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Monday, May 16

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Ana B.M. Aguiar (École de Technologie Supérieure & Institut de Recherche Hydro Québec, Canada); Arezki Merkhouf (Research Institut of Hydro Quebec (Ireq), Canada); Kamal Al-Haddad (Ecole de technologie supérieure, Canada); Claude Hudon (Research Institut of Hydro Québec, Canada)  
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Delvis Gonzalez-Lopez (Direct Drive Systems & FMC Technologies, USA)  
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Stéphane Mouty (Converteam & University of Franche Comte, Femto-ST Institute, France); Abdollah Mirzaian (Converteam, France); Frédéric Gustin (University of Franche Comte, Femto ST Institute, France); Alain Berthon (University of Franche-Comte, France); Daniel Depernet (University of Franche Comte, Femto ST Institute, France); Espanet Christophe (University of Franche Comte, Femto ST Institute, France)

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Damien Hill (Charles Darwin University, Australia); Greg Heins (Charles Darwin University, Australia); Friso DeBoer (Charles Darwin University, Australia); Benjamin Saunders (Charles Darwin University, Australia)

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Norio Takahashi (Okayama University, Japan); Daisuke Miyagi (Okayama University, Japan)

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Fangrui Liu (Ryerson University, Canada); Bin Wu (ELCERU, Canada); Navid Reza Zargari (Rockwell Automation Canada, Canada); Manish Pande (Rockwell Automation, Canada)

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Alex Ridge (University of Cambridge, United Kingdom); Peter Clifton (University of Cambridge, United Kingdom); Richard McMahon (University of Cambridge, United Kingdom); Hugh-Peter Kelly (Direct Thrust Designs Ltd., United Kingdom)

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Jeff Proverbs (Force Engineering Ltd, United Kingdom); Tom Cox (Force Engineering Ltd & University of Bath, United Kingdom); John Eastham (The University of Bath, United Kingdom)  
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Lusu Guo (Rensselaer Polytechnic Institute, USA); Leila Parsa (Rensselaer Polytechnic Institute, USA)

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Mihai Comanescu (Penn State Altoona, USA)  
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Masaru Hasegawa (Chubu University, Japan); Hiroki Yamauchi (Chubu University, Japan); Keiju Matsui (Chubu University, Japan)  
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Hongrae Kim (ABB Inc., USA); Mahshid Amirabadi (Texas A&M University, USA); Steven Englebretson (ABB Inc., USA); Waqas Arshad (ABB Inc., USA)  
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### ***Robust ANN-Based Nonlinear Speed Observer for Permanent Magnet Synchronous Machine Drives***

Hicham Chaoui (Université du Québec à Trois-Rivières, Canada); Pierre Sicard (Université du Québec à Trois-Rivières, Canada)  
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### ***Sensorless Capability of Fractional-Slot Surface-Mounted PM Motors***

Adriano Faggion (Università di Padova - University of Padova, Italy); Emanuele Fornasiero (Università di Padova - University of Padova, Italy); Nicola Bianchi (Università di Padova - University of Padova, Italy); Silverio Bolognani (University of Padova, Italy)  
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### ***Sensorless Control of Permanent Magnet Synchronous Motor Using ANFIS Based MRAS***

Manu Jain (Concordia University, Canada); Mukhtiar Singh (Ecole de Technologie Supérieure, Montreal, Quebec, Canada); Amrisha Chandra (ÉTS, Canada); Sheldon S Williamson (Concordia University, Canada)  
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## S-12 TM: Motors/Generators

Oral Session

***Simulation of Steady-State and Transient Operational Behaviour of Variable-Speed Motor-Generators of Hydro Power Plants***

Erich Schmidt (Vienna University of Technology, Austria)  
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***New Approach to Cogging Torque Simulation Using Numerical Functions***

SeyedAmin Saied (K.N.Toosi University, Iran); Karim Abbaszadeh (Amir Kabir University of Technology, Iran); Alberto Tenconi (Politecnico di Torino, Italy); Silvio Vaschetto (Politecnico di Torino, Italy)  
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***Sensitivity Analysis of the Surge Test Applied to AC Machines***

Stefan Grubic (Georgia Institute of Technology, USA); Ronald Harley (Georgia Institute of Technology, USA); Thomas G. Habetler (Georgia Institute of Technology, USA); Jose Restrepo (Universidad Simón Bolívar, Venezuela)  
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***Modern PWM Drives and High Speed Machines***

Marc Schöning (e+a Elektromaschinen und Antriebe AG, Switzerland)  
pp. 624-629

***Design and Optimization of Concentric Saddle Shaped Coils for Permanent Magnet Transverse Flux Machine in Segmented Construction***

Salwa Baserrah (University of Bremen, Germany); Bernd Orlik (University of Bremen, Germany)  
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***Inter-turn Fault Modeling of a Variable Speed PM Wind Generator Using Physics-based Approach***

Osama Mohammed (Florida International University, USA)  
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## **S-13 TM: Miscellaneous Applications**

### Oral Session

***A Novel Concept of a Single-Drive Bearingless Motor***

Juichi Asama (Shizuoka University, Japan)  
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***Modeling of Power System Dynamic Devices Incorporated in Dynamic Computation for Power Systems (DCPS) for Transient Stability Analysis***

Norazlan Hashim (Universiti Teknologi MARA, Malaysia); Ngah Ramzi Hamzah (Universiti Teknologi Mara, Malaysia); Pauziah Mohd Arsad (Universiti Teknologi MARA, Malaysia); Rahimi Baharom (Universiti Teknologi MARA, Malaysia); Nik Fasdi Nik Ismail (Universiti Teknologi Mara (UiTM), Malaysia); Norziana Aminudin (University of Technology MARA, Malaysia); Dalina Johari (University of Technology MARA, Malaysia); Ahmad Adib Sallehudin (Advanced Power Solutions Sdn. Bhd., Malaysia)  
pp. 647-652



***Design and Realization of Group Control System for FFU Based on ZigBee Wireless Sensor Network***

Wang Yiwang (Suzhou Vocational university, P.R. China); Cao Fengwen (Suzhou Vocational University, P.R. China)  
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***Design Guideline of DC Distribution Systems for Home Appliances: Issues and Solution***

Joon-Young Jeon (University of Sungkyunkwan, Korea); Jong-Soo Kim (Sungkyunkwan University, Korea); Gyu-Yeong Choe (Sungkyunkwan University, Korea); Byoung-Kuk Lee (Sungkyunkwan University, Korea); Jin Hur (University of Ulsan, Korea); Hyun-Cheol Jin (Samsung Electronics, Korea)  
pp. 657-662

***Issues with the Design of Brushless Doubly-Fed Reluctance Machines: Unbalanced Magnetic Pull, Skew and Iron Losses***

David Dorrell (University of Technology Sydney, Australia); Andrew M Knight (University of Alberta, Canada); Robert Betz (University of Newcastle, Australia)  
pp. 663-668

***Continued Operation of Delta-connected Ac Motor-drive Systems Under Short-circuit Fault***

Ahmed Sayed-Ahmed (Rockwell Automation, USA); Behrooz Mirafzal (Florida Int'l University, USA); Nabeel Demerdash (Marquette University, USA)  
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## **S-14 TM: Modeling**

### Oral Session

***Time Discretization Issues in Induction Machine Model Solving for Real-time Applications***

Bhakti Joshi (Indian Institute of Technology Bombay, India); Mukul Chandorkar (Indian Institute of Technology-Bombay, India)  
pp. 675-680

***Modeling of Nine-Phase Interior Permanent Magnet Machines (IPM) Including Harmonic Effects***

Amrit Gautam (TTU, USA); Sosthenes Karugaba (Tennessee Technological University, USA); Ojo Joseph (Tennessee Tech University, USA)  
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***Development of Transient FE-Physics-Based Model of Induction for Real Time Integrated Drive Simulations***

Osama Mohammed (Florida International University, USA)  
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***Finite Element Analysis, Modeling and Torque Distribution Control for Switched Reluctance Motors with High Non-linear Inductance Characteristics***

Bao-Huy Nguyen (Hanoi University of Science and Technology, Vietnam);  
Cao-Minh Ta (Hanoi University of Science and Technology, Vietnam)  
pp. 693-698

***Modeling and Experimental Validation of a Fault Mitigation Method in Induction Motor-Drive Systems Using a Magnetic Equivalent Circuit***

Shaohua Suo (Marquette University, USA); Gennadi Sizov (Marquette University, USA); Ahmed Sayed-Ahmed (Rockwell Automation, USA); Nabeel Demerdash (Marquette University, USA)  
pp. 699-704

***A General Mathematical Model for Non-Redundant Fault-Tolerant Inverters***

Fabio Genduso (University of Palermo, Italy); Rosario Miceli (University of Palermo, Italy)  
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## **S-15 TM: Wind Energy**

### Oral Session

***A Novel Decoupled Interconnecting Method for Current Source Converter Based Offshore Wind Farms***

Mitesh Popat (Ryerson University, Canada); Bin Wu (ELCERU, Canada);  
Navid Reza Zargari (Rockwell Automation Canada, Canada)  
pp. 711-716

***Analytical and FE Calculation of Eddy-current Losses in PM Concentrated Winding Machines for Wind Turbines***

Jassal (TU Delft, The Netherlands); Henk Polinder (Delft University of Technology, The Netherlands)  
pp. 717-722

***Development of Optimal Controllers for a DFIG Based Wind Farm in a Smart Grid Under Variable Wind Speed Conditions***

Priyam Chakravarty (Missouri S&T, USA); Ganesh Kumar Venayagamoorthy (Missouri University of Science and Technology & Real-Time Power and Intelligent Systems Laboratory, USA)  
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***Different Torque Ripple Reduction Methods for Wind Energy Conversion Systems Using Diode Rectifier and Boost Converter***

Yuanye Xia (University of Strathclyde, United Kingdom); Khaled Ahmed (University of Strathclyde, United Kingdom); Barry Williams (University of Strathclyde, United Kingdom)  
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***Energy Yield of Two Generator Systems for Small Wind Turbine Application***

Samuel Ani (Delft University of Technology, The Netherlands); Henk Polinder (Delft University of Technology, The Netherlands); Braham Ferreira (Delft University of Technology, The Netherlands)

pp. 735-740

***Direct Torque Control of Cascaded Brushless Doubly Fed Induction Generator for Wind Energy Applications***

Yongchang Zhang (University of Technology Sydney, Australia); Jianguo Zhu (University of Technology Sydney, Australia)

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## PS-02: Poster Session

Poster Session

***Direct Decoupled Active and Reactive Power Control of Doubly Fed Induction Machine Without Rotor Position Sensors and with Robustness to Saturation and Parameter Variation***

Navid Amiri (Isfahan University of Technology, Iran); S. Mohammad Madani (Isfahan University of Technology, Iran); Hossein Abootorabi Zarchi (Ferdowsi University, Iran)

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***Power Factor Compensation for CSC-fed PMSM Drive Using D-axis Stator Current Control***

Ehsan Al-nabi (Ryerson University, Canada); Bin Wu (ELCERU, Canada); Navid Reza Zargari (Rockwell Automation Canada, Canada); Vijay K Sood (University of Ontario Institute of Technology, Canada)

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***A New Torque Hysteresis Control Algorithm for Direct Torque Control of an IM Drive***

Muhammad Hafeez (Lakehead University, Canada); Mohammad Nasir Uddin (Lakehead University, Canada)

pp. 759-764

***Model Predictive Direct Torque Control for Grid Synchronization of Doubly Fed Induction Generator***

Yongchang Zhang (University of Technology Sydney, Australia); Jianguo Zhu (University of Technology Sydney, Australia); Jiefeng Hu (University of Technology, Australia)

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***Simple and Robust Predictive Direct Control of DFIG with Low Constant Switching Frequency and Reduced Torque and Flux Ripples***

Jiefeng Hu (University of Technology, Australia); Jianguo Zhu (University of Technology Sydney, Australia); Yongchang Zhang (University of Technology Sydney, Australia); Qishuang Ma (Beijing University of Aeronautics & Astronautics, P.R. China); Youguang Guo (University of Technology Sydney, Australia)

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***Control for High Instantaneous Torque From Induction Machines: Methods and Limits***

Veysel Buyukdegirmenci (University of Illinois at Urbana Champaign, USA); Krein Philip T. (University of Illinois, USA)

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***Influence of a Converter Control Malfunction on the Harmonic Behavior of Wind Turbines with Permanent Magnet Generator***

Rui Melício (University of Beira Interior, Portugal); Victor Mendes (Instituto Superior de Engenharia de Lisboa, Portugal); Joao Catalão (University of Beira Interior, Portugal)

pp. 783-788

***A Wavelet Based Multi-Resolution Controller for Sensorless Position Control of PM Synchronous Motors At Low Speed***

Arash Nejadpak (Florida International University, USA); Ahmed Mohamed (Florida International University, USA); Osama Mohammed (Florida International University, USA)

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***The Single-Phase Brushless Doubly-Fed Machine as a Generator for Wind Turbines***

Thomas Logan (University of Cambridge, United Kingdom); Teng Long (University of Cambridge, United Kingdom); Richard McMahon (University of Cambridge, United Kingdom)

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***Minimum Reactive Power Tracking with MPPT of Converter Excited Induction Generator for Wind Power Generation***

Noriyuki Kimura (Osaka Institute of Technology, Japan); Kenichi Nakatani (Osaka Institute of Technology, Japan); Morizane Toshimitsu (Osaka Institute of Technology, Japan); Nishida Yasuyuki (Chiba Institute of Technology, Japan)

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***DC Link Current Control of Cascaded Current Source Converter Based Offshore Wind Farms***

Mitesh Popat (Ryerson University, Canada); Bin Wu (ELCERU, Canada); Navid Reza Zargari (Rockwell Automation Canada, Canada)

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***Improved Low Voltage Ride Through Capability of Wind Farm Using STATCOM***

Miad Mohaghegh Montazeri (Ryerson University, Canada); David Xu (Ryerson University, Canada); Bo Yuwen (Beijing Goldwind Science & Creation Windpower Equipment Co., Ltd., P.R. China)

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***Synchronous Generator Based Wind Energy Conversion System (WECS) Using Multi-modular Converters with Autonomous Controllers***

Maira Zulqarnain (Ryerson University Toronto, Canada); David Xu (Ryerson University, Canada); Bo Yuwen (Beijing Goldwind Science & Creation Windpower Equipment Co., Ltd., P.R. China)

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***Low Cost Current Source Converter Solutions for Variable Speed Wind Energy Conversion Systems***

Jingya Dai (Rockwell Automation, Canada); Jiacheng Wang (Ryerson University, Canada); Bin Wu (ELCERU, Canada); David Xu (Ryerson

University, Canada); Navid Reza Zargari (Rockwell Automation Canada, Canada)  
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***Laminated Circumferential Transverse Flux Machines - Lamination Concept and Applicability to Electrical Vehicles***

Manuel Gärtner (University of Stuttgart, Germany); Peter Seibold (University of Stuttgart, Germany); Nejila Parspour (University of Stuttgart, Germany)  
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***Multi-Source Traction Drive for Axial Flux Permanent Magnet In-Wheel Synchronous Motor***

Ciro Attaianese (University of Cassino, Italy); Mauro Di Monaco (University of Cassino, Italy); Giuseppe Tomasso (University of Cassino, Italy)  
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***Transient and Islanding Performance of Grid-Connected Induction Generator Feeding Induction Motor and Resistive Loads***

Saad Alghuwainem (KSU, Saudi Arabia)  
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***Minimising Capacitor Lifetime Failures in Power Converters for Wave Energy Applications***

Jonathan Shek (The University of Edinburgh, United Kingdom); Ewen Macpherson (The University of Edinburgh, United Kingdom); Markus Mueller (University of Edinburgh, United Kingdom)  
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***Stability Analysis of a DC/DC Boost Converter Fed Permanent Magnet Brushless Motor Drive***

Abdul Karim Al Shanfari (The University of Sheffield, United Kingdom); Jiabin Wang (The University of Sheffield, United Kingdom)  
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***Design-oriented Analysis on Parameters of Bidirectional Converter Based on the Unbalance Factor***

Weiyang Wang (Zhejiang University, P.R. China); Wei Zhang (Zhejiang University, P.R. China)  
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***Design of Symmetric Voltage Cancellation Control for LCL Converters in Inductive Power Transfer Systems***

Hunter Wu (Energy Dynamics Laboratory, USA)  
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***Implementation of a DC-DC Converter with Variable Structure Control of Switched Systems***

Rodrigo Cardim (UNESP - Univ Estadual Paulista, Brazil); Marcelo Teixeira (UNESP - Univ Estadual Paulista, Brazil); Edvaldo Assunção (UNESP - Univ Estadual Paulista, Brazil); Marcio Covacic (UEL - Londrina State University, Brazil); Falcondes Seixas (UNESP - Univ Estadual Paulista, Brazil); Flavio Faria (UNESP - Univ Estadual Paulista, Brazil); Edson Mainardi (UNESP - Univ Estadual Paulista, Brazil)  
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***A Sensorless Speed Estimation Method for Wound Rotor Induction Machine***

Sinisa Djurović (The University of Manchester, United Kingdom); Slobodan Djukanović (University of Montenegro, Montenegro)  
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***A 6/4 Pole PM-Assisted Synchronous Reluctance Motor Drive***

Tzu-Shien Chuang (Mingchi University of Technology, Taiwan)  
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***Electric Machines as Metamaterials: Induction Machine Design Using Planar Layer Models***

Matthew P. Magill (University of Illinois at Urbana-Champaign, USA); Krein Philip T. (University of Illinois, USA)  
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***Investigation of Thermal Stress in the Rotor of Doubly-Fed Induction Generators At Synchronous Operating Point***

Jakob Jung (Dresden University of Technology, Germany); Wilfried Hofmann (TU-Dresden, Germany)  
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***A Novel Equivalent Circuit Involving Stray Load Loss and Harmonic Torques for High Speed Induction Motors Driven by Inverters***

Katsumi Yamazaki (Chiba Institute of Technology, Japan)  
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***Experimental Study of the Effect of Positive Sequence Voltage on the Derating of Induction Motors Under Voltage Unbalance***

Enrique C. Quispe (Universidad Autónoma de Occidente, Colombia); Xosé López-Fernández (Universidad de Vigo, Spain); Andre Mendes (F. C. T. University of Coimbra/ IT- Coimbra, Portugal); Antonio J. Marques Cardoso (University of Coimbra, FCTUC/IT, Portugal); Jairo Palacios (Universidad del Valle, Colombia)  
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***Performance Evaluation of Induction Motor Efficiency and In-service Losses Measurement Using Standard Test Methods***

He Zhang (University of Nottingham & WRc plc, United Kingdom); Pericle Zanchetta (University of Nottingham, United Kingdom); Chris Gerada (University of Nottingham, United Kingdom); Keith Bradley (University of Nottingham, United Kingdom); Junyi Liu (University of Nottingham, United Kingdom)  
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***A Simple and Low Cost Three-Phase Sector Induction Machine***

Adilson Tavares (Sul Riograndense Federal Institute, Brazil); Aly F Flores Filho (Federal University of Rio Grande do Sul, Brazil); Yeddo Blauth (Federal University of Rio Grande do Sul (UFRGS), Brazil)  
pp. 918-923

***Decoupling Manufacturing Sources of Cogging Torque in Fractional Pitch PMSM***

Mark Thiele (Charles Darwin University, Australia); Greg Heins (Charles Darwin University, Australia); Travis Brown (Charles Darwin University, Australia)  
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***Finite-Element Analysis and Design of a Radial-Field Brushless PM Machine Utilizing Soft Magnetic Composites***

Gene Liew (University of Adelaide, Australia); Chun Tang (University of Adelaide, Australia); Wen Soong (University of Adelaide, Australia); Nesimi Ertugrul (University of Adelaide, Australia); David Gehlert (Intelligent Electric Motor Solutions Pty. Ltd., Australia)  
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***Improving the Torque Output in Radial- and Axial-Flux Permanent-Magnet Synchronous Machines with Concentrated Windings by Using a Combined Wye-Delta Connection***

Hendrik Vansompel (Ghent University, Belgium); Peter Sergeant (Ghent University, Belgium); Luc Dupré (Ghent University, Belgium); Alex Van den Bossche (Ghent University, Belgium)  
pp. 936-941

***Adaptive Feedforward Control to Compensate Cogging Torque and Current Measurement Errors for PMSMs***

Kheng Yeo (Charles Darwin University, Australia); Greg Heins (Charles Darwin University, Australia); Friso DeBoer (Charles Darwin University, Australia); Benjamin Saunders (Charles Darwin University, Australia)  
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***Improved Model for Design of Permanent Magnet Machines with Concentrated Windings***

Hung VuXuan (Delft University of Technology, The Netherlands); Domenico Lahaye (Delft University of Technology, The Netherlands); Henk Polinder (Delft University of Technology, The Netherlands); Braham Ferreira (Delft University of Technology, The Netherlands)  
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***Methods for Determining the Parameters and Characteristics of PMSM***

Maryam Kazerooni (University of Windsor, Canada); Narayan Kar (University of Windsor, Canada)  
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***Detection and Classification of Electrical Supply Voltage Quality to Electrical Motors Using the Fuzzy-Min-Max Neural Network***

Harapajan Singh (Universiti Teknologi MARA, Malaysia); Mohd Zaki Abdullah (Universiti Teknologi MARA, Malaysia); Anas Qutieshat (Al-Balqa' Applied University, Jordan)  
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***Integrating the S-PQDA Software Tool in the Utility Power Quality Management System***

Mohamed Faisal (Universiti Kebangsaan Malaysia, Malaysia); Azah Mohamed (Universiti Kebangsaan Malaysia, Malaysia)

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***Effect of Iron Losses on the Model and Control of a Hybrid Excitation Synchronous Generator***

Rita Mbayed (University of Cergy Pontoise - France, France); Lionel Vido (SATIE, University of Cergy-Pontoise, CNRS, France); Georges Salloum (Lebanese University, Faculty of Engineering, Lebanon); Eric Monmasson (Université Cergy-Pontoise, France); Mohamed Gabsi (SATIE, ENS Cachan, CNRS Universud, France)

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## **S-16 TA: PM Machines**

Oral Session

***Experimental Verification of Core and Magnet Losses in a Concentrated Wound IPM Machine with V-Shaped Magnets Used in Field Weakening Applications***

Lester Chong (University of New South Wales, Australia); Rukmi Dutta (University of New South Wales, Australia); M. Fazlur Rahman (University of New South Wales, Australia); Howard Lovatt (CSIRO Materials Science and Engineering, Australia)

pp. 977-982

***Design Procedure of IPM Motor Drive for Railway Traction***

Massimo Barcaro (Università di Padova - University of Padova, Italy); Emanuele Fornasiero (Università di Padova - University of Padova, Italy); Nicola Bianchi (Università di Padova - University of Padova, Italy); Silverio Bolognani (University of Padova, Italy)

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***Torque Ripple Compensation Based on Instantaneous Torque Estimation in Permanent Magnet Synchronous Motors***

Noriya Nakao (Shibaura Institute of Technology, Japan); Kan Akatsu (Shibaura Institute of Technology, Japan)

pp. 989-994

***Optimal Torque Matching of a Magnetic Gear Within a Permanent Magnet Machine***

David Evans (University of Sheffield, United Kingdom); Zi Qiang Zhu (University of Sheffield, United Kingdom)

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***Influence of Design Parameters on Wide Speed Range Concentrated Winding PM Machines***

Shah Rahman (University of Alberta, Canada); Andrew M Knight (University of Alberta, Canada)

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## **S-17 TA: Converters**

Oral Session



***High-Frequency AC Drive Fed by One-Stage VF-Input AC-AC Converter***

Jie Chang (Eaton Corporation, USA)  
pp. 1007-1012

***Modular Multilevel Converter for Medium-Voltage Applications***

Grain Philip Adam (University of Strathclyde, United Kingdom); Khaled Ahmed (University of Strathclyde, United Kingdom)  
pp. 1013-1018

***Analysis of a Railway Power System Based on Four Quadrant Converters Operating Under Faulty Conditions***

Andre Mendes (F. C. T. University of Coimbra/ IT- Coimbra, Portugal); Ricardo Rocha (F.C.T. - U. Coimbra, Portugal); Antonio J. Marques Cardoso (University of Coimbra, FCTUC/IT, Portugal)  
pp. 1019-1024

***A Quadratic High Step-Up DC-DC Converter with Voltage Multiplier***

Shih-Ming Chen (National Cheng-Kung University, Taiwan); T. J. Liang (Cheng Kung University, Taiwan); Lung-Sheng Yang (National Cheng Kung University, Taiwan); Jiann-Fuh Chen (National Cheng Kung University, Taiwan); Kai-Cheung Juang (Industrial Technology Research Institute, Taiwan)  
pp. 1025-1029

***A Novel Integrated AC Choke for Common-mode Voltage Suppression in Power Converter Systems***

Ning Zhu (Ryerson University, Canada); Jinsong Kang (Tongji University, P.R. China); David Xu (Ryerson University, Canada); Bin Wu (ELCERU, Canada); Yuan Xiao (Rockwell Automation, Allen Bradley, Canada)  
pp. 1030-1035

***Optimized PID Controller for Both Single Phase Inverter and MPPT SEPIC DC/DC Converter of PV Module***

Ahmad El Khateb (University of Malaya, Malaysia); Nasrudin Abdul Rahim (University Malaya, Malaysia); Jeyraj Selvaraj (University Malaya, Malaysia)  
pp. 1036-1041

## **S-18 TA: Induction Machines**

### Oral Session

***A PWM Harmonics Elimination Method in Simultaneous Estimation of Magnetic Field and Displacements in Bearingless Induction Motors***

Akira Chiba (Tokyo Institute of Technology, Japan)  
pp. 1042-1047

***Derating Factors for Direct Online Induction Machines When Supplied with Voltage Harmonics: A Critical View***

Colin Debruyne (UGent & HoWest dept. GKG, Belgium); Jan Desmet (UGent, Belgium); Stijn Derammelaere (UGent, Belgium); Lieven Vandeveldel (Ghent University, Belgium)  
pp. 1048-1052

***An Analytical Solution for the Torque and Power of a Solid-Rotor Induction Motor***

Miroslav Markovic (EPFL Lausanne & LAI, Switzerland); Yves Perriard (Laboratory director, Switzerland)  
pp. 1053-1057

***Analytical Calculation of Electrodynamical Levitation Forces in a Special-Purpose Linear Induction Motor***

Jacek F Gieras (University of Technology and Life Sciences & Hamilton Sundstrand Applied Research, Poland); Zdzislaw Gientkowski (University of Technology and Life Sciences, Poland); Jacek Mews (University of Technology and Life Sciences, Poland)  
pp. 1058-1063

***Diagnosis and Isolation of Air-gap Eccentricities in Closed-loop Controlled Doubly-Fed Induction Generators***

Vivek M Sundaram (Texas A&M University, USA); Hamid Toliyat (Texas A&M University, USA)  
pp. 1064-1069

## **S-19 TA: Control**

### Oral Session

***Periodic Disturbance Rejection of a PMSM with Adaptive Control Algorithms***

Sebastian Maier (DLR, Germany)  
pp. 1070-1075

***Construction and Control of an Air-Cored Permanent Magnet Linear Generator for Direct Drive Wave Energy Converters***

Rieghard Vermaak (University of Stellenbosch, South Africa); Maarten Kamper (Stellenbosch University, South Africa)  
pp. 1076-1081

***Ideal Integration of Observers with Sinusoidal States by Sliding Mode - Application to Direct Field Orientation of Motor Drives***

Mihai Comanescu (Penn State Altoona, USA)  
pp. 1082-1087

***Implementation of Emotional Controller (BELBIC) for Synchronous Reluctance Motor Drive***

Ehsan Daryabeigi (IAU-YRC, Iran); Hossein Abootorabi Zarchi (Ferdowsi University, Iran); Gholam Reza Arab Markadeh (University of shahrekord, Iran); Aziz Rahman (IEMD - Chair, Canada); Caro Lucas (Prof, Iran)  
pp. 1088-1093

***Comparative Study of PMSM Drive Systems Based on Current Control and Direct Torque Control in Flux-weakening Control Region***

Yukinori Inoue (Osaka Prefecture University, Japan); Shigeo Morimoto (Osaka Prefecture University, Japan); Masayuki Sanada (Osaka Prefecture University, Japan)  
pp. 1094-1099

***Two-level Backward Operation of a VSMC for PMSG Grid-connected Variable Speed Wind Turbine Systems***

Mohamed F Aner (University of Calgary & Helwan University, Canada); Ed Nowicki (University of Calgary, Canada)  
pp. 1100-1106

## **S-20 TA: Wind Energy**

### Oral Session

***Robust Decoupling Strategy for Speed Control of Permanent Magnet Synchronous Generator in Wind Energy Conversion Systems***

Adel Merabet (Saint Mary's University, Canada); Jogendra Singh Thongam (STAS Inc., Canada); Alireza Safaee (Queen's University, Canada); Majid Pahlevaninezhad (Queen's university, Canada)  
pp. 1107-1112

***Torque/Power Rating Design of an IPM Machine for Maximum Profit-To-Cost Ratio in Wind Power Generation***

Mattia Morandin (Università di Padova - University of Padova, Italy); Emanuele Fornasiero (Università di Padova - University of Padova, Italy); Silverio Bolognani (University of Padova, Italy); Nicola Bianchi (Università di Padova - University of Padova, Italy)  
pp. 1113-1118

***Performance Evaluation of Grid Connected Wind Energy Conversion Systems with Five-phase Modular Permanent Magnet Synchronous Generators***

Ayman Abdel-Khalik (Alexandria University, Egypt); Khaled Ahmed (University of Strathclyde, United Kingdom)  
pp. 1119-1124

***Induction Generators for Direct-Drive Wind Turbines***

Matthew Henriksen (Technical University of Denmark, Denmark); Bogi Jensen (Technical University of Denmark, Denmark)  
pp. 1125-1130

***State of the Art in Generator Technology for Offshore Wind Energy Conversion Systems***

Zhaoqiang Zhang (Norwegian University of Science and Technology, Norway); Alexey Matveev (Smartmotor, Norway)  
pp. 1131-1136

***A Novel Control Strategy of an Active Crowbar for DFIG-Based Wind Turbine During Grid Faults***

Yuan Ren (Zhejiang University, P.R. China); Wei Zhang (Zhejiang University, P.R. China)  
pp. 1137-1142

## S-21 WM: PM Machines

### ***Loss Study of a Novel Axial Flux Permanent Magnet Machine***

Trong Duy Nguyen (Nanyang Technological University, Singapore); King Jet Tseng (Nanyang Technological University, Singapore); Chi Zhang (Ningbo Institute of Technology, Zhejiang University, P.R. China); Shao Zhang (Nanyang Technological University, Singapore)  
pp. 1143-1148

### ***Constrained Online Efficiency Optimization to Guarantee Load Support in Motor Drives***

Ali Bazzi (University of Illinois at Urbana-Champaign, USA); Krein Philip T. (University of Illinois, USA)  
pp. 1149-1152

### ***A Brushless DC Motor Design for an Aircraft Electro-Hydraulic Actuation System***

Xiaoyan Huang (Zhejiang University, P.R. China); Chris Gerada (University of Nottingham, United Kingdom); Andrew Goodman (University of Nottingham, United Kingdom); Keith Bradley (University of Nottingham, United Kingdom); He Zhang (University of Nottingham & WRc plc, United Kingdom); Youtong Fang (Zhejiang University, P.R. China)  
pp. 1153-1158

### ***Initial Experimental Verification of a Compact Permanent Magnet Transverse Flux Machine in a Sector Configuration***

Salwa Baserrah (University of Bremen, Germany); Bernd Orlik (University of Bremen, Germany)  
pp. 1159-1164

### ***Performance Evaluation of Brushless DC Permanent Magnet Motor Using Finite Element Method***

Thiago Hideki Akinaga (Federal University of Santa Catarina, Brazil); Cristofaro Pompermaier (Whirlpool / Embraco, Brazil); Flavio Kalluf (Whirlpool / Embraco, Brazil); Mauricio Valencia Ferreira da Luz (University Federal of Santa Catarina & CTC/GRUCAD, Brazil)  
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### ***Evaluation of Inductance in a Permanent Magnet Synchronous Motor***

Abraham Gebregergis (Nexteer Automotive, USA); Mohammad Islam (Nexteer Automotive, USA); Tomy Sebastian (Nexteer Automotive, USA); Raja Ramaksishnan (Nexteer Automotive, USA)  
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## S-22 WM: Motors/Generators

Oral Session

***New Phase Estimation Methods Dedicated to High-Frequency Voltage Injections for Sensorless PMSM Drives***

Shinji Shinnaka (Kanagawa University, Japan)  
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***Optimised Segmental Rotor Switched Reluctance Machines with a Greater Number of Rotor Segments Than Stator Slots***

James Widmer (Newcastle University, United Kingdom); Barrie Mecrow (Newcastle University, United Kingdom)  
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***Development of an Efficient Photo Voltaic Maximum Power Point Tracking Controller***

Subiyanto Subiyanto (Universiti Kebangsaan Malaysia, Malaysia); Azah Mohamed (Universiti Kebangsaan Malaysia, Malaysia); Ma Hannan (Universiti Kebangsaan Malaysia, Malaysia)  
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***EMF and Efficiency Measurements of a Novel Self-Excited Reluctance Generator***

Kazumi Kurihara (Ibaraki University, Japan)  
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***Harmonic Impact of Different Distributed Generation Units on Low Voltage Distribution System***

Aida Fazliana Abdul Kadir (Universiti Kebangsaan Malaysia, Malaysia); Azah Mohamed (Universiti Kebangsaan Malaysia, Malaysia); Hussain Shareef (University Kebangsaan Malaysia, Maldives)  
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***Modal Analysis of Operational End Winding Vibrations***

Christian Kreischer (TU Dortmund University & Institute of electrical drives and mechatronics, Germany); Stefan Kulig (TU Dortmund University, Germany); Dagmar Thien (Siemens AG, Germany)  
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## **S-23 WM: Miscellaneous Applications**

### Oral Session

***Active Reduction of Audible Noise Exciting Radial Force-Density Waves in Induction Motors***

David Franck (RWTH Aachen University, Germany); Michael van der Giet (RWTH Aachen University Germany, Germany); Kay Hameyer (RWTH Aachen University, Germany)  
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***A Three-level Five-phase Space-vector Modulation Algorithm Based on the Decomposition Method***

Martin Jones (Liverpool John Moores University, United Kingdom); Wahyu Satiawan (Liverpool John Moores University, United Kingdom); Emil Levi (Liverpool John Moores University, United Kingdom)

pp. 1219-1224

***Multiphysic Design Rules Applied to Inductors or Transformers for Railway Application***

Mathieu Rossi (Ecole Centrale de Lille (France) & Alstom Transport Belgium, France); Michel Hecquet (University Lille Nord de France / Ecole Centrale de Lille, France); Vincent Lanfranchi (LEC, University of Technology of Compiègne, France)

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***Novel Equipment for the Measurement of Core Losses in Laminations for Advanced Machines***

Maged Ibrahim (Concordia University, Canada); Pragasen Pillay (Concordia University, Canada)

pp. 1231-1236

***Modelling of a Magnetic Gear Considering Rotor Eccentricity***

Leandro Percebon (ESSS - Engineering Simulation and Scientific Software Ltda, Brazil); Rodrigo Ferraz (ESSS - Engineering Simulation and Scientific Software Ltda, Brazil); Mauricio Valencia Ferreira da Luz (University Federal of Santa Catarina & CTC/GRUCAD, Brazil)

pp. 1237-1241

***Full Bridge Rectifier Generating Mode of a 30/20-pole Hybrid Excitation Doubly Salient Machine***

Zhihui Chen (Nanjing University of Aeronautics and Astronautics, P.R. China); Yangguang Yan (Nanjing University of Aeronautics and Astronautics, P.R. China)

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## **S-24 WM: Control**

### Oral Session

***A New Direct Torque Control for AC Motors with Over Modulation Ability***

Ahmad Ghaderi (Toyota Central R&d Labs., Inc., Japan); Masaru Sugai (Toyota Central R&d Labs., Inc., Japan); Takaji Umeno (Toyota Central R&d Labs., Inc., Japan); Yasushi Amano (Toyota Central R&d Labs., Inc., Japan)

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***Field-Weakening Method for V/f-Controlled Hoist Drive***

Janne Salomäki (Konecranes Plc, Finland); Mikko Porma (Konecranes Plc, Finland)

pp. 1253-1258

***Eliminating All Machine Parameters in Encoderless Predictive Torque Control Without Signal Injection***

Peter Landsmann (Technical University of Munich, Germany); Christoph Hackl (Technical University of Munich, Germany); Ralph Kennel (Technical University of Munich, Germany)

pp. 1259-1264

***Inverter Synchronization Control with Internal Model Principle***

Yongpeng Zhang (Prairie View A&M University, USA); Chao Xia (Prairie View A&M University, USA); Jian Zhang (Prairie View A&M University, USA); Liping Guo (Northern Illinois University, USA)  
pp. 1265-1269

***Analysis and Optimization of a Modular Stator Core with Segmental Teeth and Solid Back Iron for PM Electric Machines***

Jianxin Shen (Zhejiang University, P.R. China); Canfei Wang (Zhejiang University, P.R. China); Dongmin Miao (Zhejiang University, P.R. China); Mengjia Jin (Zhejiang University China, P.R. China); Dan Shi (Zhejiang University, P.R. China); Yunchong Wang (Zhejiang University, P.R. China)  
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***Algebraic Design of Full-Order Flux Observer for IPMSM Position Sensorless Control***

Atsushi Matsumoto (Nagoya University, Japan); Masaru Hasegawa (Chubu University, Japan); Mutuwo Tomita (Gifu National College of Technology, Japan); Keiju Matsui (Chubu University, Japan)  
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## **S-25 WM: Electric Vehicle**

### Oral Session

***Novel Multi-Mode Single Leg Converter for Hybrid Electric Vehicles***

Taesik Park (University of Michigan-Dearborn, USA); Taehyung Kim (University of Michigan-Dearborn, USA)  
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***The Effect of Electric Vehicle Drive Efficiency on Bidding Vehicle-to-Grid Services***

Eric Sortomme (University of Washington, USA); Edward Doheny (University of Washington, USA); Mohamed El-Sharkawi (University of Washington, USA)  
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***Comparison of Integrated Battery Chargers for Plug-In Hybrid Electric Vehicles: Topology and Control***

Dong-Gyun Woo (Sungkyunkwan University, Korea); Gyu-Yeong Choe (Sungkyunkwan University, Korea); Jong-Soo Kim (Sungkyunkwan University, Korea); Byoung-Kuk Lee (Sungkyunkwan University, Korea); Jin Hur (University of Ulsan, Korea); Gu-Bae Kang (Hyundai Motors, Korea)  
pp. 1294-1299

***Comparative Evaluation of 6/8 and 6/10 Switched Reluctance Machines for Traction Application in Plug-in Hybrid Electric Vehicles***

Berker Bilgin (Illinois Institute of Technology, USA); Ali Emadi (Illinois Institute of Technology, USA); Mahesh Krishnamurthy (Illinois Institute of Technology, USA)  
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***Life Expectancy Calculation for Electric Vehicle Traction Motors Regarding Dynamic Temperature and Driving Cycles***

Richard Rothe (RWTH Aachen, Germany); Kay Hameyer (RWTH Aachen University, Germany)  
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***Fault Tolerant In-Wheel Motor Topologies for High Performance Electric Vehicles***

Chukwuma Ifedi (Newcastle University & Protean Electric, United Kingdom); Barrie Mecrow (Newcastle University, United Kingdom); Simon Brockway (Protean Electric, United Kingdom); Gerry Boast (Protean Electric, United Kingdom); Glynn Atkinson (Newcastle University, United Kingdom); Dragica Kostic-Perovic (Protean Electric, United Kingdom)  
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## PS-03: Poster Session

### Poster Session

***Estimation of Saturation of Permanent-Magnet Synchronous Motors Through an Energy-Based Model***

Al Kassem Jebai (Mines ParisTech, France); François Malrait (Schneider Electric, STIE, France); Philippe P. Martin (Mines ParisTech, France); Pierre Rouchon (Mines ParisTech, France)  
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***Analytical Cogging Torque Prediction for Surface-Mounted PM Machines Accounting for Different Slot Sizes and Uneven Positions***

Lijian Wu (University of Sheffield, United Kingdom); Zi Qiang Zhu (University of Sheffield, United Kingdom); David Staton (Motor Design Ltd., United Kingdom); Mircea Popescu (Motor design Ltd, United Kingdom)  
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***Effects of Load Conditions on Rotor Eddy Current Loss in Modular Permanent Magnet Machines***

Jason Ede (University of Sheffield, United Kingdom); Kais Atallah (University of Sheffield, United Kingdom); Geraint Wyn Jewell (University of Sheffield, United Kingdom)  
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***Comparison of Drive Performance of PM Synchronous Machine Fed by Inverters with Different PWM Strategies in Constant Torque and Constant Power Regions***

Hesong Liu (Beihang University, P.R. China); Zi Qiang Zhu (University of Sheffield, United Kingdom); Essam Mohamed (University of Sheffield, United Kingdom); Yongling Fu (Beihang University, P.R. China); Xiaoye Qi (Beihang University, P.R. China)  
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***Torque Components in Integral- and Fractional-Slot IPM Machines***

Massimo Barcaro (Università di Padova - University of Padova, Italy); Nicola Bianchi (Università di Padova - University of Padova, Italy)



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***Evaluation of Synchronization Capability in Line Start Permanent Magnet Synchronous Motors***

Arash Hassanpour Isfahani (University of Tehran, Iran); Sadegh Vaez-Zadeh (University of Tehran, Iran); Aziz Rahman (IEMD - Chair, Canada)  
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***Multi-phase Permanent Magnet Motor Drives for Fault-Tolerant Applications***

Marco Villani (University of L'Aquila, Italy); Marco Tursini (University of L'Aquila, Italy); Giuseppe Fabri (University of L'Aquila, Italy); Luca Castellini (Umbragroup S. p. A., Italy)  
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***Ironless Permanent Magnet Synchronous Machine Stiffness Calculations for Flywheel Energy Storage Systems***

Ian Higginson (University of Idaho, USA); Herbert Hess (University of Idaho, USA); Joseph Law (University of Idaho, USA)  
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***Extension of a D-Q Model of a Permanent Magnet Excited Synchronous Machine by Including Saturation, Cross-Coupling and Slotting Effects***

Thomas Herold (RWTH Aachen University, Germany); David Franck (RWTH Aachen University, Germany); Enno Lange (RWTH Aachen University, Germany); Kay Hameyer (RWTH Aachen University, Germany)  
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***Calculation of Iron Loss in Electrical Generators Using Finite Element Analysis***

Philip Hargreaves (Newcastle University & Convertteam UK Ltd, United Kingdom); Barrie Mecrow (Newcastle University, United Kingdom); Ross Hall (Convertteam UK Ltd, United Kingdom)  
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***Electrical Machines with Higher Efficiency Through Combined Star-Delta Windings***

Henning Kasten (TU-Dresden, Germany); Wilfried Hofmann (TU-Dresden, Germany)  
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***Impact of Over/Under and Voltage Unbalanced Supplies on Energy-Efficient Motors***

Van Wyk (University of Cape Town, South Africa); Mohamed Azeem Khan (University of Cape Town, South Africa); Paul Barendse (University of Cape Town, South Africa)  
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***Impact of Modifying the Stator Tooth Tip on Electromagnetic Torque Production for an 8/6 Switched Reluctance Machine***

Saritha Balathandayuthapani (FSU, USA); Fletcher Fleming (Florida State University & Center for Advanced Power Systems, USA); Chris Edrington (FSU, USA); Eyhab El-Kharashi (Ain Shams University, Egypt)  
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***Comparative Study Between a Single-phase and a Three-phase Switched Reluctance Machine***

Darizon Andrade (Federal University of Uberlandia, Brazil); Luciano Gomes (Federal University of Uberlandia, Brazil)  
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***Control Techniques for Power Quality Improvement in Delta Connected Load Using DSTATCOM***

Tejas Zaveri (Veer Narmad South Gujarat University, India); Bhalja Bhavesh (A D Patel Institute of Technology, India); Naimish Zaveri (C.K.Pithawalla college of Engg. & Tech., India)  
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***Influence of Design Parameters on Magnetic Gear's Torque Capability***

David Evans (University of Sheffield, United Kingdom); Zi Qiang Zhu (University of Sheffield, United Kingdom)  
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***Comparative Study of Switching Signal Generation Techniques for Three Phase Four Wire Shunt Active Power Filter***

Heli Golwala (Sardar Vallabhbhai National Institute of Technology, Surat, India); Chudamani R (Sardar Vallabhbhai National Institute of Technology, Surat, India)  
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***Improvement of Rotational Torque and Suspension Force by Winding Arrangement in a Bearingless Motor Drive for a Solid-Liquid Separator***

Yasuhiro Koshi (Tokyo University of Science, Suwa, Japan); Masahide Ooshima (Tokyo University of Science, Suwa, Japan); Mohammad Nasir Uddin (Lakehead University, Canada); Hiroshi Kitada (CMS Co. Ltd, Japan)  
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***Test Specimen Shape Considerations for the Measurement of Rotational Core Losses***

Natheer Alatawneh (Concordia University, Canada); Pragasen Pillay (Concordia University, Canada)  
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***The Effects of Magnetic Circuit Geometry on Characteristics of Switched Reluctance Motors***

Šemsudin Mašić (University of Sarajevo, Bosnia and Herzegovina); Senad Smaka (University of Sarajevo, Bosnia and Herzegovina); Iris Salihbegović (Power Enterprise Elektroprivreda BiH, Bosnia and Herzegovina); Mirsad Čosović (University of Sarajevo, Bosnia and Herzegovina)  
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***Measurement of Stator Core Magnetic Characteristics***

Alexander Clerc (University of Warwick, United Kingdom); Annette Muetze (Graz University of Technology, Austria)  
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***Multi Layer Planar Concentrated Windings***

Tom Cox (Force Engineering Ltd & University of Bath, United Kingdom); John Eastham (The University of Bath, United Kingdom)  
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***Development of a Linear Position Independent Inductive Energy Transfer System***

Thomas Gerrits (Eindhoven University of Technology, The Netherlands); Davy Krop (Eindhoven Technical University, The Netherlands); Elena Lomonova (Eindhoven University of Technology, The Netherlands)

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***Design of an Actuator for the Fast and High Accuracy Wire Scanner***

Mohamed Koujili (CERN & University of Technology of Belfort-Montbeliard, Switzerland); Youcef Ait-Amirat (Femto-ST - Université de Franche-Comté, France); Bernd Dehning (CERN, Switzerland); Abdesslem Djerdir (University of Technology, Belfort Montbeliard, France); Jonathan Emery (CERN, Switzerland); Juan Alvarez (CERN, Switzerland)

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***A Software Design Technique for Differential Protection of Power Transformer***

Adel Aktaibi (Memorial University of Newfoundland, Canada); Aziz Rahman (IEMD - Chair, Canada)

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***Auralization of Electrical Machines in Variable Operating Conditions***

Michael van der Giet (RWTH Aachen University Germany, Germany); Julian Blum (RWTH Aachen University Germany, Germany); Pascal Dietrich (RWTH Aachen University, Germany); Sönke Pelzer (RWTH Aachen University, Germany); Markus Müller-Trapet (RWTH Aachen University, Germany); Martin Pollow (RWTH Aachen University, Germany); Michael Vorländer (RWTH Aachen, Germany); Kay Hameyer (RWTH Aachen University, Germany)

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***Simultaneous State and Input Estimation of a Synchronous Machine Using the Extended Kalman Filter with Unknown Inputs***

Esmaeil Ghahremani (University of Laval, Canada); Innocent Kamwa (Hydro-Québec/IREQ, Canada)

pp. 1468-1473

***Analysis of CPSR in Motoring and Generating Modes of an IPM Motor***

Rukmi Dutta (University of New South Wales, Australia); Lester Chong (University of New South Wales, Australia); M. Fazlur Rahman (University of New South Wales, Australia)

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***Passivity-Based Adaptive Sliding Mode Speed Control of Switched Reluctance Motor Drive Considering Torque Ripple Reduction***

Mohammad Masoud Namazi Isfahani (Isfahan University of Technology, Iran); Mortaza Saghaian-Nejad (Isfahan University of Technology, Iran); Amir Rashidi (Isfahan University of Technology, Iran); Hossein Abootorabi Zarchi (Ferdowsi University, Iran)

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***An Application of Vehicular Ad Hoc Wireless Network for Hybrid Electric Vehicle***

Aslinda Hassan (Memorial University of Newfoundland, Canada); Mohamed Hossam Ahmed (Memorial University, Canada); Aziz Rahman (IEMD - Chair, Canada)  
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***Assessment of Core Losses in a Flux-Modulating Synchronous Machine***

Tadashi Fukami (Kanazawa Institute of Technology, Japan); Hirofumi Aoki (Kanazawa Institute of Technology, Japan); Kazuo Shima (Kanazawa Institute of Technology, Japan); Masatoshi Momiyama (Toshiba Mitsubishi Electric Industrial Systems Corporation, Japan); Mitsuhiro Kawamura (Toshiba Mitsubishi Electric Industrial Systems Corporation, Japan)  
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***Error Analysis of Efficiency Estimation Methods for Induction Motors***

Barbara Herndler (University of Cape Town, South Africa); Paul Barendse (University of Cape Town, South Africa); Mohamed Azeem Khan (University of Cape Town, South Africa)  
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***Analytical Modeling of Variable Impedance Induction Machines***

Hooshang Gholizad (Darmstadt University of Technology, Germany); Andreas Binder (Darmstadt University of Technology, Germany)  
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***A Simple Core Structure for Small Axial-Flux PMSGs***

John G Wanjiku (University of Cape Town, South Africa); Hartmut Jagau (University of Cape Town, South Africa); Mohamed Azeem Khan (University of Cape Town, South Africa); Paul Barendse (University of Cape Town, South Africa)  
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***Considerations for Improving the Non-Intrusive Efficiency Estimation of Induction Machines Using the Air Gap Torque Method***

Barbara Herndler (University of Cape Town, South Africa); Paul Barendse (University of Cape Town, South Africa); Mohamed Azeem Khan (University of Cape Town, South Africa)  
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**S-26 WA: PM Machines**

***Design and Performance of a Double-Layered Interior Permanent Magnet Generator***

Saleh Saleh (Memorial University of Newfoundland, Canada); Hossan Mohammad Zubayer (Memorial University of Newfoundland, Canada); Mohammad Iqbal (Memorial University of Newfoundland, Canada); M. Abdesh Khan (Lakehead University & Husky Injection Molding Systems Ltd., Canada); Aziz Rahman (IEMD - Chair, Canada)  
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***Multi-Objective Optimization of PM AC Machines Using Computationally Efficient - FEA and Differential Evolution***

Gennadi Sizov (Marquette University, USA); Dan Ionel (Marquette University, USA); Nabeel Demerdash (Marquette University, USA)  
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***Pseudo-vector Control - an Alternative Approach for Brushless DC Motor Drives***

Cao-Minh Ta (Hanoi University of Science and Technology, Vietnam)  
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***Extending Speed Range of Five-Phase PM Machines by Changing the Stator Windings Connections***

Siavash Sadeghi (Rensselaer Polytechnic Institute, USA); Leila Parsa (Rensselaer Polytechnic Institute, USA); Toliyat Hamid A. (Texas A&M University, USA)  
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***Torque Improvement of Single Phase Brushless PM Motors by Auxiliary Magnets***

Mauro Andriollo (University of Padova, Italy); Giovanni Martinelli (University of Padova, Italy); Andrea Tortella (University of Padova, Italy)  
pp. 1546-1551

***Failure Diagnosis of Brushless DC Motor with Rotor Magnet Defect***

Takeo Ishikawa (Gunma University, Japan)  
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## **S-27 WA: Induction Machines**

### Oral Session

***Effect of Laminated Core on Rotor Mode Shape of Large High Speed Induction Motor***

Sumit Singhal (Siemens Industry, Inc., USA); Kumar Singh (Miami University, USA); Andrew Hyder (Siemens Industry, Inc., USA)  
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***A Novel Evolutionary Based In-situ Efficiency Estimation Technique for Induction Machines Working with Unbalanced Supplies***

Arbi Gharakhani Siraki (Concordia University, Canada); Pragasen Pillay (Concordia University, Canada)  
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***A Customizable Voltage Behind Reactance Squirrel Cage Induction Machine Model for PSCAD/EMTDC***

Nathan Wiedebach (University of Idaho, USA); Brian K Johnson (University of Idaho, USA); Joseph Law (University of Idaho, USA); Herbert Hess (University of Idaho, USA)  
pp. 1569-1574

***Analysis Using D-Q Transformation of a Drive System Including Load and Two Identical Induction Motors***

Derya Ahmet Kocabas (Istanbul Technical University & Electrics & Electronics Faculty, Turkey); Emrah Salman (Istanbul Technical University, Turkey); Ahmet Kubilay Atalay (Istanbul Technical University, Turkey)  
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**S-28 WA: Control**

Oral Session

***Determination of Differential Inductances of Permanent Magnet Synchronous Machines for Sensorless Control***

Heiko Peter (University of Erlangen-Nuremberg, Germany); Ingo Hahn (University of Erlangen-Nuremberg, Germany)  
pp. 1579-1584

***Loss-minimizing Flux Level Control of Induction Motor Drives***

Zengcai Qu (Aalto University, Finland); Mikaela Ranta (Aalto University, Finland); Marko Hinkkanen (Aalto University, Finland); Jorma Luomi (Aalto University, Finland)  
pp. 1585-1590

***Improved Sensorless Operation of Permanent Magnet Brushless AC Motors Based on Online Optimal Efficiency Control***

Zi Qiang Zhu (University of Sheffield, United Kingdom); Li Ming Gong (University of Sheffield, United Kingdom)  
pp. 1591-1596

***Speed and Current Model Predictive Control of an IPM Synchronous Motor Drive***

Silverio Bolognani (University of Padova, Italy); Ralph Kennel (Technical University of Munich, Germany); Sascha Kuehl (Technical University of Munich, Germany); Giorgio Paccagnella (University of Padova, Italy)  
pp. 1597-1602

***Performance Analysis of Three-Phase PWM Rectifier Using Direct Power Control***

Azziddin M. Razali (Memorial University of Newfoundland, Canada); Aziz Rahman (IEMD - Chair, Canada)  
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**S-29 WA: Electric Vehicles**

Oral Session

***Operating Strategies for Switched Reluctance Generators in Exhaust Gas Energy Recovery Systems***

Melanie Michon (University of Sheffield, United Kingdom); Stuart D. Calverley (Magnomatics Ltd, United Kingdom); Kais Atallah (University of Sheffield, United Kingdom)  
pp. 1609-1614

***Design and Analysis of Axial Flux Permanent Magnet BLDC Motor for Automotive Applications.***

Sreeju Sreedharan Nair (TVS Motor Company Ltd., India); Shamsuddeen Nalakath (TVS Motor Company Ltd., India); Samraj Dhinagar (TVS Motor Company Ltd., India)  
pp. 1615-1618

***Electro-thermal Simulations of a Power Electronic Inverter for a Hybrid Car***

Jonas Ottosson (Lund University & Haldex Traction, Sweden); Mats Alakula (Lund University, Sweden); Dan Hagstedt (Lund University, Sweden)  
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***Machine Design and Configuration of a 7000 HP Hybrid Electric Drive for Naval Ship Propulsion***

Stephen Kuznetsov (Raytheon Corporation, USA)  
pp. 1625-1628

## **S-30 WA: Grid Applications**

### Oral Session

***Issues Regarding Cost Estimation of Permanent Magnet Synchronous Generators for Mega-Watt Level Wind Turbines***

Salem Alshibani (University of New South Wales, Australia); Vassilios Agelidis (The University of New South Wales, Australia)  
pp. 1629-1634

***A MATLAB/SIMULINK Model to Study the Performance of the VFT for the Interconnection of Weak and Strong AC Grids***

Ahmed Hossam El Din (University of Alexandria, Egypt); Mohamed Ashraf Abdullah (University of Alexandria, Egypt); Mona Ibrahim (University of Alexandria, Egypt)  
pp. 1635-1640

***Comparative Analysis of Closed-Loop Current Control of Grid Connected Converter with LCL Filter***

Md Shirajum Munir (University of Alberta & Islamic University of Technology, Canada); Jinwei He (University of Alberta, Canada); Yun Wei Li (University of Alberta, Canada)  
pp. 1641-1646

***Modeling and Control of a Grid-Connected BDFM Under Unbalanced Grid Voltage Conditions***

Pedram Sotoodeh (Kansas State University, USA); Mahdi Izadkhast (Sharif University of Technology, Iran); Hamed Khosravi (North Drilling Company, Iran); Hashem Oraee (Sharif University of Technology, Iran)  
pp. 1647-1651

***Several Practical Configurations of a Grid-Tied Induction Generator Constructed From Inexpensive Single Phase Induction Motors***

Rui Zhang (University of Utah, USA); Faisal Khan (University of Utah, USA); Marc Bodson (University of Utah, USA)  
pp. 1652-1657

***New System for Power Transfer Between Two Asynchronous Grids Using Twin Stator Induction Machine***

Mohamed Abdulla (College of Engineering, Alexandria University & HPI-IIc, Egypt)  
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