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TRACK  Power Electronics Integration and Manufacturing

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The University of Akron, United States

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**TRACK** Power Electronics for Utility Interface

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Mehdi Farasat, Louisiana State University

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D01.2 Hybrid Voltage Balancing Control in 3-Level Bridgeless Totem-Pole PFC .................................... 1822
Rytis Beinarys, Trong Tue Vu
ICERGi Ltd., Ireland

D01.3 Two-Switch Zeta-Based Single-Phase Rectifier with Inherent Power Decoupling and No Extra Buffer Circuit .................................................. 1830
Robson de Souza Donato, Marius Hudson de Aguiar, Roniel Ferreira Cruz, Montiê Alves Vitorino, Mauricio Beltrão de Rossiter Corrêa
Federal University of Campina Grande, Brazil

D01.4 Adaptive Tuning Method for ZVS Control in GaN-Based MHz CRM Totem-Pole PFC Rectifier ................................................................. 1837
Hongkeng Zhu, Kangping Wang, Bingyang Li, Xu Yang, Qiaoliang Chen
X'ian Jiaotong University, China

D01.5 Design and Implementation of a 5kW 99.2% Efficient High-Density GaN-Based Totem Pole Interleaved Bridgeless Bidirectional PFC ........................................... 1843
Adithyan Vetivelan2, Zibo Chen2, Qingyun Huang2, Eric Persson1, Alex Q. Huang2
1Infineon Technologies, United States; 2The University of Texas at Austin, United States

D01.6 An Approach to Localize Circulating Current for Three Phase Interleaved AC-DC Converters .......................................................... 1848
Ripunjoy Phukan1, Sungjae Ohn2, Dong Dong1, Rolando Burgos1
1Virginia Polytechnic Institute and State University, United States; 2Tesla, United States

D02: DC-DC Converters
TRACK DC-DC Converters
SESSION CHAIR
Juan Manuel Rivas-Davila, Stanford University

D02.1 Low Cost Diode-Blocked Self-Oscillating Boost Converter .................................................. 1854
David Bamgboje, William Harmon, Tingshu Hu
University of Massachusetts Lowell, United States
D02.2 Implementation and Stability of Charge Control for Full-Bridge LLC Converter ............................... 1859
Yuri Panov
*Delta Electronics Americas Ltd., United States*

D02.4 High Gain Interleaved Stacked Boost Converter ................................................................. 1867
Sukhjit Singh Ghumman, Peter W. Lehn, Mehanathan Pathmanathan
*University of Toronto, Canada*

D02.5 Re-Analysis on ZVS Condition for LLC Converter ............................................................... 1874
Haibin Song, Daofei Xu, Alpha J. Zhang
*Delta Electronics Shanghai Co. Ltd., China*

D02.6 Comparative Evaluation of Asymmetric and Symmetric Series-Capacitor Extended-Gain DC/DC Converters ............................................................................................................ 1881
Tomas Sadilek¹, Peter Barbosa¹, Iqbal Hussain²
¹*Delta Electronics Americas Ltd., United States;* ²*North Carolina State University, United States*

D02.7 Performance Evaluation and Analysis for Resonant Switched Capacitor Converter ........ 1889
Mengxuan Wei¹, Ze Ni², Shuai Yang¹, Maohang Qiu¹, Xiaoyan Liu¹, Dong Cao¹
¹*University of Dayton, United States;* ²*Monolithic Power System Inc., United States*

D02.8 A Transformer Flux Balancing Scheme based on Magnetizing Current Harmonic in Dual-Active-Bridge Converters ........................................................................................................ 1894
Zihan Gao¹, Pengfei Yao², Haiguo Li¹, Shiqi Ji¹, Zhe Yang¹, Fred Wang¹,³, Yiwei Ma¹
¹*The University of Tennessee Knoxville, United States;* ²*China Huaneng Group Co., Ltd., China;* ³*Oak Ridge National Laboratory, United States*

D02.9 Optimization and Design of a 48-to-12 V, 35 A Split-Phase Dickson Switched-Capacitor Converter .......................................................................................................................... 1900
Richard Sun, Samuel Webb, Yan-Fei Liu, Paresh C. Sen
*Queen’s University at Kingston, Canada*

D02.10 The Analysis on Hard-Switching Phenomenon during Start-Up of LLC Converter .......... 1908
Lei Wang, Yang Lei
*Dell EMC, United States*

D02.11 Applying Mode Exchange to High Step-Down Converter to Obtain Wide Input Voltage Range ............................................................................................................................... 1913
Y.T. Yau¹, C.W. Wang²,³, K.I. Hwu³
¹*National Chin-Yi University of Technology, Taiwan;* ²*Industrial Technology Research Institute, Taiwan;* ³*National Taipei University of Technology, Taiwan*

D02.12 A Soft-Switching Non-Inverting Buck-Boost Converter ....................................................... 1920
Anran Wei¹, Brad Lehman¹, William Bowhers², Mahshid Amirabadi¹
¹*Northeastern University, United States;* ²*Teradyne Inc., United States*

D02.13 Soft Start-Up of Three Phase CLLC Converter based on State Trajectory Control .......... 1927
Ahmed Nabih, Feng Jin, Qiang Li, Fred C. Lee
*Virginia Polytechnic Institute and State University, United States*

D02.14 Switching Pattern Analysis of Coupled Multi-Phase Boost-Buck Converters ................. 1933
Ahmed K. Khamis, Mohammed Agamy
*State University of New York at Albany, United States*

D02.15 Design Principles and Optimization Considerations of a High Frequency Transformer in GaN based 1 MHz 2.8 kW LLC Resonant Converter with Over 99% Efficiency ............... 1939
Hao Wen, Yong Liu, Dong Jiao, Chih-Shen Yeh, Jih-Sheng Lai
*Virginia Polytechnic Institute and State University, United States*
D02.16  Improved LLC Resonant Converter with Rectifier Operating in Three Operation Modes for Wide Voltage Range Applications
Fahad Alaql, Abdullah Alhatlani, Issa Batarseh
University of Central Florida, United States

D02.17  Multi-Variable Hybrid Switching Frequency- Duty Cycle based Phase-Shift Control for DC-DC Resonant Converters
Abhishek Awasthi, Majid Pahlevani, Praveen Jain
Queen's University, Canada

D02.18  Modeling and Analysis of 2/3-Level Dual-Active-Bridge DC-DC Converters with the Five-Level Control Scheme
Chaochao Song¹, Yongheng Yang², Ariya Sangwongwanich¹, Yiwei Pan¹, Frede Blaabjerg¹
¹Aalborg University, Denmark; ²Zhejiang University, China

D02.19  A Current-Fed High Gain Multilevel DC-DC Converter for BESS Grid Integration Applications
Vinay Rathore¹, Kaushik Rajashekara¹, Anindya Ray², Luciano A. Garcia Rodriguez², Jacob Mueller³
¹University of Houston, United States; ²Sandia National Laboratories, United States

D02.20  Simplified Frequency-Domain Analysis of Improved Asymmetrical PWM Technique for DC-DC Resonant Converters
Abhishek Awasthi, Praveen Jain
Queen's University, Canada

D02.22  Variable DC-Link Voltage LLC Resonant DC/DC Converter using Wide Band Gap Semiconductor Devices
Shuang Zhao¹, Asantha Kempitiya¹, Wibawa Chou¹, Veljko Palija²
¹Infineon Technologies Americas Corp., United States; ²Infineon Technologies AG, Germany

D02.23  Series Resonant DC-DC Converter with an AC-Switch-Based Full-Bridge Boost Rectifier
Abualkasim Bakeer, Andrii Chub, Dmitri Vinnikov
Tallinn University of Technology, Estonia

D02.24  Switching Battery Charger with Cascaded Two Loop Control using Time-Based Techniques
Chai Yong Lim¹, Debashis Mandal², Bertan Bakkaloglu¹, Sayfe Kiaei¹
¹Arizona State University, United States; ²Indian Institute of Technology Kharagpur, India

D02.25  MMC-Based High Gain Solid-State Transformers for Energy Storage Applications
Diang Xing¹, Xiao Li¹, Yue Zhang¹, Qianyi Cheng¹, Zhining Zhang¹, Boxue Hu¹, Anant Agarwal¹, Jin Wang¹, Robert Guenter²
¹The Ohio State University, United States; ²GPEM LLC, United States

D02.26  A Novel 4-to-1 Switched-Capacitor Converter
Kin Keung Lau¹, Jaesoon Choi², Seokmum Choi², Inkuk Baek²
¹Silicon Mitus Technology, Inc., United States; ²Silicon Mitus, Inc., Korea

D02.27  A High Conversion Ratio Quasi-Resonant Flying Capacitor DC-DC Converter
Basil G. Eleftheriades, Aleksander Prodić
University of Toronto, Canada

D02.28  A 32-Phase 1200-Ampere DC/DC Converter for Data Center and Artificial Intelligence Systems
Wenkang Huang, Denny Clavette, Steve Zhou, Mark Rodrigues
Infineon Technologies, United States
D03: Utility Interface

SESSION CHAIRS
Alireza Bakhshai, Queen’s University
Praveen Jain, Queen’s University

D03.1 Dynamic Performance Improvement of Model-Based Capacitor Voltage Control for Single-Phase STATCOM with Reduced Capacitance ................................................................. 2024
Motoki Akihiro, Tomoyuki Mannen, Takanori Isobe
University of Tsukuba, Japan

D03.3 Circulating Current Suppression for Multi-Function Parallel Three-Level Four-Leg Converters ................................................................................................................. 2030
Chenghui Zhang, Rui Zhang, Xiangyang Xing, Xiaoyan Li
Shandong University, China

D03.4 The Impact of the Lightning Surge on SiC-Based Medium-Voltage Three-Phase Four-Wire Grid-Connected Converters ............................................................................................ 2037
Haiguo Li¹, Yiwei Ma¹, Shiqi Ji¹, Fred Wang¹,²
¹The University of Tennessee Knoxville, United States; ²Oak Ridge National Laboratory, United States

D03.5 An Inrush Current Limit Method for SiC-Based Multi-Level Grid-Connected Converter during Low-Voltage Ride-Through .......................................................................................... 2044
Haiguo Li¹, Zihan Gao¹, Shiqi Ji¹, Yiwei Ma¹, Fred Wang¹,²
¹The University of Tennessee Knoxville, United States; ²Oak Ridge National Laboratory, United States

D03.6 Construction and Testing of a 13.8 kV, 750 kVA 3-Phase Current Compensator using Modular Switching Positions ................................................................................................... 2050
Vinson Jones¹, Roberto Fantino¹, Ahmed Rahouma¹, Juan Carlos Balda¹, Rambabu Adapa²
¹University of Arkansas, United States; ²Electric Power Research Institute, United States

D03.7 Performance Evaluation of Si/SiC Hybrid Switch-Based Three-Level Active NPC Converter .......................................................................................... 2058
Haichen Liu, Tiefu Zhao
University of North Carolina at Charlotte, United States

D03.8 A High-Frequency Planar Transformer with Medium-Voltage Isolation .......................................................................................................................... 2065
Satyaki Mukherjee¹, Branko Majmunović¹, Gab-Su Seo², Soham Dutta², Rahul Mallik², Brian Johnson², Dragan Maksimović¹
¹University of Colorado Boulder, United States; ²University of Washington, United States; ³National Renewable Energy Laboratory, United States

D03.10 Investigating the Effect of Grid Load Data on Optimal DG Placement and Capacity Determination ............................................................................................................ 2071
Saeid Khademi¹, Roohalamin Zeinali Davarani¹, Roohollah Fadaeinedjad¹, Gerry Moschopoulos²
¹Graduate University of Advanced Technology, Iran; ²Western University, Canada

D03.12 Evaluation of Carrier-Based Control Strategies for Balancing the Thermal Stress of a Hybrid SiC ANPC Converter ......................................................................................................... 2077
Mateja Novak¹, Victor Ferreira², Frede Blaabjerg¹, Marco Liserre²
¹Aalborg University, Denmark; ²Kiel University, Germany

D03.13 Optimization of PV Array-to-Inverter Power Ratio in Grid-Connected Systems to Maximize System Profit ............................................................................................................. 2084
Ebrahim Mohammadi, Gerry Moschopoulos
Western University, Canada
D03.14 Deep Deterministic Gradient Policy (DDGP) Reinforcement Learning Assisted Degradation-Aware Control of Solid-State Transformer ................................................................. 2090
Moinul Shahidul Haque, Seungdeog Choi
Mississippi State University, United States

D03.15 Effect of Inverter-Interfaced Distributed Generation on Negative Sequence Directional Element using Typhoon Real-Time Hardware in the Loop (HIL) ........................................... 2097
Oluwatimilehin Adeosun, Muhammad Foyazur Rahman, Ehab Shoubaki, Valentina Cecchi, Madhav Manjrekar
University of North Carolina at Charlotte, United States

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Oak Ridge National Laboratory, United States

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Florida State University, United States

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Haiguo Li1, Pengfei Yao1, Zihan Gao1, Fred Wang1,2
1The University of Tennessee Knoxville, United States; 2Oak Ridge National Laboratory, United States

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Guddy Satpathy, Dipankar De
Indian Institute of Technology Bhubaneswar, India

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Ziaur Rahman, DOE
Lee Woongkul, Michigan State University

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Zhituo Ni1, Mehdi Narimani1, Jose Rodriguez2
1McMaster University, Canada; 2Universidad Andres Bello, Chile

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Sang Min Kim1, Rolando Burgos2, Taesuk Kwon1, Jinhyu Seo1
1Hyundai Mobis, Korea; 2Virginia Polytechnic Institute and State University, United States

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Gyu Cheol Lim1, Gwangyol Noh1, Jonghun Choi1, Jae-Hoon Shim1, Hyeon-Gyu Choi2, Jung-Ik Ha1
1Seoul National University, Korea; 2LG Electronics, Korea

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Xicai Pan, Shangzhi Pan, Jinwu Gong, Xiaoming Zha
Wuhan University, China

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Nagoya University, Japan
D04.6 A Novel Auxiliary Resonant Commutated Pole Soft-Switching Inverter

Wenkang Gong, Shangzhi Pan, Wenqiang Lin, Jinwu Gong, Yuan Shang
Wuhan University, China

D04.7 A Three-Phase 450 kVA SiC-MOSFET based Inverter with High Efficiency and High Power Density by using 3L-TNPC

Zhao Yuan¹, Asif Imran Emon², Zhongjing Wang¹, Hongwu Peng¹, Balaji Narayanasamy¹, Mustafeez Hassan³, Yalin Wang¹, Amol Deshpande¹, Fang Luo²
¹University of Arkansas, United States; ²Stony Brook University, United States

D04.9 Comparative Evaluation of Overload Capability and Rated Power Efficiency of 200V Si/GaN 7-Level FC 3-Φ Variable Speed Drive Inverter Systems

Gwendolin Rohner¹, Spasoje Mirić¹, Dominik Bortis¹, Johann W. Kolar¹, Mario Schweizer²
¹ETH Zürich, Switzerland; ²ABB Inc., Switzerland

D04.10 Switching Motion Control of Piezoelectric Actuators in Hybrid Circuit Breakers for MVDC System Protection

Chunmeng Xu, Zhiyang Jin, Lukas Graber
Georgia Institute of Technology, United States

D04.12 Decoupling Control Method of Asymmetric Dual Three-Phase PMSM with Mutual Coupling Inductance

Gyu Cheol Lim¹, Jonghun Choi¹, Gwangyol Noh¹, Yongsu Han³, Jung-Ik Ha¹
¹Seoul National University, Korea; ²Myongji University, Korea

D05: Devices I: SiC

TRACK Devices and Components

SESSION CHAIRS
Christina DiMarino, Virginia Polytechnic Institute and State University
Laili Wang, Xi’an Jiaotong University

D05.1 Four Control Freedoms AGD for Hybrid SiC MOSFET and Si IGBT Application

Yuqi Wei, Dereje Woldegiorgis, Rosten Sweeting, Alan Mantooth
University of Arkansas, United States

D05.2 Characterization of 4.5 kV Charge-Balanced SiC MOSFETs

Jack Knoll¹, Mina Shawky¹, Sheng-Hung Yen¹, Ibrahim Esheira¹, Christina DiMarino¹, Reza Ghandi², Stacey Kennerly³, Cyril Buttay⁴
¹Virginia Polytechnic Institute and State University, United States; ²GE Global Research, United States; ³University Claude-Bernard Lyon 1, INSA-Lyon, CNRS, France

D05.3 Comparative Investigation of Body Diode Reliability of 1,2-kV SiC Power Switches for the Temperature Measurement

Jianzhi Fu, Wалиd Mansour, Giorgio Kapino, Thomas Ebel, Wulf-Toke Franke
University of Southern Denmark, Denmark
D05.4 A 13.8 kV, 100 kVA Multi-Functional MMC-Based Asynchronous Microgrid Power Conditioning System with 10 kV SiC MOSFETs

Cheng Nie1, Xingxuan Huang1, Dingrui Li1, Shiqi Ji1, Min Lin1, Ruirui Chen1, Fred Wang1,2, Leon M. Tolbert1, William Giewont1

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D05.5 Evaluation of SiC MOSFETs for Solid State Circuit Breakers in DC Distribution Applications

Lakshmi Ravi1, Dong Dong1, Rolando Burgos1, Xiaoping Song2, Pietro Cairoli2

1Virginia Polytechnic Institute and State University, United States; 2ABB Inc., United States

D05.6 Radiated Electromagnetic Interference Modeling for Three Phase Motor Drive Systems with SiC Power Modules

Boyi Zhang, Shuo Wang

University of Florida, United States

D05.9 A New Cascaded SuperCascode High Voltage Power Switch

Utkarsh Mehrotra, Douglas C. Hopkins

North Carolina State University, United States

D06: Devices II: GaN and Passive

TRACK Devices and Components

SESSION CHAIRS
Gab-Su Seo, National Renewable Energy Laboratory
Cong Li, GE Research

D06.1 Investigation of Noise Spectrum and Radiated EMI in High Switching Frequency Flyback Converters

Juntao Yao, Yanwen Lai, Zhedong Ma, Shuo Wang

University of Florida, United States

D06.2 Power Electronics-Based Switched Supercapacitor Bank Circuits with Enhanced Power Delivery Capability for Pulsed Power Applications

Deepak Ronanki1, Yashwanth Dasari2, Sheldon S. Williamson2

1Indian Institute of Technology Roorkee, India; 2University of Ontario Institute of Technology, Canada

D06.3 Design of Three-Level Flying-Capacitor Commutation Cells with Four Paralleled 650 V/60 A GaN HEMTs

Hans H. Sathler1, Tianyu Zhao2, François Costa3,4, Bernardo Cougo1, Gilles Segond1, Rolando Burgos5, Denis Labrousse5

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D06.4 A Capacitive Isolated LLC Converter

Y.T. Yau1,2, Hung-Tsung Liang2, K.I. Hwu3

1National Chin-Yi University of Technology, Taiwan; 2Asian Power Device Inc., Taiwan; 3National Taipei University of Technology, Taiwan

D06.5 Investigating GaN Power Device Double-Pulse Testing Efficacy in the Face of VTH-Shift, Dynamic Rdson, and Temperature Variations

Mohammad H. Hedayati, Harry C.P. Dymond, Rajib Goswami, Bernard H. Stark

University of Bristol, United Kingdom
D06.6 Supercapacitor Assisted Surge Absorber (SCASA) Technique: Selection of Magnetic Components based on Permeance
Silva Thotabaddurage Sadeeshvara Udayanga, Savin Kokuhennadige, Jayathu Fernando, Nihal Kularatna, D. Alistair Steyn-Ross
University of Waikato, New Zealand

D07: Power Component Design, Packaging and EMI Considerations
TRACK Power Electronics Integration and Manufacturing
SESSION CHAIR Rashmi Prasad, General motors

D07.1 Advances in Modeling and Reduction of Conducted and Radiated EMI in Non-Isoated Power Converters
Juntao Yao, Yanwen Lai, Zhedong Ma, Shuo Wang
University of Florida, United States

D07.2 Design and Optimization of 650V/60A Double-Sided Cooled Multichip GaN Module
Asif Imran Emon1, Hayden Carlton2, John Harris2, Alexis Krone2, Abdul Mirza1, Mustafeez Hassan1, Zhao Yuan3, David Huitink2, Fang Luo1
1Stony Brook University, United States; 2University of Arkansas, United States

D07.3 Design and Application Considerations of Packaging of DC-DC Converter Micromodules
Mahmoud Shousha, Dragan Dinulovic, Michael Brooks, Michael Hofer, Martin Haug
Würth Elektronik eiSos GmbH & Co. KG, Germany

D07.4 Condition Monitoring of DC-Link Capacitors using Hidden Markov Model Supported-Convolutional Neural Network
Tyler McGrew, Viktoriya Sysoeva, Chi-Hao Cheng, Mark Scott
Miami University, United States

D07.5 Effect of Mechanical Stress Induced by PCB-Embedding Fabrication on Ferrite Magnetics
Jiewen Hu, Bo Wen, Rolando Burgos
Virginia Polytechnic Institute and State University, United States

D07.6 EMI Evaluation of a SiC MOSFET Module with Organic DBC Substrate
Narayanan Rajagopal1, Christina DiMarino1, Brian DeBoi2, Andrew Lemmon2, Aaron Brovont2
1Virginia Polytechnic Institute and State University, United States; 2The University of Alabama, United States; 3PC Krause and Associates, United States

D07.7 Packaging a Top-Cooled 650 V/150 a GaN Power Modules with Insulated Thermal Pads and Gate-Drive Circuit
Yu Yan, Liyan Zhu, Jared Walden, Ziwei Liang, Hua Bai
The University of Tennessee Knoxville, United States

D07.8 Design and Characterization of 3.3 kV-15 kV Rated DBC Power Modules for Developmental Testing of WBG Devices
Utkarsh Mehrotra1, Adam J. Morgan2, Douglas C. Hopkins1
1North Carolina State University, United States; 2State University of New York Polytechnic Institute, United States

D07.9 System-Level Common-Mode EMI Analysis for Drive Applications using Unterminated Behavioral EMI Models
Harish Pulakhandam, Subhashish Bhattacharya
North Carolina State University, United States
DCM™ 1000X – Automotive Power Module Technology Platform Optimized for SiC Traction Inverters

Fabio Carastro1, Zheng Chen2, Alexander Streibel1, Ole Muehlfeld1
1Danfoss Silicon Power, Germany; 2Danfoss Silicon Power, United States

D08: Modeling and Simulation

TRACK Modeling and Simulation

SESSION CHAIRS
Kartik Iyer, Tesla
Jason Neely, Sandia National Laboratories

D08.1 Digital Twin Models of Power Electronic Converters using Dynamic Neural Networks
Andrew Wunderlich, Enrico Santi
University of South Carolina, United States

D08.2 Scalable Power Converter Architectures with Quantized Output and Envelope Prediction for Wireless Communication
Harish S. Krishnamoorthy, Tulasi Narayanan Aayer
University of Houston, United States

D08.3 A Compact Model Adopting the EKV Model for a Silicon Vertical Power MOSFET
Lixi Yan, Hao Dong, Ingmar Kalffass
University of Stuttgart, Germany

D08.4 An Accurate Compact Model for GaN Power Switches with the Physics-Based ASM-HEMT Model
Sourabh Khandelwal1, M. Labrecque2, Y. Huang2, F. Qi2, Z. Wang2, P. Smith2, Y. Wu2, R. Lal2
1Macquarie University, Australia; 2Transphorm Inc., United States

D08.5 Reduced-Order Model for Inductive Power Transfer Systems
Guangce Zheng, Kai Zhao, Peng Zhao, Haoyu Wang, Junrui Liang, Minfan Fu
ShanghaiTech University, China

D08.6 Practical Considerations of Voltage-Source-Inverters Input Impedance Modeling for System Stability Analysis
M. Sanz1, D. Ochoa1, A. Lázaro1, A. Barrado1, D. Santamargarita2, F. Huerta2
1Universidad Carlos III de Madrid, Spain; 2University of Alcalá, Spain

D08.7 Data-Driven Model-Based Smart Control of Intelligent Gate Drive for Converter Operational Performance Improvement
Dehao Qin, Liwei Wang, Shuangshuang Jin, Zheyu Zhang
Clemson University, United States

D08.9 Comparison of Finite Element Modelling Methods for Power Magnetic Components
Boyan Dinev, Wulf-Toke Franke, Thomas Ebel
University of Southern Denmark, Denmark

D08.10 Parasitic Inductances Extraction for SiC Power Modules using an Enhanced Two-Port S-Parameter Approach
Zhongjing Wang, Zhao Yuan, Yue Zhao
University of Arkansas, United States

D08.11 Optimization Algorithms for Dynamic Tuning of Wide Bandgap Semiconductor Device Models
William Collings1, Tolen Nelson1, Andrew Sellers1, Raghav Khanna1, Alan Courtay2, Sergio Jimenez3, Andrew Lemmon3
1University of Toledo, United States; 2Synopsys, Inc., United States; 3The University of Alabama, United States
D08.12 DC-Link Capacitor Current Modeling and Analysis for Three-Level Voltage Source Inverters
Zhe Zhao, Fei Diao, Yuheng Wu, Zhongjing Wang, Yue Zhao
University of Arkansas, United States

D09: Control III

SESSION CHAIR
Jaber Abu Qahouq, The University of Alabama

D09.1 An Analytical Approach of Discrete-Time Modeling of Fixed and Variable Frequency Digital Modulation
Santanu Kapat
Indian Institute of Technology Kharagpur, India

D09.2 Event-Triggered Ripple-Emulated Digital Hysteresis Current Control Architectures in DC-DC Converters
Santanu Kapat
Indian Institute of Technology Kharagpur, India

D09.3 Low-Cost Compact Approach to Reinforced Isolated Drive for LLC Converters
Edgaras Mickus, Trong Tue Vu
ICERGi Ltd., Ireland

D09.4 Passivity-Based Fixed-Order H-Infinity Controller Design for Grid-Forming VSCs
Javier Serrano-Delgado¹, Santiago Cobreces¹, Emilio J. Bueno¹, Mario Rizo²
¹University of Alcalá, Spain; ²Siemens Gamesa, Spain

D09.5 System Performance Optimization for Dual-Loop Dual-Variable Controlled Active Clamp Flyback Converter using Decoupling Compensation Technique
Shengyou Xu¹, Qinsong Qian¹, Shiyan Mao¹, Shiyun Xu¹, Tingying Wang², Weifeng Sun¹
¹Southeast University, China; ²Lianyungang JARI Electronics Co., Ltd., China

D09.6 Advanced Control Features of Hybrid Current-Programmed Digital Controller in Multiphase VRM Applications
Bar Halivni, Tom Urkin, Mor Mordechai Peretz
Ben-Gurion University of the Negev, Israel

D09.7 A 20MHz-Transformer-Based Isolated Gate Driver for 3.3kV SiC MOSFETs
Zhehui Guo, Hui Li
Florida State University, United States

D09.8 An Enhanced Linear Extended State Observer based Sensorless Control for PMSM Drives
Lizhi Qu¹, Yao Duan¹, Liang Du²
¹Toshiba International Corporation, United States; ²Temple University, United States

D09.9 Challenges and Solutions for Non-Inverting Buck-Boost Converters
Anmol Sharma, Gerhard Thiele, Joerg Kirchner, Thomas Keller, Manuel Wiersch
Texas Instruments Deutschland GmbH, Germany

D09.10 A Digital Adaptive Voltage Positioning Technique for 48-1V ISOP-LLC Converter based on Bang-Bang Charge Control
Minglong Wang, Shangzhi Pan, Jinwu Gong, Wenqiang Lin, Xiaoming Zha
Wuhan University, China
D09.11 Characterization of the Minimum Recovery Time Transients for Three-Phase PWM Rectifiers
Franco Degioanni, Ignacio Galiano Zurbriggen, Martin Ordonez
The University of British Columbia, Canada

D09.12 A Seamless Transition Control Method for Series Voltage Injection of Transformerless Perturbation Injectors
Sizhan Zhou¹, Bo Wen¹, Rolando Burgos¹, Jake Verhulst², Mohamed Belkhayat², Dushan Boroyevich¹
¹Virginia Polytechnic Institute and State University, United States; ²Newport News Shipbuilding, United States

D10: Control IV
TRACK Control
SESSION CHAIR
Martin Ordonez, The University of British Columbia

D10.1 An Effective Sliding Mode PWM Control for the PUC5 Inverter
Khaled Rayane¹,², Atallah Benalia¹, Haitham Abu-Rub¹, Shady S. Refaat², Mohamed Trabelsi²,³
¹University of Laghouat, Algeria; ²Texas A&M University at Qatar, Qatar; ³Kuwait College of Science and Technology, Kuwait

D10.2 A Digitally Current Mode Controlled Non-Inverting Buck-Boost Converter for Fast Voltage Transitions
V Inder Kumar, Santanu Kapat
¹University of Colorado Boulder, United States; ²Indian Institute of Technology Kharagpur, India

D10.3 Enhanced Gate Driver Design for SiC-Based Generator Rectifier Unit for Airborne Applications
Jiewen Hu, Xingchen Zhao, Lakshmi Ravi, Rolando Burgos, Dong Dong
Virginia Polytechnic Institute and State University, United States

D10.4 A Gate-Driver Architecture with High Common-Mode Noise Immunity under Extremely High dv/dt
Zhongjing Wang, Zhao Yuan, Yue Zhao
University of Arkansas, United States

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