ECCE 2022 – Final Technical Program

Oral Sessions, Plenary Poster Sessions, Special Sessions and Remote Q/A Sessions

Updated on August 17th 2022

Session S01: Axial Flux Machines I
Monday, October 10, 12:30PM-2:10PM, Room: 140B-Level 100, Chair: Giulio De Donato, Narges Taran

12:30PM  Design of a Carbon Fiber Rotor in a Dual Rotor Axial Flux Motor for Electric Aircraft [#742]
Chase Wiley, Dorsa Talebi, Sri Vignesh Sankarraman, Matthew C. Gardner and Moble Benedict
Texas A&M University, United States; University of Texas at Dallas, United States

Abdul Wahab Bandarkar, Yilmaz Sozer and Md Khalid Azam
University of Akron, United States

1:20PM  Winding Losses in Coreless Axial Flux PM Machines with Wave and Spiral PCB Stator Topologies [#1239]
Yaser Chulaee, Donovin Lewis, Greg Heins, Dean Patterson and Dan M. Ionel
University of Kentucky, United States; Regal Rexnord, Australia

1:45PM  Comparison of Thermal Characteristic in Various Aspect Ratios of Radial-Flux and Axial-Flux Permanent Magnet Machines [#614]
Ren Tsunata, Masatsugu Takemoto, Jun Imai, Tatsuya Saito and Tomoyuki Ueno
Okayama University, Japan; Sumitomo Electric Industries, Ltd., Japan

Session S02: Control of Electric Drives
Monday, October 10, 12:30PM-2:10PM, Room: 140C - Level 100, Chair: Constanza Ahuma, Yang Xu

12:30PM  A Model Modulated Predictive Current Control Algorithm for the Synchronous Reluctance Motor [#953]
Angelo Accetta, Maurizio Cirrincione, Massimiliano Luna, Marcello Pucci and Antonino Sferlazza
INstitute of Marine engineering - CNR, Italy; University of South Pacific, Fiji; University of Palermo, Italy

12:55PM  A Novel Nonlinear Active Disturbance Rejection Controller for Speed Control of Electric Drives [#485]
Yuefei Zuo, Shuangchun Xie, Libing Cao, Boon Siew Han, Chi Cuong (Martin) Hoang, Chok You, John Chan and Christopher H. T. Lee
Nanyang Technological University, Singapore; Schaeffler (Singapore) Pte Ltd, Singapore

1:20PM  Minimizing the Negative Impacts of Deadtime Insertion and Minimum Pulse Width in a 2-Level VSI [#307]
Caleb Secrest and Siddharth Ballal
BorgWarner Inc., United States

1:45PM  Stable and Passive Observer-Based V/Hz Control for Synchronous Motors [#636]
Lauri Tiitinen, Marko Hinkkanen, Jarno Kukkola, Mikko Routimo, Gianmario Pellegrino and Lennart Harnefors
Aalto University, Finland; ABB Oy, Finland; Politecnico di Torino, Italy; ABB Corporate Research, Sweden
Session S03: Induction Machines
Monday, October 10, 12:30PM-2:10PM, Room: 140D -Level 100, Chair: Silvio Vaschetto, Yao Duan

12:30PM  Fast 3D Transient Electromagnetic FEA for e-NVH Analysis of Induction Machines [#836]
Peng Han, Jingchen Liang, Pavani Gottipati and Mark Solveson Ansys, Inc., United States

12:55PM  Detection of stator asymmetries in wound rotor induction motors through the advanced analysis of rotor currents [#33]
Israel Zamudio-Ramirez, Jose Antonino-Daviu, Roque A. Osornio-Rios, Larisa Dunai, Alfredo Quijano-Lopez and Vicente Fuster-Roig
Universidad Autonoma de Queretaro, Mexico; Universitat Politecnica de Valencia, Spain

1:20PM  Power-Hardware-in-the-Loop Based Induction Motor Emulator with Rotor Cage Fault [#501]
Yupeng Liu, Chigozie Boniface, Paul Barendse and Pragasen Pillay Concordia University, Canada; University of Cape Town, South Africa

1:45PM  Design of Multiphase Motor Windings for Control of Multiple Airgap Fields [#661]
Fnu Nishanth, Anvar Khamitov and Eric Severson
University of Wisconsin-Madison, United States

Session S04: EV Powertrain I
Monday, October 10, 12:30PM-2:10PM, Room: 140E -Level 100, Chair: Mehdi Zadeh, Rashmi Prasad

12:30PM  Switchable 400V/800V High Voltage Architecture for Ultium Battery Electric Trucks [#588]
Brendan Conlon, Mohammad Anwar, Kris Sevel, Michael Wang, Ranya Badawi and Arash Bavili
General Motors Company, United States

12:55PM  High Voltage DC Bus Architecture for Ultium Battery Electric Vehicles [#672]
Mohammad Anwar, Brendan Conlon, Kris Sevel, Ranya Badawi, Arash Bavili, Mike Wang and Amanda Luedtke
General Motors, United States

1:20PM  Four-wheel Independently Driven Formula: Experimental EV for Motion Control Studies [#1358]
Minh C. Ta, An-Toan Nguyen, Binh-Minh Nguyen, Pascal Messier and Joao Pedro F. Trovao
University of Shebrooke, Canada; Toyota Institute of Technology, Japan

1:45PM  Direct AC charging of EV Reconfigurable Cascaded Multilevel Converter [#505]
Giulia Tresca, Andrea Formentini, Samuele Granata, Riccardo Leuzzi and Pericle Zanchetta
Universita di Pavia, Italy; Universita di Genova, Italy; University of Nottingham, United Kingdom

Session S05: Grid-Forming Inverters
Monday, October 10, 12:30PM-2:10PM, Room: 140F -Level 100, Chair: Akanksha Singh, Joseph Benzaquen

12:30PM  Dead-Time Effect on Two-Level Voltage Source Virtual Synchronous Machines [#951]
Vincenzo Mallemaci, Fabio Mandrile, Enrico Carpaneto and Radu Bojoi
Politecnico di Torino, Italy

12:55PM  Adaptive Virtual Inertia Calculation for a Virtual Synchronous Generator-Based Building-to-Building Grid [#1000]
Mhret Berhe Gebremariam, Pablo Garcia Fernandez, Angel Navarro Rodriguez and Cristian Blanco
University of Oviedo, Spain

1:20PM  Inrush Current Mitigation for Grid-Forming Inverters in Islanded Microgrids [#1158]
Mehmetcan Gursoy and Behrooz Mirafzal
Kansas State University, United States

1:45PM  Control of Aggregated Virtual Synchronous Generators Including Communication Delay Compensation [#1008]
Daniel del Rivero, Cristian Blanco, Angel Navarro-Rodriguez and Pablo Garcia
University of Oviedo, Spain
Session S06: Energy Storage: Converter and Control  
Monday, October 10, 12:30PM-2:10PM, Room: 140G -Level 100, Chair: Ariya Sangwongwanich, Ryan Brody

12:30PM  An Optimal wireless battery charger for Electric Vehicle using EF2 inverter at 6.78 MHz [#1135]  
Soumya Ranjan Meher, Yogita Choudhary and Rajeev Kumar Singh  
Indian Institute of Technology (BHU), Varanasi, India

12:55PM  Current Fed Resonant Dual Active Bridge Converter with Dual Source Property for CC-CV Charging [#1188]  
Warda Matin Khan, Rajeev Kumar Singh and Ranjit Mahanty  
Indian Institute of Technology (BHU), Varanasi, India

1:20PM  An Optimal Predictive Control for Maximum Utilization of Heterogeneous Battery Energy Storage System Interfaced Cascaded Multilevel Inverters [#1342]  
Hassan Althuwaini, Alireza Zare and Mohammad B. Shadmand  
University of Illinois Chicago, United States

1:45PM  Integrated Control Strategy Supporting the Optimal Management of a 3-kW Vanadium Redox Flow Battery: a Case Study for an Islanded DC Microgrid [#1370]  
Norma Anglani, Riccardo Leuzzi, Salvatore Riccardo Di Salvo, Giulia Tresca and Pericle Zanchetta  
University of Pavia, Italy

Session S07: Converter Topologies for Industrial Applications  
Monday, October 10, 12:30PM-2:10PM, Room: 250A -Level 200, Chair: Robert Cuzner, Kevin Lee

12:30PM  Output Power Control of Isolated Secondary-Resonant Medium-Voltage AC-DC Converter [#528]  
Kohei Budo and Takaharu Takeshita  
Nagoya Institute of Technology, Japan

12:55PM  Three-phase Transformerless PV Inverter with Reconfigurable LCL Filter [#622]  
Jalal Dadkhah, Carl Ho and Ken Siu  
University of Manitoba, Canada; University of North Texas, United States

1:20PM  Design Oriented LCL Filter Comparison between Si IGBTs and SiC MOSFETs based Bidirectional AC/DC Power Converters [#218]  
Kevin Lee and Zeljko Jankovic  
Eaton, United States

1:45PM  Dimmable Passive Light-Emitting Diode Drivers for Smart Lampposts [#142]  
Albert Ting Leung Lee and Shu Yuen Ron Hui  
The University of Hong Kong, Hong Kong; Nanyang Technological University, Singapore

Session S08: Modeling and control considerations of power converters I  
Monday, October 10, 12:30PM-2:10PM, Room: 250B -Level 200, Chair: Marco di Benedetto, Ludovico Ortombina

12:30PM  Reduced Order Small Signal Modeling of Parallel Resonant Converter based on State-plane Analysis [#958]  
Vishal Anand Aisur Gopalakrishnan, Utsab Kundu, Balasubrahmanyam Kuchibatla, Ranganathan Gurunathan and Kaushik Basu  
Bloom Energy (I) Pvt Ltd, India; Indian Institute of Science, India

12:55PM  Generalised Harmonic Model for a Triple Active Bridge DC-DC Converter [#989]  
Vishwabandhu Uttam, Venkateswara Rao Kudaravalli and Vishnu Mahadeva Iyer  
Indian Institute of Science, India
1:20PM  Modeling and Controller Design Considerations of an Isolated Active Clamp Boost PFC Converter [968]
   Himanshu Bhusan Sandhibigraha, Manas Palmal and Vishnu Mahadeva Iyer
   Indian Institute of Science, India

1:45PM  Charge-based Droop Control Addressing Control Saturation for Low-Inertia Converters [715]
   Zheng An, Rajendra Prasad Kandula, Joseph Benzaquen and Deepak Divan
   Georgia Institute of Technology, United States; Oak Ridge National Laboratory, United States

Session S09: Measurements, testing and standards I
Monday, October 10, 12:30PM-2:10PM, Room: 250C-Level 200, Chair: Norma Anglani, Jun-ichi Itoh

12:30PM  New Experimental System and Procedure for On-line Insulation Life Testing of Stator Winding of Automatic Traction PMSM without using Dynamo System [928]
   Teppei Hayakawa, Yuto Maeda, Hiroaki Matsumori, Takashi Kosaka, Nobuyuki Matsui, Yoichi Miyoshi, Kiyotaka Koga and Subrata Saha
   Nagoya Institute of Technology, Japan; Aisin corporation, Japan

12:55PM  Design and Implementation of Automated Characterization of T-type based Power Module for PV Inverter Reliability Assessment [1212]
   Ahmed Siraj, Mark Mckinney, Zheyu Zhang, Matt Ursino and Miles Russell
   Clemson University, United States; Citadel University, United States; Yaskawa Solectria Solar, United States

1:20PM  Sampling-Based Active Power Measurement in PWM Inverters: Frequency Response Errors and Design Considerations with Novel Stochastic-Based Methodologies for Noise Quantification [1206]
   Giacomo Andrioli, Sandro Calligaro, Federico Pasut, Andrea Polo, Roberto Petrella and Roberto Rinaldo
   DPIA - University of Udine, Italy; Power systems BU - Danieli Automation SpA, Italy

1:45PM  Multiphase Interleaved Reconfigurable High-Frequency-Voltage Inverter for Electrosurgical Generator [426]
   Liu Liu, Li Yongbo and Ling Gu
   Nanjing University of Science and Technology, China

Session S10: Control strategies for multi-level converters
Monday, October 10, 12:30PM-2:10PM, Room: 251A-Level 200, Chair: Deepak Ronaki, Pritam Das

12:30PM  A New Switching Strategy for a GaN-based Three-Level Active Neutral Point Clamped Converter [1050]
   Subhransu Satpathy, Partha Pratin Das, Subhashish Bhattacharya and Victor Veliadis
   North Carolina State University, United States

12:55PM  Performance Comparison of a Modular Multilevel Converter under Centralized and Decentralized Control Structures [1075]
   Vasishta Burugula, Semih Isik and Subhashish Bhattacharya
   North Carolina State University, United States

1:20PM  Analysis and Control of Grid-Tied Modular Multilevel Converters with a Passive Front-End Rectifier without LC Filter in the DC-Link [917]
   Thabet Alzahrani, Milijana Odavic, Sumeet Thakur and Kais Atallah
   University of Sheffield, United Kingdom

1:45PM  Series resonant converter for pulsating power operating at fixed frequency [640]
   Jinia Roy, Rohail Hassan and Juan Sabate
   GE Research, United States
Session S11: AC-DC Converters

Monday, October 10, 12:30PM-2:10PM, Room: 251B/C-Level 200, Chair: Matthias Radecker, Benjamin Dean

12:30PM Single-Phase PFC Boost Converter operating in CCM with Active Input Filter using Linear Regulator Assistance [#1020]
Li Le, Juliane Ritzel Farret, Geise Gulart Sarturi and Matthias Radecker
Fraunhofer-Institut EAS-IIS Dresden, Germany; Federal University of Santa Maria, Brazil; Fieger Consulting and Software Design, Germany

12:55PM A Boost-Half Bridge-based Single-Stage E-capless EV Charger [#78]
Tat-Thang Le, Jaeyeon Lee and Sewan Choi
Seoul National University of Science and Technol, Korea, Republic of

1:20PM Self-Commissioning and Compensation of Phase Error in Low-Cost Voltage Sensing for Vienna Rectifiers and Other Grid-Tied Converters [#1172]
Massimiliano Bisson, Sandro Calligaro, Roberto Petrella, Mattia Morandin and Marco Zordan
DPIA - University of Udine, Italy; Carel Industries s.p.a., Italy

1:45PM Dynamic-Circulating-Current-Minimization Control for Isolated Three-phase AC-DC Converter with Matrix Converter [#891]
Jun-ichi Itoh and Hiroki Watanabe
Nagaoka University of Technology, Japan

Session S12: GaN Power Devices and Characterization

Monday, October 10, 12:30PM-2:10PM, Room: 252A/B-Level 200, Chair: Nidhi Haryani, Thomas Cook

12:30PM A Simple and Accurate Method to Characterize Output Capacitance Losses of GaN HEMTs [#1131]
Qihao Song, Ruizhe Zhang, Qiang Li and Yuhao Zhang
Virginia Tech, United States

12:55PM Short Circuit Capability and Performance Degradation of Cascode GaN Devices - A Case Study [#796]
Zhebie Lu and Francesco Iannuzzo
Aalborg University, Denmark

1:20PM An Embedded GaN Power Module with Double-Sided Cooling and High-Density Integration [#853]
Xingyue Tian, Niu Jia, Dennis Boris Dennis Chertkovsky, Jingjing Sun, Hua Bai, Leon M. Tolbert and Han Cui
University of Tennessee, United States

1:45PM Thermal Boundary Analysis for High-Power-Density GaN-Based Chargers [#1071]
Rahil Samani, Maryam Alizadeh, Ruoyu Hou, Juncheng Lu, Ignacio Galiano Zurbriggen and Andrew Michael Knight
University of Calgary, Canada; GaN Systems Inc., Canada

Session S13: Design automation, digital twins and autonomous power electronic applications

Monday, October 10, 2:20PM-4:25PM, Room: 142A/B-Level 100, Chair: Dong Cao, Yan Li

2:20PM Optimizing a Digital Twin for Fault Diagnosis in Grid Connected Inverters - A Bayesian Approach [#1124]
Pavol Mulinka, Subham Sahoo, Charalampos Kalalas and Pedro Juliano Nardelli
CTTC/CERCA, Spain; AAU Energy, Denmark; LUT University, Finland

2:45PM Digital Twin for HVAC Load and Energy Storage based on a Hybrid ML Model with CTA-2045 Controls Capability [#1139]
Rosemary Alden, Evan Jones, Steven Poore, Huangjie Gong, Abdullah Hadi and Ionel Dan
University of Kentucky, United States
3:10PM  Automatic Layout Design for Power Electronics PCBs [#519]
Yidong Tian, Andrew Forsyth, Zhuoru Li and Cheng Zhang
The University of Manchester, United Kingdom

3:35PM  Electromigration-Aware Reliability Optimization of MCPM Layouts Using PowerSynth [#1171]
Imam Al Razi, Whit Vinson, David Huitink and Yarui Peng
University of Arkansas, United States

4:00PM  An interchangeable data structure used in automated PCB layout design and optimisation for power electronics applications [#1127]
Zhuoru Li, Yidong Tian and Cheng Zhang
University of Manchester, United Kingdom

Session S14: Electric Machines for Transportation
Monday, October 10, 2:20PM-4:25PM, Room: 140B-Level 100, Chair: Alireza Fatemi, Gerd Bramerderfer

2:20PM  A comparison of Induction machine rotor flux observers in stationary reference frame for rotor flux position estimation [#1217]
Sumit Dutta, Anno Yoo, Vinod Peddi and Yuying Shi
General Motors, United States

2:45PM  Mechanical Flux-Weakening for a Surface Permanent Magnet Machine with Split Rotor [#1432]
Jonida Cekani, Fabio Giulii Capponi and Federico Caricchi
Sapienza University of Rome, Italy

3:10PM  Comparative Analysis Between Various High Specific Power Permanent Magnet Motor Topologies for Aerospace Applications [#726]
Ali Al-Qarni, Praveen Kumar, Salar Koushan and Ayman EL-Refaie
Marquette University, United States

3:35PM  Design and analysis of cobra shaped spoke type rotor with SMC stator core for traction applications [#506]
Mohanraj Muthusamy and Pragasen Pillay
Concordia University, Canada

4:00PM  A Practical Approach to Hairpin Winding Design: Patterns Investigation, Feasibility Verification and Fractional Slot Solutions [#114]
Matteo Carbonieri, Giada Venturini and Mircea Popescu
Motor Design Limited, United Kingdom

Session S15: PM and IPM Motor Drives
Monday, October 10, 2:20PM-4:25PM, Room: 140C-Level 100, Chair: AK Arafat, Kevin Lee

2:20PM  A Control Method of Servo Motor Drives for Fast Dynamic Response and Low Torque Ripple [#923]
Sangwon Lee, Cheol-min Hwang, Jaehoon Shim and Jung-Ik Ha
Seoul National University, Korea (South)

2:45PM  Modified Deadbeat Predictive Current Control for PMSM Drive System via a Composite Integral Sliding Mode Observer [#98]
Dongsong Jin, Ling Liu, Siyuan Liu and Deliang Liang
Xi'an Jiaotong University, China

3:10PM  A New AC loss Modeling for Motor Model on MILS Toward Control Parameter Calibrations [#230]
Hiroyuki Sano, Kensuke Matsunaga, Akira Ahagon, Ryo Endo, Yusaku Suzuki, Kazuki Semba and Takashi Yamada
JSOL Corporation, Japan

3:35PM  Networked Control of Multiple Ultra-High-Speed (UHS) PMSMs for AMEBA [#1030]
Kazi Nishat Tasnim, Md Khurshedul Islam, Moinul Shahidul Haque and Seungdeog Choi
Mississippi state university, United States; Nexteer Automotive, United States
4:00PM  Enhanced Dynamic Operation of Heavily Saturated IPMSM in Signal-Injection Sensorless Control
Inhwi Hwang, Yong-Cheol Kwon and Seung-Ki Sul
Seoul National University, Korea, Republic of

Session S16: Diagnostics, Noise and Vibration in Electric Machines I
Monday, October 10, 2:20PM-4:25PM, Room: 140D -Level 100, Chair: Jose Antonino-Daviu, Konstantinos Gyftakis

2:20PM  Uniform and Localized Magnet Demagnetization Detection of Permanent Magnet Motor based on
On-line Flux Estimation [#804]
Cheng Pei Yi, Ping-Jui Ho, Chia-Jung Liu, Feng-Chi Lee and Shih-Chin Yang
National Taiwan University, Taiwan; Industrial Technology Research Institute (ITRI), Taiwan

2:45PM  Diagnostic Method for Non-Uniform Irreversible Demagnetization Fault Along z-Direction in
PMSM Using Planar Search Coil [#723]
Jun-Hyuk Im, Jun-Kyu Kang and Jin Hur
Incheon National University, Korea (South)

3:10PM  Trailing Edge PM Demagnetization in Surface PM Synchronous Motors: Analysis and Detection
[#217]
Jigyun Jeong, Hyeon-Jun Lee, Marcos Orviz Zapico, Sang Bin Lee, David Reigosa and Fernando Briz
Korea University, Korea, Republic of; University of Oviedo, Spain

3:35PM  Vibration analysis of a motor/generator for flywheel batteries
[#156]
Giorgio Piraccini, Elena Macrelli, Claudio Bianchini, Marco Troncossi and Alberto Bellini
DIN, Alma Mater Studiorum, University of Bologna, Italy; DEI, Alma Mater Studiorum,
University of Bologna, Italy; University of Modena and Reggio Emilia, Italy

4:00PM  Automated Testing for Early Identification of PD in the Stator Insulation of Low Voltage VFD
Motors [#91]
Cheolhui Park, Hyeon-Jun Lee, Marcos Orviz Zapico, Sang Bin Lee, David Diaz Reigosa,
Fernando Briz del Blanco and Greg Stone
Korea University, Korea, Republic of; University of Oviedo, Spain; Stone Dielectrics, Canada

Session S17: Transportation Electrification Applications
Monday, October 10, 2:20PM-4:25PM, Room: 140E -Level 100, Chair: Rakib Islam, Babak Nahid-Mobarakeh

2:20PM  Manufacturing Parameter Variation Effects on Performance and Energy Loss on Ultium Traction
Motors [#635]
Nima Farrokhzad Ershad, William Jensen, Ji hyun Kim, Michael Muir, Axel Ramm and Edward Kaiser
General Motors, United States

2:45PM  1.5kV, 1MVA Inverters for Electric Aircraft Applications: A Mission Profile-Based Comparative
Study [#303]
Di Wang, Linke Zhou, Pengfei Zheng, Yuhang Yang, Alan Callegaro, Piranavan Suntharalingam,
Mikhail Goykhman, Armen Baronian and Ali Emadi
McMaster University, Canada; Eaton Research Lab, United States; Eaton Aerospace, LLC.,
United States

3:10PM  Hybrid Propulsion System for Marine Vessels based on a DC Microgrid [#644]
Galina Mirzaeva, Dmitry Miller, Steve Mitchell and Steber Alan
The University of Newcastle, Australia; Ampcontrol CSM, Australia; Steber International,
Australia

3:35PM  Advanced Hybrid Battery System for Power Driving and Regeneration of Electric Vehicles [#384]
Mahmoud Abdelnaby Sayed Abdallah, Shingo Takata, Takaharu Takeshita and Tatsuyuki Oohashi
Session S18: Stability and Control of Grid-Following Inverters
_Monday, October 10, 2:20PM-4:25PM, Room: 140F -Level 100, Chair: Behrooz Mirafzal, Gab-Su Seo_

2:20PM On Stability of PQ-Controlled Grid-Following and Droop-Control Grid-Forming Inverters [#767]
Tareq Hossen and Behrooz Mirafzal
Kansas State University, United States

2:45PM Enhanced Current Loop PI Controllers with Adaptive Feed-forward Neural Network via Estimation of Grid Impedance: Application to Three-Phase Grid-Tied PV Inverters. [#1402]
Shyamal Shivneel Chand, Ravneel Prasad, Mudalair Hiye, Dhirendran Kumar, Adriano Fagiolini, Marco Di Benedetto and Maurizio Cirrincione
The University of the South Pacific, Fiji; University of Palermo, Italy; Center for Power Electronics and Drives ROMA TRE, Italy

3:10PM Economic Dispatch in Microgrids using Relaxed Mixed Integer Linear Programming [#1167]
Shweta Meena, Hao Tu, Hui Yu and Srdjan Lukic
North Carolina State University, United States

3:35PM A Self-Organizing Nano Grid (SONG) for Energy Access Clusters [#676]
Kartavya Agarwal, Vikram Roy Chowdhury, Joseph Benzaquen, Prasad Kandula and Deepak Divan
Georgia Institute of Technology, United States; National Renewable Energy Laboratory, United States; Oak Ridge National Laboratory, United States

4:00PM Real-time Implementation of Grid Code Compliant Grid Edge Energy Management System [#745]
Faeza Hafiz, Dmitry Ishchenko, Anil Kondabathini, Ghanshyamsinh Gohil, David Lawarence and Rasik Sarup
Hitachi Energy, United States; Duke Energy, United States; Open Energy Solutions Inc, United States

Session S19: Grid-forming Converters and Technologies
_Monday, October 10, 2:20PM-4:25PM, Room: 140G -Level 100, Chair: Wei Qiao, Xiaonan Lu_

2:20PM Sub-Synchronous Damping by Battery Storage System in Grid Forming Control Mode [#1034]
Ziqi Zhou, Sante Pugliese, Marius Langwasser and Marco Liserre
Kiel University, Germany

2:45PM Flexible Synchronization Control for Grid-Forming Converters with Regulated DC-Link Dynamics [#744]
Liang Zhao, Xiongfei Wang and Zheming Jin
Aalborg University, Denmark; Beijing Jiaotong University, China

3:10PM Grid-Forming Inverter Control Strategy with Improved Fault Ride Through Capability [#1193] Biqi Wang, Rolando Burgos, Bo Wen and Tang Ye
Virginia Tech, United States

Danfoss Drives, United States; North Carolina State University, United States; Danfoss Silicon Power, Germany

4:00PM Generalized Predictive Control for Voltage Source Inverter in Islanded Microgrid [#372]
Cheng Xue, Rui Liu, Han Zhang and Yunwei Li
University of Alberta, Canada

Session S20: DC-DC Converters
Monday, October 10, 2:20PM-4:25PM, Room: 250A -Level 200, Chair: Brad Lehman, Winway Chen

2:20PM Quadratic Step-up/down Converters with Wider Conversion Ratio [#794]
Guanlin Li, Hongwen Li, Xiyou Chen, Mahshid Amirabadi, Xianmin Mu and Brad Lehman
Dalian University of Technology, China; Northeastern University, United States

2:45PM Bidirectional High Step-up/down DC-DC Converter Utilizing Three-Winding Coupled Inductors [#750]
Zahra Saadatizadeh, Pedram Chavoshipour Heris and Mantooth H. Alan University of Arkansas, United States

3:10PM A High Step-Up Multi-Mode Resonant Switched-Resonator Converter [#641]
Dulika Nayanasiri, Yunwei Li and Cheng Xue
University of Alberta, Canada

3:35PM An Interleaved High Gain DC-DC Converter with Direct Power Flow Path [#122]
Ahmed Allehyani
University of Jeddah, Saudi Arabia

4:00PM Optimizing Transformer RMS Current using Single Phase Shift Variable Frequency Modulation for Dual Active Bridge DC-DC Converter [#1112]
Suman Mandal, Anshuman Shukla and Suryanarayana Doolla
Indian Institute of Technology Bombay, India

Session S21: Power converter Common Mode Voltage and EMI I
Monday, October 10, 2:20PM-4:25PM, Room: 250B -Level 200, Chair: Luca Solero, Carl Ho

2:20PM 2DoF BTSPWM for Parallel Current Source Converter with Improved CMV and Harmonic Performance [#283]
Li Ding, Cheng Xue, Pengcheng Liu and Yun Wei Li University of Alberta, Canada

2:45PM Derivation and Validation of a Common-Mode Model for a Neutral Point Clamped Dual Active Bridge [#1150]
Ryan Olson, Ahmad El Shafei, Robert M. Cuzner, Yue Zhao, Ma Zhuxuan, Adel Nasiri and Tianchen Li
University of Wisconsin - Milwaukee, United States; University of Arkansas, United States;
University of South Carolina, United States

3:10PM Optimized DC-AC EMI Filter Design for DC-Fed High Speed SiC-Based Motor Drive [#978]
Ripun Phukan, Xingchen Zhao, Che-Wei Chang, Rolando Burgos, Dong Dong, Arnaud Plat and Debbou Mustapha
CPES - Center for Power Electronics, United States; AIRBUS SAS, France

3:35PM Sinusoidal frequency modulated carrier wave topology [#212]
Dinh Le, Ashik Amin, Tahmid Ibne Mannan and Seungdeog Choi
Mississippi state university, United States; Mississippi State University, United States

4:00PM Open-loop Common-mode Voltage Injection Method of Four-level Hybrid Clamped Converter with Effective Capacitor Voltage Balancing [#407]
Yihui Zhao, Haibo Tang, Yihao Du, Chengfeng Deng, Jian Li and Jianyu Pan
Chongqing University, China

Session S22: Wireless Power Transfer I
Monday, October 10, 2:20PM-4:25PM, Room: 250C -Level 200, Chair: Li Ding, Jianfei Chen

2:20PM On the Influence of the Parasitic Capacitance of a Bridge Rectifier on Series-Resonant Capacitive Wireless Power Transfer Systems [#199]
Adrian Amler, Nikolai Weitz and Martin Maerz
Friedrich-Alexander-University Erlangen-Nurnberg, Germany
2:45PM A Capacitively-Coupled Single-Wire Earth-Return Power Tether for Aerial Platforms [#848]
Shiying Wang and Daniel Ludois
University of Wisconsin-Madison, United States

3:10PM A High-Power Large Air-Gap Multi-MHz Dynamic Capacitive Wireless Power Transfer System Utilizing an Active Variable Reactance Rectifier for EV Charging [#1035]
Sounak Maji, Dheeraj Etta and Khurram Afridi
Cornell University, United States

3:35PM Cross-Interference Free 6.78 MHz Multiple-Transmitter Using Power Factor Based Control for Wide-Area Wireless Power Transfer Systems [#623]
Masataka Ishihara, Kodai Matsuura, Akihiro Konishi, Kazuhiro Umetani and Eiji Hiraki
Okayama University, Japan

4:00PM A SiC based Two-Stage Pulsed Power Converter System for Laser Diode Driving Applications [#1287]
Raj Kumar Kokkonda, Subhashish Bhattacharya, Victor Veliadis and Chrysanthos Panayiotou
North Carolina State University, United States; Indian River State College, United States

Session S23: Control of Power Converters I
Monday, October 10, 2:20PM-4:25PM, Room: 251A -Level 200, Chair: Pericle Zanchetta, Petros Karamanakos

2:20PM Self-Tuning Finite-State Model Predictive Control with Grid Impedance Estimation in a Grid-Tied Inverter [#1424]
Salvatore Riccardo Di Salvo, Riccardo Leuzzi, Giulia Tresca, Norma Anglani and Pericle Zanchetta
University of Pavia, Italy; University of Nottingham, United Kingdom

2:45PM DC-Link Current Sensor-Less Average Current Mode Control for Series-Stacked-Buffer [#793]
Anwesha Mukhopadhyay and Vinod John
Indian Institute of Science, India

3:10PM A digital controlled short-circuit current limiting method for LLC converters with fast response and resonant current overshoot limiting [#753]
Jiwen Wei, Xu Yang, Gaohao Wei, Kangping Wang and Wenjie Chen
Xi'an Jiaotong University, China

3:35PM Design of Variable-Load Class-E Inverter Using Laplace Based Steady-State Modeling [#1209]
Yuetao Hou and Khurram Afridi
Cornell University, United States

4:00PM A Current Limiting Control Strategy for Single-Loop Droop-Controlled Grid-Forming Inverters Under Balanced and Unbalanced Faults [#228]
Wei Du, Quan Nguyen, Yuan Liu and Sheik Mohiuddin
Pacific Northwest National Laboratory, United States

Session S24: Modular Multi-Level Converters
Monday, October 10, 2:20PM-4:25PM, Room: 251B/C -Level 200, Chair: Li Ding, Hiroki Watanabe

2:20PM Startup of the Switched-Capacitor Modular Multilevel Converter with Middle Submodule [#773]
Rami Yehia, Karl Schoder, Robson Gonzatti, Michael Steurer and Fang Peng
Florida State University, United States; Federal University of Itajuba, Brazil

2:45PM Reactive Component Reduction in Modular Multilevel Matrix Converters through Iterative Design-Simulation Cycles [#1132]
Rafael Castillo-Sierra, Giri Venkataramanan and Dionisio Ramirez
University of Wisconsin-Madison, United States; Universidad Politecnica de Madrid, Spain

3:10PM Modulation and Control Schemes of Modular Three Phase FCC-CSC for High Power Applications
Li Ding, Cheng Xue, Nie Hou and Yun Wei Li
University of Alberta, Canada

3:35PM Optimized Distributed Digital Control and Communication Architecture for Flying Capacitor Modular Multilevel Converter Based PMSM Drives [#1164]
Riccardo Breda, Massimiliano Biaso, Sandro Calligaro, Mattia Iurich, Simone Mazzer and Roberto Petrella
DPIA - University of Udine, Italy

4:00PM Non-Intrusive Condition Monitoring of Submodule Capacitance of Modular Multilevel Converter with Image Identification Method [#544]
Xie Jiajun, He Yushuang, Xiong Ziyuan, Chen Zhenghao, Wang Yuming, Du Yihao and Pan Jianyu
Chongqing University, China

Session S25: SiC characterization
Monday, October 10, 2:20PM-4:25PM, Room: 252A/B -Level 200, Chair: Layi Alatise, Govind Chavan

2:20PM Experimental Test Setup for Thermal Stress Analysis of SiC Devices under Active Short Circuits [#899]
Antonia Lanzafame, Luigi Danilo Tornello, Giacomo Scelba, Elena Venuti, Alessandra Raffa, Santi Agatino Rizzo and Giuseppe Scarcella
StMicroelectronics, Italy; University of Catania, Italy

2:45PM Short circuit ruggedness of SiC MOSFETs for high reliability applications [#207]
Lydia Robinson, Hugo Calder, Andrew Gallant and Alton Horsfall
Durham University, United Kingdom

3:10PM Static and Dynamic Characterization of 3.3-kV SiC MOSFET Modules With and Without External Anti-Parallel SiC JBS Diodes [#818]
Ahmed Rahouma, German Oggier, Juan Balda and Avinash Kashyap
University of Arkansas, United States; Universidad Nacional de Rfo Cuarto, Argentina; Microchip Technology Inc., United States

3:35PM Positive and Negative Bias Temperature Instability on Crosstalk-Stressed Symmetrical & Asymmetrical Double-Trench SiC MOSFETs [#280]
Juefei Yang, Saeed Jahdi, Bernard Stark, Chengjun Shen, Olayiwola Alatise, Jose Ortiz-Gonzalez and Phil Mellor
University of Bristol, United Kingdom; University of Warwick, United Kingdom

4:00PM Sub-0.5 ns Step, 10-bit Time Domain Digital Gate Driver IC for Reducing Radiated EMI and Switching Loss of SiC MOSFETs [#146]
Horii Kohei, Morikawa Ryuzo, Hata Katsushi, Morokuma Kenichi, Wada Yukihiko, Obiraki Yoshiko, Mukunoki Yasushige and Takamiya Makoto
The University of Tokyo, Japan; Mitsubishi Electric Corporation, Japan

Monday, October 10, 5:00PM-7:30PM, Room: Expo Hall E, Chair: Huiqing Wen

P101 A Comparison on the Feasibility of Small-Scale Hybrid PV Installations in Distribution Grids Under Fixed and Variable Rate Energy Prices: Spain as a Lens [#1177]
Hafte Hayelom Adehna, Irene Pelaez, Cristian Blanco Charro and Pablo Garcia Fernandez
University Oviedo, Spain

P102 Optimal Electric Power Take-off Strategy for Surface Riding Wave Energy Converter [#1337]
Shrikesh Sheshaprasad, Farid Naghavi, Shima Hasanpour, Meseaad Albader, Matthew C. Gardner, HeonYong Kang and Hamid A. Toliyat
Texas A&M University, United States; University of Texas at Dallas, United States

P103 Transient DC-bias Suppression Strategy of Three-level Dual-Active-Bridge Converter with Five Control Degrees of Freedom [#534]
Zhichen Feng, Huiqing Wen, Qinglei Bu, Yinxiao Zhu and Xu Han
Xi'an Jiaotong-Liverpool University, China
P104  Hardware Demonstration of a Novel Three-Phase Multilevel Inverter [#94]
Francis Chen, Lei Gu, William Dally and John Fox
Stanford University, United States

Plenary Poster Session S27: DC and Renewable Power Systems
Monday, October 10, 5:00PM-7:30PM, Room: Expo Hall E, Chair: Sarasij Das, Shilpa Marti

P301  A Trade-off Between Cost and Efficiency in Solid-State Circuit Breakers [#420]
Reza Kheirollahi, Xin Zan, Shuyan Zhao, Yao Wang, Hua Zhang, Xiaonan Lu, Al-Thaddeus Avestruz and Fei Lu
Drexel University, United States; University of Michigan, United States; Temple University, United States

P302  Implementation of 99.96% Efficiency SSCB at 100A/1hour Continuous Thermal Testing [#263]
Shuyan Zhao, Reza Kheirollahi, Hua Zhang and Fei Lu
Drexel University, United States; Rowan University, United States

P303  Performance of Memory-Polarized Distance Relay in Presence of PV Generator with Vdc - Q Control [#981]
Asha Radhakrishnan, Amrita Ghosh, Indla Rajitha Sai Priyamvada and Sarasij Das
Indian Institute of Science, India; Georgia Tech, United States

P304  Circulating Current Reduction for Photovoltaic Parallel Modular Inverters Using Modified Space Vector Modulation [#1179]
Hye-Won Choi and Kyo-Beum Lee Ajou University, Korea, Republic of

P305  Design of Asymmetric Inductance for Multi-port Active Bridge Converter [#950]
Dong-Uk Kim, Sungmin Kim, ByungHwan Jeong and Byeng-Joo Byen
Hanyang University, Korea (South); Hyosung Corporation, Korea (South)

Plenary Poster Session S28: Stability Aspects in Power Electronics Systems
Monday, October 10, 5:00PM-7:30PM, Room: Expo Hall E, Chair: Ludovico Ortombina

Liang Huang, Chao Wu, Dao Zhou and Frede Blaabjerg
Aalborg University, Denmark; Shanghai Jiaotong University, China

P502  A Mode Switching Method for Transient Stability Enhancement of VSG [#599]
Shihan Luo, Hua Han, Shimiao Chen, Guangze Shi, Junlan Ou, Zhenzhen Luo and Yuxin Cheng
Central South University, China

P503  A Flexible-Combined Heat and Power System Interface Converter’ Benefits in Increasing Stability Margin of a Microgrid with High Renewable Penetrations [#658]
Qing Lin, Bo Wen and Rolando Burgos
CPES, Virginia Tech, United States

P504  Metastability of Pulse Power Loads with Nonlinear Coupled Magnetics [#770]
Chaitanya Inamdar, Wayne Weaver, Rush Robinett and David Wilson
Michigan Technological University, United States; Sandia National Laboratory, United States

P505  Stability Assessment Study for a Triple-Stage Three-Phase Solid-State Transformer [#1421]
Samuele Granata, Riccardo Leuzzi, Giulia Tresca, Erio Bassi, Francesco Benzi and Pericle Zanchetta
Università di Pavia, Italy; University of Nottingham, United Kingdom

P506  Power Control of Repurposing-Battery Modular Multilevel Converter [#296]
Tzung-Lin Lee, Yen-He Chen, Wei-Ting Zheng and Chen-Han Lin
National Sun Yat-sen University, Taiwan

P507  Open-Loop RHP Poles Issues in Online Stability Monitoring for Microgrid [#825]
Qing Lin, Bo Wen and Rolando Burgos
CPES, Virginia Tech, United States

P508  Accurate and Computationally-Optimized Small-Signal Model Identification of LLC Resonant
Converter Based on Machine Learning Techniques [1103]
Mattia Iurich, Sandro Calligaro and Roberto Petrella
DPIA - University of Udine, Italy

P509 Ripple Estimation in Commercial Off-the-shelf DC-DC Converters [162]
Fernando Perez, Airan Frances, Rafael Asensi and Javier Uceda
Universidad Politecnica de Madrid, Spain

A Hybrid Modulation Technique for Voltage Regulation in LLC Converters in the Presence of Transformer Parasitic Capacitance [915]
Simone Palazzo, Giovanni Busatto, Enzo de Santis, Roberto Giacomobono, Dario Di Ruzza and Giuseppe Panariello
University of Cassino and Southern Lazio, Italy; Rete Ferroviaria Italiana S.p.a., Italy

Plenary Poster Session S29: Selected Topics in Modeling and Diagnostics
Monday, October 10, 5:00PM-7:30PM, Room: Expo Hall E, Chair: Ludovico Ortombina

P701 A Novel Low-Frequency Radiated Emissions Prediction Technique for the Inductor of a Non-Isolated Power Converter [1221]
Yanwen Lai, Yirui Yang, Shuo Wang and Zheng Luo
University of Florida, United States; Monolithic Power Systems, Inc., United States

P702 Coupling Coefficient Tuning to Ensure Zero/Low Ripple in a QBC in a Wide Duty Cycle Range [962]
Massimiliano Luna and Giuseppe Marsala CNR-INM, Italy

P703 Self-Calibrating Loss Models for Real-Time Monitoring of Power Modules Based on Artificial Neural Networks [417]
Sven Kalker, David Meier, Christoph H. van der Broeck and Rik W. De Doncker
RWTH Aachen University - ISEA, Germany

P704 Machine Learning based Condition Monitoring for SiC MOSFETs in Hydrokinetic Turbine Systems [769]
Alastair Peter Thurlbeck and Yue Cao
Oregon State University, United States

P705 Short-Circuit Fault Diagnosis of a Three-Phase Current-Source Inverter [1144]
Sneha Narasimhan, Sagar Kumar Rastogi and Subhashish Bhattacharya
PhD Student, United States; Professor, United States

P706 Series DC Arc Fault Detection Using a Wavelet-Based Filter Bank with Statistical Analysis [1208]
Joseph Yeager, Hsin-Che Hsieh, Seunghoon Baek and Jih-Sheng Lai
Virginia Tech FEEC, United States

P707 Fault Diagnosis using Shallow Neural Networks for Voltage Source Inverters in SynRM Drives [1397]
Jacopo Riccio, Rahul Ranjeev Kumar, Gianarlo Cirrincione, Maurizio Cirrincione and Pericle Zanchetta
University of Nottingham, United Kingdom; University of the South Pacific, Fiji; University of Picardie Jules Verne, France

P708 An Adaptive Dead Time Prediction Method for Primary-Side Regulation Active-Clamp Flyback Converter [84]
Chong Wang, Daying Sun, Wenhua Gu and Sang Gui
Nanjing University of Science and Technology, China; Wuxi Taclink Optoelectronics Technology Company, China

P709 Fault Reconfiguration of Series-Connected Dual-Transformer Active Bridge Converter for Reliable Shipboard DC System [613]
Baichuan Teng, Jianjun Ma, Miao Zhu and Xu Cai
Shanghai Jiaotong University, China

P710 GaN Four-leg Inverter Implementing Novel Common Mode Elimination using a Hardware-in-the-loop System-Level Controller [777]
Plenary Poster Session S30: Capacitors and Power Electronic Thermal Design
*Monday, October 10, 5:00PM-7:30PM, Room: Expo Hall E, Chair: Thomas Ebel, Adam Skorek*

P901  Methodology for Large-signal Loss Characterization of Ferroelectric Class II MLCC in High-frequency Range [#1039]
      Jiang Yunlei, Hu Borong, Wen Bo, Shen Yanfeng and Long Teng
      University of Cambridge, Great Britain; Danfoss Silicon Power R&D, Great Britain

P902  Flex wire winding resistance [#882]
      Rafal Wojda
      Oak Ridge National Laboratory, United States

P903  Investigation of Cooling Techniques and Enclosure Types for Integrated Motor Drives [#1003]
      Renato Amorim Torres, Hang Dai, Woongkulee, Kimberly Saviers, Thomas Jahns and Bulent Sarlioglu
      University of Wisconsin-Madison, United States; Michigan State University, United States; Raytheon Technologies, United States

P904  Thermal Management of SiC MOSFETs within Hydrokinetic Applications [#854]
      Trenton Kilgore, Md Tariquzzaman and Yue Cao
      Oregon State University, United States

P905  Weight-Minimizing Optimization of Microchannel Cold Plate for SiC-based Power Inverters in More-Electric Aircraft [#659]
      Che-Wei Chang, Xingchen Zhao, Ripun Phukan, Dong Dong, Rolando Burgos and Arnaud Plat
      Virginia Tech, United States; virginia Tech, United States; Airbus, France

P906  Coupled Electro-Thermo-Mechanical Analysis to Understand Fuse Element Ageing by Finite Element Method [#910]
      Praveen Chandradhas, Laurent Milliere, Antonie Gerlaud and Amir Sajjad Bahman
      Aalborg University, Denmark; Mersen, France

P907  A Novel Approach of Electrothermal Modeling for Multichip Power Modules [#110]
      Zongyao Zhou, Jianxiong Yu, Xinglai Ge, Jiajie Duan, Cheng Luo and Chunxu Lin
      Southwest Jiaotong University, China; Zhejiang University, China; Eaton (China) Investment Corporation, China

P908  Development of Nonlinear Resistive Field Grading Materials for Mitigating Enhanced Electric Field in Power Electronic Modules [#231]
      Omar Faruqe, Farhina Haque, Pradip Saha, Adam J. Morgan, Woongje Sung and Chanyeop Park
      Mississippi State University, United States; State University of New York Polytechnic Institute, United States

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Plenary Poster Session S31: Permanent Magnet Machines
*Monday, October 10, 5:00PM-7:30PM, Room: Expo Hall E, Chair: David Reigosa*

P1101  Performance Comparison of Different Permanent Magnet Motors for Traction Applications [#1044]
       Md Khurshedul Islam, Kazi Nishat Tasnim, Md Zakirul Islam, Han-Gyu Kim and Seungdeog Choi
       Mississippi state university, United States; Tula Technology, United States

P1102  A Study on Stator Shape to Reduce Cogging Torque and Torque Ripple of Double-Layer Spoke Type PMSM [#934]
       Dong-Woo Nam, Dong-Ho Kim, In-Jun Yang, Si-Woo Song and Won-Ho Kim
       Gachon University, Korea (South); Hanyang University, Korea (South)

P1103  Tooth Modulation Effect of Electromagnetic Force on Fractional Slot Concentrated Winding PMSM According to Slot Opening [#924]
       Jae-Hyun Kim, Jun-Yeol Ryu, Soo-Hwan Park, Kyoung-Soo Cha, Chi-Sung Park and Myung-Seop Lim
Hanyang University, Korea, Republic of

P1104 Spoke type Permanent Magnet Synchronous Generator Design considering Magnetizing and Cogging Torque [#797]
Dong-Ho Kim, Su-Yong Kim, Si-Woo Song, Ju Lee and Won-Ho Kim
Hanyang University, Korea (South); Korea Electronics Technology Institute, Korea (South); Gachon University, Korea (South)

P1105 Efficiency Improvement of Permanent Magnet Synchronous Machines With High Slot Fill Aluminum Winding [#1279]
Yuto Yamada, Hiroya Sugimoto and Kazuhito Imae
Tokyo Denki University, Japan; Aster Co., Ltd., Japan

P1106 Comparative Study of Flux-Switching Machines with T-Array and U-Array Permanent-Magnet Arrangements [#912]
Fawen Shen, Yuming Yan, Shuai Wang, Benjamin Cheong, Chandana Jayampathi Gajanayake, Amit Gupta and Christopher H. T. Lee
Nanyang Technological University, Singapore; Rolls-Royce PLC, Singapore

P1107 Torque Ripple Suppression and Current Regulation for Vector Controlled Switched Reluctance Motors [#727]
Shou Qiu, Daichi Makihara and Kyohei Kiyota
Tokyo Institute of Technology, Japan

P1108 Fault Diagnosis Using Voltage Angle In Dual Three-Phase Interior Permanent Magnet Synchronous Motor [#148]
Jun-Kyu Kang, Dong-Wook Yoo and Jin Hur
Incehon National University, Korea (South); KERI (Korea Electrotechnology research institute, Korea (South)

P1109 Basic Examination for an Adjustable Field IPM Motor with a Field Adjustment Winding on a Rotor [#929]
Ryusyo Nakazawa, Masatsugu Takemoto, Satoshi Ogasawara and Koji Orikawa
Hokkaido University, Japan; Okayama University, Japan

Plenary Poster Session S33: Materials, Losses, Thermal and Manufacturing Issues
Monday, October 10, 5:00PM-7:30PM, Room: Expo Hall E, Chair: Rafal Wrobel, Poskovic Emir

P1301 Iron Loss Characterization in Laminated Cores at Room and Liquid Nitrogen Temperature [#675]
Marco Biasion, Ines Santos Perdigao Peixoto, Joao Filipe Pereira Fernandes, Silvio Vaschetto, Gerd Bramerdorfer and Andrea Cavagnino
Politecnico di Torino, Italy; IDMEC Instituto Superior Tecnico, Portugal; Johannes Kepler University Linz, Austria

P1302 Airgap Flux-based Estimation of Permanent Magnet Temperature for Thermal Protection of PMSMs [#92]
Hyeon-Jun Lee, Jigyun Jeong, Marcos Orviz Zapico, Sang Bin Lee, David Reigosa and Fernando Briz
Korea University, Korea; Republic of; University of Oviedo, Spain

P1303 Continuous-Domain Semi-Analytical Method for Tolerance Analysis of Axial Flux Permanent Magnet Machines [#1204]
Andres Escobar, Carlos Madariaga, Werner Jara, Juan Tapia, Michele Degano and Javier Riedemann Pontificia Universidad Catolica de Valparaiso, Chile; University of Concepcion, Chile; University of Nottingham, United Kingdom; University of Sheffield, United Kingdom

P1304 An Experimental Assessment of the Impact of high dv/dt SiC Converters on Insulation Lifetime of Electrical Machines [#252]
David Hewitt, Shubham Sundeepl, Jiabin Wang, Antonio Griffio, Mohamed Diab and Xibo Yuan
University of Sheffield, United Kingdom; University of Bristol, United Kingdom

Session S34: Thermal Issues in Electric Machines
Tuesday, October 11, 8:30AM-10:10AM, Room: 140B-Level 100, Chair: Fabio Giulii Capponi, Rafal Wrobel
8:30AM Thermomagnetic Cooling for High Power Density Electrical Machines [#299]
Guangjin Li, Yafeng Zhang, Wei Zhang, Morley Nicola and Zi-Qiang Zhu
The University of Sheffield, United Kingdom

8:55AM Losses Analysis of Induction Motors under Ambient and Cryogenic Conditions [#507]
Luis Fernando Dias Bucho, Joao Filipe Pereira Fernandes, Paulo Jose da Costa Branco, Marco Biasion, Silvio Vaschetto and Andrea Cavagnino
IDMEC Instituto Superior Tecnico, Portugal; Politecnico di Torino, Italy

9:20AM Thermal Analysis of a Short-Operating-Duty Dual-Lane Fault-Tolerant Actuator for Aerospace Applications [#493]
Rafal Wrobel, Barrie Mecrow and Maamar Benarous
Newcastle University, United Kingdom; Collins Aerospace, United Kingdom

9:45AM Slotless Motor with Active Metal Brazed Copper Winding for High Power Density Applications [#752]
Ritvik Chattopadhyay, Md Sariful Islam, Rajib Mikail and Iqbal Husain
North Carolina State University, United States; Halla Mechatronics, United States; ABB, United States

Session S35: General Electric Drives
Tuesday, October 11, 8:30AM-10:10AM, Room: 140C - Level 100, Chair: Arshiah Mirza, Constanza Ahuma

8:30AM Common-Mode Voltage Mitigation in Dual Three-Phase Drives using Predictive Control and Modulated Virtual Vectors [#846]
Sodiq Agoro and Iqbal Husain
North Carolina State University, United States

8:55AM Design Aspects of Three-Phase Current-Source Converter Commutation Cells with Monolithic Bidirectional GaN Transistors [#634]
Neha Nain, Ivana Kovacevic-Badstuebner, Jonas Huber, Ulrike Grossner and Johann W. Kolar
ETH Zurich, Power Electronic Systems Laboratory, Switzerland; ETH Zurich, Advanced Power Semiconductor Lab, Switzerland

9:20AM A High-Accuracy Power Loss Model of SiC MOSFETs in Current Source Inverter Considering Current Commutation and Parasitic Parameters [#877]
Feida Chen, Sangwhee Lee, Thomas Jahns and Bulent Sarlioglu
University of Wisconsin-Madison, United States

9:45AM Direct Flux Vector Control of Synchronous Machines in Multi-Motor-Mono-Inverter Setup for Fan Array Applications [#690]
Anantaram Varatharajan, Paolo Pescetto and Gianmario Pellegrino
Politecnico di Torino, Italy

Session S36: Actuators and Non-Conventional Machines
Tuesday, October 11, 8:30AM-10:10AM, Room: 140D - Level 100, Chair: Eric Severson, Renato Lyra

8:30AM High force density five degrees of freedom electromagnetic actuator [#663]
Krishan Kant and David Trumper
MIT, United States

8:55AM Comparison of Modulator Retention Shapes for Radial Flux Coaxial Magnetic Gears [#626]
Salek A Khan, Godwin Duan and Matthew C Gardner
University of Texas at Dallas, United States; Princeton University, United States

9:20AM Design of a Dipole Interior Permanent Magnet Bearingless Slice Motor for Flux-weakening Control [#716]
Taryn Loutit and Minkyun Noh
UBC, Canada
9:45AM  Flux Angle Mapping Coaxial Magnetic Gears for High Gear Ratios [#983]  
Salek A Khan, Matthew C Gardner and Godwin Duan  
University of Texas at Dallas, United States; Princeton University, United States

Session S37: Cybersecurity in power electronic systems  
Tuesday, October 11, 8:30AM-10:10AM, Room: 140E -Level 100, Chair: Subham Sahoo, Dong Cao

8:30AM  Decentralized Anomaly Identification in Cyber-Physical DC Microgrids [#328]  
Kirti Gupta, Subham Sahoo, Rabindra Mohanty, Bijaya Ketan Panigrahi and Frede Blaabjerg  
Indian Institute of Technology, Delhi, India; Aalborg University, Denmark; Indian Institute of Technology, (BHU), Varanasi, India

8:55AM  Data-Driven Approach for Detection of Physical Faults and Cyber Attacks in Manufacturing Motor Drives [#590]  
Bowen Yang, Jin Ye, Stephen Coshatt, Wenzhan Song and Feraidoon Zahiri  
University of Georgia, United States; Robins Air Force Base, United States

9:20AM  Robust Model Predictive Control for Attack Mitigation of Virtual Synchronous Generators (VSGs) in an Islanded Microgrid [#657]  
Jinan Zhang, Lulu Guo and Jin Ye  
University of Georgia, United States; Tongji University, China

9:45AM  Load Redistribution Attacks in Multi-Terminal DC Grids [#735]  
Zhi Jin Zhang, Matthieu Bloch and Maryam Saeedifard  
Georgia Institute of Technology, United States

Session S38: Converters for Microgrid I  
Tuesday, October 11, 8:30AM-10:10AM, Room: 140F -Level 100, Chair: Joseph Benzaquen, Yilmaz Sozer

8:30AM  A Robust Stabilization Method of Power Converter for Islanded Microgrids to Realize Plug and Play Function [#907]  
Daisuke Kanda, Kenji Natori and Yukihiko Sato  
Chiba University, Japan

8:55AM  Grid-Forming Distributed Generation Inverter Control for A Smooth Transition from Grid-Connected to Islanded Operation Mode in Microgrids [#525]  
Biqi Wang, Qing Lin, Rolando Burgos and Bo Wen  
Virginia Tech, United States

9:20AM  Wideband Dissipativity Enhancement for Multi-Sampling Controlled Grid-Following VSCs [#1066]  
Shan He, Zhiqing Yang, Dao Zhou, Xiongfei Wang, Rik De Doncker and Frede Blaabjerg  
Aalborg University, Denmark; Hefei University of Technology, China; RWTH Aachen University, Germany

9:45AM  Multi-Sampled Grid-Side Current Control for LCL-Filtered VSCs with Enhanced Dissipativity [#1070]  
Shan He, Zhiqing Yang, Dao Zhou, Xiongfei Wang, Rik De Doncker and Frede Blaabjerg  
Aalborg University, Denmark; Hefei University of Technology, China; RWTH Aachen University, Germany

Session S39: High Power Converter Topologies for Photovoltaic Systems  
Tuesday, October 11, 8:30AM-10:10AM, Room: 140G -Level 100, Chair: Ed Muljadi, Akanksha Singh

8:30AM  A Split-Phase Enhanced Hybrid Active NPC Topology for PV Applications with Short-circuit Fault Tolerant Capability [#1024]  
Satish Belkhode, Rajat Shahane, Anshuman Shukla and Jin Wang  
Indian Institute of Technology Bombay, India; The Ohio State University, United States

8:55AM  DZ-Source Converter: A Duality Inspiration of Z-Source Converter for Current-Source High-Conversion Ratio Applications [#1129]
Amir Hakemi, Saman Asghari Gorji, Dezso Sera and Geoffrey Walker  
Queensland University of Technology, Australia

9:20AM  A 1kV, 480V Power Electronics Hub for DER Integration in Commercial Buildings [#364]  
Michael Starke, Madhu Chinthavali, Steven Campbell and Benjamin Dean  
Oak Ridge National Laboratory, United States

9:45AM  L2C2 Network-Based Non-Isolated Multi-Output Hybrid Converter with Reduced Leakage Current [#1269]  
Rajat Kumar Keshari and Rajeev Kumar Singh  
Indian Institute of Technology (BHU), Varanasi, India

Session S40: Isolated DC-DC Resonant Converters  
Tuesday, October 11, 8:30AM-10:10AM, Room: 250A -Level 200, Chair: Ali Khajehoddin, Fahad Alaql

8:30AM  A Single Phase CLLC Resonant Converter with a Novel Matrix Integrated Transformer [#191]  
Feng Jin, Ahmed Nabih, Zheqing Li and Qiang Li  
CPES of Virginia Tech, United States

8:55AM  Multi-Mode Rectifier-Based Dual-Input LLC Converter for Wide Voltage PV Applications [#965]  
Fahad Alaql, Reza Rezaii, Abdullah Alhatlani, Sahin Gullu, Md Safayatullah and Issa Batarseh  
Imam Mohammad Ibn Saud Islamic University, Saudi Arabia; University of Central Florida, United States

9:20AM  Bidirectional Isolated Full-Bridge Resonant Converter with Ripple-Cancelling Characteristics for Electrical Vehicle On-Board Charger [#955]  
Ryo Nishiyama, Shota Okutani, Pin-Yu Huang and Yuichi Kado  
Kyoto Institute of Technology, Japan

9:45AM  Control Strategy of Transient Process for Dual-Bridge Series Resonant Converter [#357]  
Zhuolan Li, Yu Zhang, Xinmi Wu and Jiawen Yang  
Huazhong University of Science and Technology, China

Session S41: Reliability, Diagnostics and Fault Analysis of Power Converters I  
Tuesday, October 11, 8:30AM-10:10AM, Room: 250B -Level 200, Chair: Stefano Bifaretti, Petros Karamanakos

8:30AM  Exploring Interactions Between Reflected Wave and Partial Discharge in WBG Motor Drives [#1152]  
Sama Salehi Vala, Kushan Choksi, Abdul Basit Mirza and Fang Luo  
Stony Brook University, United States

8:55AM  A Fast-Response High-Accuracy Overvoltage Protection Circuit for Soft-Switching Current-Source Converters [#714]  
Zheng An, Mickael J. Mauger, Rajendra Prasad Kandula, Joseph Benzaquen and Deepak Divan  
Georgia Institute of Technology, United States; Oak Ridge National Lab, United States

9:20AM  A Space Vector based Diagnosis Method for Switch Open-Circuit Fault in Vienna Rectifier [#274]  
Menghu Liu, Li Peng, Wenzhe Xu, Xinyue Guo and Cai Chen  
Huazhong University of Science and Technology, China

9:45AM  Robust Open Circuit Fault Tolerance for Five-Level HANPC Inverters Using an Improved SV-PWM Modulation [#1173]  
Laith M. Halabi and Kyo-Beum Lee  
Ajou University, Jordan; Ajou University, Korea, Republic of

Session S42: Measurements, testing and standards II  
Tuesday, October 11, 8:30AM-10:10AM, Room: 250C -Level 200, Chair: Jun-ichi Itoh, Tianqi Hong

8:30AM  Comparison of Partial Discharge Characterizations under 60 Hz Sinusoidal Waveform and High-
frequency PWM Waveform [#1093]
Zhicheng Guo, Alex Q. Huang and Xianyong Feng
UT Austin, United States

8:55AM A Guide for Accurate and Repeatable Measurement of the RTH,JC of SiC Packages [#317]
Jack Knoll, Christina DiMarino and Cyril Buttay
Virginia Tech, United States; University Lyon, France

9:20AM An All-Passive Compound Current Sensor for Fast Switching Current Monitoring [#1303]
Ali Parsa Sirat, Hossein Niakan, Michael Campo, Jeffery De La Rosa Garcia and Babak Parkhideh
University of North Carolina at Charlotte, United States

9:45AM Analysis and Design of Gate Controlless Hybrid Circuit Breaker Utilizing SiC-JFET for Low Voltage DC System [#1417]
Yoshihiro Fujisaki, Takanori Isebo and Tomoyuki Mannen
University of Tsukuba, Japan

Session S43: Control, Modeling and Stability of Grid-Forming Converters
Tuesday, October 11, 8:30AM-10:10AM, Room: 251A -Level 200, Chair: Omid Beik, Carl Ho

8:30AM Modeling of Symmetrical and Asymmetrical Grid Faults for P-HIL Accuracy Analysis in LVRT Tests [#311]
Muhammad Usman Rafiq, Sante Pugliese and Marco Liserre
University of Kiel, Germany

8:55AM Small-Signal Stability Support From Dynamically Configurable Grid-Forming/Following Inverters for Distribution Systems [#1237]
Lizhi Ding, Yuhua Du, Xiaonan Lu, Shuan Dong, Andy Hoke and Jin Tan
Temple University, United States; National Renewable Energy Laboratory, United States

9:20AM Capacitor Current Control for the Parallel-Connected Grid-Forming Inverters [#1330]
Prithwiraj Roy Chowdhury and Madhav Manjrekar
University of North Carolina at Charlotte, United States

9:45AM Multivariable Grid-Forming Converters with Direct States Control [#361]
Meng Chen, Dao Zhou and Frede Blaabjerg
Aalborg University, Denmark; Aalborg University, Denmark

Session S44: Multi-Level and Multi-Phase Converters
Tuesday, October 11, 8:30AM-10:10AM, Room: 251B/C -Level 200, Chair: Deepak Ronanki, Alex Huang

8:30AM A Half-Bridge Modular Multilevel Converter Topology with DC Fault Tolerance Capability [#839]
Araz Saleki, Bahram Jahanbakhshi Pordanjani, Saman Rezaade, Mahima Gupta and Mohammad Tavakoli Bina
Portland State University, United States; K. N. Toosi University of Technology, Iran; Shahid Beheshti University, Iran

8:55AM A Novel Hybrid Cross-connected Sub-module-based Hybrid MMC for MV Applications [#997]
Rajat Shahane, Satish Belkhode and Anshuman Shukla
Indian Institute of Technology Bombay, India

Madhu Chinthavali, Aswad Adib, Joao Onofre Pereira Pinto, Rafal Wojda and Michael Starke
Oak Ridge National Laboratory, United States

9:45AM Harmonic Analysis of Input DC Current in Six- and Nine-Phase Voltage Source Inverters [#1265]
Wesam Taha, Peter Azer and Ali Emadi
McMaster University, Canada; McMaster University, Canada
 Session S45: Wide Bandgap Device Packaging
Tuesday, October 11, 8:30AM-10:10AM, Room: 252A/B -Level 200, Chair: Adam Skorek, Fang Luo

8:30AM Packaging of a 15-kV Silicon Carbide MOSFET With Insulation Enhanced by a Nonlinear Resistive Polymer-Nanoparticle Coating [#680]
Zichen Zhang, Shengchang Lu, Carl Nicolas, Nick Yun, Woongje Sung, Khai Ngo and Guo-Quan Lu
Virginia Tech, United States; SUNY Polytechnic Institute, United States

8:55AM EMI Mitigation with Stacking DBC Substrate for High Voltage Power Module [#1335]
Xiaoling Li, Yuxiang Chen, Hao Chen, Sudharsan Chinnaiyan, Tianchen Li, Robert Cuzner, Adel Nasiri, Yue Zhao and Alan Mantooth
University of Arkansas, United States; University of Wisconsin-Milwaukee, United States; University of South Carolina, United States

9:20AM Electro-Thermal Optimization of Common-Mode Screen for Organic Substrate-Based SiC Power Module [#512]
Narayanan Rajagopal, Emre Gurpinar, Burak Ozpineci and Christina DiMarino
Virginia Tech, United States; Oak Ridge National Laboratory, United States

9:45AM A Highly Integrated GaN Power Module with Low Parasitic Inductance and High Thermal Performance [#128]
Hang Kong, Fengtao Yang, Chengzi Yang, Yifan Zhang, Zhenyu Wang, Yilong Yao, Yan Wang and Laili Wang
Xi'an Jiaotong University, China

Tuesday, October 11, 10:30AM-1:00PM, Room: Expo Hall E, Chair: Chunmeng Xu, Ayan Mallik

P1501 APOD PWM Based Method to Suppress Zero-Sequence Circulating Current in Parallel Three-Level NPC Inverters under Interleaved Operation [#1182]
Jun-Hyeok Park, Hyung-Woo Lee and Kyo-Beum Lee
Ajou University, Korea, Republic of

P1502 Co-simulation of Smart Grids and Homes including Ultra-fast HVAC Models with CTA-2045 Control and Consideration of Thermal Comfort [#1225]
Evan S. Jones, Rosemary E. Alden, Huangjie Gong, Abdullah Al Hadi and Dan M. Ionel
University of Kentucky, United States

P1503 Characterization of Emerging Computing Architectures for Dynamic Simulation of Future Power Grids with Large-Scale Power Electronics [#1013]
Jongchan Choi, Suman Debnath and Phani Marthi
Oak Ridge National Laboratory, United States

P1504 A Multi-Parameter Approach to Optimal Power Dispatch in Grid-Connected Photovoltaic-Battery Systems [#264]
Ebrahim Mohammadi and Gerry Moschopoulos
Postdoctoral Fellow, Carleton University, Canada; Professor, Western University, Canada

P1505 A study of the use of tidal energy to supply the electricity of a remote island [#504]
Erfan Rajaeian, Rooholamin Zeinali davarani, Fateme Zeinali Dolatabad, Rooollah Fadaeinedjad and Gerry Moschopoulos
Graduate University of Advanced Technology, Iran; University of Western Ontario, Canada

 Plenary Poster Session S47: Automated design considerations in power electronics and batteries/UPS systems
Tuesday, October 11, 10:30AM-1:00PM, Room: Expo Hall E, Chair: Qianwen Xu, Wilmar Martinez

P1701 Reinforcement Learning Based Optimal Energy Management of A Microgrid [#1146]
Saqib Iqbal and Kamyar Mehran
Queen Mary University of London, QMUL, UK, United Kingdom
Plenary Poster Session S48: Electrified Transportation Systems
Tuesday, October 11, 10:30AM-1:00PM, Room: Expo Hall E, Chair: Md Sariful Islam, Woongkul Lee

P1901 An Overview of Electrical Machines and Drives Technologies for Electrified Aircrafts [#1234]
Junhan Zhao, Xiaolong Zhang, Niraja Swaminathan and Kiruba Haran
University of Illinois Urbana-Champaign, United States

P1902 Bandwidth Enhancement of Power-Electronics-Based Mission Profile Emulator with Reference Current Feedforward [#360]
Shihao Xia, Ke Ma, Qing Yan, Yuqing Sheng and Yangjun Deng
Shanghai Jiaotong University, China; Sungrow Power Supply Co., Ltd., China

P1903 Comparative Study on Insulation Lifetime of Stator Winding of Dual Inverter Fed Open Winding IPMSM and Single Inverter Fed Star-Connected IPMSM for EV Application [#926]
Yuto Maeda, Teppei Hayakawa, Hiroaki Matsumori, Takashi Kosaka, Nobuyuki Matsui, Yoichi Miyoshi, Kiyotaka Koga and Subrata Saha
Nagoya Institute of Technology, Japan; Aisin corporation, Japan

Mohammad Abdul Bhuiya and Mohamed Youssef
Ontario Tech University, Canada

P1905 Short Circuit Localization in Automotive Ringstructured Power Nets based on Graph Theory [#831]
Sarmad Hussain, Ahmed Alnaggar, Laurenn Tippe and Hans-Georg Herzog
BMW Group, Germany; Technical University of Munich, Germany

P1906 A CBPWM Strategy with Flexible Zero-Sequence Voltage Injection for Three-Level TNPC Converters in Aircraft Electric Starter/Generator System [#401]
Feng Guo, Yue Zhao and Patrick Wheeler
University of Arkansas, United States; University of Nottingham, United Kingdom
P1907  Model Predictive Control for the Reduction of Marine Propellers Vibrations [#774]
Constanza Ahumada, Luca Tarisciotti, Diego Sepulveda and Doris Saez
Universidad de Chile, Chile; University Andres Bello, Chile

P1908  Design Aspects, Challenges, and Benefits of SiC Based Integrated Switched Reluctance Machine Drives [#991]
Md Ehsanul Haque, Anik Chowdhury, Mohammad Arifur Rahman, Shuvajit Das, Abdul Wahab Bandarkar, Md Tawhid Bin Tarek, Okan Boler, Yilmaz Sozer, Ashraf Siddiquee, Jeffrey Geither, David Colavincenzo and Fernando Venegas
University of Akron, United States; Bendix CVS, United States

P1909  Selective Gate Driver in SiC Inverter to Improve Fuel Economy of Electric Vehicles [#1165]
Luowei Wen, Wensong Yu, John Geiger and Iqbal Husain
North Carolina State University, United States; North Carolina State University, United States; Texas Instruments, United States

Plenary Poster Session S49: Multi-Level Converters
Tuesday, October 11, 10:30AM-1:00PM, Room: Expo Hall E, Chair: Nathan Miles Ellis, Pablo Garcia

P2101  Circulating Currents and Losses Analysis of an MMC with Using SVM-based Common Mode Voltage Reduction Strategy for a Wind Turbine Application [#1383]
Chengjun Tang, Jian Zhao and Torbjorn Thiringer
Chalmers University of Technology, Sweden

P2102  Open-Circuit Fault-Tolerant Method for Three-Level Quasi-Switched Boost T-Type Inverter [#959]
Minh-Khai Nguyen, Vinh-Thanh Tran and Duc-Tri Do
General Motors, United States; Ho Chi Minh City Univ. of Technology and Edu, Vietnam

P2103  A novel three-level, three-phase, single stage Solid State Transformer with an integrated DC link [#892]
Sanjay Rajendra and Alex Huang
The University of Texas at Austin, United States

P2104  Loss Estimation of a Dual Active Bridge as part of a Solid State Transformer using Frequency Domain Modelling [#455]
Nikolas Menger, Tobias Merz, Jannik Gehringer, Fabian Sommer and Marc Hiller
Karlsruhe Institute of Technology, Germany

Plenary Poster Session S50: Modeling and Control Considerations of Power Converters II
Tuesday, October 11, 10:30AM-1:00PM, Room: Expo Hall E, Chair: Francesco Gennaro

P2301  Current-Mode Controller for an Electric Vehicle Battery System [#1245]
Zhao Yuankun and Jaber Abu Qahouq
The University of Alabama (UA), United States

P2302  Review of MPPT Methods for LLC Converters in Photovoltaic Applications [#1333]
Sumana Ghosh, Abdullah Alhatlani, Md Safayatullah and Issa Batarseh
University of Central Florida, United States; Imam Mohammad Ibn Saud Islamic University, Saudi Arabia

P2303  Novel Junction Temperature Optimized Operation of Dual Active Bridge Converter Using Extended-Phase-Shift Modulation Featuring SiC MOSFETs [#477]
Yoganandam Vivekanandham Pushpalatha and Dimosthenis Peftitis
Norwegian University of Science and Technology, Norway

P2304  An Investigation into the Effect of the Gate Drive Resistance on the Performance of the Balanced Inverter [#888]
Pengkun Tian, Feida Chen, Thomas Jahns and Bulent Sarlioglu
University of Wisconsin-Madison, United States
Plenary Poster Session S51: WBG Design and Applications
Tuesday, October 11, 10:30AM-1:00PM, Room: Expo Hall E, Chair: Yue Zhao, Tiefu Zhao

P2501 A figure of merit (FOM) for power FET switching devices [#1352]
Patrick Palmer, Edward Shelton, Jeff Carter, Lathom Louco and Sam Sohirad
Simon Fraser University, Canada; Oxford University, United Kingdom; Borg Warner, United Kingdom; Borg Warner, United States

P2502 A di/dt Triggered Self-Powered Unidirectional DC Circuit Breaker for both GaN and SiC platform for 400 V DC Applications [#1385]
Bhawani Shankar, Rafael Perez Martinez, Philip Zuk and Srabanti Chowdhury
Stanford University, United States; Transphorm, Inc, United States

P2503 Design and Demonstration of a Medium-Voltage Silicon Carbide ANPC Power Stage [#1211]
Zhuxuan Ma, Fei Diao, Zhongjing Wang, Yuheng Wu, Mohammad Hazzaz Mahmud and Yue Zhao
University of Arkansas, United States; Wolfspeed Inc., United States

P2504 Thermal stress reduction in power devices using distributed loss PWM for CSIs [#823] Sangwhee Lee, Renato Amorim Torres, Feida Chen, Thomas Jahns and Bulent Sarlioglu University of Wisconsin Madison, United States

P2505 Weight Judgement Based Thermal Balancing Strategy for Interleaved Buck Converters [#451]
Zehui Li, Junrui Liang and Haoyu Wang
ShanghaiTech University, China; ShanghaiTech University, China

P2506 A 900V/4mohm/80A Bidirectional SiC DC Solid State Contactor (SSC) [#855] Zibo Chen, Chen Chen and Alex Q. Huang
The University of Texas at Austin, United States

P2507 Driver Integrated Online Rds-on Monitoring Method for SiC Power Converters [#751] Zibo Chen, Chen Chen and Alex Q. Huang
The University of Texas at Austin, United States

P2508 Unipolar and Bipolar Pulsed Gate Stresses and Threshold Voltage Shifts in GaN e-HEMTs [#403] Arkadeep Deb, Olayiwola Alatise, Jose Ortiz-Gonzalez, Erfan Bashar, Mohamed Taha, Mahdi Tousizadeh, Philip Mawby and Saeed Jahdi
University of Warwick, United Kingdom; University of Bristol, United Kingdom

P2509 Estimator-based Energy Sharing Control for Battery Power Module Applications [#1154] Abdulrahman Mostafa, Mahmoud Gaafer, Omar Abdel-Rahim and Mohamed Orabi
APEARC, Faculty of Engineering, Aswan University, Egypt

Plenary Poster Session S52: Switched Reluctance and Flux Switching Machines I
Tuesday, October 11, 10:30AM-1:00PM, Room: Expo Hall E, Chair: Roy McCann, Luigi Alberti

P2701 Modelling and Controller Design for Simplified Torque Control of Switched Reluctance Machine [#1216]
Mouli Thirumalasetty and Narayanan Gopalaratnam
Indian Institute of Science Bengaluru, India
P2702  Design and Parametric Analysis of Dual Mechanical Port Field Excited Flux Switching Generator for Wind Turbine Applications [#269]
Wasiq Ullah, Faisal Khan, Udochukwu B. Akuru, Shahid Hussain, Muhammad Yousaf and Lilian L. Amuhaya
COMSATS University Islamabad, Abbottabad Campus, Pakistan; Tshwane University of Technology, Pretoria, South Africa; Botswana International University of Science and, Botswana

P2703  Performance Comparison of Optimized Stator-Mounted Permanent Magnet Machines Using Genetic Algorithm Optimization [#454]
Guanbo Zhang and Guang-Jin Li
The University of Sheffield, United Kingdom

P2704  Optimization of Magnetization State Manipulation in Variable-Flux PMSMs [#1394]
Marcos Orviz, Diego F. Laborda, David Reigosa, Juan Manuel Guerrero and Fernando Briz
Universidad de Oviedo, Spain

P2705  Proposal of a Variable Magnet Motor Switchable between Vernier Motor and PMSM [#980]
Kohei Aiso
Shibaura Institute of Technology, Japan

Plenary Poster Session S53: Materials, Losses and Thermal Issues
Tuesday, October 11, 10:30AM-1:00PM, Room: Expo Hall E, Chair: Greg Heins

P2901  A Novel Measurement Setup for Evaluating the Effect of Mechanical Stress on Soft Magnetic Material Properties [#1374]
Gereon Goldbeck, Gerd Bramerderfer, Christoph Dobler, Daniel Woeckinger and Wolfgang Amrhein
Johannes Kepler University Linz, Austria, Austria

P2902  Simplified Thermal Model of Disk-Shaped Automotive Smart Braking Actuators [#1391]
Federica Graffeo, Silvio Vaschetto, Alessio Miotto, Fabio Carbone, Alberto Tenconi, Emmanuel Agamloh and Andrea Cavagnino
Politecnico di Torino, Italy; Brembo S.p.A., Italy; Baylor University, United States

P2903  Changes in the Steinmetz Coefficients of Punched Soft-Magnetic Sheets [#650]
Zbigniew Gmyrek, Jacek Szulakowski, Silvio Vaschetto and Andrea Cavagnino
Lodz University of Technology, Poland; Politecnico di Torino, Italy

P2904  Iron Losses Measurements and Prediction of Ultra-High Switching Frequency PWM-Supplied Laminated Magnetic Cores [#653]
Daniele Cremente, Giacomo Scelba, Giulio De Donato, Silvio Vaschetto, Emmanuel Agamloh and Andrea Cavagnino
Universita degli studi di Catania, Italy; Sapienza Universita di Roma, Italy; Politecnico di Torino, Italy; Baylor University, United States

Plenary Poster Session S54: Electric Drives I
Tuesday, October 11, 10:30AM-1:00PM, Room: Expo Hall E, Chair: Jiangang Hu

P3101  Model-Predictive Control of Open-End Winding Synchronous Reluctance Drives [#1025]
Jacopo Riccio, Luca Rovere, Mauro Di Nardo, Shafiq Odhano and Pericle Zanchetta
University of Nottingham, United Kingdom; Newcastle University, United Kingdom

P3102  Implementation of an Auxiliary Low-Voltage DC Power Supply from an Electric Traction Open-Ended Motor Drive Configuration [#552]
Salvatore Foti, Luigi Danilo Tornello, Giacomo Scelba, Daniele Cremente, Mario Cacciato and Antonio Testa
University of Messina, Italy; University of Catania, Italy

P3103  A New Method to Select Rotor Position Sensor Resolution in Variable Speed Drives [#1420]
Luigi Danilo Tornello, Gaetano Turrisi, Giacomo Scelba, Giulio De Donato, Fabio Giulii Capponi
and Giuseppe Scarcella  
University of Catania, Italy; Sapienza University of Rome, Italy
P3104 Experimental Identification of Induction Machine Flux Maps for Traction Applications [#1411]  
Lisa Tolosano, Eric Armando, Sandro Rubino, Fabio Mandrile and Radu Bojoi  
Politecnico di Torino, Italy

P3105 Model Predictive Current Control using Single Layer Neural Network for PMSM Drives [#1170]  
Hasan Ali Gamal Al-kaf, Samer Saleh Hakami, Laith M. Halabi and Kyo-Beum Lee  
Ajou University, Yemen; Ajou University, Jordan; Ajou University, Korea, Republic of

P3106 Combined Winding Drives for Industrial-Scale Bearingless Motors [#1114]  
Zhouzhou Wang and Eric Severson  
University of Wisconsin-Madison, United States

P3107 Compensating the Thermally Derated Torque for Six-Phase Induction Machine Based Electric Drive  
System Using Linear Parameter Varying Control [#349]  
Athar Hanif and Qadeer Ahmed  
The Ohio State University, Columbus, OH, United States

P3108 An Interactive Tool for the Analysis of Mechanical Stresses on Wind Turbine Shafts [#937]  
Simon Pierre Betoka, Joseph Song-Manguelle, Pascal Lingom, Mamadou Lamine Doumbia, Jean-Maurice Nyobe-Yome and Thomas Alphonce Mbock-Singock  
University of Quebec at Trois-Rivieres, Canada; Oak Ridge National Laboratory, United States;  
University of Douala, Cameroon; University of Quebec Rouyn-Noranda, QC, Canada, Canada

P3109 Fast Gradient Method Based on Dynamic Programming in Model Predictive Control for PMSM  
Drives [#685]  
Jonghun Yun, Jiwon Yoo, Shenhui Cui and Seung-Ki Sul  
Seoul National University, Korea (South)

P3110 Multi-objective Design Optimization for Current Sensor Rogowski Coil [#682]  
Xia Du, Andrea Stratta, David Porras, Yuqi Wei, Yuheng Wu, Zahra Saadatizadeh, Chris Farnell and  
Alan Mantooth  
University of Arkansas, United States

P3111 Analysis and Quantification of Position Sensor Offset Error in Feedforward Controlled PMSMs  
[#42]  
Gayan Edirisinghe, Lihini Rajapaksha, Sunil Abeyratne and Sandun Kuruppu  
Sri Lanka Institute of Information Technology, Sri Lanka; University of Peradeniya, Sri Lanka;  
Saginaw Valley State University, United States

P3112 Performance Analysis of the Alternate Arm Converter for Electric Drive Applications [#1104]  
Nageswara Rao Karaka, Govind Avinash Reddy and Anshuman Shukla  
Indian Institute of Technology, Bombay, India

**Plenary Poster Session S55: Energy Storage and Harvesting**  
*Tuesday, October 11, 2:30PM-5:00PM, Room: Expo Hall E, Chair: Akanksha Singh*

P3301 Lifetime evaluation of lithium-ion batteries under pulsed charging currents [#1045]  
Siyu Jin, Xin Sui, Xinrong Huang, Shunli Wang, Remus Teodorescu and Daniel-Ioan Stroe  
Aalborg University, Denmark; Chang'an University, China; Southwest University of Science and  
Technology, China

P3302 Energy Storage for Hourly Dispatching Utility-Scale Solar Power using HOMER Pro - A Cost  
Investigation [#746]  
Pranoy Roy, Yuan Liao and JiangBiao He  
University of Kentucky, United States

P3303 Aging Mechanisms of Electrodes in LiFePO4/Graphite Batteries [#813]  
Yaqi Li, Alex Juul Soegaard, Jonas Ilum Soerensen, Jia Guo, Daniel-Ioan Stroe, Kjeld Pedersen and  
Leonid Gurevich  
Aalborg University, Denmark
Plenary Poster Session S56: Data analytics for accelerated simulation/energy forecasting and smart protection algorithms
Tuesday, October 11, 2:30PM-5:00PM, Room: Expo Hall E, Chair: Yan Li

P3501 An FPGA-based Power Converter Simulation Accelerator towards Highly Time-Efficient Machine Learning-Aided Design Methodology [#351]
Zhenyu Xu, Xueshen Zhang, Tao Wei, Keon-Woo Kim and Yeonho Jeong
University of Rhode Island, United States; Samsung Electronics Co., Ltd, Korea (South)
P3502 Converter Circuits to Machine Learning: Optimal Feature Selection [#1106]
Ahmed k. Khamis and Mohammed Agamy
University at Albany SUNY, United States
P3503 Series AC Arc Fault Detection using Decision Tree-Based Machine Learning Algorithm and Raw Current [#445]
Kamal Chandra Paul, Linus Schweizer, Tiefu Zhao, Chen Chen and Yao Wang
University of North Carolina at Charlotte, United States; Karlruhe Institute of Technology, Germany; University of Central Florida, United States; Hebei University of Technology, China
P3504 Ground Fault Localization of Branched Wire Network using Reverse Image Search [#1192]
Xiaoyan Liu, Maohang Qiu, Mengxuan Wei and Dong Cao
University of Dayton, United States
P3505 Eccentricity Severity Estimation of Induction Machines using a Sparsity-Driven Regression Model [#496]
Xiangtian Zheng, Hiroshi Inoue, Makoto Kanemaru and Dehong Liu
TEXAS A&M UNIVERSITY, United States; Mitsubishi Electric Corporation, Japan; Mitsubishi Electric Research Laboratories, United States

Plenary Poster Session S57: Selected topics in emerging technologies
Tuesday, October 11, 2:30PM-5:00PM, Room: Expo Hall E, Chair: Xuzhen Huang, Jinia Roy

Seunghwan Keum and Scott Parrish
General Motors Global Research and Development, United States
P3702 Analysis and Suppression of Voltage Oscillation of Solid-state Circuit Breaker Entering Active Region [#422]
Dehao Qin, Zheyu Zhang, Di Zhang, Yuntao Xu, Ravi Lakshmi, Shahsavarian Tohid, Dong Dong and Yang Cao
Clemson University, United States; Naval Postgraduate School, United States; virginia Tech, United States; University of Connecticut, United States; Virginia Tech, United States
P3703 A Solid-State Circuit Breaker without Current Limiting Inductor [#497]
Di Zhang, Yuntao Xu, Brandt Jonathan, Zheyu Zhang, Qin Dehao and Dong Dong
Naval Postgraduate School, United States; Clemson University, United States; Virginia Tech, United States
P3704 Series PV Arc Fault Detection using Current Demodulation and Autocorrelation Coefficients [#660]
Jonathan Kim, Brad Lehman and Roy Ball
Northeastern University, United States; Northeastern Unviersity, United States; Mersen, United States
P3705 Compensation Network Design Method for Capacitive Power Transfer System Considering Coupling Variation [#872]
Sunghyuk Choi, Gyu Cheol Lim, Jin-Su Hong, Euihoon Chung, Gyu Yeong Choe and Jung-Ik Ha
Seoul National University, Korea (South); Hyundai Motors Company, Korea (South)

Plenary Poster Session S58: Power Electronic Converter Topologies
Tuesday, October 11, 2:30PM-5:00PM, Room: Expo Hall E, Chair: Mahshid Amirabadi, Carsten Fronczek

P3901 A Differential Power Processing Converter Adopting Active Clamp Structure and Integrated Planar Transformer [#181]
Ji-Hoon Lim, Dong-In Lee, Ye-Ji Hyeon and Han-Shin Youn
Incheon National University, Korea (South)

P3902 Impact of GaN-HEMT Combinations with Different Die-Size on the Efficiency of a Single-Phase Photovoltaic Differential Buck Inverter [#1014]
Tobias Brinker, Philipp Mand and Jens Friese
Leibniz University Hannover, Germany

P3903 A Class E Based Multichannel Auxiliary Power Supply with Load Independent Zero-Voltage-Switching Operation [#106]
Li Ying, Watson Alan, Kaya Mustafa and Wheeler Patrick
University of Nottingham, United Kingdom

P3904 A Cost-Effective Winding Structure On Modular Matrix Transformer LLC Application [#112]
Zhengming Hou, Shengcheng Kao and Jih-Sheng Lai
Virginia Tech, United States

P3905 Design and Control of Integrated DC-DC Converter for Electric Vehicles [#48]
Issac Kim, Won-Yong Jang, Myeong-Won Kim and Jung-Wook Park
Yonsei University, Korea, Republic of

P3906 Investigation into Magnetic Control of Hard-Switching DC-DC Converters [#167]
J. Marcos Alonso, Hector Chinchero, Guirguis Abdelmessih, Yueshi Guan and Vijie Wang
University of Oviedo, Spain; University of Burgos, Spain; Harbin Institute of Technology, China

P3907 Dual-Buck Three-Phase AC-AC Converter Without Commutation Problems [#69]
Usman Ali Khan, Myeong-Won Kim, Ashraf Ali Khan and Jung-Wook Park
Yonsei University Seoul South Korea, Korea (South); Memorial University of Newfoundland, Canada

P3908 A novel single stage AC-AC converter for Hybrid Solid State Transformer [#896]
Sanjay Rajendran and Alex Huang
The University of Texas at Austin, United States

P3909 Single-phase Transformerless Unified Power Quality Conditioner Based on Three-Leg Converter [#699]
Jean Torelli Cardoso, Cursino Brandao Jacobina and Alan Santana Felinto
Federal University of Campina Grande, Brazil

Plenary Poster Session S59: Modeling and Control Considerations of Power Converters III
Tuesday, October 11, 2:30PM-5:00PM, Room: Expo Hall E, Chair: Fei Lu

P4101 Analysis and Verification of the Series Resonant Converter for Constant Power Loads [#686]
Arkadeb Sengupta, Utsab Kundu and Vinod John
Indian Institute of Science, Bangalore, India

P4102 A Parameter Estimator for Inductance within a Dual Active Bridge Converter [#415]
Zachary Smith, Michael McIntyre, Paul Ohodnicki and Brandon Grainger
University of Pittsburgh, United States; University of Louisville, United States

P4103 Evaluation of Position Controllers for a Wheatstone Bridge Active Magnetic Bearing system [#740]
Luca Tarisciotti, Constanza Ahumada, Luca Papini, Catalina Gonzalez Castano and Paolo Bolognesi | University Andres Bello, Chile; University of Chile, Chile; University of Pisa, Italy

P4104 A PWM Strategy for Cascaded H-bridges to Reduce the Loss Caused by Parasitic Capacitances of Medium Voltage Dual Active Bridge Transformers [216]
Haiguo Li, Zihan Gao and Fred Wang | the University of Tennessee, United States

P4105 A Method to Compensate for the Distortion of the Output Voltage of an H-Bridge Inverter Under Sinusoidal Unipolar PWM [418]
Hitesh Kumar, Somenath Banerjee and Santanu K. Mishra | Indian Institute of Technology Kanpur, India

P4106 Five-leg Single-phase Transformerless Unified Power Quality Conditioner [701]
Jean Torelli Cardoso, Cursino Brandao Jacobina, Alan Santana Felinto and Mauricio Beltrao Rossiter Correa | Federal University of Campina Grande, Brazil

P4107 A Model Independent Predictive Control of Active Front Ends in Offshore Wind Turbine Systems [1357]
Yuzhe Zhang, Xiaodong Liu, Zhenbin Zhang and Feng Wang | Shandong University, China; State Grid Wuxi Power Supply Company, China; Shandong Agriculture and Engineering University, China

P4108 Hybrid Predictive Control of Grid-tied MMC to Mitigate Circulating Current Using a Simple PR Controller [1334]
Zexin Liu, Ralph Kennel, Yuanxiang Sun, Yanhua Liu and Zhenbin Zhang | SDU, China; TUM, Germany

Plenary Poster Session S60: Magnetics and Packaging
Tuesday, October 11, 2:30PM-5:00PM, Room: Expo Hall E, Chair: Adam Skorek, Helen Cui

P4301 Integrated High Frequency Nanocrystalline Based Planar Magnetics Design for a Bidirectional CLLLC Resonant Converter [1264]
Sunil Kumar Dube, Ramu Nair and Pritam Das | SUNY Binghampton, United States

P4302 The Shape of Polar Anisotropic Magnetizer to Reduce the Dead Zone of a Ring Bonded Magnet [942]
Jeong-Yeon Min, Dong-Woo Nam, Hyun-Jo Pyo, Min-Ki Hong and Won-Ho Kim | Gachon University, Korea (South)

P4303 Frequency Dependence Deterioration of AC Resistance in Large-Diameter Litz Wire for High Power Induction Heating [1190]
Kawahara Shota, Umetani Kazuhiro, Ishihara Masataka and Hiraki Eiji | Okayama University, Japan

P4304 Optimized Thermal Modelling of High Power Planar PCB Magnetics [190]
Lucia Clavero Ordonez, Alberto Delgado Exposito, Pedro Alou Cervera, Miroljub Bakic and Thiwanka Wijekoon | Universidad Politecnica de Madrid, Spain; Huawei Technologies Duesseldorf, Germany

P4305 Mission-Profile-Based Lifetime study for SiC Module Chips using Graphene Films [826]
Sepideh Amirpour and Torbjorn Thiringer | China Euro Vehicle Technology AB, Sweden; Chalmers University of Technology, Sweden

Plenary Poster Session S61: Diagnostics, Noise and Vibration in Electric Machines
Tuesday, October 11, 2:30PM-5:00PM, Room: Expo Hall E, Chair: Luca Zarri

P4501 Demagnetization Risk Assessment in a Dual Stator Permanent Magnet Vernier Machines [261]
Zia Ullah, Mudassir Raza Siddiqui and Shehab Ahmed | King Abdullah University of Science & Technology, Saudi Arabia; Incheon National University, Korea (South)

P4502 Assessment of the rotor condition in soft-started induction motors through the Hilbert transform of
transient stray flux signals [449]
Vicente Biot-Monterde, Angela Navarro-Navarro, Israel Zamudio-Ramirez, Jose Antonino-Daviu and Roque A Osornio-Rios
Universitat Politecnica de Valencia, Spain; Universidad Autonoma de Queretaro, Mexico P4503
Detection and Separation of Faults in Permanent Magnet Synchronous Machines using Hybrid Fault-Signatures [259]
Zia Ullah, Junhyuk Im and Shehab Ahmed
King Abdullah University of Science and Technolo, Saudi Arabia; Incheon National University, Korea (South)
P4504 Electric Motor and Power Electronics NVH Control Strategies for Electric Propulsion Systems of Battery Electric Vehicles [119]
Song He, Peng Zhang, Vinod Chowdary Peddi and Cheng Gong
General Motors Company, United States
P4505 Condition Monitoring of Direct Torque Controlled Permanent Magnet Synchronous Machines [270]
Ibrahim M. Allafi and Shanelle N. Foster
Michigan State University, United States
P4506 EDM Damage Assessment and Lifetime Prediction of Motor Bearings Driven by PWM Inverters [499]
Ryan Collin, Alex Yokochi and Annette von Jouanne
Baylor University, United States

Plenary Poster Session S62: Modelling and Analysis of Electric Machines in Specialized Applications
Tuesday, October 11, 2:30PM-5:00PM, Room: Expo Hall E, Chair: Silvio Vaschetto

P4701 Generalized High-Fidelity Reduced-Order Modeling of Doubly-Fed Machines and Induction Machines [429]
Peng Peng and Peng Han
General Motors Company, United States; ANSYS. Inc, United States
P4702 Theoretical and Experimental Reevaluation of Short-Circuited Rotor Windings in Induction Machines [830]
Peng Han, Peng Peng, Wei Qin and Ming Cheng
Ansys, Inc., United States; General Motors Company, United States; Southeast University, China
P4703 Comparison of Numerical Induction Motor Models with FEA-Based-Lookup Tables [866]
Ryoko Imamura
Powersys Inc., United States
P4704 Space-Vector Dynamic Model of Dual-Three Phase Induction Motors with Balanced and Unbalanced Structures in State Form [358]
Angelo Accetta, Massimiliano Luna and Marcello Pucci
INM-CNR, Italy
P4705 3 MW Design and Comparison of Geared Slip-Synchronous Wind Turbine Systems [1084]
Dillan Ockhuis and Maarten Kamper
Stellenbosch University, South Africa
P4706 Passive Electrodynamic Bearings [628]
Abdoalateef Alzhrani and Kais Atallah
University of Sheffield, United Kingdom
P4707 Performance comparison of transverse and axially laminated synchronous reluctance machines [1436]
Emmanuel Agamloh and Shovan Deb
Baylor University, United States
P4901 Feedforward Deadtime Compensation Using Current Zero Crossing Detection [#1138]
  Michael Kercher, Wensong Yu and Iqbal Husain
  North Carolina State University, United States; North Carolina State University, United States

P4902 Linear Dead-Time Compensation Control Using the Voltage Command Value Suitable for Low-Inductance Motors [#288]
  Motoki Hada, Keiichiro Kondo, Kohei Aiso, Yasuaki Aoki and Takahiro Watanabe
  Waseda University, Japan; Shibaura Institute of Technology, Japan; Denso Corporation, Japan

P4903 Sensorless Disturbance Rejection for High-Precision Permanent Magnet Motor Motion System [#875]
  Yi-Jen Lin, Po-Huan Chou, Wei-Chieh Hsu, Chi-Jun Wu and Shih-Chin Yang
  National Taiwan University, Taiwan; Industrial Technology Research Institute, Taiwan

P4904 Shunt-Connected Solar Microinverter for Induction Motor Soft-Starting and Active and Reactive Power Compensation [#1373]
  Musab Guven, Kangbeen Lee, Younsuk Dong and Woongkuk Lee
  Michigan State University, United States

P4905 State of Charge Estimation of Battery Energy Storage Systems in Low Voltage Electric Drive Applications for Hybrid and Electric Vehicles [#651]
  Ester Vasta, Alberto Lucifora, Luigi Danilo Tornello, Salvatore Foti, Mario Cacciato, Christian Pernaci, Christian Pernaci and Giacomo Scelba
  University of Catania, Italy; University of Messina, Italy; Audi AG, Italy

P4906 Vector Projection-based Sensorless Control of a SynRM Drive Including Self and Cross-Saturation [#359]
  Angelo Accetta, Maurizio Cirrincione, Massimiliano Luna, Marcello Pucci and Antonino Sferlazza
  INM-CNR, Italy; USP - University of South Pacific, Fiji; University of Palermo, Italy

  Myeong-Won Kim, Issac Kim and Jung-Wook Park
  Yonsei Univ., Republic of Korea; Yonsei Univ, Korea, Republic of

P4908 V/f control for Switched Reluctance Motor [#681]
  Takahiro Kumagai, Jun-ichi Itoh and Masakazu Kato
  Nagaoka University of Technology, Japan; Nagaoka Motor Development Co., Ltd., Japan

P4909 Learning-based Position Sensorless Control in Low-speed Region for SMPMSM [#903]
  Jaehoon Shim, Byung Ryang Park, Sung Hyuk Choi and Jung-Ik Ha
  Seoul National University, Korea (South)

P4910 DC-Link Current Harmonics Reduction of a Dual Inverter with a Lower Floating Capacitor Voltage [#693]
  Akihito Mizukoshi and Hitoshi Haga
  National Institute of Tech., Kisasazu College, Japan; Nagaoka University of Technology, Japan

P4911 Real-Time Data-Driven System Identification of Motor Drive Systems Using Online DMD [#1016]
  Muhammed Ali Gultekin and Ali Bazzi
  University of Connecticut, United States

P4912 Non-Uniform Global Demagnetization Detection in Interior PMSMs Using Search Coils [#1113]
  Marcos Orviz, David Reigosa, Jigyun Jeong, Hyeon-Jun Lee, Sang Bin Lee and Fernando Briz
  Universidad de Oviedo, Spain; Korea University, Republic of Korea
Session S64: Prof. Donald W. Novotny Memorial Session I
Wednesday, October 12, 8:30AM-10:10AM, Room: 140B-Level 100, Chair: Thomas Jahns, Bulent Sarlioglu

8:30AM In Memoriam: Prof Novotny Major Contributions to Electric Machine Research and Teaching
Thomas M. Jahns and Bulent Sarlioglu
University of Wisconsin-Madison, United States

8:55AM Design and Comparison of Direct-Drive and Geared High Specific Power Permanent Magnet Motors for Aerospace Applications [#598]
Ali Al-Qarni, Salar Koushan, Towhid Chowdhury and Ayman EL-Refaie
Marquette University, United States

9:20AM Magnetic, Thermal and Structural Scaling of Synchronous Machines [#1433]
Gaetano Dilevrano, Paolo Ragazzo, Simone Ferrari, Gianmario Pellegrino and Timothy Burrell
Politecnico di Torino, Italy; Oak Ridge National Laboratory, United States

9:45AM Design of an Extremely Efficient, Rare-Earth Free, 5 kW Motor in a NEMA 210 Frame [#1028]
Dorsa Talebi, Matthew C. Gardner, Shrikesh Sheshaprasad, Hamid A. Toliyat, Paul Knauer and Alan D. Crapo
Texas A&M University, United States; University of Texas at Dallas, United States; This Old Part Engineering, LLC, United States; Alan D Crapo Consulting, United States

Session S65: Sensorless Drives
Wednesday, October 12, 8:30AM-10:10AM, Room: 140C - Level 100, Chair: Peng Han, Yang Xu

8:30AM Suitability of Bearingless Motor Windings for Non-Salient Rotor Displacement Self-Sensing [#1195]
Nathan Petersen and Eric Severson
University of Wisconsin, Madison, United States

8:55AM Fast Evaluation of Self-Sensing Control Capability for a Synchronous Reluctance Motor [#546]
Alice Maimeri, Luigi Alberti, Silverio Bolognani and Berto Matteo
University of Padova, Italy

9:20AM Adaptive Sensorless Control of High Speed Surface-Mounted PMSM Drives with Inductance Estimator based on Current Error [#243]
Zhihao Song, Wenxi Yao and Kevin Lee
Zhejiang University, China; Eaton Corporation, United States

9:45AM Stator Flux Observer for the Sensorless Speed Control of Synchronous Machines with Uncertain Torque Constant [#1015]
Emilio Carfagna, Giovanni Migliazza, Fabio Bernardi, Cristiano Maria Verreli and Emilio Lorenzani
University of Modena and Reggio Emilia, Italy; University of Roma Tor Vergata, Italy

Session S66: Additive Manufacturing in Electric Machines
Wednesday, October 12, 8:30AM-10:10AM, Room: 140D -Level 100, Chair: Vandana Rallabandi

8:30AM Electrical Characteristics of Additively Manufactured Hollow Conductor Coils with Integrated Heat Pipes for Electric Aircraft Applications [#47]
Sina Vahid, Salar Koushan, Towhid Chowdhury and Ayman EL-Refaie
Marquette University, United States

8:55AM Eddy Current Loss Reduction in Binder Jet Printed Iron Silicon [#1181]
Khan Jazib Islam, Thang Q. Pham, Hawke Suen, Tanzilur Rahman, Geeta Kumari, Patrick Kwon, Carl J. Boehlert and Shanelle N. Foster
Michigan State University, United States

9:20AM Spaced Orthocyclic Winding Pattern for Improved Die Compressed Coils [#1321]
Dominick Sossong and Ian P. Brown
Illinois Institute of Technology, United States
9:45AM  Additively Manufactured Heat Exchanger for Improved Cooling of Electric Machines [#849]
Gokhan Cakal, Ahmed Hembel and Bulent Sarlioglu
University of Wisconsin-Madison, United States

Session S67: EV Charging
Wednesday, October 12, 8:30AM-10:10AM, Room: 140E -Level 100, Chair: Yigeng Huangfu, Aparna Saha

8:30AM  Bridgeless Boost-Buck based Universal PFC Converter with Wide Output Voltage for Onboard Battery Charging Applications [#575]
Harish Karneddi and Deepak Ronanki
Indian Institute of Technology Roorkee, India

8:55AM  Isolated AC/DC converter used in EV/PHEV battery charger from household AC outlet [#1199]
Daisuke Endo, Hiroaki Matsumori, Takashi Kosaka, Sadanori Suzuki and Kenichi Nagayoshi
Nagoya Institute of Technology, Japan; TOYOTA INDUSTRIES CORPORATION, Japan

9:20AM  Transformerless Partial Power Converter for Electric Vehicle Fast Charging Stations [#736]
Daniel Pesantez, Hugues Renaudineau, Sebastian Rivera and Samir Kouro
Universidad Tecnica Federico Santa Maria, Chile; Universidad de los Andes, Chile

9:45AM  Electric Vehicle Charging Station Architecture with Extreme Fast Chargers [#1160]
Radha Sree Krishna Moorthy, Michael Starke, Benjamin Dean, Aswad Adib, Steven Campbell and Madhu Chinthavali
Oak Ridge National Laboratory, United States

Session S68: Solid State Transformers and Applications
Wednesday, October 12, 8:30AM-10:10AM, Room: 140F -Level 100, Chair: Nathan Weise, Kaushik Basu

8:30AM  Operation and control of Soft Switching Solid State Transformer as a Virtual Synchronous Machine for Photovoltaic application [#1298]
Vikram Roy Chowdhury, Zheng An, Rajendra Prasad Kandula and Deepak Divan
National Renewable Energy Laboratory, United States; Georgia Institute of Technology, United States; Oak Ridge National Laboratory, United States

8:55AM  A Simple Control Method without Voltage Balance Algorithm for Modular Solid-State Transformer [#918]
Paul Jang, Hwa-pyeong Park, Jongbok Baek, Dong-Uk Kim and Sungmin Kim
Tech University of Korea, Korea (South); Korea Institute of Energy Research, Korea (South); Hanyang University, Korea (South)

9:20AM  ZVS Boundary Analysis and Design Guideline of MV Grid-Compliant Solid-State Transformer for DC Fast Charger Applications [#1054]
Yos Prabowo, Shrivatsal Sharma, Subhashish Bhattacharya, Awneesh Tripathi and Vijay Bhavaraju
North Carolina State University, United States; Eaton Corporation, United States

9:45AM  Medium Voltage Energy Hub Based on Multilevel Cascaded H Bridge-Dual Active Bridge Back-to-Back Converter for Power Distribution Feeders Interconnection and Multiple Simultaneous Grid Services [#996]
Jongchan Choi, Joao Onofre Pereira Pinto, Madhu Chinthavali and Aswad Adib
Oak Ridge National Laboratory, United States

Session S69: Advanced Power Converter Control Routines for Photovoltaic Systems
Wednesday, October 12, 8:30AM-10:10AM, Room: 140G -Level 100, Chair: Ariya Sangwongwanich, Yunwei Li

8:30AM  Operation Mode Transition Technique of Flexible Modulation Scheme for Single-phase Transformerless PV Inverters [#705]
Zhongting Tang, Ariya Sangwongwanich and Frede Blaabjerg
Aalborg University, Denmark
8:55AM A Lyapunov-based Generalized Dc-Side Controller Design for PV-Connected Systems [#1227]
Rahul Mallik, Branko Majnumovic, Soham Dutta, Gab-Su Seo, Dragan Maksimovic and Brian Johnson
University of Washington, United States; University of Colorado Boulder, United States; National Renewable Energy Laboratory, United States

9:20AM Reconfigurable step-up/down partial power converter for PV power optimizer [#587]
Hugues Renaudineau, Daniel Pesantez, Nicolas Muller, Freddy Flores-Bahamonde, Samir Kouro and Jose Rodriguez
Universidad Tecnica Federico Santa Maria, Chile; Universidad Austral de Chile, Chile;
Universidad Andres Bello, Chile; Universidad San Sebastian, Chile

9:45AM An Adaptive DC Voltage Control for SiC based Medium Voltage Photovoltaic Inverter [#988]
Jenson Joseph Attukadavil, Sandeep Anand and Baylon G Fernandes
Indian Institute of Technology, Bombay, India

**Session S70: Multi-Level Converter Topologies**
*Wednesday, October 12, 8:30AM-10:10AM, Room: 250A -Level 200, Chair: Zhituo Ni, Nikolas Menger*

8:30AM Efficiency and DC-link Ripple Analysis of Neutral-Point-Less (NPL) Multilevel Inverter with Discontinuous Pulse Width Modulations [#1198]
Mikayla Benson, Xiaofeng Dong, Musab Guven, Kangbeen Lee, Jinyeong Moon and Woongkul Lee
Michigan State University, United States; Florida State University, United States

8:55AM An Actively Balanced Distributed Regenerative Snubber with Reduced Part Count in Multi-Level Power Converters [#1326]
Nathan Miles Ellis, Logan Horowitz, Rahul Iyer, Nathan Brooks and Robert Pilawa-Podgurski
UC Berkeley, United States

9:20AM SCR-Front-End Regenerative CHB Drive with Improved Harmonic Profile [#309]
Zhituo Ni, Mehdi Narimani and Navid Zargari
Rockwell Automation Canada, Canada; McMaster University, Canada

9:45AM A Multiphase Series Connected Converter for High Voltage High Power Dc-dc Applications [#1090]
Mohd Shadab Ansari, Anshuman Shukla and Himanshu J Bahirat
Indian Institute of Technology Bombay, India

**Session S71: Modeling of Power Converters**
*Wednesday, October 12, 8:30AM-10:10AM, Room: 250B -Level 200, Chair: Mengqi Wang, Pritam Das*

8:30AM A Blackbox Modeling Approach for DC-DC Converters with Strong Nonlinear Dynamics Using an Improved Strategy for the Transition among Local Models [#631]
Fernando Perez, Airan Frances, Rafael Asensi and Javier Uceda
Universidad Politecnica de Madrid, Spain

8:55AM Steady-State Analysis of Power Converters using the Enhanced State Vector Algorithm [#1233]
Reza Sadri, Mohammad Daryaei and Sayed Ali Khajehoddin
University of Alberta, Canada

9:20AM Improved Three-Terminal Model for PWM Converters with Current-Mode Control [#1242]
Yi-Hsun Hsieh and Fred C. Lee
Virginia Tech, United States

9:45AM Numerical Design of Input Filters by Parameter Dependent Lyapunov Functions [#545]
Ramon Estalella Rodriguez, Carlos Olalla Martinez, Angel Cid Pastor and Isabelle Queinnec
University Rovira i Virgili, Spain; University of Toulouse, France
Session S72: Wireless Power Transfer II
Wednesday, October 12, 8:30AM-10:10AM, Room: 250C -Level 200, Chair: Jiangfeng Wang, Dianxun Xiao

8:30AM  High-Performance Multi-MHz Capacitive Wireless Power Transfer System with an Auxiliary ZVS Circuit [#1292]
Dheeraj Etta, Sounak Maji and Khurram K. Afridi
Cornell University, United States

8:55AM  Simulation-Compatible Capacitive-Coupler Modeling and Analysis for Wireless Power Transfer Applications [#405]
Ilya Zeltser, Eli Abramov and Mor Mordechai Peretz
Rafael Advanced Defense Systems Ltd., Israel; Ben-Gurion University of the Negev, Israel

9:20AM  Synchronous Rectification Based on a Digital Delay Line in a High-Frequency Resonant Converter for Wireless Power Transfer [#1224]
Kamlesh Sawant, Nathan Bich and Jungwon Choi
University of Minnesota Twin Cities, United States

9:45AM  Reduced Model for Fast Simulation of a Lithium-Ion Battery Pack Taking Into Account Current and State of Charge Dispersion [#55]
Fernanda Vendrame, Christophe Forgez and Marie Sayegh
Safran; Universite de Technologie de Compiegne, France; Universite de Technologie de Compiegne, France; Safran, France

Session S73: Nonlinear Control Techniques for Power Electronics Applications
Wednesday, October 12, 8:30AM-10:10AM, Room: 251A -Level 200, Chair: Marko Hinkkanen, Luca Solero

8:30AM  Design Elements of a Nonlinear Decentralized Control Scheme For Modular Power Conversion [#1012]
Chenmin Deng, Pedram Chavoshipour Heris, Duy T. Nguyen, Pushkar Saraf and Alex J. Hanson
The University of Texas at Austin, United States

8:55AM  Dynamic Performance Improvement of Microgrids with High Uncertainty Using Adaptive Robust Control [#1312]
Hasan Abdollahi Sofla and Iqbal Husain
North Carolina State University, United States

9:20AM  Robust Modifications to Model Reference Adaptive Control for Reference Voltage Tracking in a Dual Active Bridge dc-dc Converter [#704]
Kartikeya Jayadurga Prasad Veeramraju, Alvaro Cardoza, Jagannathan Sarangapani and Jonathan Kimball
Missouri University of Science and Technology, United States

9:45AM  Tuning of Weighting Factors by Direct Pole-Placement for Model Predictive Current Controlled Grid-Tied Converters with LCL Filter [#580]
Waqar A. Khan, Armin Ebrahimian, Iman Hosseini and Nathan Weise
Marquette University, United States

Session S74: Multi-Level Converters
Wednesday, October 12, 8:30AM-10:10AM, Room: 251B/C -Level 200, Chair: Zahra Saadatzadeh, Massimiliano Luna

8:30AM  Twelve-Step Inverter [#594]
Haitham Kanakri and Euzeli Cipriano Dos Santos, Jr.
Indiana University Purdue University IUPUI, United States

8:55AM  A Review on Hybrid Modular Multilevel Converters for Medium Voltage Applications [#1001]
Rajat Shahane, Nageswara Rao Karaka and Anshuman Shukla
Indian Institute of Technology Bombay, India
9:20AM Three-Phase Modular Multilevel Converters Composed of Universal Smart Power Module [#286]
Mana Sakamoto and Hitoshi Haga
Nagaoka University of Technology, Japan

9:45AM A Novel Three-Phase Seven-Level Hybrid Flying-Capacitor Inverter [#885]
Min-Seok Kim, Jonathan Pribadi and Dong-Choon Lee
Yeungnam University, Korea (South)

Session S75: Silicon Carbide Switching Performance
Wednesday, October 12, 8:30AM-10:10AM, Room: 252A/B -Level 200, Chair: Xiaoqing Song, Leon Tolbert

8:30AM Comparison of Motor Neutral Point Overvoltage Oscillations in SiC-Based Adjustable Speed Drives using Two-Level and Three-Level Inverters [#618]
Wenzhi Zhou, Mohamed Diab and Xibo Yuan
University of Bristol, United Kingdom; Loughborough University, United Kingdom; The University of Bristol, United Kingdom

8:55AM Influence of the Inverter Dead-time on the Reverse Recovery Characteristics of 3.3-kV SiC MOSFETs and JBSFETs [#1272]
Ashish Kumar, Subhashish Bhattacharya and Jayant Baliga
North Carolina State University, United States

9:20AM Analytical Switching Transient Model of TO-247-4 Packaged SiC MOSFETs and Comparison with TO-247-3 Devices [#1053]
Manish Mandal, Shamibrota Kishore Roy and Kaushik Basu
Indian Institute of Science Bangalore, India

9:45AM Analysis and Reduction of Turn-on Gate-source Voltage Oscillation on Paralleled SiC MOSFETs Application [#101]
Dongxin Jin, Nianzun Qi, Jin Ouyang and Cheng Luo
Eaton Research Labs, China; Southwest Jiaotong University, China

Session S76: Axial Flux Machines II
Wednesday, October 12, 10:30AM-12:10PM, Room: 140B-Level 100, Chair: Greg Heins, Giulio De Donato

10:30AM Stator Design for an Axial Flux PM Motor Using Straight Teeth Core with Distributed Winding [#463]
Junichi Asama, Aiku Ikuta and Shohei Watanabe
Shizuoka University, Japan

Emir Poskovic, Fausto Franchini and Luca Ferraris
Politecnico di Torino, Italy

11:20AM Improved Cooling for a High-Speed Axial-Flux Machine Using Soft Magnetic Composites [#1058]
Matthew Meier and Elias Strangas
Michigan State University, United States

11:45AM Design and Analysis of an Axial Flux Coaxial Magnetic Gear with Balanced Axial Forces for Precision Aerospace Actuation Applications [#118]
Bryton Praslicka, Donald F. Knight, Tazio L. Stefanelli, Nick Palmer, Adam White, Joshua Jones and Hamid Toliyat
Texas A&M University, United States; Kaney, Inc., United States

Session S77: Prof. Donald W. Novotny Memorial Session II
Wednesday, October 12, 10:30AM-12:10PM, Room: 140C - Level 100, Chair: Bulent Sarlioglu, Thomas Jahns

10:30AM In Memoriam: Prof. Novotny Major Contributions to WEMPEC, IEEE, and Electrofishing
Thomas M. Jahns and Bulent Sarlioglu
University of Wisconsin-Madison, United States
Session S78: Bearingless and High-Speed Machines

Wednesday, October 12, 10:30AM-12:10PM, Room: 140D -Level 100, Chair: Wolfgang Gruber, Matthew C. Gardner

10:30AM Homopolar Bearingless Slice Motor with Quadruple Three-Phase Windings [#881]
Simon Szoke and Minkyun Noh
University of British Columbia, Canada

10:55AM Exact Torque and Force Model of Bearingless Electric Machines [#1353]
Anvar Khamitov and Eric Severson
University of Wisconsin-Madison, United States

11:20AM Enhanced Torque Density of a Novel One-Axis Actively Positioned Single-Drive Bearingless Motor [#603]
Theeraphong Srichiangsa, Rikuya Oe, Hiroya Sugimoto, Yusuke Fujii, Kyoei Kiyota and Akira Chiba
Tokyo Institute of Technology, Japan; Tokyo Denki University, Japan

11:45AM Optimization of Stack Length in Magnetic-Geared Motor with Magnetically Suspended High-Speed Rotor [#441]
Akira Kumashiro, Akira Chiba, Wolfgang Gruber, Wolfgang Amrhein and Gerald Jungmayer
Tokyo Institute of Technology, Japan; Johannes Kepler University Linz, Austria; Linz Center of Mechatronics GmbH, Austria

Session S79: EV Powertrain II

Wednesday, October 12, 10:30AM-12:10PM, Room: 140E -Level 100, Chair: Woongkul Lee, Rakib Islam

Ranya Badawi, Mohammad Anwar, Steven Wybo and Mehrdad Teimorzardeh General Motors, United States

10:55AM Design and Testing of an Automotive Compliant 800 V 550 kVA SiC Traction Inverter with Full-Ceramic DC-Link and EMI Filter [#573]
Fausto Stella, Enrico Vico, Davide Cittanti, Chaohui Liu, Jinliang Shen and Radu Bojoi Politecnico di Torino, Italy; National NewEnergyVehicleTech Innovation Center, China

11:20AM Capacitive Link Universal Converters for EV Powertrain [#1277]
Anran Wei, Brad Lehman, Siavash Pakdelian and Mahshid Amirabadi
Northeastern University, United States; University of Massachusetts Lowell, United States

11:45AM Fault Localization in Automotive Power Nets for Utilization in Energy Management Systems Used for Autonomous Driving Based on Graph Theory [#316]
Laurenz Tippe, Ahmed Alnaggar, Sarmed Hussain, Joachim Froeschl and Hans-Georg Herzog Technical University of Munich (TUM), Germany; BMW Group, Germany
Session S80: Control of High Penetration Renewable Grid

Wednesday, October 12, 10:30AM-12:10PM, Room: 140F -Level 100, Chair: Ed Muljadi, Fariba Fateh

10:30AM Enhanced Frequency Support Scheme of Generic Inverter-Based Resource Models for Renewable-Dominated Power Grids [#1085]
Jinho Kim, Eduard Muljadi, Bharat Vyakaranam, Quan Nguyen, Ahmad Tbaileh, Sohom Datta, Wei Du, Yuan Liu, Yousu Chen, Nader A. Samaan, Manisha Maharjan, Seo Sangwon and M Al Mamun
Auburn University, United States; PNNL, United States

10:55AM A Decoupled Droop Control Strategy for Cascaded Multicell Inverter with Low-Frequency Modulation [#1427]
Shuo Zhang, Wei Qiao and Liyan Qu
University of Nebraska-Lincoln, United States

11:20AM Inter-area Oscillation Damping Controller for DFIG based Wind Power Plants [#1077]
Sami Alalwani, Semih Isik and Subhashish Bhattacharya
North Carolina State University, United States

11:45AM Modeling analysis and characterization of a distributed generation system based on Microgrid for Hardware-in-the-loop (HIL) Applications [#952]
Paulo Leandro, Fabiano Salvadori and Gregory Almeida
Universidade Federal da Paraiba, Brazil; Instituto Federal de Alagoas, Brazil

Session S81: Energy Storage and Harvesting

Wednesday, October 12, 10:30AM-12:10PM, Room: 140G -Level 100, Chair: Xin Sui, Daniel-Ioan Stroe

10:30AM Lite-Sparse Hierarchical Partial Power Processing for Heterogeneous Degradation of Batteries in Energy Storage Systems [#1368]
Alireza Ramyar, Wentao Xu, Xiaofan Cui, Jason Siegel, Anna Stefanopoulou and Al-Thaddeus Avestruz
University of Michigan, United States

10:55AM A Multi-Stack Variable Stiffness Magnetic Torsion Spring for a Wave Energy Converter [#876]
Dawei Che, Bertrand Dechant, Alex Hagmuller and Jonathan Bird
Portland State University, United States; aquaharmonics Inc., United States

11:20AM Used Lithium-Ion Batteries in Second-Life Applications: Feasibility Study [#341]
Minh Tran, Tuomas Messo, Roni Luhtala, Jussi Sihvo and Tomi Roinila
Tampere University, Finland

11:45AM Analysis, Modeling, and Validation of Cascaded Magnetics for Magnetic Energy Harvesting [#63]
Gao Min, Yi Lifang and Moon Jinyeong
Florida State University, United States

Session S82: DC-DC Converter Topologies

Wednesday, October 12, 10:30AM-12:10PM, Room: 250A -Level 200, Chair: Minh-Khai Nguyen, Ahmed Allehyani

10:30AM An Interleaved Multi-Phase Boost Converter with Coupled Inductors for High Power Density [#421]
Ahmed Ismail, Zhuxuan Ma, Ahmad Al-Hmoud and Yue Zhao
University of Arkansas, United States

10:55AM A Four-Phase Soft-Switching Boost Converter with Single Auxiliary Switch [#718]
Minh-Khai Nguyen and Caisheng Wang
General Motors, United States; Wayne State University, United States

11:20AM 48V-to-12V Always-Dual-Path Hybrid DC-DC Converter for Inductor Current Reduction [#159]
Hata Katsuhito, Tanaka Shinsaku, Rikiishi Yasuhiro and Matsumoto Takashi
The University of Tokyo, Japan; Sanken Electric Co., Ltd., Japan
11:45AM  An Accurate Output Current Prediction Scheme For Primary-Side Regulation Active-Clamp Flyback Converter [#176]
Yu Yao, Chong Wang, Daying Sun, Wenhua Gu and Chuanxiang Sheng
Nanjing University of Science and Technology, China

Session S83: Power converter Common Mode Voltage and EMI II
Wednesday, October 12, 10:30AM-12:10PM, Room: 250B -Level 200, Chair: Rangarajan Tallam, Robert Cuzner

10:30AM  Analysis, Design & PCB Optimization of a DC Bus Planar CM Inductor to Reduce EMI in SiC Converters [#597]
Zoran Vrankovic, Gennadi Sizov, Gary Skibinski, Rohit Suryadevara and Yao Da
Rockwell Automation, United States

10:55AM  Integrated Single-Stage EMI Filters for Grid-Tied Voltage Source Converters: A Design Oriented Approach [#904]
Srinivas Gulur, Vishnu Mahadeva Iyer and Subhashish Bhattacharya
Lucid Motors, United States; Indian Institute of Science, Bangalore, India; NC State University, United States

11:20AM  Synchronously Switched Active EMI Filter [#961]
Duy T. Nguyen, Chenmin Deng, Elijah Macias and Alex J. Hanson
The University of Texas at Austin, United States

11:45AM  A Modeling Technique for Low-Frequency Near-field Radiated EMI Measurement Based on the Study of the Mechanism of the Monopole Antenna [#1222]
Yirui Yang, Yanwen Lai, Shuo Wang and Zheng Luo
University of Florida, United States; Monolithic Power Systems, Inc., United States

Session S84: Protection devices / algorithms
Wednesday, October 12, 10:30AM-12:10PM, Room: 250C -Level 200, Chair: Tianqi Hong, Jinia Roy

10:30AM  Coordination of Solid-State Circuit Breakers for DC Grids Under High-Fault-di/dt Conditions [#643]
Govind Chavan, Xiaqing Song, Debanjan Chatterjee, Abhinav Patni and Pietro Cairoli
ABB, United States

10:55AM  Adjustable Current Limit Feature with a Self-Sensing and Self-Triggering Monolithically Integrated SiC Circuit Breaker Device [#790]
Taro Takamori, Keiji Wada, Norman Boettcher, Tobias Erlbacher, Wataru Saito and Shin-ichi Nishizawa
Tokyo Metropolitan University, Japan; Fraunhofer IISB, Germany; Kyushu University, Japan

11:20AM  A Fault Current Limiter Based on Voltage-Controlled Tunable Inductors [#1289]
Junwei Cui, Chao Jia, Liyan Qu and Wei Qiao
University of Nebraska-Lincoln, United States

11:45AM  Galvanically Isolated Clamp-on Medium-Voltage Sensing [#223]
Blake D. Rose and Daniel C. Ludois
University of Wisconsin-Madison, United States

Session S85: Model Predictive Control of Power Electronics
Wednesday, October 12, 10:30AM-12:10PM, Room: 251A -Level 200, Chair: Tarisciotti Luca, Petros Karamanakos

10:30AM  A Unified Model Predictive Control for the Grid Integration of Vanadium Redox Flow Batteries [#1422]
Riccardo Leuzzi, Andrea Volpini, Salvatore Riccardo Di Salvo, Giulia Tresca and Pericle Zanchetta
University of Pavia, Italy; University of Nottingham, United Kingdom
10:55AM Model Predictive Control with Sphere-Decoding Algorithm for parallel-connected H-Bridges [347]
Cristina Terlizzi, Stefano Bifaretti and Alessandro Lampasi
University of Rome Tor Vergata, Italy; ENEA DTT, Italy

11:20AM Model Predictive Control for a PLL-less SiC Grid-Tied Inverter with Zero-Voltage-Ride-Through Capability [495]
Xiaofeng Dong and Hui Li
Florida State University, United States

11:45AM Real-Time Network Protocol for Gate Driver Communication and Control [1271]
Vladimir Mitrovic, Yu Rong, Boran Fan, Yijie Bai, Yuliang Cao, Dong Dong, Rolando Burgos and Dushan Boroyevich
Virginia Tech, United States; virginia Tech, United States

**Session S86: AC-AC Converters**
*Wednesday, October 12, 10:30AM-12:10PM, Room: 251B/C -Level 200, Chair: Galina Mirzaeva, Mohamed Youssef*

10:30AM Zeta-Based AC-Link Universal Converter [1263]
Mojtaba Salehi, Masih Khodabandeh and Mahshid Amirabadi
Northeastern University, United States

10:55AM Comparison of Control Techniques for Dual-Mode Inversion Stage of a GaN-Based High-Power-Density Single-Phase Transformer-Less Online UPS [1243]
Maida Farooq, Danish Shahzad and Khurram Afridi
Cornell University, United States

11:20AM A novel modulation scheme for Matrix Converters based on Predictive Control and featuring constant switching frequency [1329]
Galina Mirzaeva, Yuan Liu and Marco Rivera
The University of Newcastle, Australia; Universidad de Talca, Chile, Chile

11:45AM Three-Phase Four-Wire Unified Power Quality Conditioner Based on AC-DC-AC Nine-Leg Converter and Shunt Converter [702]
Jean Torelli Cardoso, Cursino Brandao Jacobina, Alan Santana Felinto and Mauricio Beltrao Rossiter Correa
Federal University of Campina Grande, Brazil

**Session S87: Novel Applications and Features of WBG Gate Drivers**
*Wednesday, October 12, 10:30AM-12:10PM, Room: 252A/B -Level 200, Chair: Jin Wang, Zheyu Zhang*

10:30AM A Magnetic-Coupled Single Gate-Driver Structure for Series Power Devices in DC Circuit Breaker Applications [221]
Jian Liu, Lakshmi Ravi, Dong Dong, Rolando Burgos, Steve Schmalz and Andy Schroedermeier
Virginia Tech, United States; Virginia Tech, United States; Eaton, United States

10:55AM Wireless High-isolation Power Supply for Gate Drives Using Class-E Inverter and GaN devices [527]
Yan Sheng, Zhao Yihui, Deng Chengfeng, Tang Haibo, Jiang Runquan and Pan Jianyu
Chongqing University, China

11:20AM Improved Short-Circuit Protection Scheme with Fast Fault Detection for SiC MOSFET [1096]
Shahjahan Ahmad Syed, N V Prasad Kamisetty and Narayanan Gopalaratnam
Indian Institute of Science, Bengaluru, India

11:45AM 1.2 kV SiC MOSFET Full-Bridge Power Module with Integrated Gate Driver and Coupled Inductor [318]
Jack Knoll, Jesi Miranda-Santos, Xingyu Chen, Christina DiMarino and Qiang Li
Virginia Tech, United States
Session S88: Synchronous Reluctance Machines  
Wednesday, October 12, 2:00PM-3:40PM, Room: 140B-Level 100, Chair: Gianmario Pellegrino, Yves Perriard

2:00PM  Effect of Step Skew in Synchronous Reluctance Machines for High Performance Applications [#474]  
Md Sariful Islam, Amina Shrestha and Mohammad Islam  
Halla Mechatronics, United States

2:25PM  Design Optimization and Comparison of PM-Assisted Synchronous Reluctance Machine using Different Magnet Combinations [#377]  
Praveen Kumar, Qingqing Ma, Ali Al-Qarni, Towhid Chowdhury and Ayman EL-Refaie  
Marquette University, United States

2:50PM  Synchronous Reluctance Machines for Low Torque Ripple Requiring Applications [#1316]  
Mazharul Chowdhury, Mohammad Islam and Iqbal Husain  
NC State University, United States; Halla Mechatronics, United States

3:15PM  Design and Analysis of Line-Start Synchronous Reluctance Motor Considering the Maximum Inertia and Power Factor [#1313]  
Kim Hyunwoo, Ahn Jungho, Kim Jeongwon, Yun Inyeol, Kang Junho and Lee Ju  
Hanyang University, Korea, Republic of

Session S89: Induction Motor Drives  
Wednesday, October 12, 2:00PM-3:40PM, Room: 140C - Level 100, Chair: Jiangang Hu, Arshiah Mirza

2:00PM  Stable and Passive Observer-Based V/Hz Control for Induction Motors [#637]  
Lauri Tiitinen, Marko Hinkkanen and Lennart Harnefors  
Aalto University, Finland; ABB Corporate Research, Sweden

2:25PM  Control of a Five-Phase Induction Motor Drive with High-Torque Density and Voltage Overmodulation [#1231]  
Luca Vancini, Michele Mengoni, Gabriele Rizzoli, Luca Zarri and Angelo Tani  
University of Bologna, Italy

2:50PM  Stator and Rotor Temperatures Estimation in Three-Phase Open-ended Winding Induction Motor Drives [#556]  
Daniele Cremente, Luigi Danilo Tornello, Salvatore Foti, Giacomo Scelba, Antonio Testa and Giuseppe Scarcella  
University of Catania, Italy; University of Messina, Italy

3:15PM  One New Terminal Reaching Law Based Sliding Mode with Direct Thrust Control for the Linear Induction Machines in Metro Transportation [#29]  
Abdul Khalique Jnuejo, Wei Xu, Faye F. M. El-Sousy, Ashfaque Ahmed Hashmani, Moustafa Magdi and Mohamed G. Hussien  
Department of Electrical Engineering, Qaid-e-Awa, Pakistan; State Key Laboratory of Advanced Electromagnetic, China; Prince Sattam bin Abdulaziz University, College, Saudi Arabia; Electrical Engineering, Mehran University of Eng, Pakistan; Electrical Engineering Department, Faculty of En, Egypt; Department of Electrical Power and Machines Engi, Egypt

Session S90: Diagnostics, Noise and Vibration in Electric Machines II  
Wednesday, October 12, 2:00PM-3:40PM, Room: 140D -Level 100, Chair: David Reigosa, Thomas Wolbank

2:00PM  Fault Detection and Severity Assessment in PMSMs Using Search Coils Exploiting Machine Symmetry [#1110]  
Marcos Orviz, David Reigosa, Hyeon-Jun Lee, Jigyun Jeong, Sang Bin Lee and Fernando Briz  
Universidad de Oviedo, Spain; Korea University, Korea, Republic of

2:25PM  Critical Aspects of Demagnetization Faults in Direct Drive Permanent Magnet Generators for Renewables [#10]  
Konstantinos Gyftakis, Giorgos Skarmoutsos, Ignacio Barajas-Solano, Joe Burchell and Markus Mueller
2:00PM Analysis and Conceptualization of a Single-Phase Buck-Boost Integrated EV On-Board Charger Based on a Double Bridge Inverter Drive System [#1032]
Davide Cittanti, Enrico Vico, Fabio Mandrile, Eric Armando and Radu Bojoi
Politecnico di Torino, Italy

2:25PM Analysis and Design of Soft-Switching Single-Stage Single-Phase PFC Converter for Bidirectional Plug-in EV Charger [#860]
Nil Patel, Luiz Lopes and Akshay Kumar Rathore
Concordia University, Canada; Singapore Institute of Technology, Singapore

2:50PM Diode Current Reduction Method of Three-Phase Boost PFC Converter with Semi-Bridgeless PFC Diode [#1311]
Jeongjun Seo, Yonghee Lee and Jungik Ha
Seoul National University, Korea (South); LG Innotek Co. Ltd., Korea (South)

3:15PM Supercapacitor and Bidirectional DC-DC Converter-based Active Charge Balancing Scheme for Lithium-ion Batteries [#189]
Akash Samanta, Alvin Huynh, Mohit Sharma, Vinicius Marcis and Sheldon Williamson
Graduate Research Scholar, Canada; Graduate Student, Canada; Associate Manager(R&D), India; Professor and Canada Research Chair, Canada

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**Session S92: Converters for Microgrid II**
Wednesday, October 12, 2:00PM-3:40PM, Room: 140F -Level 100, Chair: Aswad Adib, Ali Khajehoddin

2:00PM Aggregated Emulation of Multiple Converters with Heterogeneous Dynamics in Low-Voltage Microgrids - A Clustering Approach [#812]
Yubo Song, Subham Sahoo, Yongheng Yang, Frede Blaabjerg and Yun Wei Li
Aalborg University, Denmark; Zhejiang University, China; University of Alberta, Canada

2:25PM Multi-Agent Deep Reinforcement Learning for Decentralized Voltage-Var Control in Distribution Power System [#1410]
Mengfan Zhang, Qianwen Xu, Sindri Magnusson, Robert Pilawa-Podgurski and Guodong Guo
KTH Royal Institute of Technology, Sweden; Stockholm University, Sweden; University of California, Berkeley, United States; North China Electric Power University, China

2:50PM A Converter-Based Battery Energy Storage System Emulator for the Controller Testing of a Microgrid with Dynamic Boundaries and Multiple Source Locations [#1091]
Dingrui Li, Yiwei Ma, Chengwen Zhang, He Yin, Yu Su, Lin Zhu, Fred Wang and Leon M Tolbert
University of Tennessee, United States

3:15PM Unified Control Method for Seamless Transition of a Weak Grid Connected AC Microgrid to Islanded Mode [#1324]
Mehrnaz Madadi, Subhashish Bhattacharya and Ke Zou
North Carolina State University, United States; Ford motor company, United States
Session S93: Photovoltaic Converter Control and Hardware Enhancement Features

Wednesday, October 12, 2:00PM-3:40PM, Room: 140G -Level 100, Chair: Dorai Yelaverthi, Rolando Burgos

2:00PM  Adaptive Internal Model based Current Control with Embedded Active Damping of a Three-Phase Grid Connected Inverter with LCL Filter for PV Application [#1294]
Vikram Roy Chowdhury and Akanksha Singh
National Renewable Energy Laboratory, United States

2:25PM  A Nonlinear Direct Power Controller for a Three-phase Grid Connected Inverter with Online Parameter Update for PV Application [#1291]
Vikram Roy Chowdhury and Akanksha Singh
National Renewable Energy Laboratory, United States

2:50PM  A Modular Step-up PV Converter With Coupled Output Power Balancers Utilizing A New Fully Soft-switched Active Voltage Quadrupler (AVQ) [#1122]
Kajanan Kanathipan and John Lam
York University, Canada

Suman Debnath, Phani R V Marthi, Zerui Dong, Qianxue Xia and Sudipta Chakraborty
Oak Ridge National Laboratory, United States; Opal-RT Corporation, United States; Georgia Institute of Technology, United States; Opal-RT Technologies, United States

Session S94: Grid Interactive Inverters

Wednesday, October 12, 2:00PM-3:40PM, Room: 250A -Level 200, Chair: Zahra Saadatizadeh, Carl Ho

2:00PM  Inductor Core Loss Estimation and Comparison of Modulations Achieving ZVS for High-Frequency DCM Grid-tied Inverters [#1389]
Cheng Huang, Rintaro Shimada, Tomoyuki Mannen and Takanori Isobe
University of Tsukuba, Japan

2:25PM  Half Bridge Current Source Inverter Topology for Grid-Connected Applications [#621]
Reza Alavi and Ho Carl
University of Manitoba, Canada

2:50PM  Dynamic Phasor-Based Modeling and Analysis of Selective Harmonic Compensated Single-Phase Grid-Forming Inverter Connected to Nonlinear and Resistive Loads [#786]
Udoka Chile Nwaneto and Andrew M. Knight
University of Calgary, Canada

3:15PM  An Improved High-Resolution Wide Bandwidth ANPC Converter using VLMM and Lyapunov Stability Theory for Grid-Connected Applications [#654]
Mohammad Babaie, Mostafa Abarzadeh and Al-Haddad Kamal
Ecole de technologie superieure, Canada; SmartD Technologies Inc., Canada

Session S95: Power Converter Stability I

Wednesday, October 12, 2:00PM-3:40PM, Room: 250B -Level 200, Chair: Giacomo Scelba, Fei Lu

2:00PM  Simplified Stability Analysis Method for Multiple Servo Drive System Connected to Common DC Bus Line [#665]
Katsuki Miura, Hiroki Watanabe, Keisuke Kusaka, Jun-ichi Itoh, Takeshi Kiribuchi and Hiroyuki Tokusaki
Nagaoka University of Technology, Japan; OMRON Corporation, Japan

2:25PM  A Cascaded Power Controller for Robust Frequency Ride-Through of Grid-Forming Converters [#281]
Paul Imgart, Anant Narula, Massimo Bongiorno, Mebtu Beza and Jan Svensson
Chalmers University of Technology, Sweden; Hitachi Energy, Hitachi Energy Research, Sweden
2:50PM  Impact of the Cascaded DC-DC Converter on the D-Q Impedance of a PFC Converter [#313]
Qing Lin, Bo Wen, Rolando Burgos, Xiong Li and Qiong Wang
CPES, Virginia Tech, United States; Google, United States

3:15PM  Active Damping of Power Control for Grid-Forming Inverters in LC Resonant Grids [#297]
Shiyi Liu, Heng Wu, Xiongfei Wang, Theo Bosma, Jos van der Burgt, Ganesh Sauba and Ravi Singh
DNV and Aalborg University, Denmark; Aalborg University, Denmark; DNV, Netherlands

Session S96: Measurements, testing and standards III
Wednesday, October 12, 2:00PM-3:40PM, Room: 250C -Level 200, Chair: Jinia Roy, Xuzhen Huang

2:00PM Vibration Monitoring of Power Transformer based on Ultra-Sensitive Fiber Optic Sensors [#306]
Nageswara Lalam, Brandon Grainger, Dolendra Karki, Ruishu Wright, Khurram Naeem and Paul Ohodnicki
National Energy Technology Laboratory, United States; University of Pittsburgh, United States

2:25PM Shielding Technique for Noise Reduction in Hall-Effect Current Sensor of Voltage Source Inverter [#336]
Jiwon Yoo, Yoon-Ro Lee, Hwigon Kim and Seung-Ki Sul
Seoul National University, Korea (South)

3:00PM Synchronized Micro-Controllers-based Data Acquisition System for Energy Plants using Modbus Protocol [#197]
Maeva Courcelle, Dustin Kottonau and Giovanni De Carne
Karlsruhe Institute of Technology, Germany

3:15PM Combinational Rogowski Coil with Enhanced DC Measurement Capability for Double Pulse Test Applications [#974]
Sadia Binte Sohid, Han Cui, Wen Zhang, Fred Wang and Bernhard Holzinger
University of Tennessee Knoxville, United States; Keysight Technologies, Germany

Session S97: Design Optimization and Loss Minimization Studies
Wednesday, October 12, 2:00PM-3:40PM, Room: 251A -Level 200, Chair: Tarisciotti Luca, Omid Beik

2:00PM Influence of Layout Parasitics and its Optimization in Two-Level Gallium-Nitride Based Current Source Inverter [#1174]
Mustafeez ul Hassan and Fang Luo
Stony Brook University, United States

2:25PM Hybrid Phase-Frequency Control-enabled Global Loss Minimization of a Full-Bridge LLC Converter under Wide Gain and Load-range Operation [#645]
Naveed Ishraq, Saikat Dey and Ayan Mallik
Arizona State University, United States

2:50PM Optimization and Co-design of a 2-MHz GaN-based 700W LLC Converter [#646]
Nitish Jolly, Ashwin Chandwani, Osarogie Purr Irabor and Ayan Mallik
Arizona State University, United States

3:15PM Extended InC MPPT Control for Phase-Shifted Dual-Input LLC Converter [#990]
Abdullah Alhatlani, Sumana Ghosh and Issa Batarseh
Imam Mohammad Ibn Saud Islamic University, Saudi Arabia; University of Central Florida, United States

Session S98: Magnetic Design for Isolated DC-DC Converters
Wednesday, October 12, 2:00PM-3:40PM, Room: 251B/C -Level 200, Chair: Marcos Alonso, Mahshid Amirabadi

2:00PM New Hybrid Model for Evaluating the Frequency-Dependent Leakage Inductance of a Variable Inductance Transformer (VIT) [#76]
Angshuman Sharma and Jonathan W. Kimball
Missouri University of Science and Technology, United States

2:25PM  Analysis and Design of a Multiport Resonant DC Transformer for Solid-State Transformer Applications [#370]
Thiago Pereira, Yuqi Wei, Homer A. Mantooth and Marco Liserre
Kiel University, Germany; University of Arkansas, United States

2:50PM  Multi-Objective-Optimized Parameter Design Method for High-frequency Resonant Converters [#947]
Ling Gu, He Fan, Zhiyu Jin and Da Xu
Nanjing University of Science and Technology, China

3:15PM  A Single Stage 950 V to 7V DC/DC Modified Flyback Converter Topology [#1255]
Shubham Srivastava, Mandeep Singh Rana and Santanu K. Mishra
IIT Kanpur, India

Session S99: Circuit Design with Silicon Carbide MOSFETS
Wednesday, October 12, 2:00PM-3:40PM, Room: 252A/B-Level 200, Chair: Alan Mantooth, Srivatsa Ragunath

2:00PM  Digital Active Gate Driving System for Paralleled SiC MOSFETs with Closed-loop Current Balancing Control [#743]
Liyang Du, Yuqi Wei, Xia Du, Andrea Stratta, Zahra Saadatizadeh and Alan Mantooth
University of Arkansas, United States

2:25PM  Gate Driver Power Supply for Medium Voltage SiC Mosfets with Air Core Transformer [#695]
Juan Sabate, Eladio Delgado and Maja Harfman-Todorovic
GE Research, United States

2:50PM  A Physics-based Simscape Compact SiC Power MOSFET Model with Temperature-Scaling [#994]
Abu Shahir Md Khalid Hasan, Md Maksudul Hossain and H. Alan Mantooth
University of Arkansas, United States

3:15PM  Understanding PCB Design Parameters for Optimal Thermal Performance of Surface-Mount SiC MOSFETs [#353]
Zheng An, Dorai Yelaverthi, Chunmeng Xu and Xiaoqing Song
Georgia Institute of Technology, United States; ABB US Research Center, United States

Session S100: Interior Permanent Magnet Machines
Wednesday, October 12, 4:00PM-5:40PM, Room: 140B-Level 100, Chair: Rukmi Dutta, Takashi Kato

4:00PM  Design, Analysis and Experimental Evaluation of a Novel High-Speed High-Power Ferrite IPM Machine for Traction Applications [#679]
Khoa Dang Hoang, Anshan Yu, Sana Ullah, Kais Atallah, Giorgio Valente and Annabel Shahaj
The University of Huddersfield, United Kingdom; Altair China, China; The University of Newcastle, United Kingdom; The University of Sheffield, United Kingdom; Hexagon System Dynamics, United Kingdom

4:25PM  Trade Study for Rare-Earth-Free Interior Permanent Magnet Synchronous Machine using MnBi Permanent Magnets [#117]
Ryan Brody, Paul Ohodnicki, Mohendro Ghosh, Ahmed Talaat, Cuauhtemoc Macias, Jun Cui, Andrew Sherman and Brandon Grainger
University of Pittsburgh, United States; Iowa State University, United States; Powdermet Inc., United States

4:50PM  Effect of Stray Magnetic Field on Position Sensor Used in Permanent Magnet Synchronous Machine (PMSM) Drive for Propulsion System [#591]
William Jensen, Mazharul Chowdhury, Jihyun Kim and Brian Gallert General Motors, United States

Session S101: Medium Voltage and High-Power Drives
Wednesday, October 12, 4:00PM-5:40PM, Room: 140C - Level 100, Chair: Jun Wang, Mohammed Agamy

4:00PM Three-Level Optimized Pulse Patterns With Reduced Common-Mode Voltage [#111] Isavella Koukoula, Petros Karamanakos and Tobias Geyer
Tampere University, Finland; ABB Systems Drives, Switzerland

4:25PM Gradient-Based Predictive Pulse Pattern Control with Active Neutral Point Balancing for Three-Level Inverter Medium-Voltage Drives [#894]
Mirza Abdul Waris Begh, Petros Karamanakos and Tobias Geyer
Tampere University, Finland; ABB System Drives, Switzerland

4:50PM A New Reduced Power Cell for Regenerative Cascaded H-Bridge Motor Drives [#656]
Doho Kang, Zhituo Ni, Sarah Badawi, Mehdi Narimani, George Cheng and Navid Zargari
McMaster University, Canada; Rockwell Automation, Canada

Session S102: Switched Reluctance and Flux Switching Machines II
Wednesday, October 12, 4:00PM-5:40PM, Room: 140D -Level 100, Chair: Lavanya Vadamodala, Roy McCann

4:00PM Magnetic Flux Path and Inductance Analysis of Flux-Switching Machines with Different Field and Armature Winding Configurations [#1300]
Mostafa Fereydoonian, Dheeraj Bobba and Woongkul Lee
Michigan State University, United States; Powersys-Solutions, United States

4:25PM Experimental Investigations on 10,000-RPM Slitted-Rotor Switched Reluctance Machine [#1026]
Syed Shahjahan Ahmad, Anupam Verma, Mouli Thirumalasetty, Vijai Biradar, Gopalaratnam Narayanan and Pramod Kumar
Indian Institute of Science, India

4:50PM Optimization Comparison of DC-Excited Vernier Reluctance Machine Synchronous Condensers [#406]
Abraham Botes and Maarten J. Kamper
University of Stellenbosch, South Africa

Session S103: Battery System
Wednesday, October 12, 4:00PM-5:40PM, Room: 140E -Level 100, Chair: Woongkul Lee, Shuvajit Das

4:00PM Maximum Current Limit Equalization by Phase-Shift Control of Multi-Active Half-Bridge Equalizer [#1047]
Manish Milind Tathode, Shimul Kumar Dam, Baiju Payyappilly, Vinod John and Utsab Kundu
EE Department, Indian Institute of Science, India; University of Tennesse, United States; UR Rao Satellite Centre, ISRO, India

4:25PM Realtime Internal-Impedance Measurement of Li-ion Battery Using Discrete-Interval-Binary-Sequence Injection [#61]
Minh Tran, Tomi Roinila and Joni Markkula
Tampere University, Finland

4:50PM Multi-Loop Control of Hybrid Li-ion Battery Packs Using the Auxiliary DC Bus for State-of-Charge Regulation [#772]
Marium Rasheed, Craig Simpson, Hongjie Wang and Regan Zane
Utah State University, United States

Session S104: Power Converters for Grid Support
Wednesday, October 12, 4:00PM-5:40PM, Room: 140F -Level 100, Chair: Ma Awal, Khorsheed Alam

4:00PM A Low-Voltage-Ride-Through Strategy for Grid-Forming Converters Based on Reactive Power Synchronization [#138]
Han Deng, Yang Qi, Jingyang Fang, Vincent Debuisschere and Yi Tang
Nanyang Technological University, Singapore; Northwestern Polytechnic University, China; Shandong University, China; University of Grenoble Alpes, France
4:25PM  Estimated Load Current Feedforward Method for DC-DC Converter to Improve DC Bus Voltage Regulation in a Multi-Port Converter Based System [#1244]
Md Rashed Hassan Bipu, Siye Cen and Iqbal Husain
North Carolina State University, United States

4:50PM  Control and Grid Support Function Evaluation for a three-phase Back to Back Modular Multilevel Converter System [#1280]
Vikram Roy Chowdhury, Akanksha Singh and Barry Mather
National Renewable Energy Laboratory, United States

**Session S105: DC-DC Converters for Renewable Energy**
*Wednesday, October 12, 4:00PM-5:40PM, Room: 140G -Level 100, Chair: Debanjan Chatterjee, Regan Zane*

4:00PM  Analysis of Dual Phase-shifted Full-bridge Converter with Modular Asymmetry [#1360]
P. Roja and Vinod John
Indian Institute of Science, Bangalore, India

4:25PM  SiC-based Isolated Three-port DC-DC Converter Implementation for Medium Voltage Microgrid Applications [#1080]
Osamah Aljumah, Semih Isik, Sulaiman Alshammari and Subhashish Bhattacharya
North Carolina State University, United States

4:50PM  Analysis and Design of LLC Based Dual Half Active Bridge Resonant Converter [#1022]
Prakash Ji Barnawal, Vivek Nandan Lal and Rajeev Kumar Singh
Indian Institute of Technology(BHU), Varanasi, India

**Session S106: Inverters for High-Power Industrial Applications**
*Wednesday, October 12, 4:00PM-5:40PM, Room: 250A -Level 200, Chair: Cristian Blanco Charro, Fei Lu*

4:00PM  Hardware Implementation of a SiC Three-Phase Four-Leg VSI with Sigma-Delta Modulation to Comply with the Military Standards 1399 and 461 [#1425]
Matthew Storm, Alexander Julian and Giovanna Oriti
Naval Postgraduate School, United States; Consultant, United States

4:25PM  Design of Rogowski Coil Current Sensor Integrated with Busbar and Gate Driver for 211 kW Three-Level T-Type Inverter [#1061]
Xingchen Zhao, Ripun Phukan, Che-Wei Chang, Dong Dong, Rolando Burgos, Arnaud Plat and Debbou Mustapha
Virginia Tech, United States; virginia Tech, United States; Airbus, France

4:50PM  Loss Analysis and Experimental Evaluation of a Si-IGBT based ARCP Inverter [#865]
Eddy Aeloiza, Weiqiang Chen, Veli-Matti Leppanen and Tero Viitanen
ABB, United States; ABB, Finland

**Session S107: Reliability, Diagnostics and Fault Analysis of Power Converters II**
*Wednesday, October 12, 4:00PM-5:40PM, Room: 250B -Level 200, Chair: Marco di Benedetto, Rangarajan Tallam*

4:00PM  A Half-Bridge On-State Voltage Sensor for In-Situ Measurements [#1116]
Chondon Roy, Namwon Kim, Daniel Evans, Ali Parsa Sirat, James Gafford and Babak Parkhideh
University of North Carolina at Charlotte, United States; Oak Ridge National Laboratory, United States

4:25PM  Rogowski-pair Sensor for High-speed Switch Current Measurements without Reset Requirement [#1223]
Ali Parsa Sirat, Hossein Niakan, Chondon Roy and Babak Parkhideh
University of North Carolina at Charlotte, United States

4:50PM  Digital Twin based Real-Time Analysis of DC-DC Boost Converters [#1380]
Giulia Di Nezio, Marco Di Benedetto, Alessandro Lidozzi and Luca Solero
Roma Tre University, Italy
Session S108: Big data, machine learning and AI applications in energy systems
Wednesday, October 12, 4:00PM-5:40PM, Room: 250C -Level 200, Chair: Yan Li, Subham Sahoo

4:00PM Audio Data-driven Anomaly Detection for Induction Motor Based on Generative Adversarial Networks [#919]
Jaehoon Shim, Taesuk Joung, Sangwon Lee and Jung-Ik Ha
Seoul National University, Korea (South)

4:25PM Impedance Mapping in Smart Grids with Dynamic Mode Decomposition
Luxembourg Institute of Science and Technology, Luxembourg; Loyola University Andalusia, Spain

4:50PM Convolutional Neural Network Based Metal Object Detection System for Wireless EV Charging
[#104]
Chengyin Liu, Hao Chen, Zeqian Cheng, Yizhen Lin, Jiande Wu and Xiangning He
Zhejiang University, China; China Tobacco Zhejiang industrial co, LTD, China

Session S109: Control of Power Converters II
Wednesday, October 12, 4:00PM-5:40PM, Room: 251A -Level 200, Chair: Marko Hinkkanen, Mengqi Wang

4:00PM An Optimized Start-up Scheme for Isolated Cascaded AC/DC Power Converters [#1240]
Garry Jean-Pierre, Vasistha Burugula, Awneesh Tripathi and Vijay Bhavaraju
Eaton Research Labs, United States; FREEDM Lab, United States

4:25PM Double-Sided Control of DC-link Voltage in Back-to-Back Converters [#563]
Ziya Ozkan, Dao Zhou and Frede Blaabjerg
PostDoc, Denmark; Associate Professor, Denmark; Professor, Denmark

[#1431]
Shyamal Shivneel Chand, Dhirendran Kumar, Marco Di Benedetto, Ravneel Prasad, Hiye Mudaliar, Alessandro Lidozzi, Luca Solero and Maurizio Cirrincione
University of the South Pacific, Fiji; Roma Tre University, Italy; University of Palermo, Fiji; ROMA TRE University, Italy

Session S110: Isolated DC-DC Converters with Dual Active Bridges
Wednesday, October 12, 4:00PM-5:40PM, Room: 251B/C -Level 200, Chair: Regan Zane, Amirnasser Yazdani

4:00PM Modeling and Soft-Switching Operation of an Isolated Modular-Multilevel-Converter-Based DC- DC Converter [#1162]
Hossein Saeedifard and Amirnasser Yazdani Ryerson University, Canada

4:25PM Reconfigurable Bidirectional DC-DC Converter for Electric Vehicle Onboard Charging Applications [#1029]
Ramana Manohar Reddy and Das Moumita IIT Mandi, India

4:50PM Investigation of the Five-level Hybrid Active NPC-based Dual-Active-Bridge Converter for EV Battery Charging Applications [#975]
Satish Belkhode, Gautam Ratanpuri, Suman Mandal, Anshuman Shukla and Suryanarayana Doolla
Indian Institute of Technology Bombay, India
Session S111: Transformer Design and Isolation Materials  
*Wednesday, October 12, 4:00PM-5:40PM, Room: 252A/B - Level 200, Chair: Robert Cuzner, Debanjan Chatterjee*

4:00PM  Planar Structure High-Frequency Transformer Design for Medium Voltage Applications [#847]  
Ruxi Wang, Zhiyu Shen, Chi Zhang, Boyi Zhang and Barbosa Peter  
Delta Electronics, United States

4:25PM  Insulation Design for a Compact, Medium-Voltage Transformer [#1268]  
Sharifa Sharfeldden, Ravisekhar Raju and Christina Dimarino  
Virginia Polytechnic Institute & State Universit, United States; Fastwatt LLC, United States

4:50PM  Calculation of Transformer Leakage Flux by Simplified Flux Path Geometries [#1386]  
Richard Beddingfield, Alex Leary, Ronald Noebe, Mark Nations, Randy Bowman and Subhashish Bhattacharya  
North Carolina State Univesity, United States; NASA Glenn Research Center, United States; Nasa Glenn Research Center, United States

Session S112: IPM and Synchronous Reluctance Machines  
*Thursday, October 13, 8:30AM-10:10AM, Room: 140B-Level 100, Chair: Luigi Alberti, Thomas Jahns*

8:30AM  Identification and Inversion of the Non-Linear Magnetic Model of Anisotropic Synchronous Machines [#1396]  
Shafiq Odhano and Barrie Mecrow  
Newcastle University, United Kingdom

8:55AM  Performance Evaluation of Dual 3-Phase Permanent Magnet Assisted Synchronous Reluctance Machines under Faults [#629]  
Md Sariful Islam, Amina Shrestha and Mohammad Islam  
Halla Mechatronics, United States

9:20AM  Feasible Operating Regime of a Triple Three Phase Synchronous Reluctance Motor using Field Analysis [#1191]  
Musayyibi Shuaibu and Joseph Olorunfemi Ojo  
Tennessee Tech University, United States

9:45AM  A Proposal of Hybrid Excitation Variable Flux Memory Motor Having Field Winding with Magnetization Function in the Rotor [#604]  
Keito Yokomichi, Ren Tsunata, Masatsugu Takemoto and Jun Imai  
Okayama University, Japan

Session S113: Monitoring, Diagnostics, Reliability and EMI  
*Thursday, October 13, 8:30AM-10:10AM, Room: 140C - Level 100, Chair: Weiqiang Chen, Peng Han*

8:30AM  Generalized Roughness Bearing Fault Diagnosis Using Time Series Analysis and Gradient Boosted Tree [#1301]  
Mojtaba Afshar, Mehrdada Heydarzadeh and Bilal Akin  
Dept. Elec. Eng. University of Texas at Dallas, United States

8:55AM  Methods For Reduced Computation Time For Frequency-Domain Evaluation Of Transient Voltage Effects In Electric Machines [#362]  
Bianca Wex, Wolfgang Gruber and Siegfried Silber  
Linz Center of Mechatronics, Austria; Johannes Kepler University Linz, Austria

9:20AM  Fault-Tolerant Control of a Dual Three-Phase Interior PMSM Under Open-Phase Faults [#1395]  
Marcos Orviz, Diego F. Laborda, Juan Manuel Guerrero and David Reigosa  
Universidad de Oviedo, Spain

9:45AM  Degradation Monitoring of Power Modules Based on Frequency-Domain Thermal Model [#456]  
Ke Ma, Quan Zhong, Mengqi Xu, Dingyi Wang, Haoran Wang and Shengming Wang  
Shanghai Jiaotong University, China; Hefei University of Technology, China; Sungrow Power Contacts, Inc.
Session S114: Switched Reluctance and Flux Switching Machines III  
Thursday, October 13, 8:30AM-10:10AM, Room: 140D -Level 100, Chair: Lavanya Vadomada, Roy McCann

8:30AM  Fast Optimization of a Switched Reluctance Motor for 2W-EV using Combined Surrogate Model and Multi-Objective Optimization [#905]  
        Farha Siddique, Bhim Singh and Sharankumar Shastri  
        Indian Institute of Technology Delhi, India

8:55AM  A Modified Geometry Based Analytical Model of Switched Reluctance Machines for Rapid Design Process [#1002]  
        Lavanya Vadomada, Shuvajit Das, Anik Chowdhury and Yilmaz Sozer  
        Altair Inc, United States; University of Akron, United States

        Leyue Zhang, Josh Schroeder, Justin Paddock, Gregory Nellis and Bulent Sarlioglu  
        University of Wisconsin-Madison, United States

9:45AM  Offline Current Profiling Schemes for Torque Ripple Reduction in Mutually Coupled Switched Reluctance Machines using a Three-Phase Voltage Source Converter [#1254]  
        Kun Hu and Jin Ye  
        University of Georgia, United States

Session S115: Electrified Air Vehicles  
Thursday, October 13, 8:30AM-10:10AM, Room: 140E -Level 100, Chair: Babak Nahid-Mobarakeh, Md Sariful Islam

8:30AM  High-Reliability Converter with Silicone-coating Insulation Architecture for Electric Aircraft [#782]  
        Hiroshi Kamizuma, Hisashi Morooka, Ryo Moteki, Kimihisa Furukawa, Yuichi Mabuchi and Kinya Nakatsu  
        Hitachi, Ltd. Research & Development Group, Japan

8:55AM  Solar array regulation for high-voltage satellite power bus [#509]  
        Ausias Garrigos, David Marroqui, Jose Manuel Blanes, Carlos Orts, Pablo Casado and Cristian Torres  
        Miguel Hernandez University of Elche, Spain

9:20AM  Reliability-Oriented Multi-Objective Design Optimization of Electric Aircraft Propulsion Drives [#713]  
        Benjamin Luckett and JiangBiao He  
        University of Kentucky, United States

        Hao Zeng, Thomas Jahns and Bulent Sarlioglu  
        University of Wisconsin - Madison, United States

Session S116: Devices V2G Applications  
Thursday, October 13, 8:30AM-10:10AM, Room: 140F -Level 100, Chair: Alireza Fatemi, Marzieh Karami

8:30AM  $\eta_{max}$-Charging Strategy for Lithium-Ion Batteries of EVs in V2G Applications [#829]  
        Hamzeh Beiranvand, Nicola Blasuttiigh, Thiago Pereira, Sandra Hansen geb. Noehren, Helge Krueger, Marco Liserre and Alessandro Massi Pavan  
        Kiel University, Germany; University of Trieste, Italy

8:55AM  Design and Implementation of a Hardware Test-bed for Real-time EV-Grid Integration Analysis [#1347]  
        Emin Ucer and Mithat Kisacikoglu
9:20AM  Efficiency Trade-off-Oriented Analysis for the integration of DC-DC Converter and Battery Pack in V2G Applications [#731]
Nicola Blasuttigh, Hamzeh Beiranvand, Thiago Pereira, Simone Castellan and Marco Liserre
University of Trieste, Italy; Kiel University, Germany

9:45AM  A Novel Multilevel EV Charging Station Based on the Parallel Hybrid Converter and Dual Active Bridge [#1098]
Nikhil Suresh Patil, Ibhan Chand Rath, Mohd Shadab Ansari and Anshuman Shukla
Indian Institute of Technology Bombay, India

**Session S117: Emerging High Power Converters and Monitoring Techniques**
*Thursday, October 13, 8:30AM-10:10AM, Room: 140G -Level 100, Chair: Dong Dong, Qianwen Xu*

8:30AM  A 75 kVA Intelligent Power Stages (IPS) Unit Design for Future Grid-interface Application [#963]
Yuliang Cao, Yijie Bai, Vladimir Mitrovic, Boran Fan, Dong Dong, Rolando Burgos, Dushan Boroyevich, Radha Krishna Moorthy and Madhu Sudhan Chinthavali
Virginia Tech, CPES, United States; Oak Ridge National Laboratory, United States

8:55AM  A Unidirectional Single-Phase LLC Based High Frequency Link Inverter [#350]
Anirban Pal, Vishal Anand A. G., Bala Subrahmanyan Kuchibhatla and Kaushik Basu
University of Nottingham, United Kingdom; Bloom Energy (I) Pvt Ltd., India; Indian Institute of Science, Bangalore, India

9:20AM  Real-time Condition Monitoring of Power Modules in Grid-tied Power Converter [#1249]
Junchong Fan, Dihao Ma, Jin Wang, Madhu Chinthavali and Radha Moorthy
The Ohio State University, United States; Oak Ridge National Laboratory, United States

9:45AM  Automated Detection of Failures in Doubly-Fed Induction Generators for Wind Turbine Applications [#90]
Byambasuren Battulga, Muhammad Faizan Shaikh, Sang Bin Lee and Mohamed
Osama Korea University, Korea, Republic of; General Electric Company, Germany

**Session S118: Low Power Converters for Industrial Applications**
*Thursday, October 13, 8:30AM-10:10AM, Room: 250A -Level 200, Chair: Fang Luo, Utsab Kundu*

8:30AM  Tuned Three-Level Flying Capacitor Power Amplifier for Visible Light Communication [#480]
Juan R. Garcia-Mere, Juan Rodriguez, Diego G. Lamar and Javier Sebastian
University of Oviedo, Spain

8:55AM  Ultra-Low Frequency DC-DC Converters Using Switched Batteries [#83]
Emeric Perez, Carlos-Augusto Berlitz, Yasser Moursy, Bruno Allard, Sami Oukassi and Gael Pillonnet
Univ. Grenoble Alpes, CEA, LETI, France; INSA Lyon, CNRS, Laboratoire Ampere, France

9:20AM  Active Reactance Control for Output Voltage Regulation in Wireless Power Transfer [#536]
Junhyeong Lee and Jung-Ik Ha
Seoul National University, Korea (South)

9:45AM  PWM Inverter-based High Frequency AC Power Architecture for Space Application [#761]
Surjakanta Mazumder, Deekshith V Prabhu, Prachin Kumar Chahar, Utsab Kundu, Pradeep K Peter and Kaushik Basu
Indian Institute of Science, Bangalore, India; U R Rao Satellite Centre, Bangalore, India

**Session S119: Power Semiconductor Reliability and Diagnostics**
*Thursday, October 13, 8:30AM-10:10AM, Room: 250B -Level 200, Chair: Rangarajan Tallam, Yuting Liu*

8:30AM  On the Effect of SiC Power MOSFET Gate Oxide Degradation in High Frequency Phase Leg-Based Applications [#1377]
Javad Naghibi, Sadegh Mohsenzade, Kamyar Mehran, Iqbal Saqib and Martin Foster
Queen Mary University of London, United Kingdom; K. N. Toosi University of Technology,
8:55AM Optimizing Sensor Count and Placement to Detect Bond Wire Lift-offs and Surface Defects in High-Power IGBT Modules using Low-Cost Piezo-electric Resonators [#827]
Tohfa Haque, Abu Hanif and Faisal Khan
University of Missouri Kansas City, United States

9:20AM Single Chip Junction Temperature Measurement for Paralleled SiC MOSFETs in Conduction Mode [#508]
Manuel Riefer, Jonathan Winkler, Sebastian Strache and Ingmar Kallfass
Robert Bosch GmbH, University of Stuttgart, Germany; Robert Bosch GmbH, Germany; University of Stuttgart, Germany

9:45AM Methodology of Gate Voltage Selection for Power Loss Manipulation of Power Semiconductor Device [#999]
Abhishek Chanekar, Nachiketa Deshmukh, Abhinav Arya and Sandeep Anand
Indian Institute of Technology Bombay, India; Indian Institute of Technology Kanpur, India

Session S120: Magnetics
Thursday, October 13, 8:30AM-10:10AM, Room: 250C -Level 200, Chair: Paul Ohodnicki, Adam Skorek

8:30AM Reduction Methodology of Eddy Losses in Ferrite Cores for High-Frequency Transformers Based on Loss-Effective Conductivity Extraction [#238]
Zheyuan Yi, Kai Sun, Hanyu Liu and Quanliang Zhang
Tsinghua University, China; Delta Electronics Shanghai Co. Ltd., China

8:55AM Design of Variable Air-Core Coupled Co-axial Solenoidal Inductors [#1133]
Ujjwal Pratik and Zeljko Pantic
North Carolina State University, United States

9:20AM 3.5 kW/in3 Planar Coupled Inductor Design and Optimization for a 50 kW 3-level Four-Switch Buck-Boost (3L-FSBB) Converter [#969]
Yuliang Cao, Yijie Bai, Vladimir Mitrovic, Boran Fan, Dong Dong, Rolando Burgos, Dushan Boroyevich, Radha Krishna Moorthy and Madhu Sudhan Chinthavali
Virginia Tech, United States; virginia Tech, United States; Oak Ridge National Laboratory, United States

9:45AM Partial Saturation in Permanent Magnet Inductors [#535]
Bradford Houska, Decheng Yan, Joseph Benzaquen and Deepak
Divan Georgia Institute of Technology, United States

Session S121: Control of Power Converters III
Thursday, October 13, 8:30AM-10:10AM, Room: 251A -Level 200, Chair: Giacomo Scelba, Francesco Gennaro

8:30AM Rapid Prototyping of Model Predictive Control in a Grid-Following Three-Phase Inverter to Meet the Conducted EMI Limits in MIL-STD-461G [#868]
Ethan Foster, Alexander Julian, Giovanna Oriti and Matthew Storm Naval Postgraduate School, United States; Consultant, United States

8:55AM Constant Delay-Line Repetitive Control Analysis for VSI under Grid-Tied and Intentional Islanding Operation [#893]
Alessandro Faro, Marco Di Benedetto, Alessandro Lidozzi and Luca Solero
ROMA TRE University, C-PED, Italy

9:20AM Low Voltage, Minimum Switch Count Second-Harmonic Filter for Single-Phase Converters [#1007]
Anwesha Mukhopadhyay and Vinod John
Indian Institute of Science, Bangalore, India

9:45AM Simultaneous Measurement of Bus Impedance and Control Loop Gains in Multi-Converter Systems [#457]
Tomi Roinila, Hessamaldin Abdollahi, Roosa Sallinen, Khodamoradi Aram and Enrico Santi
Session S122: Modulation Strategies for Multi-Level Converters
Thursday, October 13, 8:30AM-10:10AM, Room: 251B/C -Level 200, Chair: Sandro Calligaro, Winway Chen

8:30AM Modulation Strategy for Three-level Neutral-Point-Clamped Converter achieving Clamping Diodes Loss Control [#1056]
Xiang Lin and Dong Dong
Virginia Tech, United States; virginia Tech, United States

8:55AM Three-parts modulation and hybrid balancing for three-phase five-level NPC inverter [#1308]
Eshet Wodajo, Malik Elbuluk, Seungdeog Choi and Ashik Amin
University of Akron, United States; Mississippi state university, United States; Mississippi State University, United States

Pascal Lingom, Joseph Song-Manguelle, Simon Pierre Betoka, Mamadou Lamine Doumbia, Jean- Maurice Nyobe-Yome and Jin Tao
University of Quebec at Trois-Rivieres, Canada; Oak Ridge National Laboratory, United States; National Higher Polytechnic School of Douala, Cameroon; Department of Electrical Engineering and Automat, China

9:45AM Quasi-3-Level Modulation of Multilevel Nested-T Topology [#411]
Wasi Haider Ali, Anatolii Tcai and Thiwanka Wijekoon
OTH Regensburg, Germany; Huawei Technologies, Germany

Session S123: High Power Module Design
Thursday, October 13, 8:30AM-10:10AM, Room: 252A/B -Level 200, Chair: Christina DiMarino, Fang Luo

8:30AM A 650 V, 2.1 mohm GaN Half-bridge Power Module for 400V EV Traction Inverter Application [#134]
Peng Han, Pengkun Liu, Qingyun Huang, Zibo Chen and Alex Huang
The University of Texas at Austin, United States

8:55AM A New Package for SiC Power Modules with Ceramic Heatsink [#115]
Zhaobo Zhang, Xibo Yuan and Lihong Xie
University of Bristol, United Kingdom

9:20AM Demonstration of Wire bondless Silicon Carbide Power Module with Integrated LTCC Jet Impingement Cooler [#1297]
Hao Chen, Tiwei Wei, Xiaoling Li, Yuxiang Chen, Yujui Lin, Sudharsan Chinnaiyan, Mehdi Asheghi and H. Alan Mantooth
University of Arkansas, United States; Stanford University, United States

Benjamin Albano, Boyan Wang, Christina DiMarino and Yuhao Zhang
Virginia Tech, United States

Session S124: Design Optimization in Electric Machines
Thursday, October 13, 10:30AM-12:10PM, Room: 140B-Level 100, Chair: Gerd Bramerdorfer, Peng Han

10:30AM Topology Optimization of Electric Machines: A Review [#409]
Fnu Nishanth and Bingnan Wang
University of Wisconsin-Madison, United States; Mitsubishi Electric Research Laboratories, United States

10:55AM Low Space Harmonic Content Windings (LSHWs) Applied to Improve the Pareto Front in
Design Optimization of Electric Machines [#1346]
Nanjun Tang and Ian P. Brown
Illinois Institute of Technology, United States

11:20AM Sensitivity Study on Configuration of Large Scale Multi-Objective Optimization of a PMSM [#163]
Hiroyuki Sano, Taizo Senda, Yoshitaka Kida, Yusaku Suzuki and Takashi Yamada
JSOL Corporation, Japan

11:45AM Scalability and Design and Optimization of High Specific Power 500kW SPM Machine with Additively Manufactured Coils and Integrated Heat Pipes [#308]
Salar Koushan, Sina Vahid, Ali Al-Qarni and Ayman EL-Refaie
Marquette University, United States

Session S125: High Speed High-Efficiency Motor Drives
Thursday, October 13, 10:30AM-12:10PM, Room: 140C - Level 100, Chair: Mohammed Agamy, Wei Xu

10:30AM RC Filter Free Flux-based Sensorless BLDC Drive for Permanent Magnet Motor using Pulse Amplitude Modulation [#757]
Ik-Tiat Song, Ching-Lon Huang, Yi-En Chen and Shih-Chin Yang
National Taiwan University Mechanical department, Taiwan

Kevin Lee, Zhihao Song and Wenxi Yao
Eaton, United States; Zhejiang University, China

11:20AM Soft-Switching dv/dt Filter with Ultra High Power Density and 50% Power Loss Savings for 150 kW SiC Motor Drives [#678]
Dakai Wang and Wensong Yu
North Carolina State University, United States

11:45AM Zero-Sequence Current Reduction Method of Dual Inverter with a Common DC-Link for High-Speed Applications [#549]
Jun Ohata and Hitoshi Haga
NAGAOKA UNIVERSITY OF TECHNOLOGY, Japan; Nagaoka University of Technology, Japan

Session S126: Wound Field and PM Machines
Thursday, October 13, 10:30AM-12:10PM, Room: 140D - Level 100, Chair: Ian Brown, Rukmi Dutta

10:30AM Bicoherence and Skewness-Kurtosis Analysis for the Detection of Field Winding Faults in Synchronous Motors using stray flux signals [#165]
Jose Aurora Carmenate, Miguel Iglesias-Martinez, Jose Antonino-Daviu, Carlos A. Platero-Gaona, Pedro Fernandez de Cordoba Castella, Jose A. Conejero Casares and Larisa Dunai
Universidad de Pinar del Rio, Cuba; Universitat Politecnica de Valencia, Spain; Universidad Politecnica de Madrid, Spain

10:55AM Influence of the Lamination Material and Rotor Pole Geometry on the Performance of Wound Field Synchronous Machines [#725]
Marco Biasion, Damian Kowal, Reza Rajabi Moghaddam and Michele Pastorelli
Politecnico di Torino, Italy; ABB, Sweden; Independent researcher, Sweden

11:20AM Virtual-stator Loss Model for Synchronous Generators [#255]
Zhaoqiang Zhang, Arne Nysveen, Borge Johannes Fagermyr, Robert Nilssen and Hossein Ehya
Norwegian University of Science and Technology, Norway

11:45AM Change of polarity in Synchronous Motors [#298]
Chiara Conto and Nicola Bianchi
Session S127: Inductive power transfer and traction applications
Thursday, October 13, 10:30AM-12:10PM, Room: 140E -Level 100, Chair: Manuela Sechilariu, Rashmi Prasad

10:30AM  Design Optimization Methodology for High-Frequency Rotary Transformers for Contactless Power Transfer Systems [#419]
Harsha Vardhan, Milijana Odavic and Kais Atallah
University of Sheffield, United Kingdom

10:55AM  Modeling, Design, and Control of a Single-Stage AC-AC Converter-based Inductive Power Transfer System with V2G Capability [#1306]
Jalaj Kumar and Suvendu Samanta
Department of Electrical Engineering, IIT Kanpur, India

11:20AM  High Voltage DC-Bus Voltage Balancing Control of a 350 kW Multiport EV Charging System [#625]
Abhijit Choudhury, Yuichi Mabuchi, Kimihisha Furukawa and Nawaz Husain
Hitachi Ltd., Japan

11:45AM  Isolated Cryogenic Auxiliary Power Supply (CAPS) for GaN Based Converters [#1036]
Samuel Defaz, Mustafeez ul Hassan and Fang Luo
Stony Brook University, United States

Session S128: Power Converters Control
Thursday, October 13, 10:30AM-12:10PM, Room: 140F -Level 100, Chair: Sheldon Williamson, Akash Samanta

10:30AM  Enhanced Operation of Hybrid MMC under Reduced DC-link Voltage [#1064]
Poornachandra Rao Nallamatti and Anshuman Shukla
Indian Institute of Technology, Bombay, India

10:55AM  Pulsating DC Power Minimization in a Multi-port DC/AC Converter by an Adaptive Phase-Shift in the Single-Phase AC Ports [#1205]
Gleisson Balen, Cristian Blanco, Angel Navarro-Rodriguez and Pablo Garcia
University of Oviedo - UNIOVI, Spain

11:20AM  CSS-RIP-APSA Controlled Grid Following Neutral Clamped DSTATCOM for Third Harmonic Mitigation [#1338]
Surya Prakash, Ranjan Kumar Behera, Khaled Al Jaafari, Omar Al Zaabi, Khalifa Al Hosani, Arobinda Dash and Utkal Ranjan Muduli
Indian Institute of Technology Patna, India; Khalifa University, United Arab Emirates

11:45AM  Demand Driven Energy Management for PIPO Auxiliary Power Supply Architecture [#1159]
Yalda Azadeh, Mustafeez ul Hassan, Abdul Basit Mirza, Fang Luo, Krishna Moorothy Radha and Madhu Sudhan Chinthavali
Stony Brook University, United States; Oak Ridge National Lab (ORNL), United States

Session S129: Generators and Control for Wind Applications
Thursday, October 13, 10:30AM-12:10PM, Room: 140G -Level 100, Chair: Jingyang Fang, JiangBiao He

10:30AM  Coordinate Control of Wind Turbines in a MVDC Grid [#383]
Omid Beik and Gholamian Mahzad
North Dakota State University, United States; University of Isfahan, Iran

10:55AM  Design and Control of Series-DC Wind Farms based on Three-Phase Dual Active Bridge Converters [#305]
Hussain A. Hussain and Kareem A. Noureldin
Kuwait University, Kuwait
10:30AM Gate Driver Switching Noise Propagation Study for Medium Voltage SiC-based Power Electronics Building Blocks [#1126]
He Song, Igor Cvetkovic, Richard Zhang, Christina DiMarino and Dushan Boroyevich
Virginia Tech, United States

10:55AM Zero Voltage Vector Based Open Fault Detection Method for a Grid-Connected Single Phase CHMI with Phase-Shifted PWM [#1189]
Juil Kwak, Dongho Choi and June-Seok Lee
Dankook university, Korea (South)

11:20AM Design and Testing of a SiC-based Solid-State Bypass Switch for 1 kV Power Electronics Building Blocks [#304]
Sri Naga Vinay Mutyala, Igor Cvetkovic, Christina DiMarino and Dushan Boroyevich
Center for Power Electronics Systems (CPES), United States

11:45AM Collector-Emitter Voltage Based Health Monitoring of Bond Wire in IGBT at Low Gate Voltage [#884]
Pankaj Kumar, Abhinav Arya, Abhishek Chanekar, Pratik Deshmukh and Sandeep Anand
Qualcomm India, India; Indian Institute of Technology Kanpur, India; Indian Institute of Technology Bombay, India; Intel Technology India Pvt. Ltd., India

Session S131: Control Strategies for Active Bridge Converters
Thursday, October 13, 10:30AM-12:10PM, Room: 251A -Level 200, Chair: Yunting Liu, Marzieh Karami

10:30AM Harmonic-Balance Based Power Flow and ZVS Analysis of a Quad-Active Bridge DC-DC Converter [#1236]
Ezekiel Olayiwola Arogunjo, Joseph Olorunfemi Ojo and Olivia Nnadi
Tennessee Technological University, United States; Tennessee Technological University, United States

10:55AM A Novel Control Strategy for Extending the ZVS Range of Triple Active Bridge Converter [#1180]
Arnur Karbozov, Mriganka Ghosh Majumder, Harish S. Krishnamoorthy and Kaushik Rajashekara
University of Houston, United States

11:20AM Voltage Phasor Based Current Limiting for Grid-Forming Converters [#567]
Tobias Erckrath, Peter Unruh and Marco Jung
Fraunhofer IEE, Germany

11:45AM Time-varying Phasor Analysis of Nonlinear Droop with Virtual Impedance in Stand-alone Residential Nanogrids [#970]
Andres Salazar Llinas, Alberto Berzoy Llerena and Javad Mohamadpour Velni Rivian, United States; sonnen Inc, United States; University of Georgia, United States
Session S132: Control Methods and PWM Techniques for Multi-Level Converters

Thursday, October 13, 10:30AM-12:10PM, Room: 251B/C -Level 200, Chair: Phani Kumar Chamarthi, Kyo-Beum Lee

10:30AM  An Average Model for Three-Phase Five-level Flying Capacitor Converters with Phase-Shifted PWM [#522]
          Biqi Wang, Rolando Burgos and Bo Wen
          Virginia Tech, United States

10:55AM  Double-Vector Model Predictive Voltage Control for 5-Level Flying Capacitor Multilevel Converter [#873]
          Seyed Iman Hosseini Sabzevari, Armin Ebrahimian, Waqar Khan and Nathan Weise
          Marquette University, United States

11:20AM  Enhanced Pulse Width Modulation Methods for 1-ph Five Level Neutral Point Clamped Inverter [#365]
          Phani Kumar Chamarthi, Mohamed Shawky El Moursi, Ahmed Al Durra, Khalifa Alhosani and Ameena Alsumaiti
          Khalifa University, United Arab Emirates

11:45AM  A Si/SiC Hybrid Five-Level ANPC Full-Bridge DAB Converter with Dedicated Modulation Strategy [#459]
          Na Gao, Yu Zhang, Xinmi Wu, Jiawen Yang, Qingxin Guan and Zhuolan Li
          Huazhong University of Science and Technology, China

Session S133: Silicon Carbide Devices

Thursday, October 13, 10:30AM-12:10PM, Room: 252A/B -Level 200, Chair: Andrew Lemmon, Govind Chavan

10:30AM  Electrothermal Ruggedness of High Voltage SiC Merged-PiN-Schottky Diodes Under Inductive Avalanche & Surge Current Stress [#282]
          Chengjun Shen, Saeed Jahdi, Juefei Yang, Olaiyiwola Alatise, Jose Ortiz-Gonzalez and Phil Mellor
          University of Bristol, United Kingdom; University of Warwick, United Kingdom

10:55AM  A 650V Hybrid-Channel SiC Trench MOSFET with Improved On-State Performance [#1108]
          Luyang Zhang, Dai Tianxiang, Peter Gammon, Vishal Shah, Philip Mawby and Marina ANntoniou
          University of Warwick, United Kingdom

11:20AM  Quasi-Two-Level (Q2L) Half Bridge Cascaded (HBC) Super Switch (SS) Concept for Medium Voltage Applications [#870]
          Ruxi Wang, Chi Zhang, Tomas Sadilek, Zhiyu Shen and Peter Barbosa
          Delta Electronics, United States

11:45AM  15kV/50A SiC AC Switch Based On Series Connection of 1.7kV MOSFETs [#543]
          Wei Xu and Alex Q. Huang
          University of Texas at Austin, United States
Special Session SP01: SiC and GaN Applications in Electric Vehicles: Current Issues
Monday, October 10, 12:30PM-2:10PM, Room: 141 -Level 100
Chairs/Organizers:
Victor Veliadis, PowerAmerica

Special Session SP02: Energy Access and Off-Grid Systems: Technology Innovation for Scalable, Affordable and Sustainable Energy Access Solutions
Monday, October 10, 12:30PM-2:10PM, Room: 142A/B-Level 100
Chairs/Organizers:
Sanjib Kumar Panda, National University of Singapore, Singapore
Issa Batarseh, University of Central Florida, USA

Special Session SP03: High Efficiency, High Power Density, and Fault-Tolerant Motor and Drives for Electric Vehicles and Electric Airplanes - Similarities and Differences
Monday, October 10, 2:20PM-4:25PM, Room: 141 -Level 100
Chairs/Organizers:
Bulent Sarlioglu, University of Wisconsin-Madison
Ozge Taskin, Ricardo UK
Ayman EL-Refaie, Marquette University

Special Session SP04: Challenges and Opportunities for Lunar Surface Microgrids
Tuesday, October 11, 8:30AM-10:10AM, Room: 141 -Level 100
Chairs/Organizers:
Jin Wang, The Ohio State University

Special Session SP05: New developments in Wide-Bandgap Bidirectional Switches and Applications
Tuesday, October 11, 8:30AM-10:10AM, Room: 142A/B-Level 100
Chairs/Organizers:
Victor Veliadis, PowerAmerica, NCSU
Thomas M. Jahns, University of Wisconsin - Madison

Special Session SP06: Future Trends and Challenges in Vehicle Electrification - Part I Power Electronics and Motors
Wednesday, October 12, 8:30AM-10:10AM, Room: 141 -Level 100
Chairs/Organizers:
Mazharul Chowdhury and Jihyun Kim, General Motors, United States
Arshan Khan and Lakshmi Reddy, CNH Industrial, United States

Special Session SP07: Reliability of Power-Electronic Systems for Solar Energy
Wednesday, October 12, 8:30AM-10:10AM, Room: 142A/B-Level 100
Chairs/Organizers:
Sudip K. Mazumder, University of Illinois Chicago
Frede Blaabjerg, Aalborg University
Patrick McCluskey, University of Maryland at College Park
Jack D. Flicker, Sandia National Laboratories

Special Session SP08: Future Trends and Challenges in Vehicle Electrification - Part II Battery and Charging
Wednesday, October 12, 10:30AM-12:10PM, Room: 141 -Level 100
Chairs/Organizers:
Mazharul Chowdhury and Jihyun Kim, General Motors, United States
Arshan Khan and Lakshmi Reddy, CNH Industrial, United States
Special Session SP09: Paradigm Shift towards 100% Renewables in Modern Power Systems: Theory and Practice of Grid-Forming Inverter Technologies
Wednesday, October 12, 10:30AM-12:10PM, Room: 142A/B-Level 100
Chairs/Organizers:
Xiaonan Lu, Purdue University
Jin Tan, National Renewable Energy Laboratory

Special Session SP10: Advanced Cooling Systems for Electric Machines and Power Electronic Converters - Part I
Wednesday, October 12, 2:00PM-3:40PM, Room: 141-Level 100
Chairs/Organizers:
Bulent Sarlioglu, University of Wisconsin-Madison
Jin Wang, Ohio State University
Sreekant Narumanchi, National Renewable Energy Laboratory

Special Session SP11: Measurement Technology Required for the Power Electronics Industry that Leads the Decarbonized Society
Wednesday, October 12, 2:00PM-3:40PM, Room: 142A/B-Level 100
Chairs/Organizers:
Christopher Scholz, Hioki, USA

Special Session SP12: Advanced Cooling Systems for Electric Machines and Power Electronic Converters - Part II
Wednesday, October 12, 4:00PM-5:40PM, Room: 141-Level 100
Chairs/Organizers:
Bulent Sarlioglu, University of Wisconsin-Madison
Jin Wang, Ohio State University
Sreekant Narumanchi, National Renewable Energy Laboratory

Special Session SP13: Standard development for solid state transformer: an update on existing IEEE standards on magnetics and new standard for solid state transformer
Wednesday, October 12, 4:00PM-5:40PM, Room: 142A/B-Level 100
Chairs/Organizers:
Marco Liserre, Kiel University, Germany
Johan Enslin, Clemson University, US
Xu She, Lunar energy, US
Matt Wikowski, Enachip, US
Zhixiang Zou, Southeast University, China

Special Session SP14: Advanced Power Electronics and Drives for Commercial Vehicle Electrifications
Thursday, October 13, 8:30AM-10:10AM, Room: 141-Level 100
Chairs/Organizers:
AK Arafat, Drive System Design

Special Session SP15: Power Electronics for Integration of MV Utility-Scale PV Systems
Thursday, October 13, 8:30AM-10:10AM, Room: 142A/B-Level 100
Chairs/Organizers:
Juan Carlos Balda, University of Arkansas
Ke Ma, Shanghai Jiao Tong University
Yongheng Yang, Zhejiang University
Adel Nasiri, University of South Carolina
Special Session SP16: Towards Enhancing the Resiliency of Grid-Interactive Inverters
Thursday, October 13, 10:30AM-12:10PM, Room: 141 -Level 100,
Chairs/Organizers:
Behrooz Mirafzal, Kansas State University
Robert Reedy, DOE SETO

Special Session SP17: GaN Integrated Circuits and Challenges Solved by Integration
Thursday, October 13, 10:30AM-12:10PM, Room: 142A/B-Level 100,
Chairs/Organizers:
Alex Lidow, Efficient Power Conversion Corporation
Simon Li, GaNPower International
Mohamed Imam, Infineon
Doug Bailey, Power Integrations
Francesco Ferrazza, STMicroelectronics
Remote Q/A Session R01: Control, Analysis and Modeling of Renewable Energy Systems
Monday, October 17, 9:00AM-9:55AM, Room: Zoom #1, Chair: Ngoc Ha Pham, Meiqin Mao

Parametric broadband excitation for real-time condition monitoring of monocrystalline photovoltaic modules using impedance spectroscopy [#321]
Linda Shelembe and Paul Barendse
University of Cape Town, South Africa

Analysis of switch-mode converter inductor current ripple excitation of a monocrystalline PV module using impedance spectroscopy for condition monitoring [#322]
Linda Shelembe and Paul Barendse
University of Cape Town, South Africa

Quantitative Evaluation of Different Voltage Lift Techniques in DC-DC Converters for Renewable Energy Systems [#559]
Xinying Li, Yan Zhang, Jinjun Liu and Yihai Li
Xi'an Jiaotong University, China

A Perturbation and Observation Based Sawtooth Carrier Modulation Strategy of Parallel Converters [#32]
Xi Liu, Chenghui Zhang and Xiangyang Xing Shandong University, China

A ZVS based bidirectional Equalizer for Battery Equalization [#939]
Rui Ling, Zhibin Dai, Xinch He, Dongxue Li and Jiquan Zhao
Chongqing University, China; Vicor Corporation, United States

A Non-uniform Planar Coil In Electro-magnetic Vibration Energy Harvesting [#72]
Xianchao Liu, Han Peng, Kai Gao, Wang Shaojing and Xu Peng
Huazhong University of Science and Technology, China; State Grid Shanghai Electric Power Research Inst, China

Prediction of I-V characteristics for Bifacial PV Modules via an alpha-beta single double-diode model [#901]
Dou Hong, Jieming Ma, Ka Lok Man, Huiqueing Wen and Prudence Wong
Xi'an Jiaotong-Liverpool University, China; University of Liverpool, United Kingdom

Power Loss Reduction for PV Emulator Using Transistor-based PV Model [#97]
Habes Ali Khawaldeh, Mohammad Al-soeidat, Dylan Lu and Li Li
University of Technology Sydney, Australia

Energy Storage Minimization Control in Grid-Connected Photovoltaic Virtual Synchronous Generator [#100]
Yuguang Hou, Jia Liu, Xuewen Li and Jinjun Liu
Xi'an Jiaotong University, China

Remote Q/A Session R02: Grid Inverters and Applications
Monday, October 17, 9:00AM-9:55AM, Room: Zoom #2, Chair: Ahmed Abuhussein, Pallavi Bharadwaj

Xi'an Jiaotong University, China

Design and FPGA Implementation of a Real-time Simulation Platform for an MMC-H DC Transformer [#821]
Liye Wu, Yichao Sun, Carlos Teixeira, Brendan McGrath, Donald Holmes and Yufan Li
Nanjing Normal University, China; RMIT University, Australia

Transient Stability Study of a Real-World Microgrid with 100% Renewables [#1415] Yaswanth Velaga, Jing Wang, Annabelle Pratt, Laurence Abcede and Nagadev Shamukh
National Renewable Energy Laboratory, United States; San Diego Gas & Electric, United States

Global Maximum Power Point Tracking for Photovoltaic Systems Using Hybrid Secant and Binary Search Algorithms [#789]
Anusha Kumaresan, Glen G. Farivar, Hossein Dehghani Tafti, Neha Beniwal, Naga Brahmandra Yadav Gorla and Josep Pou
Nanyang Technological University, Singapore; University of Western Australia, Australia
Modeling and Evaluation of Winding Losses in High Voltage Planar Transformers [232]
Hanyu Liu, Kai Sun, Guoen Cao, Zheyuan Yi and Shilei Lu
Tsinghua University, China; Chinese Academy of Sciences, China

A Robust IMFOGI Control for Power Quality Enhancement of a Dual Stage SPV-BES-BDC- SyRG DG
Set Based Standalone Microgrid [491]
Subhadip Chakraborty, Gaurav Modi and Bhim Singh
Indian Institute of Technology Delhi, India

Impact on the Harmonic Distortion of Low-Capacitance Static Compensator with Discontinuous
Modulation [1428]
Qingxiang Liu, Ezequiel Rodriguez Ramos, Glen Ghias Farivar, Salvador Ceballos, Josep Pou,
Christopher David Townsend and Ramon Leyva
Nanyang Technological University, Singapore; TECNALIA, Spain; University of Western
Australia, Australia; Universitat Rovira i Virgili, Spain

Efficiency Improvement of Computer Power Supply using Power Consumption Estimation from CPU
Performance Monitors [391]
Shinichi Kawaguchi
Kanagawa Institute of Technology, Japan

Adaptive Reduced-Order Method of Aggregated Impedance Model for Large-Scale Photovoltaic Stations
Small Signal Stability Analysis [374]
Xun Jiang, Meiqin Mao and Liuchen Chang
Hefei University of Technology, China; Hefei University of Technology, Canada

High-Speed Three-Phase Enhanced Phase-Locked Loop for Grid Synchronization Under
Adverse Conditions [898]
Surya chandra Gulpalli, Srinivas Gude and Chia-Chi Chu
National Tsing Hua University, Taiwan; Delta Electronics, Inc., Taiwan

Remote Q/A Session R03: Electrification of Rail, Sea and Air Transportation Systems
Monday, October 17, 9:00AM-9:55AM, Room: Zoom #3, Chair: Shuvajit Das

Modeling and Harmonic Instability Analysis of the PET-Based Train-Grid System [444] Chunxu Lin,
Dan Liu, Huimin Wang, Kexin Wang, Yun Zuo, Qingli Deng, Junwen Mu and Xinglai Ge
Southwest Jiaotong University, China

SOC inconsistency estimation using sensor fusion method based on the dual extended Kalman filter
neglecting the cell-to-cell aging condition [1365]
Jinhyeong Park, Jaewon Kim, Dongjae Lee, Roland Kobla Tagayi, Jelim Lee, Woonki Na and
Jonghoon Kim
Chungnam National University, Korea (South); California State University, United States
An any-cell-to-any-cell equalization based on half-bridge CLLC converters for Lithium-ion
battery strings [170]
Ruijia Cai, Yundong Ma, Ruiran Dai, Zhao Zhiqiang, Peng Wang and Pengfei Wang
Nanjing University of Aeronautics and Astronautics, China

Design of Power Hardware-in-the-Loop Simulation for Aircraft Brushless Wound-Rotor Synchronous
Motor [184]
Yuanhao Xie, Dong Jiang and Zicheng Liu
Huazhong University of Science and Technology, China

An experimental investigating on the effect of contact resistance for pouch type lithium-ion battery of the
performance and safety [1362]
Insu Baek, Deokhun Kang, Changki Choi, Batool Dania, Bongwoo Kwak, Woonki Na and
Jonghoon Kim
Chungnam National University, Korea, Republic of; Chungnam National University, Pakistan;
Korea Institute of Industrial Technology, Korea, Republic of; California State University,
United States
Data-driven prediction of battery degradation using EIS-based robust features [1363] SeungHwa Sin, PyeongYeon Lee, SangWoo Cho, Mazhar Abbas, SangRyuk Lee and Jonghoon Kim Chungnam National University, Korea, Republic of

Complete Process Emulation of Integrated Starter/Generator Using Power Electronic Devices [173] Yuanhao Xie, Dong Jiang and Liangchen Tian Huazhong University of Science and Technology, China

Partial Discharge Detection of Electrical Machine Insulation Under PWM Voltage with High dv/dt for More Electric Aircraft [175] Hao Sun, YaLin Wang, Yi Ding, YiFan Rui, Lu Fan and Yi Yin Shanghai Jiao Tong University, China

Active Filter Circuit in the HF AC-link of a Bidirectional Wireless Battery Charger for EV [1105] Asier Garcia-Bediaga, Ander Avila, Itziar Alzuguren, Alejandro Rujas and Miroslav Vasic Ikerlan Technology Research Centre (BRTA), Spain; Technical University of Madrid (UPM), Spain

Remote Q/A Session R04: Wireless power transfer
Monday, October 17, 9:00AM-9:55AM, Room: Zoom #4, Chair: Zhen Xin, Jiangfeng Wang

Frequency Optimization Method for Underwater Wireless Power Transfer Considering Coupling Conditions [150] Jia Li, Kailong Liu, Jixie Xie, Chong Zhu and Xi Zhang Shanghai Jiao Tong University, China; Warwick Manufacturing Group University, United Kingdom

A Two-Dimensional Misalignment-Tolerant IPT System Based on Three-arm Voltage Doubler Rectifier [187] Shunpan Liu, Yihao Wu, Lingyun Zhou, Ruikun Mai, Zhengyou He and Stefan Goetz Southwest Jiaotong University, China; University of Cambridge, United Kingdom


Arrangement Strategy of Antenna Array Based on Cruciform Growth Algorithm for Microwave Wireless Power Transmission [250] Xue Wang, Ke Jin, Shuchen Cheng and Weiyang Zhou Nanjing University of Aeronautics & Astronautics, China

Advanced Self-Oscillating Control for Domino Wireless Power Transfer Systems with Quasi- Load Independent Outputs [273] Kaiyuan Wang and Yun Yang The Hong Kong Polytechnic University, Hong Kong

Pulse Density Modulation Control of LCC-S Compensated WPT System with Switch-Controlled Capacitors for Constant Output Voltage of Frequency-Selective Receivers [87] Ke Li, Wen Ding and Jiangnan Yuan Xi’an Jiaotong University, China

A Robust Primary-Side Hybrid Data-Driven Load Monitoring Strategy For Wireless Power Transfer Systems [295] Yang Yun and Wu Huihuan The Hong Kong Polytechnic University, Hong Kong

Shielding Design for High-Frequency Wireless Power Transfer System for EV Charging with Self-Resonant Coils [1136] Ruiyang Qin, Jie Li, Jingjing Sun and Daniel Costinett the University of Tennessee, Knoxville, United States
A Dynamic Reconstruction Strategy for Adaptive Power Receiving of Moving Targets in MPT System

Jianying Ding, Ke Jin, Xing Li, Weiyang Zhou and Zhongwei Chen
Nanjing University of Aeronautics and Astronaut, China

Remote Q/A Session R05: Power Converter Topologies A
Monday, October 17, 9:00AM-9:55AM, Room: Zoom #5, Chair: Zhituo Ni, Vishnu Mahadeva Iyer

Three-Phase Voltage-Fed Inverter with Pulse-Voltage-Injected Two-Phase Modulation for CVCF Applications [#395]
Taketo Ikeuchi and Shin-ichi Motegi
Kobe City College of Technology, Japan

Modular Multilevel Converter Based Topology with Lower Number of High-Frequency Switches [#70]
Saleh Farzamkia, Houshang Salimian Rizi and Alex Q. Huang
University of Texas at Austin, United States

A High Step-Up DC-DC Converter Using a Three Winding Coupled Inductor for Photovoltaic to Grid Applications [#326]
Saeed Habibi, Ramin Rahimi, Mehdi Ferdowsi and Pourya Shamsi Missouri University of Science and Technology, United States

A Novel Modular Multilevel Converter with Single Bridge Arm Per Phase for Size Reduction [#278]
Chang Pan, Lei Lin, Xiaojie Shi and Tianxiang Yin
Huazhong University of Science and Technology, China

Single-Phase Single-Stage PFC Based on a Novel Floating Capacitor Filter for Electric Vehicle On-Board Charger Application [#1087]
Itziar Alzuguren, Asier Garcia-Bediaga, Ander Avila, Alejandro Rujas and Miroslav Vasic Ikerlan Technology Research Centre (BRTA), Spain; UPM, Spain

Boost Operation of a Dual-Active-Bridge AC-DC Converter with an Active Energy Buffer [#542]
Shohei Komeda, Shunsuke Takuma and Yoshiya Ohnuma
Tokyo Univ. of Marine Science and Technology, Japan; Nagaoka Power Electronics Co., Ltd., Japan

Single Phase High Power Density MISN PFC Converter [#684]
Tianlin Huang, Wending Zhao and Xinke Wu
Zhejiang University, China

Three-Phase Three-Level Reduced Switch Count Isolated AC/DC Neutral-Point Clamped Converter With High-Frequency DC-Link [#691]
Ailton Dutra, Montie Vitorino and Mauricio Correa Federal University of Campina Grande, Brazil

Five-Level Three-Phase AC/DC Stacked Multicell Converter With Reduced Switch Count [#692]
Ailton Dutra, Reuben Souza, Montie Vitorino and Mauricio Correa Federal University of Campina Grande, Brazil

Remote Q/A Session R06: Grid Forming Inverters and Distributed Generation
Monday, October 17, 10:00AM-10:55AM, Room: Zoom #1, Chair: Liqun He, Ahmed Abuhussein

Inertia Evaluations on Grid Forming Inverters with Virtual Synchronous Generator Control Applied to Photovoltaic Power Systems [#453]
Qiang Lin, Tetsu Shijo, Kenichirou Ogawa, Hiroshi Uno, Yasuhiro Kanekiyo and Junichi Arai Toshiba Corporation, Japan; Energy and Environment Technology Research Inst, Japan
Improved Control Strategy of Grid-Forming Inverters for Fault Ride-Through in a Microgrid System
Jing Wang
National Renewable Energy Laboratory, United States

Virtual Flux-based Grid-Forming Current Controller for Flexible Operation of Voltage Source Converters
Afif Nazib, Donald Grahame Holmes and Brendan McGrath
Universiti Malaysia Perlis, Malaysia; RMIT University, Australia

Virtual Synchronous Machine Control Applied to Solid State Transformer
Yushi Miura and Junya Higuchi
Nagaoka University of Technology, Japan

Event Detection Based Voltage and Frequency Restoration for Mobile Emergency Energy Storage Vehicle without Communication
Xi'an Jiaotong University, China

An Advanced Voltage Regulation Strategy for the Meshed Distribution Networks with Soft Normally-Open Point
Inner Mongolia University of Technology, China; Shanghai Jiao Tong University, China; Shanghai University of Engineering Science, China; Foshan Power Supply Bureau of Guangdong Power Gr, China

Short-Circuit Fault Protection Scheme for Serial-Shunt Type Soft Normally Open Point
Xinyi Kong, Jianwen Zhang, Jianqiao Zhou, Jiajie Zang, Gang Shi, Xu Cai, Xinming Fan and Dongmin Xi
Shanghai Jiaotong University, China; The key laboratory of control of power transmiss, China; Foshan Power Supply Bureau, China; Inner Mongolia University of Technology, China

Ultra-Efficient Ultra-Wide Load Range Power Conversion Platform for DC Building Applications
Sui Pung, Victor Cheung, Qingchun Li and Tin Ho, River Li
ASTRI, Hong Kong; ASTRI, China

FRA-based DQ Impedance Measurement for Three-Phase Power Electronic Systems
Toshiji Kato, Kaoru Inoue, Kazuki Yomura and Miwa Yoshiki
Doshisha University, Japan

Remote Q/A Session R07: Data-Driven Assessment and Design for Power Electronic Applications
Monday, October 17, 10:00AM-10:55AM, Room: Zoom #2, Chair: Shuai Zhao

Health indicator evaluation for battery pack inconsistency and SOH estimation based on LSTM
Jonghoon Kim, Dongho Han, Sanguk Kwon, Taesuk Mun, Miyoung Lee and Faiz Majeed
Chungnam National University, Korea (South)

A Sequential Network-model Alliance Module for Lithium-ion Battery Temperature Prediction
Li Marui, Dong Chaoyu, Li Xiangke, Dong Xiaohong, Mu Yunfei and Jia Hongjie
Tianjin University, China; The Hong Kong Polytechnic University, China; Hebei University of Technology, China

Energy Equalization of Battery Pack with Inconsistent Capacity
Rui Ling,
Miaoya Yu, Shu Liu, Dongxue Li and Fei Feng
Chongqing University, China; Vicor Corporation, United States

Digital Twin System of Capacitive DC Bank Considering the Electrothermal Coupling Effect
Mingshuo Zhu, Yi Liu, Meng Huang and Xiaoming Zha
Wuhan University, China

Multi-Branch ResNet-Transformer Based Deep Hybrid Approach for Short-term Spatio- Temporal Solar Irradiance Forecasting
Saeedeh Ziyabari, Liang Du and Saroj K Biswas
Temple University, United States
Deep Neural Network-based Black-box Modeling of Power Electronic Converters Using Transfer Learning [758]
Pouria Qashqai, Rawad Zgheib and Kamal Al-Haddad
Ecole de technologie superieure (ETS), Canada; Hydro-Quebec, Canada

Zhenyu Zhao, Daniel Moscovitz, Shengyi Wang, Xiaoyuan Fan and Du Liang
Temple University, United States; PJM Interconnections, United States; Pacific Northwest National Lab, United States

An Improved Hardware-in-loop Power Electronics Converter Fast Multi-physics Design System [268]
Chi Zhang, Wei Liu, Cheng Jiachang, Wang Kun and Shi Yimeng
Firstack Technology, China

Remote Q/A Session R08: Power Converter Topologies; DC-DC and AC-DC-AC
Monday, October 17, 10:00AM-10:55AM, Room: Zoom #3, Chair: John Lam, Yifeng Wang

A High-efficiency Resonant DC-DC Converter with Wide Voltage Gain Range [201] Mengying Chen, Bo Chen, Yifeng Wang, Ping Wang, Mingzhi Zhang and Chaochang Che
Tianjin University, China

A Novel Current Sharing Method of Interleaved LLC Resonant Converter by a Common CL Filter [234]
Fan Zhai, Guidan Li, Yifeng Wang, Bo Chen, Zhongjie Wang and Chaochang Che
Tianjin University, China

A Novel Bidirectional TLCT Resonant DC-DC Converter with wide voltage range [136] Yifeng Wang, Mingzhi Zhang, Bo Chen, Mengying Chen, Chen Chen and Chaochang Che
Tianjin University, China

An Improved ISOP-LLC Converter for Wide Voltage Variation Range [195] Yifeng Wang, Chen Chen, Bo Chen, Danfeng Zhao, Ruilin Ji and Mingzhi Zhang
Tianjin University, China; State Grid Tianjin Power Costumer Service Center, China

Novel Common-Ground Dual-Buck Inverter for Photovoltaic Applications with No Leakage Current Issues [332]
Ashraf Ali Khan, Usman Ali Khan, Shahnawaz Khan and Shehab Ahmed
KAUST, Saudi Arabia; Yonsei University, Korea (South); University of Lahore, Pakistan

Six-Leg AC-DC-AC Single-Phase Three-Wire Power Converter [1178]
Bruna Gehrke, Cursino Jacobina, Rodrigo Lacerda, Filipe Rocha and Italo Silva
Federal University of Campina Grande, Brazil; Federal University of Paraiba, Brazil

Dynamic Pulse-Positioning for a Single-Stage Isolated AC-DC Converter [982] Vishwa Perera, Juan Zuniga and John Salmon
University of Alberta, Canada

An Interleaved High Step-Up DC-DC Converter with Coupled Inductor and Built-in Transformer for Renewable Energy Applications [586]
Ramin Rahimi, Saeed Habibi, Mehdi Ferdowsi and Pourya Shamsi
Missouri University of Science and Technology, United States

Remote Q/A Session R09: Advanced Drivers, Driving, and Thermal Design
Monday, October 17, 10:00AM-10:55AM, Room: Zoom #4, Chair: Zheyu Zhang, Zheyu Zhang

Toshiba Europe Ltd, United Kingdom; Toshiba Corporation, Japan

A 15MHz GaN FET AZVT Buck Converter that Achieves 7.2-point Efficiency Increase at Heavy Load [367]
Motohiro Kanai, Hidetoshi Taki, Kyohei Tanimura and Kousuke Miyaji
Shinshu University, Japan; Shinshu University, Japan
Measurement of Maximum \( \frac{dI}{dt} \) with Printed Circuit Board Rogowski Coil for Junction Temperature Estimation of IGBT Modules [\#583]
Yafei Shi, Huai Wang, Yichao Duan, Jianlong Kang and Zhen Xin
Hebei University of Technology, China; Aalborg University, Denmark

Study on the Impacts of Signal Carrier in a Compact Gate Driver with Single Isolation Channel for Both Signal and Power Transferring [\#548]
Cheng Jiang, Han Peng, Qiaozi Yue and Qiaoling Tong
Huazhong University of Science and Technology, China

Xi'an Jiaotong University, China; National New Energy Vehicle Technology Center, China

Reshaped Switching Trajectory of SiC MOSFET via Co-Optimized Active Gate Driver [\#1235]
Mingrui Zou, Peng Sun, Yulei Wang, Zheng Zeng, Kaiyan Li and Xudong Han
Chongqing University, China

Conduction Time Variation-Based Active Thermal Control Method for Si and SiC Hybrid Switch [\#835]
Haichen Liu, Tiefu Zhao, Xiwen Xu and Jiale Zhou
University of North Carolina at Charlotte, United States

Remote Q/A Session R10: PM & Synchronous Reluctance Machine Design
Monday, October 17, 10:00AM-10:55AM, Room: Zoom #5, Chair: Akira Chiba, Fabio Giulii Capponi
Investigation of the impact of magnet segmentation on high frequency eddy current losses in an interior permanent magnet motor [\#764]
Samith Sirimanna, Xiaolong Zhang and Kiruba Haran
University of Illinois Urbana Champaign, United States

Shape Optimization of Stator Teeth in Interior Permanent Magnet Synchronous Motors with Distributed Windings to Reduce Rotor Loss [\#754]
Katsumi Yamazaki, Taiga Uematsu, Akihiro Tanaka and Tohru Nakada
Chiba Institute of Technology, Japan; Nissan Motor Co., Ltd., Japan

Permanent Magnets Assistance Design Methods of High-Speed Synchronous Reluctance Machines [\#703]
Gianvito Gallicchio, Marco Palmieri, Francesco Cupertino, Mauro Di Nardo, Michele Degano and Chris Gerada
Politecnico di Bari, Italy; University of Nottingham, United Kingdom

Reduction of On-Load Torque Ripple in PMSM using Time-Space Harmonics Analysis of Air-Gap Flux Density [\#133]
Yan Dong, Lei Haowei, Zhang Zhen, Shi Tingna and Xia Changliang
Zhejiang University, China; Zhejiang University AEEI Center, China

University of Adelaide, Australia

Design and Analysis of Two Degree-of-Freedom Rotary-Linear Machines with Hybrid Permanent Magnets for Robotic Applications [\#143]
Yaojie He, You Zhou and Christopher H.T. Lee
Nanyang Technological University, Singapore

Accurate MTPA Strategy of PMSM Considering Cross Saturation Effect Based on Full-Flux-Linkage Model [\#105]
Jiayue Zhou, Xi Xiao, Zitan Wang, Haifeng Lu, Jianyun Chai and Zhang Meng
Tsinghua University, China; Beijing Institute of Control Engineering, China

Influence of Circulating Currents on Electromagnetic Performance of 6-Slot/2-Pole High-speed PM Motors with Rotor Eccentricity [\#285]
Tianran He, Ziqiang Zhu, Fan Xu, Hong Bin, Di Wu, Liming Gong and Jintao Chen
University of Sheffield, United Kingdom; Midea Group Corporate Research Center, China
Remote Q/A Session R11: Power converters and control for renewable energy systems A

Tuesday, October 18, 9:00AM-9:55AM, Room: Zoom #1, Chair: Hengzhao Yang

A Symmetrical Architecture for PV String Using LLC-based Voltage Multiplier by Differential Power Processing Technique [#140]
Xue Wang, Huining Wen, Yinxiao Zhu, Guanying Chu and Rui Du
Xi'an Jiao tong - Liverpool University, China; Lincoln University, China

A Simplified Power Balance Strategy for Three-Phase Cascaded H-bridge Photovoltaic Inverter [#814]
Hao Xue and Jinwei He
Tianjin University, China

Space Vector Modulation Technique for Leakage Current Attenuation in Grid-Connected Three-Phase Multilevel PV Inverters [#1252]
Luan Aleixo Canario Mendonca, Filipe Antonio da Costa Bahia, Andre Pires Nobrega Tahim, Jose Renes Pinheiro and Fabiano Fragoso Costa
Federal University of Bahia, Brazil

Leakage Current Reduction with 240CPWM in Silicon Carbide based Transformerless Grid-connected PV Converter [#1049]
Hafsa Qamar, Haleema Qamar, Nikhil Korada, Raja Ayyanan and Madhura Sondharangalla
Arizona State University, United States

A Dual-Input-Single-Output Boost Converter with Inductors Coupling For Dual Electromagnetic Energy Harvesters [#568]
Letian Tong, Han Peng, Xianchao Liu, Kai Gao, Shaojing Wang and Peng Xu
Huazhong University of Science and Technology, China; State Grid Shanghai Electric Power Research Inst, China

Power Converter Technologies for 20MW Wind Turbines [#271] Xibo Yuan, Yonglei Zhang and Xin Peng
China University of Mining and Technology, China

Fuel Cell Stack broadband Excitation for Online Condition Monitoring using different Switch-mode DC-DC Topologies [#460]
Surprise Mahlangu and Paul Barendse
University of Cape Town, South Africa

A Single-Phase Single-Stage Five-Level Common-Ground Transformerless Inverter with Six-Switches and Switched-Capacitor Cell [#584]
Fan Peng, Guohua Zhou, Nengmou Xu, Siya Gao and Dong Wu
Southwest Jiao tong University, China

A Novel Single-Phase Transformerless Grid-Connected PV Inverter [#1241]
Arnaldo Oliveira Cunha Junior, Filipe Antonio da Costa Bahia, Joao Paulo Ramos Agra Mello, Andre Pires Nobrega Tahim and Fabiano Fragoso Costa
Federal University of Bahia, Brazil; Federal Rural University of Pernambuco, Brazil

Remote Q/A Session R12: Wireless Chargers

Tuesday, October 18, 9:00AM-9:55AM, Room: Zoom #2, Chair: Md Sariful Islam

A High Power Density 3/1-phase Compatible MISN-PFC Converter for On-Board Charger [#624]
Wending Zhao, Tianlin Huang and Xinke Wu
Zhejiang University, China
RWTH Aachen University, Germany; Institute for Automotive Engineering RWTH Aachen, Germany
A Large-scale Wireless Charging Station for Electric Vehicles [#400] Jaehong Lee and Seung-Hwan Lee
University of Seoul, Korea (South)
Z3 class 50 kW Bidirectional IPT charger for EV [#931] Fernando Gonzalez-Hernando, Ander Jauregi, Irma Villar, Alejandro Rujas and Luis Mir Ikerlan Technology Research Centre (BRTA), Spain, Spain
A Four Port Isolated PV-Based EV Charger that Supports level-2 and DC Charging [#851] Mohamed Tamasas Elrais, Reza Rezaii, Sumana Ghosh and Issa Batarseh
University of Central Florida, United States

Remote Q/A Session R13: Selected topics in emerging technologies
Tuesday, October 18, 9:00AM-9:55AM, Room: Zoom #3, Chair: Yuzhuo Li, Qiang Wei
An Integrated Receiver for Inductive Power Transfer [#71] Yiming Yin, Heyuan Li and Minfan Fu
ShanghaiTech University, China
Impedance-Model-Based Design of High-Order Class E Inverter [#95] Yifan Jiang, Rong He, Kai Zhao and Minfan Fu
ShanghaiTech University, China
A Dual Coupled Double-Sided LCC IPT System Adapted to Battery Charging Profile Under High Misalignment [#144] Shuyu Yang, Kailong Liu, Jixie Xie, Chong Zhu and Xi Zhang
Shanghai Jiao Tong University, China; Warwick Manufacturing Group University, United Kingdom
A Full Load Range Soft-Switching Inductive Power Transfer System [#227] Xin Li, Yiming Zhang and Yi Tang
Nanyang Technological University, Singapore; Fuzhou University, China
An Adaptive Multi-Target Microwave Power Transmission Method Based on Split-Calibration and Power-Focusing Algorithm [#248] Shuchen Cheng, Ke Jin, Huan Hu and Weiyang Zhou
Nanjing University of Aeronautics & Astronautics, China
Nanjing University of Aeronautics & Astronautics, China
Efficiency Optimization of Class-F Power Amplifier at Different Power Levels for Microwave Power Transmission [#438] Chen Yang, Ke Jin, Weiyang Zhou and Huan Hu
Nanjing Univ. of Aeronautics and Astronautics, China
Thermal Analysis Based on Equivalent Thermal Model for Magnetic Couplers in Wireless Charging System [#662] Dongsheng Wang, Hao Feng and Li Ran
Chongqing University, China
Si IGBT and SiC MOSFET Hybrid Switch-Based Solid State Circuit Breaker for DC Applications [#840] Haichen Liu, Jiale Zhou, Tiefu Zhao and Xiwen Xu
Remote Q/A Session R14: Power Converter Performance Improvement

Tuesday, October 18, 9:00AM-9:55AM, Room: Zoom #4, Chair: Li Zhang, Qiang Wei

Technical Investigation on Robustness Enhancement for Grid-Connected Inverter in Weak Grid by Adding an Improved Grid Voltage Feedforward Path [#287]
Huili Zhang and Tianzhi Fang
Nanjing Univ. of Aeronautics and Astronautics, China

Design Method of Control Parameters for PCS Grid-Connected Mode Based on the Stability Analysis of Islanding Switching [#458]
Sheng Ren, Min Chen and Haoqing Cai
Zhejiang University, China

9:50AM AC Impedance Modeling of True-Bipolar MMC-HVdc System With Dual-Droop Control [#132]
Bole Feng, Yue Wang, Pengkun Li, Quanle Zhu, Yinglin Xue, Fengmo Li, Runtian Li and Yi Liu
Xi'an Jiaotong University, China; State Grid Corporation of China, China

 Leakage Current Analysis and Mitigation for Modular Multilevel Converter with Floating Submodules [#366]
Yongtao Liang, Dong Jiang, Wei Sun, Jianan Chen and Hong Li
Huazhong University of Science and Technology, China; Beijing Jiaotong University, China

Unsupervised Anomaly Detection for Multilevel Converters Based on Wavelet Packet Transform and Variational Autoencoders [#31]
Shu Ye and Feng Zhang
Shanghai Jiao Tong University, China

Current Ripple Mitigation in DC-Link Capacitors of Three-Phase NPC Converters Using Mixing Level-Shifted Modulation Schemes [#344]
Yong-Yao Shen, Szu-Chi Peng, Surya chandra Gulipalli, Po-Tai Cheng and Chia-Chi Chu
National Tsing Hua University, Taiwan

PI Tuning of High-bandwidth Buck Converters Based on Genetic Algorithm and Accurate Small-Signal Model [#966]
Yu Shao, Xiangpeng Cheng, Jinjun Liu, Zeng Liu and Jiwen Wei
Xi'an Jiaotong University, China

A Modular and Integrated Reconfigurable Design for Battery Energy Storage System [#719] Huizhen Huang, Amer Ghias and Zuo Wang
Nanyang Technological University, Singapore

Finite Control Set Model Predictive Control for Five-Level Modified Active Nested Neutral Point Clamped Converter [#895]
Wenyuan Ding, Faraji Faramarz, Vijesh Jayan, Zuo Wang, Amer M. Y. M. Ghias and Honnyong Cha
Nanyang Technological University, China; Kyungpook National University, Korea (South); Nanyang Technological University, Singapore

Remote Q/A Session R15: Electric Drives A

Tuesday, October 18, 9:00AM-9:55AM, Room: Zoom #5, Chair: Kevin Lee, Zhe Zhang

Model-Free Predictive Pulse Pattern Control for Permanent Magnet Synchronous Motor Drives [#52]
Dianxun Xiao, Battur Batkhishig, Aathira Karuvaril Vijayan, Alan Callegaro, Rohit Baranwal and Ali Emadi
McMaster University, Canada; Eaton, United States
Vibration Frequency Estimation Scheme Based on Second-Order Extended State Observer for IPMSM Drive System Without Accelerometer [#369]
Yun Zuo, Shuaishuai Wang, Huimin Wang, Dan Liu, Chunxu Lin, Abebe Teklu Woldegiorgis, Junwen Mu and Xinglai Ge
Southwest Jiaotong University, China

University of Florida, United States

Design and Analysis of a 54-Pulse Converter and 7-level Hybrid Inverter for Medium Voltage Induction Motor Drive [#447]
Rohit Kumar, Bhim Singh and Piyush Kant
Indian Institute of Technology Delhi, India; Indian Institute of Technology, Kanpur, India

Impedance-Based Analysis of Digital Control Delay in Metro Traction Drive System [#781]
Junwen Mu, Yun Zuo, Chunxu Lin, Huimin Wang, Shuaishuai Wang and Xinglai Ge
Southwest Jiaotong University, China

Open-End Nine-Leg Half-Controlled Converter for Six-Phase Synchronous Generator-Based Wind Energy Conversion Systems [#380]
Emerson de Lacerda Soares, Cursino Brandao Jacobina, Nayara Brandao de Freitas, Nady Rocha and Ayslan Caisson Noroes Maia
Federal University of Campina Grande, Brazil; INESC TEC, Portugal; Federal University of Paraiba, Brazil; Federal Institute of Ceara, Brazil

Flying Start of Permanent Magnet Generator Connected PWM Rectifier Based on Short Circuit Current Vector Increments [#435]
Sun Gaoyang, Guo Hong, Ding Xiaofeng and Yang Yanyong
Beihang University, China

A Comparison Between Nonlinear Kalman Filters for Sensorless Induction Motor Drives [#1072]
Abbas Hassan, Ali Bazzi and Jensen Finn
American University of Beirut, Lebanon; University of Connecticut, United States; Aarhus University, Denmark

Current Measurement Offset Error Compensation for Indirect Field-Oriented Controlled Induction Motor Drives [#294]
Sangmin Lee and Kibok Lee
Incheon National University, Korea (South); Inha University, Korea (South)

Remote Q/A Session R16: Solid state transformers and utility applications
Tuesday, October 18, 10:00AM-10:55AM, Room: Zoom #1, Chair: Anirban Pal, Cheng Wang

A Novel Modular Multilevel Converter Based Power Electronic Transformer with Integrated Switching Pairs [#1214]
Yinyu Yan, Yichao Sun, Wanxin Guo, Zhendong Ji, Dongye Li and Jianfeng Zhao
Nanjing Normal University, China; Nanjing University of Science and Technology, China; Nanjing Institute of Technology, China; Southeast University, China

Model Predictive Control of a Modular Multilevel DC Transformer under Quasi-square Modulation [#822]
Yufan Li, Yichao Sun, Carlos Teixeira, Liye Wu, Brendan McGrath and Donald Grahame Holmes
Nanjing Normal University, China; RMIT University, Australia
Hierarchical Control for dc-Link Voltage and Power Sharing of CHB-based Solid State Transformer
[#125]
Jianqiao Zhou, Jianwen Zhang, Jiacheng Wang, Jiajie Zang, Gang Shi, Xu Cai and Xinming Fan
Shanghai Jiao Tong University, China; Simon Fraser University, Canada; Shanghai University of
Engineering Science, China; Foshan Power Supply Bureau, China

Design and Implementation of DC-Transformer using 10 kV SiC MOSFET for Medium-Voltage Extreme
Fast Charger [#667]
Hao Feng, Jehyuk Won, Xinyu Liang, Srdjan Srdic and Srdjan Lukic
Chongqing University, China; Gachon University, Korea (South); Analog Devices, United
States; EGSTON Power Electronics, Austria; North Carolina State University, United States

Integrated onboard battery charger based on four-bridge converter [#126] Bonyang Li,
Min Zhou, Dong Jiang and Jialou Gao
Huazhong University of Science and Technology, China

New Measurement Algorithm for Supraharmonics Real-time monitoring Based on Dynamic Compressed
Sensing [#516]
Ting Yang, Fengxia Yang, Yuqing Niu and Wei Li
Tianjin University, China; The University of Sydney, Australia

A Hierarchical Control Scheme With Flexible Power Regulation for the Series-Type Microgrid System
[#648]
Changwei Qin and Xiaoyan Li
Shandong Jianzhu University, China; Shandong University, China

The Control Method for LCL-Type Single-Phase Grid-Connected Inverter Based on Circuit Energy
Storage [#957]
Zenghao Xia, Miaoya Yu, Hao Wu, Xinlin Li, Xingwang Huang and Xiaodong Li
Chongqing University, China

Economic Analysis of Retrofitting Electric Motors with a Rewinding Process to Partial Loads [#413]
Victor Aguiar, Fabio Nascimento, Ricardo Pontes, Wilkley Correia and Fernando Ferreira
Fed. R. Univ. of the Semi-Arid Region (UFERSA), Brazil; Federal University of Ceara
(UFC), Brazil; University of Coimbra (UC), Portugal

Remote Q/A Session R17: Power Converter Topologies; AC-AC and multilevel
Tuesday, October 18, 10:00AM-10:55AM, Room: Zoom #2, Chair: Bilal Akin, Shohei Komeda

New Type High-Frequency Transformer Isolated Cascaded AC-AC Converter for DVR to Compensate
Sag or Swell in Voltage [#291]
Ashraf Ali Khan, Usman Ali Khan, Hafiz Furqan Ahmed and Shehab Ahmed
KAUST, Saudi Arabia; Yonsei University, Saudi Arabia; National Sun Yat-sen University,
Taiwan

Quasi Two-Level Operation and Neutral-Point Voltage Balance Method for a Four-Level ANPC based
Dual Active Bridge DC-DC Converter [#433]
Jupeng Pang, Kui Wang, Zedong Zheng, Tong Zheng and Yongdong Li
Tsinghua University, China

Low-Frequency Ripple Voltage Suppression Based on Active Power Decoupling for Modular Multilevel
Converter Sub-Module Capacitors [#557]
Hang Su, Shunfeng Yang, Fuyuan Zhuang, Yunshan Wang, Jingchun Huang and Qingyuan
Wang Southwest Jiaotong University, China

Improved Virtual Space Vector Modulation Scheme for the Reduced Switch Count Three-Level Inverter
With Unbalanced Neutral-Point Voltage Conditions [#647]
Changwei Qin and Xiaoyan Li
Shandong Jianzhu University, China; Shandong University, China
Remote Q/A Session R18: Power Converter Control and Optimization

Tuesday, October 18, 10:00AM-10:55AM, Room: Zoom #3, Chair: Alessandro Lidozzi, Salvatore Foti

Implementation of Vector control for Single Phase Dual Active Bridge to achieve ZVS and ZCS for Switching Loss Reduction [#784]
Ganesan Perumal and Kamalesh Hatua
Centre for Development of Advanced Computing, India; Indian Institute of Technology Madras, India

General Pulse Distribution Method of MMC under Phase-leg Based PD-PWM Modulation [#819]
Yichao Sun, Yufan Li, Brendan McGrath, Carlos Teixeira, Donald Grahame Holmes and Jianfeng Zhao
Nanjing Normal University, China; RMIT University, Australia; Southeast University, China

Square-Wave Current Control Optimization Method of Variable Frequency Modulation Inverter for Two-Stage HMI Digital Ballast [#141]
Yifeng Wang, Shaoqi Yang, Xiaoyong Ma, Chen Wang, Yu Bai and Lei Li
Tianjin University, China; Beijing Huayuan Movie Equipment Co., LTD, China

A Computationally Efficient FCS-MPC Imitator for Grid-Tied Three-Level NPC Power Converters Based on Sequential Artificial Neural Network [#801]
Xinliang Yang, Yanda Lyu, Kun Wang, Uihyun Kim, Zhenbin Zhang and Ki-Bum Park
KAIST, Korea (South); Technical University of Denmark, Denmark; KAIST, Korea, Republic of; Shandong University, China

A Weighting Factor Design Approach for FCS-MPC Techniques Based on PSO and K-Means Algorithm [#802]
Xinliang Yang, Junda Li, Kun Wang, Uihyun Kim, Zhenbin Zhang and Ki-Bum Park
KAIST, Korea (South); Shandong University, China; KAIST, Korea, Republic of

An Improved Model-free Predictive Power Control for Three-Phase AC/DC Converters [#683]
Shengnan Li, Tingyi He, Shujun Wu, Xin He, Peng He, Yunhang Dai, Yongchang Zhang, Qiyan Qu, Yufei Wang, Haisen Zhao and Guorui Xu
Electric Power Research Institute of Yunnan Powe, China; Yunnan Electric Test & Research Institute Group, China; North China Electric Power University, China; North China University of Technology, China; University of Chinese Academy of Sciences, China

Online Parameter Optimization Method of Harmonic Controller for Grid-Connected Inverter [#664]
Tang Jian, Zou Zhixiang, Liu Xingqi, Zhang Yi, Xu Ruokai, Wang Yuchen and Hua Wei
Southeast University, China

Power Oscillation Suppression Control Strategy with Peak Current Limitation for Three-Phase Four-Leg Inverter Under Unbalanced Voltage Dips [#50]
Hao Yang, Zhao Liu, Ning Zhou, Shuai Meng, Qifeng Sun and Dongming Zhao
Nanjing University of Science and Technology, China

Analysis and Modeling of Multi-Resonant Switched Tank Converter with Partial Power Voltage Regulation [#168]
Ruiran Dai, Yundong Ma, Zhiqiang Zhao, Ruijia Cai, Peng Wang and Pengfei Wang
Nanjing University of Aeronautics and Astronautics, China

Remote Q/A Session R19: Packaging, Materials and Passive Components

Tuesday, October 18, 10:00AM-10:55AM, Room: Zoom #4, Chair: Christina DiMarino

Observation of PWM-Dependent Chip Deformation of Automotive Power Module [#312]
Peng Sun, Liang Wang, Yulei Wang, Zheng Zeng, Xudong Han, Mingrui Zou and Kaiyan Li
Chongqing University, China
Design and Evaluation of a 1200-V/200-A SiC Three-Level NPC Power Module [#130]
  Zhang Honglang, Wu Yingzhe, Yin Shan, Jin Shoudong, Lin Shaofeng, Jiang Tian, Li Hui and Cheng Yuhua
  Univ. of Electron. Sci. & Technol. of China, China; Xiamen SAN-U Optronics Co., Ltd., China

Multi-Physics Coupling Analysis and Optimization Design of SiC MOSFET Power Module Package Insulation [#606]
  Wang Yalin, Li Wenyi, Ding Yi, Sun Hao and Yin Yi
  Shanghai Jiao Tong University, China

Knowledge-aware Artificial Neural Network for Loss Modeling of Planar Magnetic Components [#394]
  Junyun Deng, Wenbo Wang, Prasanth Venugopal, Jelena Popovic and Gert Rietveld
  University of Twente, Netherlands; Yongjiang Lab, China

Feasible Evaluations of Low Profile Magnetic Structure Based on Meander Winding and Split- Magnetic Cores with High-Cooling Capability Used in Power Converters [#392]
  Jun Imaoka, Kazuya Matsuta, Hiroki Ochiai, Koichi Shigematsu, Mostafa Noah and Masayoshi Yamamoto
  Nagoya University, Japan

Low Loss Non Air Gap Multi-Permeability Planar Inductor Design for Totem-Pole PFC [#331]
  Pengyuan Ren, Wenjie Chen, Xingwei Huang, Yuxuan Chen, Yongxing Zhou and Xu Yang
  Xi'an Jiaotong University, China

The Influence of Asymmetric Parameters on Crosstalk between Paralleled SiC MOSFETs [#489]
  Yujie Ding, Hongyao Liu, Saijun Mao, Kun Wang, Wenyu Li and Zhikun Wang
  Fudan University, China; UniSiC Technology (Shanghai) Co., Ltd., China

Power Semiconductor Lifetime Extension Technique using Turn-on Energy as a Variable to Maintain Constant Loss [#154]
  Howe Li Yeo, Vaisambhayana Sriram and Anshuman Tripathi
  Nanyang Technological University, Singapore

Remote Q/A Session R20: Electric Machine Effects of Design and Operation
  Tuesday, October 18, 10:00AM-10:55AM, Room: Zoom #5, Chair: Athanasios Karlis, David Reigosa

Measurement of Vibration and Acoustic Noise Generated by Magnetostriction in Three Stator Cores Made of High Silicon Steel, Amorphous Iron, and Conventional Silicon Steel [#427]
  Yifei Cai, Fares El-Faouri, Saikawa Naoki and Chiba Akira
  Tokyo Institute of Technology, Japan

Investigation of Effective Conditions of Radial Force Sum Flattening for Acoustic Noise Reduction in Switched Reluctance Motors [#229]
  Akira Chiba, Candra Adi Wiguna, Kyohei Kiyota, Sozer Yilmaz, Gundogmus Omer, Junichi Asama and Atsuya Ohashi
  Tokyo Institute of Technology, Japan; University of Akron, United States; Shizuoka University, Japan

Online Optimization Method of Two-step Commutation for Switched Reluctance Generator [#188]
  Zhiyuan Chai, Peilin Liu, Xin Li and Chuang Liu
  Nanjing University of Aeronautics and Astronautics, China
Vibration Characteristics of Induction Motors Considering the Lower-Order Harmonics in Power Supply
Haisen Zhao, Zihan Zhou, Zixu Wang, Jinping Kang, Eldeeb Hassan, Guorui Xu, Yang Zhan and Yongchang Zhang
North China Electric Power University, China; BorgWarner Noblesville Technical Center, United States

Mathematical Derivation of Current Reference for Radial-Force Sum Flattening in Switched Reluctance Motors
Fares El-Faouri, Yifei Cai, Yusuke Fujii and Akira Chiba
Tokyo Institute of Technology, Japan

Contact Resistance Prediction with Grey Box Thermal Model and Experimental Validation of Axial Flux Motors
Zhaozong Li, Chengning Zhang, Fengyu Zhang, Zeyuan Xu, David Gerada, Christopher Gerada, Xueping Li, Shuo Zhang and Yue Zhao
The University of Nottingham, United Kingdom; Beijing Institute of Technology, China; Huazhong University of Science and Technology, China

Proactive Low-Frequency Ride-Through Method for Speed-Sensorless Induction Motor Drives Against Changing Torque
Ruhan Li, Cheng Luo, Kai Yang, Zhijie Xu, Yifei Zheng and Yuhao Huang
Huazhong University of Science and Technology, China

Remote Q/A Session R21: Power Converter Topologies B
Wednesday, October 19, 9:00AM-9:55AM, Room: Zoom #1, Chair: Sheldon Williamson, Montie Vitorino

Analytical Comparison of 3-Level 2-Phase and Double-Step-Down Topologies for Integrated High-Ratio DC-DC Converters in BCD and GaN Process
Muhammad Rizwan Khan, Xin Zhang and Cheng Huang
Iowa State University, United States; IBM T. J. Watson Research Center, United States

A Synchronous Rectification Method with Switching Delay for CLLC Converters to Achieve Secondary-side ZVS
Leheng Wang, Huan Chen and Kai Sun
Tsinghua University, China

Minimum Current Operation of Impedance Control Network Resonant Converters
Mausamjeet Khatua and Khurram Afridi
Cornell University, United States

A Multi-Mode Hybrid CCM/DCM Three-Phase Step-Up AC/DC Soft-Switched Converter with an Adaptive Active-Controlled Auxiliary Circuit and Constant Output Voltage
Siamak Derakhshan and John Lam
York University, Canada

A Single-Stage Multilevel AC-DC Bidirectional Converter With Natural Grid Harmonic Elimination
Ramu Nair, Sunil Dube and Pritam Das
SUNY Binghamton, United States
A New Full-MOSFET-Switches-Based Buck-Boost Type Inverter with Reactive Power Support Capability [#612]
Yanqi Cheng, Weimin Wu, Jianming Chen, Gang Lu, Eftychios Koutroulis, Frede Blaabjerg and Henry Chung
Shanghai Maritime University, China; Zhejiang HRV Electric Co. Ltd, China; Technical University of Crete, Greece; Aalborg University, Denmark; City University of Hongkong, China

Grid Filter Reduction of Single-Phase Inverters using 3-Leg Topology [#89] Guanhong Song, Bo Cao, Hassan Athab and Liuchen Chang
University of New Brunswick, Canada

An Algorithm for Harmonic Elimination in Three-Phase Multilevel Inverters [#916] Concettina Buccella, Maria Gabriella Cimoroni, Sobhan Mohamadian and Carlo Cecati DISIM, University of L'Aquila, Italy

Remote Q/A Session R22: Select Topics on EMI and Multilevel Topologies
Wednesday, October 19, 9:00AM-9:55AM, Room: Zoom #2, Chair: Tommaso Scimone, Li Zhang
Decoupling Control of Circulating Current Suppression and Current Distortion Elimination for the Paralleled Vienna-Type Rectifiers [#803]
Wanqing Han, Xiaoyan Li, Changwei Qin, Xianzhe Pang and Chenghui Zhang Shandong University, China; Shandong Jianzhu University, China

Automatic-Optimization ADRC-Based Disturbance Rejection Method for Low Voltage Interface Converter in Microgrid [#147]
Long Tao, Ping Wang, Yifeng Wang, Xiaoyong Ma, Huaidong Shi and Shaoqi Yang Tianjin University, China

An Instantaneous Power Balancing Control With Power Factor Correction for Single-Stage Three-Phase AC-DC Converters [#979]
Mojtaba Forouzesh, Yan-Fei Liu and Paresh C. Sen Queen's University, Canada

Southwest Jiaotong University, China

Common-Mode Voltage Reduction Scheme for MMC with Consideration of Dead Zone [#324] Hui Liu, Jianan Chen, Dong Jiang and Wei Sun
Huazhong University of Science and Technology, China; Nanjing University of Technology, China

Power MOSFET Lifetime Prediction Method Based on Optimized Long Short-Term Memory Neural Network [#158]
Hongyu Ren, Xiong Du, Yaoyi Yu, Jing Wang, Junjie Zhou and Yuhao Peng
State Key Laboratory of Power Transmission Equip, China

Analysis on Voltage to Ground of Submodules for MMC Under NLM and CPS-PWM [#174] Huang Yihong, Lin Lei, Shi Xiaojie and Yin Tianxiang
Huazhong University of Science and Technology, China

A Constant Common-Mode Voltage PWM Method for Three-Phase Series-end Winding Topology [#272]
Zhiyuan Wang, Zicheng Liu, Dong Jiang and Ronghai Qu
Huazhong University of Science and Technology, China

Remote Q/A Session R23: Wide Bandgap Design and Applications
Wednesday, October 19, 9:00AM-9:55AM, Room: Zoom #3, Chair: Yue Zhao
Design Considerations for Developing 1.2 kV 4H-SiC BiDFET-enabled Power Conversion Systems [#805]
Ajit Kanale, Tzu-Hsuan Cheng, Ramandeep Narwal, Aditi Agarwal, B. Jayant Baliga, Subhashish Bhattacharya and Douglas C. Hopkins
North Carolina State University, United States
Influence of Emitter Side Design on the Unintentional Turn-on of 10kV+ SiC n-IGBTs [972] Ioannis Almpanis, Marina Antoniou, Paul Evans, Lee Empringham, Peter Gammon, Florin Udrea, Philip Mawby and Neophytos Lophitis
University of Nottingham, United Kingdom; University of Warwick, United Kingdom; University of Cambridge, United Kingdom

A Wide-Range Input Auxiliary Power Supply based on Series-Connected SiC MOSFETs with Active Gate Driver [1319]
Arindam Sircar, Inhwan Lee, Muhammad Abubakr Saeed and Xiu Yao
University at Buffalo, United States

Analysis of Nonlinear Conductivity Coating used to Improve Electric Field Distribution in Medium Voltage Power Module [828]
Yuan Gao, Yang Yang, Hongbo Zhao, Thore Stig Aunsborg, Stig Munk-Nielsen and Christian Uhrenfeldt
Aalborg University, Denmark; Northwestern University, United States

Real EOFF as a factor in design of soft-switched DC-DC converters with SiC MOSFET power modules [932]
Jacek Rabkowski, Fernando Gonzalez-Hernando, Mariusz Zdanowski, Irma Villar and Uxue Larranaga
Warsaw University of Technology, Poland, Poland; Ikerlan Technology Research Centre (BRTA), Spain, Spain; CAF Power & Automation, Spain

Modeling and Analysis of Bridge-Leg Crosstalk of GaN HEMT Considering Staged Effect of Common-Source Inductance [616]
Xiao Li, Xuyang Liu, Jianyu Cao, Yushan Liu, Haiwen Yuan and Yaosuo Xue
Beihang University, China; Oak Ridge National Laboratory, United States

Remote Q/A Session R24: Design and Performance Assessment of Electric Machines A
Wednesday, October 19, 9:00AM-9:55AM, Room: Zoom #4, Chair: Eric Severson, Jonathan Bird

Impact of Two Types of Grounding on the Common-mode Voltage of Wide-bandgap Motor Drive Systems [355]
Yipu Xu, Xibo Yuan, Zihao Wang, Yan Li and Yonglei Zhang
China University of Mining and Technology, China

Design and Analysis of Dual-Winding Permanent Magnet Machine with High Torque Density [265]
Shaoshuai Wang, Jianzhong Zhang, Ning Wang and Yongbin Wu
Southeast University, China

Performance Analysis and Mechanical Assembly Considerations for a Spoke-Type Permanent Magnet Vernier Machine with an Inner Salient Pole Core on the Rotor [511]
John Mushenya and Azeem Khan
University of Cape Town, South Africa

A Two-Dimensional Analysis Model of Cogging Torque in Homopolar Inductor Machines [889]
Yufei Wang, Guomin Zhang, Haishen Zhao and Zhongjing Liu
Institute of Electrical Engineering CAS, China; North China Electric Power University, China

Thermal Modeling with Surrogate Model-Based Optimization of Direct Oil Cooling Heat Transfer Coefficient for HEV Motor [755]
So-Yeon Im, Tae-Gun Lee, Ki-Won Kim, Jin-Cheol Park, Jun-Woo Chin and Myung-Seop Lim
Hanyang University, Korea, Republic of; Korea Automotive Technology Institute, Korea, Republic of
Influence of Magnetic Shield Thickness in End Region on Stator Leakage Reactance of Synchronous Condenser [#633]
Xu Guorui, Zhu Xueyang, Li Weili, Liu Wenmao, Zhan Yang and Zhao Haisen
North China Electric Power University, China; Beijing Jiaotong University, China

Transformer Integration and Winding Design for ISOP-LLC Converter [#196] Yifeng Wang, Chen Chen, Bo Chen, Zhongjie Wang, Ruijin Ji and Mingzhi Zhang Tianjin University, China; State Grid Tianjin Power Costumer Service Center, China

Huazhong University of Science and Technology, China

Remote Q/A Session R25: Electric Drives B
Wednesday, October 19, 9:00AM-9:55AM, Room: Zoom #5, Chair: Ali Bazzi, Seema Kewat

An Improved Model-Free Predictive Current Control Method for PMSM Drives Based on Extended Control Set and Fast Current Difference Updating [#816]
Yongchang Zhang, Wenjia Shen, Haitao Yang, Guo Xiaojiang, Fu Mingzhi and Qin Meng
North China Electric Power University, China; North China University of Technology, China; Huaneng Clean Energy Research Institute, China

Model Predictive Current Control of PMSM Drives Based on Evaluation of Switch Jumps [#817]
Haitao Yang, Min Li, Yongchang Zhang, Xiaojiang Guo, Mingzhi Fu and Meng Qin
North China University of Technology, China; North China Electric Power University, China; Huaneng Clean Energy Research Institute, China

An Improved Synchronous Frequency Extractors PLL with Low Computational Burden [#45] Kai Liu, Yuchen Wang and Wei Hua
Southeast University, China

Control Method of Dual Parallel Surface-Mounted Permanent-Magnet Synchronous Motor Systems with Different Parameters Using Single Inverter [#902]
Cheonsu Park and Shinji Doki
Nagoya University, Japan

Synchronous Switch Current Reversion (SSCR) Technique for Motor Braking Enhancement [#995]
Li Teng, Zhiwu Xie, Yu Yin and Junrui Liang
ShanghaiTech University, China; ShanghaiTech University, China

Sensorless Estimation for Stator Winding Temperature of Automotive Electric Motors Based on Sequential Current Pulse Injection [#385]
Yansong Lu, Hao Yin, Jingbo Han, Jingxuan Li, Chong Zhu and Xi Zhang
Shanghai Jiao Tong University, China

A Virtual Voltage Vector-Based Space Vector Modulation Scheme for Three-Phase Open-Winding Motor Drive with Five-Leg Converter [#41]
Zhipeing Dong, Hang Zhao, Rundong Huang, Wusen Wang and Chunhua Liu
City University of Hong Kong, Hong Kong; The Hong Kong University of Science and Technolo, Hong Kong

Fault tolerant operation of an LCI and VSI fed hybrid induction machine drive for medium voltage high power applications [#800]
Harikrishnan Pookulangara, Pratyush Pandey, Jose Titus and Kamalesh Hatua
PhD scholar, India; Assistant Professor, India; Associate Professor, India

Discontinuous PWM Scheme for an Open-end Winding Induction Motor Drives Fed by Dual Inverter [#688]
Kibok Lee and Yongsu Han
Inha University, Korea (South); Myongji University, Korea (South)
Remote Q/A Session R26: Power converters and control for renewable energy systems B

Wednesday, October 19, 10:00AM-10:55AM, Room: Zoom #1, Chair: Zian Qin

Flexible Power Point Tracking for Photovoltaic Systems under Partial Shading Conditions [#339]
  Yinxiao Zhu, Huiqing Wen, Qinglei Bu, Guanying Chu and Haochen Shi
  Xi'an Jiaotong-Liverpool University, China; Huazhong University of Science and Technology, China

Analysis of Direct-duty-ratio based MPPT control scheme for Integrated Dual-DC Boost Converter [#630]
  Ritam Chakrborty and Olive Ray
  Indian Institute of Technology Bhubaneswar, India

Modified Hybrid Modulation Technique for Cascaded H-Bridge Converter with DC Bus Oscillation [#845]
  Sumit Rohidas Patil, Amir Hussain and Wajiha Shireen
  University of Houston, United States

Power Ramp-Rate Control for Differential Power Processing-based Distributed PV Systems [#172]
  Yinxiao Zhu, Huiqing Wen, Guanying Chu, Qinglei Bu, Xue Wang and Haochen Shi
  Xi'an Jiaotong - Liverpool University, China; Huazhong University of Science and Technology, China

A Comparison of PI-Based and Sorting-Based State of Charge Balancing Methods in Cascaded H-Bridge Converters [#397]
  Gaowen Liang, Ezequiel Rodriguez, Glen Farivar, Naga Brahmendra Yadav Gorla, Neha Beniwal, Josep Pou and Georgios Konstantinou
  Nanyang Technological University, Singapore; University of New South Wales, Australia

Energy Redistribution as a Method for Mitigating Risk of Propagating Thermal Runaway [#741]
  Jacob Mueller, Yuliya Preger, Andrew Kurzawski, Luciano Garcia Rodriguez and John Hewson
  Sandia National Laboratories, United States

An Adaptive Cyber Security Scheme for AC Micro-grids [#333] Junjie Xiao,
  Lu Wang, Zian Qin and Pavol Bauer
  Delft University of Technology, Delft, Netherlands

An Analysis of SoC Self-convergence for Adaptive Droop Control Systems of Battery Energy Storage with Different Capacity [#166]
  Yasushi Eto, Yuichi Noge, Masahito Shoyama and Tadatoshi Babasaki
  Kyushu University, Japan; NTT Facilities, Inc., Japan

Remote Q/A Session R27: AC/DC distribution, AC/DC microgrids and renewable energy integration

Wednesday, October 19, 10:00AM-10:55AM, Room: Zoom #2, Chair: Anshuman Shukla, Fariba Fateh

Adaptive Droop Controller for PV - Battery Based Microgrids [#729] Yusuf
  Gupta and Mohammad Amin
  Norwegian University of Science and Technology, Norway

A Communication-less Secondary Voltage Control Based on Small-AC-Signal Injection for DC Microgrids [#471]
  Pu Zhao, Zeng Liu, Qing Wang and Jinjun Liu
  Xi'an Jiaotong University, China

Distribution Power Loss Minimization of Energy Storage Systems in DC Microgrids under FDI Attacks [#200]
  Yajie Jiang, Yun Yang, Siew-Chong Tan and Shu Yuen Ron Hui
  The University of Hong Kong, Hong Kong; The Hong Kong Polytechnic University, Hong Kong; Nanyang Technological University, Hong Kong
Fault-Ride Through Strategy for Islanded Microgrids Via Dynamically Reconfigurable Voltage Reference [#574]
Xia Shen, Wen Huang, Chao Shen, Yang Shen, Zhikang Shuai and Z.john Shen
Hunan university, China; Southeast university, China; Illinois Institute of Technology, United States

Quantum Approximate Optimization Algorithm-Enabled DER Disturbance Analysis of Networked Microgrids [#1068]
Hang Jing, Ye Wang, Yan Li, Liang Du and Ziping Wu
Penn State University, United States; Duke University, United States; Temple University, United States; ComEd, United States

Generator Preventive Maintenance Scheduling in Large Power Systems with High Penetration of Renewable Energy Resources [#226]
Thanh Tung To, Solmaz Kahourzade and Amin Mahmoudi
University of South Australia, Australia; Flinders University, Australia

FOFLL Based Synchronization Scheme with LDLMS Control for Solar Fed Microgrid Feeding Hybrid AC/DC Loads [#619]
Suvom Roy, Farheen Chishti, Bhim Singh and B.K. Panigrahi
Indian institute Of Technology, Delhi, India

Remote Q/A Session R28: Power Converter Topologies C
Wednesday, October 19, 10:00AM-10:55AM, Room: Zoom #3, Chair: Sandro Calligaro, Fabio Mandrile

Design and Implementation of Inverted Voltage Balancing Control for Bidirectional Flying- Capacitor DC/DC Converter [#35]
Hung-Chi Chen and Ding-Hao Lin
National Yang Ming Chiao Tung University, Taiwan

Triple-Phase Shift Power-Level Controller (TPSPC) For Single-Phase Dual Active Bridge (DAB) DC/DC Converter [#428]
Hamid Naseem and Jul-Ki Seok Yeungnam University, Korea, Republic of

Enhancement of The CCM Operating Region of A Synchronous Buck Converter Using A Flux- Rate Switching-Based Adjustable Inductor [#913]
Ruman Kalyan Mahapatra, L. Umanand and K. Gopakumar
Indian institute of science, India; Indian Institute of Science, India

Optimization of Stacked Structure LLC Resonant Converter with Hybrid Modulation Strategy [#747]
Yuqi Wei and Alan Mantooth
University of Arkansas, United States

An 80A 48V-Input Capacitor-assisted Dual-Inductor Hybrid Dickson Converter for Large-Conversion-Ratio Applications [#1339]
Weijie Han, Chen Chen, Jin Liu and Hoi Lee
University of Texas at Dallas, United States

A Three-Port DC-DC-DC Converter based on Dual Active Bridge Series Resonant Topology for Electric Vehicle DC Fast Charging Applications [#776]
Md Safayatullah, Reza Rezaai, Fahad Alaql and Issa Batarseh
University of Central Florida, United States; Imam Mohammad Ibn Saud Islamic University, Saudi Arabia

GaN-Based T-Type Totem-Pole Rectifier with ZVS Control and Reactive Power Regulation [#256]
Jingjing Sun, Liyan Zhu, Ruiyang Qin, Jie Li, Daniel Costinett and Leon Tolbert
the University of Tennessee, Knoxville, United States; The University of Tennessee, Knoxville, United States
Quadratic Extended-Duty-Ratio Boost Converter with Voltage Multiplier Cell for High Gain Applications [1099]
Ankul Gupta, Nikhil Korada, Raja Ayyanar and Madhura Sondharangalla
Arizona State University, United States

Remote Q/A Session R29: Design and Performance Assessment of Electric Machines B
Wednesday, October 19, 10:00AM-10:55AM, Room: Zoom #4, Chair: Matthew C. Gardner, Poskovic Emir

Comparative Study on Slotted and Slotless High-Speed Permanent Magnet Motors with Toroidal Windings [284]
Fan Xu, Tianran He, Ziqiang Zhu, Hong Bin, Di Wu, Liming Gong and Jintao Chen
University of Sheffield, United Kingdom; Midea Group Corporate Research Center, China

Design and Analysis of Electric-Excitation Claw-Pole Field-Modulated Machine Considering Effective Harmonics [251]
Yu Dong, Xianglin Li, Xiaosong Wang, Kejin Lu and Xingtian Feng
China University of Petroleum (East China), China; Qingdao University, China

A Combined 3-D Geometric and Magnetic Modeling Approach of Coils in Air-Cored Resonant Induction Machines [1259]
Zhao Jin, Matteo Iacchetti, Alexander Smith, Rajesh Deodhar, Yoshiyuki Komi, Ahmad Abdullaah and Chiaki Umemura
The University of Manchester, United Kingdom; IMRA Europe S.A.S. UK Research Centre, United Kingdom; Aisin Corporation, Japan

Influence of Rotor Damping Effect on Dynamic Characteristic of Dual-Excited Synchronous Generator with Excitation Control [533]
Xu Guorui, Fu Yue, Wang Zhenzheng, Zhan Yang, Zhao Haisen and Zhang Yongchang
North China Electric Power University, China

Improvement of Reactive Power Consumption Ability for Dual-Excited Synchronous Condenser [632]
Xu Guorui, Li Zijing, Li Zhiqiang, Zhao Haisen, Zhan Yang and Zhang Yongchang
North China Electric Power University, China; China Electric Power Research Institute, China

Impact of Inverter Switching Harmonics in Detecting Changes in Impedance Due to Broken Rotor Bars [185]
Lebohang Ralikalakala and Paul Barendse University of Cape Town, South Africa

Influence of PWM Excitation on DC Winding Induced Voltage in Wound Field Switched Flux Machines [605]
Zhongze Wu, Lai Jin, Wentao Zhang, Ying Fan, Wei Hua and Ming Cheng
Southeast University, China

A Stable and Computationally Efficient Spatial Harmonic Model for Predicting the DC Winding Induced Voltage in WFSF Machine [80]
Wentao Zhang, Zhongze Wu, Ying Fan, Wei Hua and Ming Cheng
Southeast University, China

A Motor Capable of Conversion Between Synchronous Motor and Induction Motors with Pole Change for Electric Vehicles [254]
Hayate Matsumoto and Kazuto Sakai
Toyo University, Japan

Remote Q/A Session R30: Converter Control Optimization and Enhancement
Wednesday, October 19, 10:00AM-10:55AM, Room: Zoom #5, Chair: Alessandro Lidozzi, Salvatore Foti

Computation-Efficient Variable Angle Phase-Shifting PWM Method for Cascaded H-Bridge Converters [842]
Yiwei Pan, Ariya Sangwongwanich, Thiago Pereira, Yongheng Yang, Marco Liserre and Frede Blaabjerg
Aalborg University, Denmark; Kiel University, Germany; Zhejiang University, China
Open-Circuit Fault Diagnosis and Fault-Tolerant Control for Coupled-Inductor-Based Aalborg Inverter
Chengqi Xiao, Weimin Wu, Jianmin Chen, Gang Lu, Eftichios Koutroulis, Henry Shu-Hung Chung and Frede Blaabjerg
Shanghai Maritime University, China; Zhejiang HRV Electric Co. Ltd, China; Technical University of Crete, Greece; City University of Hong Kong, China; Aalborg University, Denmark

VRFT for Current-Mode Buck Converter with Anti-Windup Compensation
Naoki Kameya, Yasutaka Fujimoto, Yu Hosoyamada and Toyoaki Suenaga
Yokohama National University, Japan; Kyosan Electric Manufacturing Co., Ltd., Japan

Stability and Accuracy Evaluation of LCL Coupling Networks for PMSM Emulation PHIL
Luca Bigarelli, Marco Di Benedetto, Alessandro Lidozzi and Luca Solero
ROMA TRE University, C-PED, Italy

A Discrete-Time Domain Modeling of LLC Resonant Converter Considering the Nonlinearity of Voltage-Controlled Oscillator
Yuecheng Zhang, Xinbo Ruan and Ying Li
NUAA, China; University of Nottingham, United Kingdom

Active-Damping for Digital Controlled LC-Type Voltage Source Inverter with Positive Proportional Feedback of Filter Capacitor Voltage
Li Zhang, Haoxin Yang and Yi Tang
Huazhong University of Science and Technology, China; Nanyang Technological University, Singapore

Exploration of the Pareto Optimization of Bidirectional Isolated DC-DC Power Electronic Converters for More Electric Aircraft
Alejandro Fernandez-Hernandez, Fernando Gonzalez-Hernando, Asier Garcia-Bediaga, Irma Villar and Gonzalo Abad
Ikerlan Technology Research Centre (BRTA), Spain; Mondragon Unibertsitatea, Spain

A Novel Online On-State Voltage Drop Measurement Technique for Thyristors
Yanyong Yang, Dayong Zheng, Xiaofeng Ding and Pinjia Zhang
Beihang University, China; Tsinghua University, China

Fieldbus Communication Scheme for Modular Converter Systems - Considerations for Minimal Switching Period and Low Data Latency
Stefan Rietmann, Simon Fuchs, Simon Beck and Juergen Biela
ETH Zurich, HPE, Switzerland