



PRELIMINARY TECHNICAL PROGRAM

Venue: Brisbane Marriott Hotel



TUTORIALS

Tutorial 1: Monday 2nd December | 8:30 am – 12:30 pm (UTC +10)

Room: Queen Adelaide 1

High Density Power Converter Design – the Practical and Theoretical Challenges and Solutions to Realizing the Benefits of the Flying Capacitor Multi-Level Converter

Instructor:



Robert Pilawa University of California-Berkeley, USA

Abstract:

The Flying Capacitor Multi-Level Converter (FCML) promises significant theoretical advantages in dc-dc and dc-ac/ac-dc applications, owing to favorable fundamental passive and active component scaling. Despite having been invented several decades ago, it has not seen widespread use, due to the difficulty of realizing its theoretical advantages in practice. In this tutorial, we will provide background and motivation for the use of FCML, along with detailed analysis of the underlying device scaling trends that gives it an advantage over conventional two-level designs. We will highlight practical challenges associated with control, such as flying capacitor balancing, startup/shutdown, and power factor correction. We will also provide an overview of key sources of capacitor voltage imbalance, along with recent developments in active capacitor balancing to help resolve this issue. Finally, practical layout, gate drive, and component selection choices will be presented, along with demonstration of recent hardware prototypes that bring these solutions together to demonstrate record-breaking performance in dc-ac power conversion, with applications in electric drivetrains.

TUTORIALS

Tutorial 2: Monday 2nd December | 8:30 am – 12:30 pm (UTC +10)

Room: Queen Adelaide 2

Fundamentals of inductive power transfer

Instructor:



Duleepa J. Thrimawithana, University of Auckland, NZ

Abstract:

Currently, there is a strong drive to electrify the transportation sector as a solution to the environmental and economic impacts of vehicles using internal combustion engines. Although, fast and extreme fast charging systems have been developed and deployed to help EV users refuel in a fraction of an hour, this is achieved at the expense of battery life and user safety. In contrast, wireless charging of stationary and in-motion electric vehicles promises a future where EVs are replenished organically, thus avoiding long charging times, range anxiety and battery degradation.

The tutorial will start with a brief discussion on the history of wireless power transfer (WPT) technology. Subsequently, the fundamental operating principles of an inductive power transfer (IPT) system will be presented. Commonly used compensation networks, power electronics converters and magnetic designs will be then reviewed. This will be followed by a discussion on more advanced IPT technologies, such as bi-directional systems, misalignment tolerance, etc., with a special focus on wireless electric vehicle (EV) charging. During this tutorial, we will also work through a few design examples and validate these designs using LTspice and Ansys Maxwell simulation models (participants will have access to these models).

TUTORIALS

Tutorial 3: Monday, 2nd December | 8:30 am – 12:30 pm (UTC +10)

Room: Atcherley

Recent Advances of Predictive Control for Energy Conversion Systems

Instructors:



Ralph Kennel,
Technical University of
Munich, Germany



Zhenbin Zhang,
Shandong University,
China



Ricardo P. Aguilera,
University of Technology
Sydney, Australia

Abstract:

The goal of this tutorial is to provide working knowledge on the development and implementation of MPC in different application fields. The introduction teaches the basic MPC principles, including mathematical techniques and optimization methods necessary to formulate and solve the control problem. In the second part, this tutorial will focus on addressing practical challenges in MPC of electrical drives. Particularly, this tutorial introduces the recent development of predictive encoderless control for AC motor drives. In addition to the expected combination of predictive control and pulse signal injection method, the cooperation of predictive control and fundamental frequency model method will also be introduced. Finally, in the last section, applications on high-power grid-connected converters including photovoltaic inverters, battery management systems, and active power filters are presented. These case studies demonstrate practical MPC designs and evaluate and discuss their results.

TUTORIALS

Tutorial 4: Monday, 2nd December | 8:30 am – 12:30 pm (UTC +10)

Room: Jacaranda

Emerging Solid-State-Transformer based Electric-Vehicle Ultra-fast Charging Station

Instructors:



Sanjib K. Panda
National University of Singapore, Singapore



Jaydeep Saha

National University of Singapore, Singapore

Abstract:

Transportation electrification is one of the major energy sustainability spotlights of this decade due to the accelerated push for carbon footprint reduction by various government policies worldwide, fueled by the commitments made by governments at various environmental summits. With the rapid growth of electric-vehicle (EV) industry in the past few years, the development of EV charging infrastructure is picking up pace simultaneously. This tutorial will focus on the emerging applications of SST based EV ultra-fast charging solutions that has incredible potential for providing highly compact and efficient EV ultra-fast charging solutions in the near future (especially in space-constrained urban applications), and will highlight the state-of-the-art research and developments in this domain. The tutorial will start off with a brief introduction to the EV fast/ultra-fast charging conc, along with an overview of the SST technology and its potential in compact EV fast/ultra-fast charging solutions while providing a succinct review of the various relevant SST topologies. Secondly, the discussion will shift to the concept of medium-voltage (MV) utility-grid-connected universal EV fast/ultra-fast charging station with bidirectional fast charging capability. The multi-port universal fast/ultra-fast charging/discharging station's V2G/G2V modulation/control (while ensuring that the expectations of mimicking an existing public refueling station can be approached), implementation aspect and comparative evaluation with existing solutions would be outlined.

TUTORIALS

Tutorial 5: Monday, 2nd December | 1:30 pm – 5:30 pm (UTC +10)

Room: Queen Adelaide 1

Late Breaking Research Findings on Solid-State-Transformers

Instructor:



Johann W. Kolar, Swiss Federal Institute of Technology (ETH) Zurich, Switzerland

Abstract:

- Introduction to the SST concept
- Main future application areas incl. high-power EV charging, datacenters, dc distribution systems
- State-of-the-art topologies and novel three-phase unfolder-based ac-dc SST concepts
- Comprehensive comparative evaluation of SST technologies, incl. raw material use and environmental aspects, against conventional low-frequency transformer based solutions
- Research vectors and outlook

TUTORIALS

Tutorial 6: Monday, 2nd December | 1:30 pm – 5:30 pm (UTC +10)

Room: Queen Adelaide 2

Grid-Integration Technologies and Beyond for Solar Photovoltaic Systems

Instructors:



Yongheng YANG,



Yinxiao ZHU,



Dehong XU,

Zhejiang University, China

Abstract:

Driven by the continuous drop in the levelized cost of energy (LCoE), photovoltaic (PV) systems are widely integrated into the power grid towards carbon neutrality, and for greener and more sustainable society. However, the high penetration of power electronics-based PV systems raises great concerns about grid instability due to intermittent power injection, such as the frequency stability induced by the deficient mechanical inertia in PV-/RES-rich power systems. Accordingly, various attempts have been made to enhance the entire system performance, emphasizing the grid-friendly integration of PV energy, to guarantee the grid resilience, reliability, stability, and energy harvesting. Beyond conventional passive integration, recent PV systems can be controlled as active power sources, particularly, mitigating the adverse effects and simultaneously providing high controllability and flexibility. In this context, this tutorial is designed to walk through the technological challenges for grid-integration of solar PV energy, and more importantly, to look at different solutions. This tutorial provides a comprehensive approach to designing grid-friendly PV systems, covering the details from modelling, topologies, and to advanced controls (grid-following and grid-forming to enhance the friendliness). The goal is to improve the functionality and manageability of grid-connected PV systems by advanced controls to ensure the sustainability, compatibility with the power grid, efficiency, and reliability of PV systems that adhere to grid regulations and help to reduce the LCoE. It is for intermediate and advanced engineers, and researchers seeking practical solutions for grid-friendly integration of PV energy. The prerequisite is basic power electronics and control.

TUTORIALS

Tutorial 7: Monday, 2nd December | 1:30 pm – 5:30 pm (UTC +10)

Room: Jacaranda

Methods to Identify & Control Highly Non-Linear Three-Phase Machines

Instructors:



Andreas Liske,



Yinxiao ZHU,



Alexander
Oerder,



Stephan Goehner

Karlsruhe Institute of technology (KIT), Germany

Abstract:

Highly utilized three-phase machines show a highly nonlinear electromagnetic behavior, making it very challenging or even impossible to control them using standard control algorithms.

One very appropriate and well-proven method to cope with this nonlinearity is the measurement of multi-dimensional flux linkage maps for each possible operating point of the given machine. During operation a look-up-table is used to adjust the gain of the used control algorithm to the actual differential inductance in each given operating point. The flux maps are also used in non-linear model predictive control (MPC) schemes to enhance dynamics.

In this tutorial different methods to obtain multi-dimensional flux maps of permanent magnet synchronous machines (PMSM), synchronous reluctance machines (SynRM), electrically excited synchronous machines (EESM) and induction machines (IM) are presented. This includes steady state-tests, locked-rotor-tests, and a new approach that replaces flux maps with a physics informed neural network. In addition to the flux-map-identification, also one well-proven control method that makes use of these flux maps and enables for high dynamics is presented. Of course, also hands-on tips from our long-term lab-experience, dealing with several motor test-benches ranging from few hundred Watts (Pedelec/E-Bike motors) to several 100kW (automotive) for over a decade will be given in each of the described topics.

TUTORIALS

Tutorial 8: Monday, 2nd December | 1:30 pm – 5:30 pm (UTC +10)

Room: Atcherley

Condition and Health Monitoring of Power Electronic Components and Converters

Instructor:



Huai Wang, Aalborg University, Denmark

Abstract:

With the increasing use of power electronic converters for electrical energy generation, conversion, transmission, and utilization, our society is moving forward to a fully electrical-driven chapter. From e-mobility, industrial drive, and energy storage to data analytics, information management, and digital transformation, power electronics technology services as a precise and efficient electrical energy conversion unit. They are all heavily electricity-dependent applications and require electrical energy with proper type. However, power electric converters are subject to frequent operational and environmental strains, which can induce failures. The prediction of these failures is difficult but important, so the operation of a system can be halted before a catastrophic failure occurs. Hence, it demands cost-effective and robust condition and health monitoring solutions for operation optimization and predictive maintenance, facilitating life-cycle-reduction and performance boost of power electronic converters.

This tutorial aims to present the state-of-the-art condition and health monitoring methods for power electronic components and converters. It starts with a brief introduction to the reliability and availability challenges of power electronics in different applications, underlining the importance, function, and benefits of condition monitoring, and their demands on field applications. Then, it discusses the condition monitoring methods for power semiconductor switches, capacitors, and power electronic converters. A few case studies for converters with silicon, SiC, and GaN devices, and electrolytic and film capacitors are used to illustrate the principles and associated practical considerations. Finally, it gives perspectives on the challenges and the gap between academic research and industrial applications in condition and health monitoring in power electronic converters.

Technical Session 1: Tuesday, 3rd December | 1:00 pm – 3:00 pm
Session Title: DC/DC Converters I
Room: Grand Ballroom

PAPER NO.	AUTHOR NAMES	PAPER TITLE
0916	Hwa-Dong Liu, Chang-Hua Lin, Bushra Sabir and Jyun-Wei Shih	Novel Adjustable Isolated Converter for Enhanced Photovoltaic System Performance
1911	Hwa-Dong Liu, Chang-Hua Lin, Rashid Ahmed Khan, Yi-Jie Zeng and Chun-Hsin Chang	Innovative High Step-Up Converter for Improved Photovoltaic Efficiency
9375	Jia-Jen Yang, Tsorng-Juu Liang, Kai-Hui Chen, Xue-Yi Chen and Wei-Chiang Kuo	Design and Implementation of a Half-Bridge Resonant Converter with Light Load Efficiency Improvement
2337	Quanrui Liu, Xibo Yuan, Sergio Busquets-Monge, Jiang Feng, Yonglei Zhang and Kai Wang	Using ChatGPT for the Knowledge and Design of Power Electronics Converters
2544	Lars van Eeuwijk, Bart Bokmans and Bas Vermulst	A Comparative Analysis of GaN, SiC, and Si Transistors in kW-range Synchronous Converters

Technical Session 2: Tuesday, 3rd December | 1:00 pm – 3:00 pm

Session Title: Devices

Room: Queen Adelaide 1

PAPER NO.	AUTHOR NAMES	PAPER TITLE
1886	Abdelmoumin Allioua and Gerd Griepentrog	Enhanced EMI Mitigation in High-Frequency DC-DC Converters through Hybrid Filtering Approaches
0597	Sadeeshvara Silva Thotabaddadurage, Hamish Avery and Andrew Laphorn	Thermal Vulnerability Evaluation of Semiconductor Switching Devices: Testing of Selected Si, SiC MOSFETs and GaN HEMTs
8286	Ke Li, Cyril Buttay, Angel Pena Quintal and Paul Evans	Analysis of GaN-HEMT switching current overshoot in a half-bridge circuit
9276	Yohei Sukita, Katsuhiro Hata, Kenichi Morokuma, Yukihiko Wada, Yuta Yamaoka, Yasushige Mukunoki and Makoto Takamiya	Method for Determining Optimum Time in Time-Domain Stop-and-Go Active Gate Driving
1917	Zhuli Liu, Yuichi Kado, Yasuyuki Kanai, Moriyasu Shiozawa and Hironari Nishino	High-Efficiency Operating Conditions for DC 400V Direct-Coupled PV-Battery Systems Using SiC MOSFETs Circuit Breaker
6920	Charley Shi, Suzanne Lo, Duleepa Thrimawithana, Francesca Adams, Aaron Wadsworth, Matthew Pearce and Rachel Oliver	Measurement of GaN HEMT Dynamic Rds(on) at Cryogenic Temperatures

Technical Session 3: Tuesday, 3rd December | 1:00 pm – 3:00 pm

Session Title: AC Machines

Room: Atcherley

PAPER NO.	AUTHOR NAMES	PAPER TITLE
2412	Stephan Goehner, Johannes Stoss, Matthias Brodatzki, Benjamin Bachowsky, Andreas Liske, Johannes Kolb and Marc Hiller	Combining Locked Rotor and Steady State Tests for EESM Flux Linkage Identification
6681	Leonard Geier, Stephan Göhner, Johannes Stoss, Andreas Liske and Marc Hiller	A Novel Highly Dynamic Torque Control Scheme for Electrically Excited Synchronous Machines
4591	Junwei Lu, Xiaokun Li and Frank Cole	Application of High Frequency Rotary Transformer for Separately Excited Synchronous Generator in Offshore Wind Turbine
0531	Benjamin Bachowsky, Benedikt Schmitz-Rode, Jonathan Sattler and Andreas Liske	Recursive Moving Lean Instant Slope Constant Estimator for Online Measurement of Derivative and Absolute Value of Oversampled Signals
7187	Silvan Scheuermann, Matthias Brodatzki and Martin Doppelbauer	Sensitivity Analysis in High-Frequency Modeling of Traction Motors with Hairpin Windings
9818	Nijan Yogal and Christian Lehrmann	Impact of Permanent Magnets Demagnetization on Line-Start Permanent Magnet Synchronous Motors: Feasibility Study of Protection for Mains and Inverter Operation

Technical Session 4: Tuesday, 3rd December | 1:00 pm – 3:00 pm
Session Title: Wireless Power Transfer Systems
Room: Queen Adelaide 2

PAPER NO.	AUTHOR NAMES	PAPER TITLE
0790	Cancan Rong, Junhao Wu, Haoyang Wang, Lizhou Liu, Xiaolin Mou, Yefei Xu and Wei Han	Transmission Performance Analysis of Three-coil WPT System with Relay Coils Based on Parity-Time Symmetric Principle
4829	Tianhao Zhang, Lizhou Liu, Yefei Xu, Yi Zhou, Huan Luo and Cancan Rong	An Integrated Anti-Misalignment WPT-Based Charging Equalizer for Series-Connected Energy Storage Systems
6006	Chengxuan Tao, Lifang Wang, Yuan Yue, Fang Li and Chengliang Yin	A Double-sided Current-sharing Method for Dual-channel Wireless Power Transfer
7247	Chaolai Da, Lifang Wang, Fang Li, Ziyuan Lin, Junqiao Huang and Chengliang Yin	A Comprehensive Research on Eddy Current Loss, Frequency Optimization, and Efficiency Maximization in UWPT Systems
7839	Jiaqi Zeng, Zhenhao Zhang, Shouxiang Li, Cancan Rong, Liqun Chen and Xiaolin Mou	Design and Comparison of Vertical DD Coil and Planar DD Coil for Wireless Charging System
8632	Yuze Zhao, Xiandong Xu, Longfei Liu, Zhuo Chen, Lingxiao Xue, Xiaolin Mou and Lidong Zhang	Study on the effect of cone angle variation on the performance of conical underwater wireless charging coupler

Technical Session 5: Tuesday, 3rd December | 3:15 pm – 5:15 pm

Session Title: DC/AC Converters I

Room: Grand Ballroom

PAPER NO.	AUTHOR NAMES	PAPER TITLE
0222	Hanxu Diao and Jinming Xu	Analysis and Enhancement of Transient Synchronization Stability for Grid-Forming Converters Considering Reactive Power Control
3655	Kaizhe Nie, Feng Gao and Kangjia Zhou	Self-Tuning ANN Controller for Grid-Connected Parallel-Inverter
6382	Shuaiwen Feng, Dylan Dah-Chuan Lu, Yam Siwakoti, Muhammad Mubashir Alam and Waqas Hassan	Non-isolated Three-port Boost H-bridge Inverter With Hybrid Modulation for Single-Phase renewable power Systems
5637	Baldomero Araya, Cristian Garcia, Pablo Acuna, Ricardo Aguilera, Cristian Castillo, Daniel Sanchez and Jose Rodriguez	Virtual Vector Optimal Switching Sequence Model Predictive Control for Computational Burden Reduction
9805	Fabian Hohmann and Stefan Hain	Influence of RDSon and VTH Deviations in Silicon Carbide MOSFETs on the Peak Current of Traction Inverters
5705	Yunuo Yuan, Lingjun Yao and Yongheng Yang	Battery Management System Integrated Matching Control of Grid-Forming System under Black-Start

Technical Session 6: Tuesday, 3rd December | 3:15 pm – 5:15 pm

Session Title: Energy Storage Systems

Room: Atcherley

PAPER NO.	AUTHOR NAMES	PAPER TITLE
7570	Wenlong Yang, Minwang Wang, Wenchao Zhu and Changjun Xie	Capacity Optimization of Hybrid Energy Storage System based on Hysteresis Energy Management Strategy
7817	Pingchuan Li, Hao Tian, Min Wei, Zhengwei Zhao and Feng Gao	A DAB-based Partial Power Processing Converter for Sodium-ion Batteries Featuring Wide Voltage Range
8210	Wei-Ren Chen, Jenn-Jong Shieh, Hwa-Dong Liu and Chang-Hua Lin	Simulation and Verification of Battery Voltage Sampling Compensation Technique
5617	Lu Zhang, Chenzhuo Yang, Xiang Wang, Zhiyuan Cai, Honghao Li and Rui Fan	Low-carbon Dispatching Strategy of Virtual Power Plant based on CNN-LSTM Load Forecasting
0601	Saleh Forouhari, Chris Townsend and Hossein Dehghani Tafti	Analysis of the Performance of Proportional Integral Current Controllers in A Parallel Multi-Inverter Structure
0871	Nisitha Padmawansa, Kosala Gunawardane and Kasun Subasinghage	Fuel Cell and Supercapacitor Hybrid Power Supply for DC Microgrid Applications

Technical Session 7: Tuesday, 3rd December | 3:15 pm – 5:15 pm

Session Title: Cryogenic power electronic systems

Room: Queen Adelaide 1

PAPER NO.	AUTHOR NAMES	PAPER TITLE
4123	Sarat Singamneni, Yifan Lv, Malaya Behera, Rod Badcock, Grant Lumsden, Alan Caughley, Sangkwon Jeong, Duleepa Thrimawithana, Stijn Tissink, Eloise Cameron-Smith and Aaron Wadsworth	Design for additive manufacturing and thermal management in GaN-based power electronics systems.
4916	Reece Cateley, Geoff Antony, Andrew Laphorn and Bill Heffernan	Leakage current and Capacitance Measurements of GaN HEMTs in a Cryogenic Environment
5451	Aaron Wadsworth, Yueming Sun, Charley Shi, Matthew Pearce, Zhenan Jiang and Duleepa Thrimawithana	Experimental Evaluation of an HTS Double Pancake Coil for Cryogenic Power Electronics
6620	Grant Lumsden, Alan Caughley, Rodney Badcock and Swarn Kalsi	Cryogenic cooling of motor armature windings for aircraft applications
7130	Duleepa J Thrimawithana, Kai-Yeung Li, Didier Chassaigne, Olivier Crepel, Madalina Pascaru, Antoine Van Der Laan, Julien Gosteau, Jackman Lin and Grant Covic	The Design of a Lightweight Inductive Power Coupler for eVTOLs
8553	Charley Shi, Aaron Wadsworth, Duleepa Thrimawithana and Matthew Pearce	Ancillary Circuitry for a Cryogenic GaN Half-Bridge

Technical Session 8: Tuesday, 3rd December | 3:15 pm – 5:15 pm

Session Title: Emerging topics I

Room: Queen Adelaide 2

PAPER NO.	AUTHOR NAMES	PAPER TITLE
2409	Jaydeep Saha, Xiaoliang Wang, Yi Hui Doo, Sishi Li, Zhenyi Zheng, Hean Ming Kang, Ting Yeh and Fu Ying	Development of Next-Generation Compact and Radiation-hardened GaN-based Power Converters for Small Satellite Applications
9880	Hean Ming Kang, Jaydeep Saha, Yeh Ting, Sanjib Kumar Panda and Dipti Srinivasan	Quantitative Performance Comparison of Commercial Small Satellite Electrical Power System Architectures
9401	Xiang Cheng, Wenxuan Yin, Furong Liu and Changjun Xie	Parameter identification of lithium-ion battery electrochemical model using sensitivity analysis and neural networks
6489	Xiaofan Wei, Zhenhao Liu, Furong Liu and Changjun Xie	Influence of Fast Temperature Variation on NCM Lithium-ion Batteries Aging in Low-Temperature Environment
5475	Mohsen Asoodar, Mehrdad Nahalparvari, Hans-Peter Nee and Iman Shafikhani	A Time-Skew Resilient Online Condition Monitoring Technique for Power MOSFETs Based on ON-State Resistance Estimation
4367	Stewart Marchant	A fast switching half bridge using GaN transistors

Technical Session 9: Wednesday, 4th Dec. | 10:15 am – 12:15 pm
 Session Title: DC/DC Converters II
 Room: Grand Ballroom

PAPER NO.	AUTHOR NAMES	PAPER TITLE
6522	Igor Alves Maronni, Alex Sander Sebaje, Robson Mayer, Jose Antenor Pomilio and Joel F. Guerreiro	CLLC Converter Resonant Tank Design for Minimized Power Derating
8546	Robson Mayer, Alex Sander Sebaje, Igor Alves Maronni, Jose Antenor Pomilio and Joel F. Guerreiro	Modeling of Isolated Bidirectional Symmetrical Full-Bridge CLLC Resonant Converter
7613	Mahdis Haddadi, Saman Asghari Gorji, Samson Yu and Hieu Trinh	An Advanced Virtual DC Machine Control Strategy for management of Energy Storage System in a Standalone DC Microgrid
9504	Dylan D.-C. Lu	Reliability Assessment of Cascaded Two-stage Boost-converter-based Three-Port Converters
2384	Jiang Feng, Xibo Yuan, Quanrui Liu, Chuanjie Zhao, Yonglei Zhang, Kai Wang and Yunting Ma	A 5 kW Gallium Nitride (GaN) Photovoltaic (PV) DC-DC Converter with a Power Density of 4.73 W/cm ³ and Efficiency of 98%

Technical Session 10: Wednesday, 4th Dec. | 10:15 am – 12:15 pm

Session Title: ADV Modulation and Control

Room: Atcherley

PAPER NO.	AUTHOR NAMES	PAPER TITLE
0379	Janith Wijesingha, Lasantha Meegahapola and Xinghuo Yu	First Order Sliding Mode Control Based Active/Reactive Power Control of Grid-Following Voltage Source Inverter in an AC Microgrid.
1765	Che-Yu Lu and Tzu-Ping Cheng	SMO-Based Field-Oriented Control for Electrically Power-Assisted Bike System
6118	Marziyeh Hajiheidari, Joel Fushekati, Mohammad Emad, Bas Vermulst and Jeroen Van Duivenbode	Single-Path High-Resolution Digital Pulse Width Modulator (HRDPWM) without SR Latch
9123	Masaya Mitsuhashi, Hidehito Matayoshi, Toshimitsu Morizane and Soma Jinno	Verification of Effectiveness of Power Reduction Ratio and Instantaneous Wind Speed Feedback Control
9798	Yafei Yin, Zhenbin Zhang and Zhen Li	A New Distributed Model Predictive Control for DC Microgrids: Adaptively-Varying Slew-Rate Based Solution

Technical Session 11: Wednesday, 4th Dec. | 10:15 am – 12:15 pm
Session Title: Renewable Energy
Room: Queen Adelaide 1

PAPER NO.	AUTHOR NAMES	PAPER TITLE
6065	Naief Almatrafi, Dylan Lu, Li Li, Afaq Hussain and Adel Tatish	Innovative Droop-Controlled Power Controller for PV Systems: Enhancing Stability and Increasing PV Penetration
7318	Ruben Inzunza, Shivalika Sharma, Chieko Umeno, Yasuaki Mitsugi, Daisuke Kanda and Kenta Yamabe	Test results of ROCOF and system split for a Grid Forming ESS converter
8497	Yeonju Choi, Yateendra Mishra, Jonathan Love and Dezso Sera	Degradation modelling of PEM electrolyzers under fluctuating input power for long-term performance optimisation
1945	Fei Deng, Huizhong Wang, Ziheng Xiao, Lei Zhang, Zhigang Yao and Yi Tang	Decentralized Master-Slave Control Strategy for Current Sharing in islanded DC Microgrids
6050	Iman Ramezani and Qianwen Xu	Multi-Agent Graph Reinforcement Learning for Inverters-Based Distributed Energy Resources Real-Time Decentralized Volt-Var Control in Distribution Grids

Technical Session 12: Wednesday, 4th Dec. | 10:15 am – 12:15 pm
 Session Title: Emerging topics 2
 Room: Queen Adelaide 2

PAPER NO.	AUTHOR NAMES	PAPER TITLE
1677	Zhaobo Zhang, Wenzhi Zhou and Xibo Yuan	From Packaging to Power Converter: Holistic Design and Implementation of a 60 kW/L Ceramic Based SiC Converter
1255	Muhammad Ehab, Chris Townsend and Hossein Dehghani Tafti	A Review of Current Control Schemes in Grid Connected Inverters
6473	Lucas Elias dos Santos, Jesus Flores Huaman, Eliabe Duarte Queiroz, Daniel Dotta and José Antenor Pomilio	A MIMO Self-Tuning Data-Driven Control Application for Power Electronic Converters Robustness Operation
2537	Nilani Ranasinghe, Amir Taghvaie, Firuz Zare and Simon Denman	A Comparative Study of Machine Learning Models for Estimating Current Harmonic in Distribution Networks
4496	Chia-Wei Lu, Hwa-Dong Liu, Jenn-Jong Shieh and Chang-Hua Lin	Planning and Verification of a Cloud-Based Monitoring DC Microgrid System Using the Greedy Algorithm
5182	I-Chan Tsai, Chung-Chia Wu and Le-Ren Chang-Chien	Parameter Optimization for Active Gate Drivers in Silicon Carbide Applications

Technical Session 13: Wednesday, 4th Dec. | 2:45 pm – 4:45 pm

Session Title: DC/AC Converters II

Room: Grand Ballroom

PAPER NO.	AUTHOR NAMES	PAPER TITLE
5671	Kamil Swiderski, Yang Zhang and Qianwen Xu	Discrete-time model based controller design and stability analysis for grid connected converters considering time delay
5626	Carlos Reusser, Ramón Herrera and Felipe Alvarado	Current and dc-link voltage-drift Active Hysteresis Control of a four level Quasi Nested Converter
9832	Vahid Dargahi	Active Control of 9-Level Flying-Capacitor-Based Active Neutral-Point-Clamped Inverters
2627	Enes Ayaz, Marcus Jackson, Shahriar Sarmast, Bhanu Singh, Staffan Norrga and Hans-Peter Nee	Evaluation of Possible Traction Inverter Topologies for Heavy-Duty Electric Vehicles
3207	Khalil Algarny, Ahmed Sheir, Mahinda Vilathgamuwa and Dezso Sera	Estimation of Stability Boundaries of Grid Connected Virtual Synchronous Generator Using Vector Perturbation Method

Technical Session 14: Wednesday, 4th December | 2:45 pm – 4:45 pm

Session Title: Transportation systems

Room: Queen Adelaide 1

PAPER NO.	AUTHOR NAMES	PAPER TITLE
6021	Minyung Cha, Hossein Enshaei, Hung Nguyen, Shantha Gamini Jayasinghe and Gamini Jayasinghe	Modeling and Simulation of Fuel Cell Battery Hybrid Electric Ship
6839	Indrashis Haldar, Bas Vermulst, Dongsheng Yang, Xinwei Xu and Thomas Gerrits	Investigating Safe Operation Boundaries of Single Isolation Stage Based Multi-Outlet EV Fast Charging Architecture
9685	Vedang Gaikwad, Bill Heffernan, Andrew Laphorn, Reece Cateley, Adam Hyndman and Roger Reeves	Characteristic variations between commercial GaN HEMTs at cryogenic temperatures down to 4K
9440	Xuke Chen, Jianghan Yu and Wenxing Zhong	An Optimization Method for Multi-Channel LCC-S Wireless Power Transfer System Based on Multi-Island Genetic Algorithm and Splitting Coils
7403	Kathrin Schulte and Sascha Stegen	Energy Storage for Electric Passenger Aircraft
4568	Laxman Timilsina, Elutunji Buraimoh, Ali Moghassemi, Grace Karimi Muriithi, Ali Arsalan, Gokhan Ozkan, Behnaz Papari, Christopher S. Edrington and Okan Ciftci	Hybrid Electric Vehicle Simulation Operation Across Distributed Laboratories using Hardware Integrated Virtual Environment Concept

Technical Session 15: Wednesday, 4th December | 2:45 pm – 4:45 pm

Session Title: AC/DC Converters 1

Room: Queen Adelaide 2

PAPER NO.	AUTHOR NAMES	PAPER TITLE
4266	Zaid Parry, Lee Empringham and Liliana de Lillo	A study on the feasibility of using SiC devices in realising highly power dense matrix converters.
0846	Rodrigo H. Cuzmar, Ricardo P. Aguilera, Javier Pereda, Pablo Poblete, Andrés Mora and Dylan Lu	MPC Strategy Applied to Modular Multilevel Matrix Converters for Low-Frequency AC Transmission Systems
1817	Kaveh Pouresmaeil, Maurice Roes, Nico Baars and George Papafotiou	Improved THD in ac/ac modular multilevel converters through phase-optimization of PWM
9667	Xiaochen Jin, Jinming Xu and Shanshui Yang	Analysis and comparison of transient stabilities of current-controlled and voltage-controlled VSGs
3735	Michael Glashauser and Otto Kreutzer	Performance of Top-Side Cooled WBG Transistors in ANPC Converter With Passive Cooling and Automated Manufacturing
0671	Jamil Hassan, Aswin Palanisamy, Dylan D.-C. Lu and Yam Siwakoti	A Symmetric Unipolar Pulse Width Modulation for Dual Active Bridge Converters

Technical Session 16: Wednesday, 4th December | 2:45 pm – 4:45 pm

Session Title: Miscellaneous issues in power electronics I

Room: Atcherley

PAPER NO.	AUTHOR NAMES	PAPER TITLE
2798	Md Ohirul Qays, Iftekhar Ahmad and Daryoush Habibi	Long-Term Techno-economic Effects of Optimal STATCOMs to Address System Strength Shortfall in A Renewable Energy-integrated Building Management System
3832	Aaron Laufs, Xinyi Yu and Rik W. De Doncker	Comparison of Various Model-Based Sensorless Control Strategies for small-size high-speed PMSMs
5983	Lars Dresel and Gerd Griepentrog	A Novel Balancing Strategy for SiC Based Bipolar Solid State Switch for Particle Accelerator Applications
6105	Iacovos Ioannou, Minella Bezha, Saher Javaid, Naoto Nagaoka and Vasos Vassiliou	Smart Power Balancing with Machine Learning: Optimizing Storage and Managing System Stability Between Fluctuating and Controllable Devices
6127	Ziqing Xia, Mei Su and Zhangjie Liu	A solvability condition of decoupled reactive power flow based on Banach's fixed-point theorem
6715	Andrea Zingariello, Zhaoqing Zhang and Gerd Griepentrog	Evaluation of the Common-Mode Current Propagation Paths in Motor Drive Systems

Technical Session 17: Thursday, 5th December | 10:15 am – 12:15 pm

Session Title: DC/DC Converters III

Room: Grand Ballroom

PAPER NO.	AUTHOR NAMES	PAPER TITLE
2295	Paul Archer, Robert Anthoney, Michael McCaffrey, Kenan Hafeel, Carlos Teixeira, Richardt Howard Wilkinson and Brendan Peter McGrath	A Customised Low-voltage Power Supply for a Formula SAE Electric Racing Vehicle
5257	Kumar Joy Nag and Aleksandar Prodic	Power Electronic Converter for Portable Electric Stimulators
9256	Hossein G. Sahebi, Saman A. Gorji, Samson Yu and Hieu Trinh	A Nonlinear Model Predictive Control for Bidirectional Dual Active Bridge Converter
7074	Debora Damasceno, Mateus Dias, Jose Carlos Ugaz Pena and Jose Pomilio	Impedance-based Stability Analysis of DC Microgrid Feedforward-Controlled Connected Converters
9753	Camilo Suarez, Diego Bernal Cobaleda and Wilmar Martinez	DAB with Switched Inductor (DAB-SI) for Reduced Effective Currents at Ligh-load Operation

Technical Session 18: Thursday, 5th December | 10:15 am – 12:15 pm

Session Title: Grid Forming Converters

Room: Queen Adelaide 1

PAPER NO.	AUTHOR NAMES	PAPER TITLE
0076	Thai Vo and Chandana Samarasinghe	Comparison of DC/AC Grid-Following and Grid-Forming Converters in Weak Power Systems
0750	Louis Rahal Goonasekara, Lasantha Meegahapola and Shuo Yan	Impact on System Strength and Frequency from Different Grid-Forming Inverter Control Strategies
1448	Elnaz Firouzmand, Farhad Farokhi, Iman Sharifi and H.A. Talebi	Continuous Abstraction Modelling and Control of Grid-Forming Inverters
2597	Mohammad Raeispour, Shou Yan and Lasantha Meegahapola	Distributed Neural Network-based Control of Grid-Forming Converter Against Adversarial Data
6541	Tamojit Chakraborty, Bikiran Guha and Anamitra Pal	Stabilization of 100% Inverter-Based Power Systems with Grid Forming Controls in Positive Sequence RMS Simulation Platforms
6563	Yantao Xu, Yongheng Yang, Yexiang Yu and Xiaotian Wu	Comparison of Virtual Synchronous Generator and Matching-based Control for High-Power Direct-Drive Wind Turbine Systems

Technical Session 19: Thursday, 5th December | 10:15 am – 12:15 pm

Session Title: Miscellaneous Issues in Converters and Drives

Room: Atcherley

PAPER NO.	AUTHOR NAMES	PAPER TITLE
1347	Xinyi Yu, Duc Huu Pham, Lukas Braun and Rik W. De Doncker	Stator Inter-Turn Fault Detection and Classification in Permanent Magnet Synchronous Machines Using High-Frequency Voltage Injection
4777	Xue Jiarui, Wenchao Zhu and Changjun Xie	Long-term Unsupervised Prediction of Proton Exchange Membrane Fuel Cells Considering Voltage Recovery
4781	Wenchen Zhao, Zhenbin Zhang and Zhen Li	A Fast Diagnosis Method for Multiple Open-Circuit Faults in MMC Based on Multi-Feature Fusion: An Approach Integrating Switching State Information
5519	Robert Kragl, Karl Oberdieck, Konstantin Spanos, Steffen Beushausen and Ingmar Kallfass	Impact of Switching Behavior on the Noise Emission of Power Semiconductors
6918	Aswin Palanisamy, Jamil Hassan, Dylan Lu, Ricardo Aguilera and Yam Siwakoti	A High Step-Down Flying Capacitor Resonant Converter with Quadruple frequency at the Resonant Tank
7534	Masaaki Komatsu	Development and Evaluation in Solid State Switchgear Technology for the International Space Station Electrical Power Systems

Technical Session 20: Thursday, 5th December | 10:15 am – 12:15 pm

Session Title: High-Power Converters

Room: Queen Adelaide 2

PAPER NO.	AUTHOR NAMES	PAPER TITLE
2302	Patrick Palmer and Danielle Jaye Agron	Current Imbalance Test in Asymmetrical Parallel Connected IGBTs for High Inverter Current Applications
2493	Viktor Hofmann	A Scalable Interline Power Flow Controller
2598	Fabian Herzig and Rik W. De Doncker	A High-Power Medium-Voltage Medium-Frequency Transformer Design Methodology
7437	Nafis Subhani, Junwei Lu, Simon Yao and Yong Zhu	Discrete Inductor Free Phase Shifted Dual Active Bridge Converter for DC Fast EV Charging Application
9748	Mohsen Asoodar, Mehrdad Nahalparvari and Hans-Peter Nee	A Sensorless Active Snubber Circuit for Series Connection of Semiconductor Devices in Modular Multilevel Converters

Technical Session 21: Thursday, 5th December | 2:45 pm – 4:45 pm

Session Title: DC/AC Converters III

Room: Grand Ballroom

PAPER NO.	AUTHOR NAMES	PAPER TITLE
5279	Zheran Zeng, Dongsheng Yang and Songda Wang	A Dispatchable Virtual Oscillator Controller in the dq Frame
1008	Wei Jiang, Yonglei Zhang, Xibo Yuan, Xiang Guo, Ruijie Zhu and Yi Li	Extended Control Set Model Predictive Control for Three-phase Three-level NPC Converters
7291	Kexin Bu, Hao Tian and Feng Gao	A Novel Seven-Level (7L) Hybrid-Clamped (HC) Topology with Variable Stair Edge PWM (VSEPWM)
7584	Chamanie Welmillage Don, Mahinda Vilathgamuwa and Yateendra Mishra	Sensitivity Enhancement of Virtual Synchronous Machine-Based Grid Forming Inverters in Degraded Condition
4468	Mohsen Asoodar, Mehrdad Nahalparvari, Christer Danielsson and Hans-Peter Nee	A Current Sensorless Method for Online Condition Monitoring of DC-Link Capacitors in FACTS and HVDC applications

Technical Session 22: Thursday, 5th December | 2:45 pm – 4:45 pm

Session Title: AC/DC Converters II

Room: Queen Adelaide 1

PAPER NO.	AUTHOR NAMES	PAPER TITLE
5441	Oleksandr Solomakha, Valentyna Afanasenko and Ingmar Kallfass	Multilevel Digital Twin of Power Electronics based on Degradable Wide-Bandgap Semiconductors for State-of-Health Estimation
5793	Victor Cordeiro de Arruda, Eliabe Duarte Queiroz and Joel Filipe Guerreiro	Enabling grid voltage and frequency support with islanding detection in V2G capable electric vehicle charging stations
2167	Ali Mahmoudian, Foad Taghizadeh, Mohammad J Sanjari, Rasoul Garmabdari, Mirsaeed Mousavizade and Junwei Lu	Optimal Sizing of Battery Energy Storage System and Interlink Converter in an Energy Constraint Hybrid AC/DC Microgrid

Technical Session 23: Thursday, 5th December | 2:45 pm – 4:45 pm

Session Title: Wireless Power Applications

Room: Queen Adelaide 2

PAPER NO.	AUTHOR NAMES	PAPER TITLE
2132	Hongjian Zhou, Alexander Bailey, Brian Gu, Seho Kim and Ho Seok Ahn	Implementation of a Multi-MHz Wireless Charging System for Agricultural Drones
3078	Zhihao He, Duleepa Thrimawithana, Grant Covic and Martin Neuburger	An Asymmetrical Amplitude Digitized Modulation Scheme for TP-IBMC in Unbalanced Three-Phase IPT Systems
4795	Daniel Fritz, Lukas Elbracht, Jannis Noeren, Marco Zimmer and Prof. Dr. Nejila Parspour	Design and Implementation of a 200 kW Inductive Wireless Power Transfer System using a Modular Approach
5223	Kaito Takashima, Takehiro Imura and Yoichi Hori	A Study of Leakage Magnetic Field Reduction by Active Shielding for Receiver Coil Moving in DWPT Using Air-core Coils
5488	Brian Gu, Harshana Senanayake, Seho Kim, Michael O'Sullivan and Grant Covic	Power Level Sizing of In-Motion Wireless Power Transfer for Electric Vehicle Charging

Technical Session 24: Thursday, 5th December | 2:45 pm – 4:45 pm

Session Title: Late Breaking Research and Post Journal

Presentations

Room: Atcherley

PAPER NO.	AUTHOR NAMES	PAPER TITLE
3775	Dai Bui, Guoxing Wang, Lei Zhao and Patrick Hu	A Bidirectional Autonomous High-Frequency Wireless Power Transfer System With Constant Voltage Output Against Load and Coupling Variations
6146	Shadab Murshid, Prasanth Sundararajan, Mrutyunjaya Sahani and Sanjib Kumar Panda	A 13-Level Switched Capacitor Boost MLI With Dual Configurability
6855	Prasanth Sundararajan, Dharani Kolantla, Jaydeep Saha and Sanjib Kumar Panda	Design of High-Density and High-Efficiency SiC-based Drive-train Inverter

2nd Monday

Morning Tutorial
8.30-10.00

Tea
10.00-10.30

Morning Tutorial
10.30-12.30

Lunch
12.30-1.30

Afternoon Tutorial
1.30-3.00

Tea
3.00-3.30

Afternoon Tutorial
3.30-5.30

Welcome Reception
6.00-7.30

3rd Tuesday

Opening Ceremony
8.30-9.00

Plenary 1
9.00-9.45
Hirofumi Akagi

Plenary 2
9.45-10.30
Brad Lehman

Tea
10.30-10.45

Plenary 3
10.45-11.30
Huai Wang

Plenary 4
11.30-12.15
Jian Sun

Lunch
12.15-1.00

Technical Sessions
1.00-3.00

Tea
3.00-3.15

Technical Sessions
3.15-5.15

WIE
5.30-6.30

4th Wednesday

Keynote 1
8.30-9.15
Gunilla Burrows

Keynote 2
9.15-10.00
Robert Pilawa

Tea
10.00-10.15

Technical Sessions
10.15-12.15

Lunch
12.15-1.00

Keynote 3
1.00-1.45
Sanjib Panda

Invited Speech 1
1.45-2.30
Lasantha Meegahapola

Tea
2.30-2.45

Technical Sessions
2.45-4.45

Conference Dinner
6.30-9.00

5th Thursday

Keynote 4
8.30-9.15
Ralph Kennel

Keynote 5
9.15-10.00
Johanne Kolar

Tea
10.00-10.15

Technical Sessions
10.15-12.15

Lunch
12.15-1.00

Invited Speech 2
1.00-1.45
Guenter Keller

Invited Speech 3
1.45-2.30
Zian Qin

Tea
2.30-2.45

Technical Sessions
2.45-4.45