Algorithm of DSTATCOM for Power Quality Enhancement in Distribution System	<i>M. Srinivas, I. Hussain, and B. Singh</i>	4160
Unified Triple-Phase-Shift Control to Minimize Current Stress and Achieve Full Soft-Switching of Isolated Bidirectional DC–DC Converter	<i>J. Huang, Y. Wang, Z. Li, and W. Lei</i>	4169
Real-Time Implementation of Model-Predictive Control on Seven-Level Packed U-Cell Inverter	<i>J. I. Metri, H. Vahedi, H. Y. Kanaan, and K. Al-Haddad</i>	4180
Model Predictive Voltage Control for Single-Inductor Multiple-Output DC–DC Converter With Reduced Cross Regulation	<i>B. Wang, V. R. K. Kanamarlapudi, L. Xian, X. Peng, K. T. Tan, and P. L. So</i>	4187
A Novel Control for a Cascaded Buck–Boost PFC Converter Operating in Discontinuous Capacitor Voltage Mode	<i>M. O. Badawy, Y. Sozer, and J. A. De Abreu-Garcia</i>	4198
A PWM Plus Phase-Shift Controlled Interleaved Isolated Boost Converter Based on Semiactive Quadrupler Rectifier for High Step-Up Applications	<i>Y. Lu, Y. Xing, and H. Wu</i>	4211
Variable Duty Cycle Control for Quadratic Boost PFC Converter	<i>Z. Chen, P. Yang, G. Zhou, J. Xu, and Z. Chen</i>	4222
<i>Renewable Energy Systems</i>		
A DC-Side Sensorless Cascaded H-Bridge Multilevel Converter-Based Photovoltaic System	<i>G. Farivar, B. Hredzak, and V. G. Agelidis</i>	4233
Robust Energy Management of a Hybrid Wind and Flywheel Energy Storage System Considering Flywheel Power Losses Minimization and Grid-Code Constraints	<i>H. H. Abdeltawab and Y. A.-R. I. Mohamed</i>	4242
Contribution-Based Energy-Trading Mechanism in Microgrids for Future Smart Grid: A Game Theoretic Approach	<i>S. Park, J. Lee, S. Bae, G. Hwang, and J. K. Choi</i>	4255
A Game Theory Approach to Energy Management of An Engine–Generator/Battery/Ultracapacitor Hybrid Energy System	<i>H. Yin, C. Zhao, M. Li, C. Ma, and M.-Y. Chow</i>	4266
High Step-Up Trans-Inverse (Tx^{-1}) DC–DC Converter for the Distributed Generation System	<i>Y. P. Siwakoti, F. Blaabjerg, and P. C. Loh</i>	4278
Small-Signal Modeling and Parameters Design for Virtual Synchronous Generators	<i>H. Wu, X. Ruan, D. Yang, X. Chen, W. Zhao, Z. Lv, and Q.-C. Zhong</i>	4292
<i>Robotics and Mechatronics</i>		
Fine Force Reproduction of Environmental Haptic Sensations Based on Momentum Control	<i>Y. Asai, Y. Yokokura, and K. Ohishi</i>	4304
<i>Actuators and Motors</i>		
Continuous–Discrete Time-Observer Design for State and Disturbance Estimation of Electro-Hydraulic Actuator Systems	<i>S. Ahmed Ali, A. Christen, S. Begg, and N. Langlois</i>	4314
The Shell-Like Spherical Induction Motor for Low-Speed Traction: Electromagnetic Design, Analysis, and Experimental Tests	<i>J. F. P. Fernandes and P. J. C. Branco</i>	4325
Rotation Control and Characterization of High-Speed Variable-Capacitance Micromotor Supported on Electrostatic Bearing	<i>B. Sun, F. Han, L. Li, and Q. Wu</i>	4336
Autobalancing Control for MSCMG Based on Sliding-Mode Observer and Adaptive Compensation	<i>C. Liu and G. Liu</i>	4346
<i>Control and Signal Processing</i>		
A Novel Observer Design for Simultaneous Estimation of Vehicle Steering Angle and Sideslip Angle	<i>B. Zhang, H. Du, J. Lam, N. Zhang, and W. Li</i>	4357
A Fast and Parametric Torque Distribution Strategy for Four-Wheel-Drive Energy-Efficient Electric Vehicles	<i>A. M. Dizqah, B. Lenzo, A. Sorniotti, P. Gruber, S. Fallah, and J. De Smet</i>	4367
Tube-Based Robust Model Predictive Control of Nonlinear Systems via Collective Neurodynamic Optimization	<i>Z. Yan, X. Le, and J. Wang</i>	4377
Fault Detection for Underactuated Manipulators Modeled by Markovian Jump Systems	<i>L. Wu, W. Luo, Y. Zeng, F. Li, and Z. Zheng</i>	4387
Velocity-Free Fault-Tolerant and Uncertainty Attenuation Control for a Class of Nonlinear Systems	<i>B. Xiao and S. Yin</i>	4400

<i>Diagnosis and Monitoring</i>		
A Novel Diagnostic Technique for Open-Circuited Faults of Inverters Based on Output Line-to-Line Voltage Model	C. Shu, C. Ya-Ting, Y. Tian-Jian, and W. Xun	4412
Motor Health Monitoring at Standstill Through Impedance Analysis	S. M. Shin, B. H. Choi, and H. G. Kang	4422
<i>Instrumentation and Sensors</i>		
Passive Wireless Sensor for Measuring AC Electric Field in the Vicinity of High-Voltage Apparatus	M. Yazdani, D. J. Thomson, and B. Kordi	4432
<i>Intelligent Systems</i>		
A Novel Strategy for Reducing Inrush Current of Three-Phase Transformer Considering Residual Flux	S. Fang, H. Ni, H. Lin, and S. L. Ho	4442
A New Model-Based Rotation and Scaling-Invariant Projection Algorithm for Industrial Automation Application	H.-C. Shih and K.-C. Yu	4452
<i>Networking</i>		
Quantized Control Under Round-Robin Communication Protocol	K. Liu, E. Fridman, K. H. Johansson, and Y. Xia	4461
SPECIAL SECTION ON PREDICTIVE CONTROL IN POWER CONVERTERS AND ELECTRICAL DRIVES—PART II		
Predictive Control in Power Converters and Electrical Drives—Part II	M. Rivera, J. Rodriguez, and S. Vazquez	4472
Generalized Predictive Current Control (GPCC) for Grid-Tie Three-Phase Inverters	M. G. Judewicz, S. A. González, N. I. Echeverría, J. R. Fischer, and D. O. Carrica	4475
A New Generalized Robust Predictive Current Control for Grid-Connected Inverters Compensates Anti-Aliasing Filters Delay	J. Castelló, J. M. Espí, and R. García-Gil	4485
Experimental Validation of a Robust Continuous Nonlinear Model Predictive Control Based Grid-Interlinked Photovoltaic Inverter	R. Errouissi, S. M. Muyeen, A. Al-Durra, and S. Leng	4495
Model Predictive Control of Quasi-Z-Source Four-Leg Inverter	S. Bayhan, H. Abu-Rub, and R. S. Balog	4506
Model-Predictive Control Scheme of Five-Leg AC–DC–AC Converter-Fed Induction Motor Drive	D. Zhou, J. Zhao, and Y. Li	4517
Five-Phase Induction Motor Rotor Current Observer for Finite Control Set Model Predictive Control of Stator Current	C. Martín, M. R. Arahal, F. Barrero, and M. J. Durán	4527
Dynamic Performance Evaluation of a Nine-Phase Flux-Switching Permanent-Magnet Motor Drive With Model Predictive Control	M. Cheng, F. Yu, K. T. Chau, and W. Hua	4539
Predictive Power Control of Matrix Converter With Active Damping Function	J. Lei, B. Zhou, J. Wei, J. Bian, Y. Zhu, J. Yu, and Y. Yang	4550
FPGA-Based Model Predictive Controller for Direct Matrix Converter	O. Gulbudak and E. Santi	4560
Direct Torque Control for VSI-PMSM Using Vector Evaluation Factor Table	C. Xia, S. Wang, X. Gu, Y. Yan, and T. Shi	4571
Model Predictive Torque Control for Torque Ripple Compensation in Variable-Speed PMSMs	A. Mora, Á. Orellana, J. Juliet, and R. Cárdenas	4584
Direct Power Control for Three-Phase Two-Level Voltage-Source Rectifiers Based on Extended-State Observation	Z. Song, Y. Tian, Z. Yan, and Z. Chen	4593
Cascaded Dual-Model-Predictive Control of an Active Front-End Rectifier	J. Sawma, F. Khatounian, E. Monmasson, L. Idkhajine, and R. Ghosn	4604
Predictive Control of a Back-to-Back NPC Converter-Based Wind Power System	A. Calle-Prado, S. Alepuz, J. Bordonau, P. Cortes, and J. Rodriguez	4615
Fast and Robust Predictive Current Controller for Flicker Reduction in DC Arc Furnaces	S. Srdic, M. Nedeljkovic, S. N. Vukosavic, and Z. Radakovic	4628
Model Predictive Control in the Multi-Megawatt Range	T. J. Besselmann, S. Van de moortel, S. Almér, P. Jörg, and H. J. Ferreau	4641
