

Conference Information

● Date & Venue

Date: May 31 – June 4, 2026

Venue: DEJIMA MESSE NAGASAKI

4-1 Onouemachi, Nagasaki City, Nagasaki Prefecture, 850-0058, JAPAN

● Official Language

The working language of the conference will be English.

All submissions and presentations must be in English.

● Registration

The Registration Desk is in the Foyer of Event & Exhibition Hall (1F) and open during the following hours:

Open Hours:

May 31 (Sun.)	12:00 – 20:00
June 1 (Mon.)	7:00 – 18:00
June 2 (Tue.)	7:00 – 18:00
June 3 (Wed.)	7:00 – 18:00
June 4 (Thu.)	7:00 – 15:00

● Cloak

Cloak is located in the Foyer on 1st floor and open during the following hours:

Open Hours: June 4 (Thu.) 8:00 – 16:30

● Secretariat

The secretariat office is at Room 105/106 (1F) during conference period.

● Badge

All the participants including accompanying persons are asked to wear their name badges to enter the session rooms and to take part in social programs. Please wear your name badge at all the time during the conference period.

Name printed on the badge will be the name registered at the time of registration. Please note that the registered name cannot be changed. In addition, transfers are not allowed.

● Lunch

Lunch is served for all participants with Lunch Ticket.

Place & Time:

Event & Exhibition Hall B (1F)	June 1 (Mon.)	12:20 –
	June 2 (Tue.)	12:00 –
	June 3 (Wed.)	12:00 –
Convention Hall (2F)	June 4 (Thu.)	12:30 –

● Coffee Break

Place & Time: Event & Exhibition Hall B (1F)

June 1 (Mon.)	10:45 – 11:15 / 16:10 – 16:30
June 2 (Tue.)	10:15 – 10:45 / 16:00 – 16:20
June 3 (Wed.)	10:15 – 10:45 / 16:00 – 16:20
June 4 (Thu.)	9:50 – 10:10

Conference Information

- **Internet (Wi-Fi)**

[1F] SSID: dejimach1 PW: nagasakich1 [2F] SSID: dejimach2 PW: nagasakich2
[Event & Exhibition Hall (1F)] SSID: dejimaeh PW: nagasakieh

- **Message Board**

Any program changes or urgent announcements from the secretariat and person to person messages will be posted on the Message Board located near the Registration Desk. Please check the board occasionally.

- **Authors' Breakfast**

The Authors' Breakfast Meeting will be held from 7:20 to 8:20 at Event & Exhibition Hall 1F. All oral presenters and session chairpersons are requested to attend on the day of their session.

For on-line Participants

- **Access to On-line Session Room (Zoom) & Platform**

There are 14 online sessions in total. For these sessions, no dedicated rooms or screen projection facilities will be provided.

If you would like to attend the online sessions, please join using your own laptop or other personal device.

If necessary, you may use the lunch venue in the Event and Exhibition Hall (1F).

- **Photography and Recording**

Photography / Recording in the sessions is strictly prohibited. Taking photos / screenshots of presentation materials without any approval from authors is also prohibited.

Sponsored Meetings

- **Women in Engineering**

June 1 (Mon.) 12:50 – 14:10 at Room 107 (1F)

Other Meetings

- **APECC (Asian Power Electronics Coordinate Committee) Meeting**

June 1 (Mon.) 13:00 – 14:30 at Room 110 (1F)

- **Magnetics Roadmap Leadership Meeting**

June 3 (Wed.) 10:30 – 12:00 at Room 110 (1F)

- **ECCE-Asia Coordination Committee Meeting**

June 3 (Wed.) 12:40 – 14:10 at Room 110 (1F)

Conference Information

Social Programs

1. Welcome Reception

Date & Time: Sunday, May 31, 18:00 – 19:30

Venue: Event & Exhibition Hall B (1F), DEJIMA MESSE NAGASAKI

Dress Code: Casual

Fee: Included in Registration fee

All registered participants and their accompanying persons are invited to attend free of charge. A light meal and drinks will be served.

2. Banquet

Date & Time: Wednesday, June 3, 19:00 – 21:00

Venue: Hall 1 – 4 (2F), DEJIMA MESSE NAGASAKI

Dress Code: Informal

Fee: [Regular] 10,000JPY [Student] 5,000JPY

A full course meal and entertainment will be provided.

Participants are required to purchase extra tickets in advance. If you don't have one but wish to attend, please contact the Registration Desk on-site.

Conference Information

Public Meeting

● Meet PELS Leaders

Date & Time: Tuesday, June 2, 12:15 – 12:40

Venue: Room 103 (1F), DEJIMA MESSE NAGASAKI

IEEE Power Electronics Society President, Johan Enslin, is delighted to invite you to "Meet PELS Leaders".

This meeting will provide an opportunity to engage with fellow PELS members, gain insights into the society's initiatives, and share ideas towards shaping the future of power electronics.

PELS will present one of the PELS Best Chapter Awards and kick off the global PELS Day celebrations to commemorate its anniversary with a festive cake-cutting ceremony.

All PELS members, from students to professionals, are encouraged to come together to strengthen professional network, foster collaboration, and enjoy light refreshments!

Let's Power a Sustainable Future Together!

● PELS Region-10 Chapter Chairs Meeting

Date & Time: Tuesday, June 2, 12:40 – 14:10

Venue: Room 103 (1F), DEJIMA MESSE NAGASAKI

The IEEE PELS Region 10 Chair Meeting is for PELS Chapter and Student Branch Chapter Chairs within the region who are interested in engaging, collaborating, and sharing ideas with other PELS chapters. This meeting will provide an open forum for chapter chairs to discuss chapter activities, membership growth, successes, challenges, and IEEE and PELS resources.

Presented by:

Sanjib K. Panda, Region 10 Co-Chair (South & Southeast Asia), IEEE PELS

Kai Sun, Region 10 Co-Chair (East Asia & Oceania), IEEE PELS

Tao Yang, VP of Membership, IEEE PELS

Stamp Rally

Once you have completed registration at the reception desk, we will provide you with a stamp rally sheet. You can collect stamps by visiting the corporate exhibits. We have prizes available for those who collect four stamps, so please join in.

Pickup Location: 1F Registration Counter Exchange

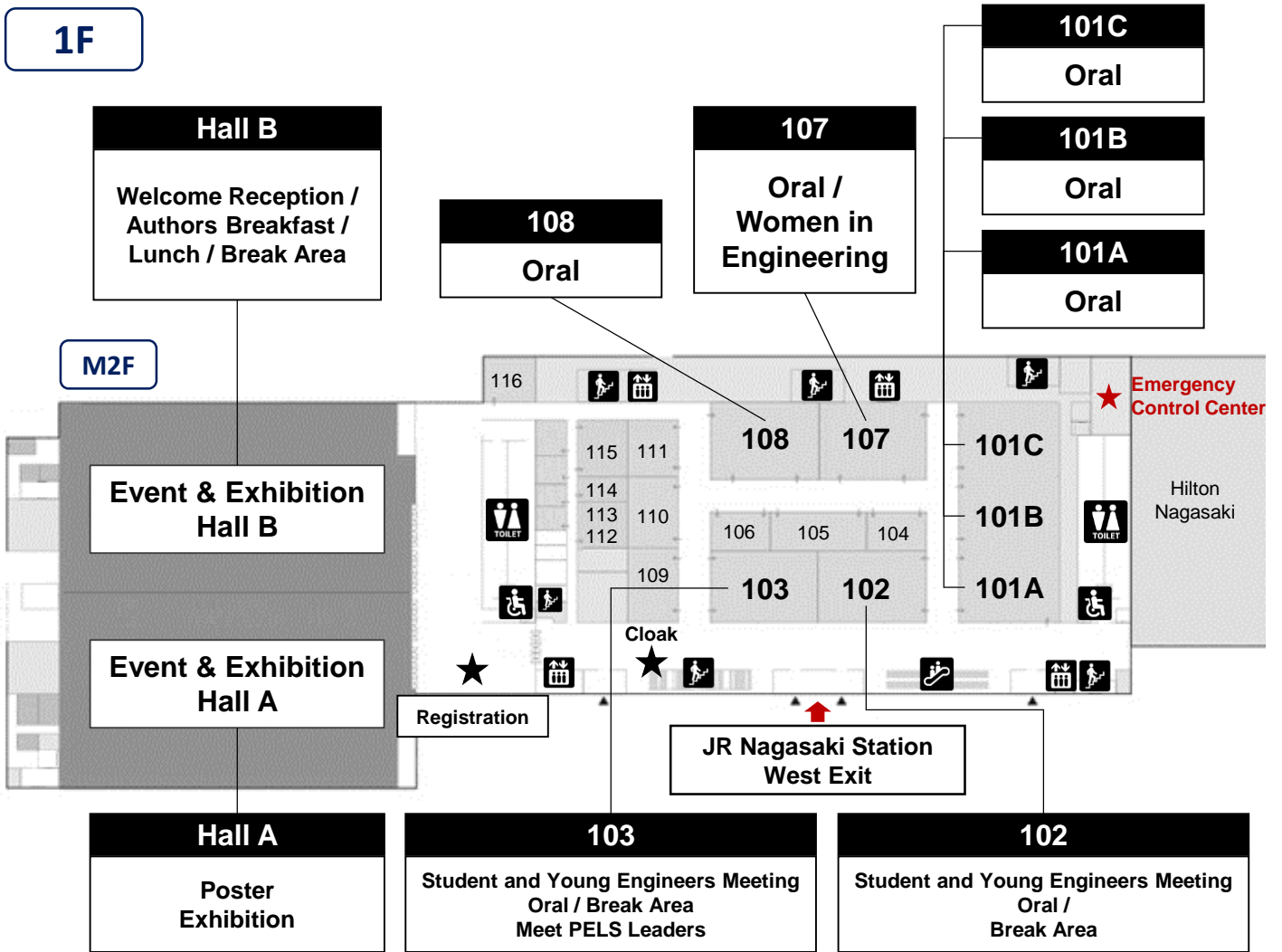
Time: (June 1) 14:00 – 17:00 (Jun 2 –) 10:30 – 17:00

Exchange Condition: Collect stamps from 4 or more different companies

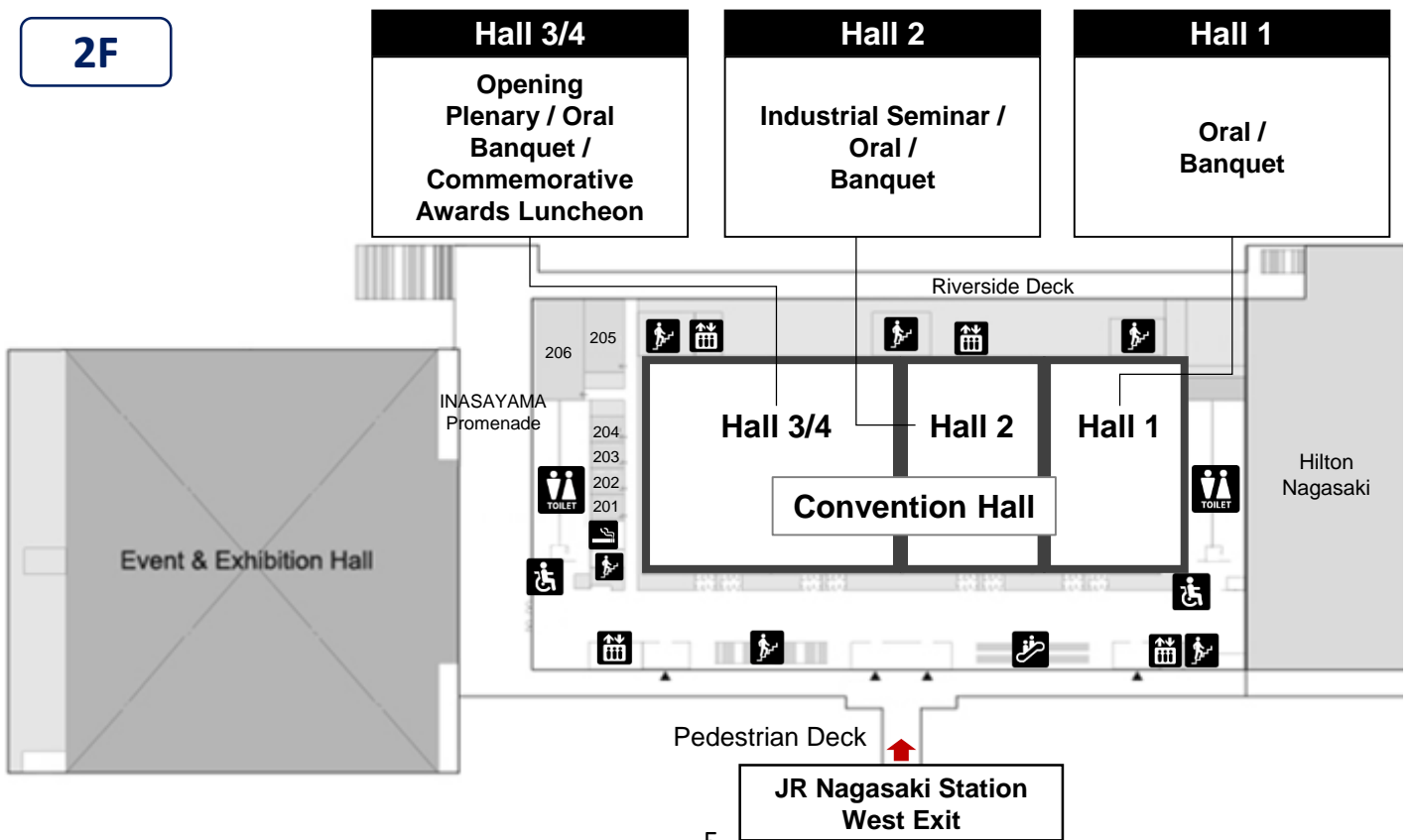
*Please exchange for a mug as soon as possible, as the number of mugs is limited.

Floor Plan

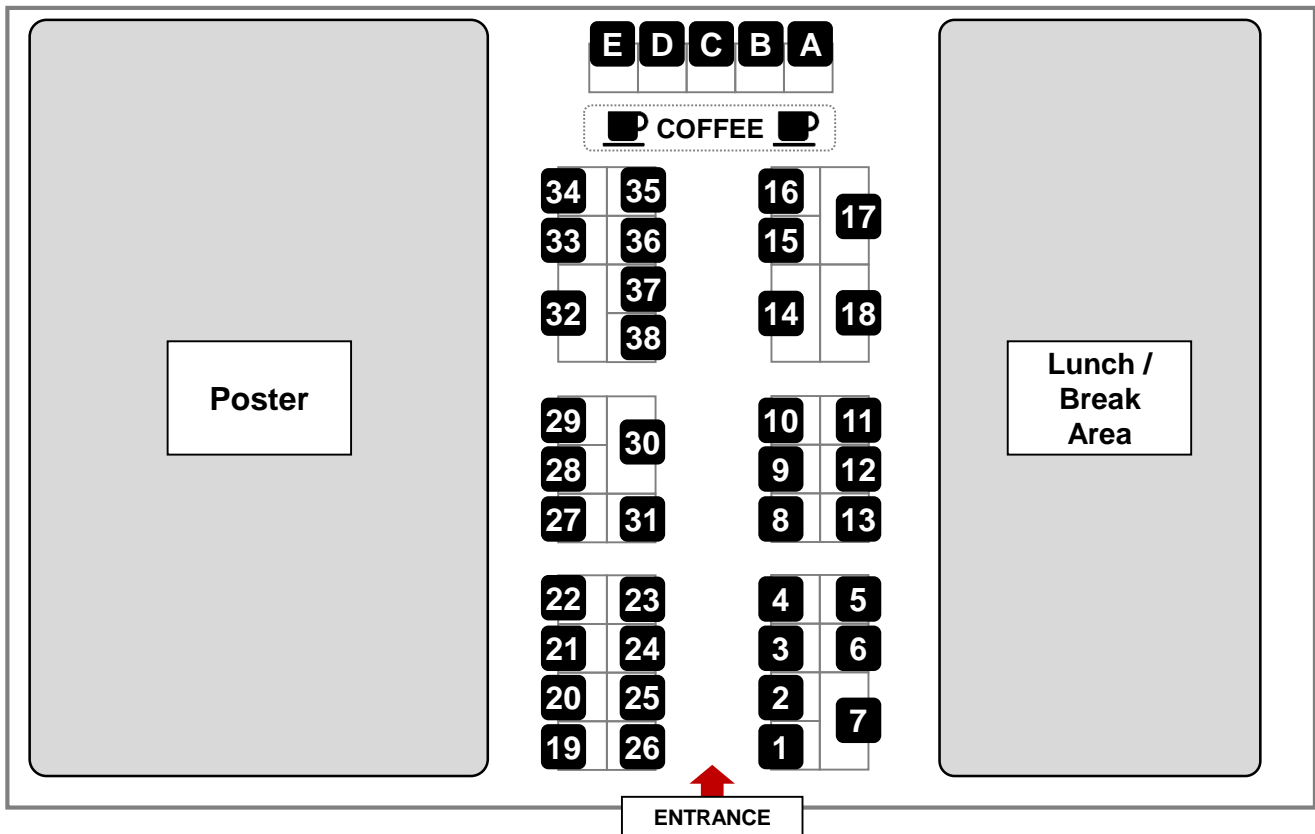
1F



2F



Exhibition Floor Map / Exhibitors



1	Japan Power Electronics Association
2	Myway Plus Corporation
3	Typhoon HIL
4	Nuvoton
5	Chroma Japan Corp.
6	HIOKI E.E. CORPORATION
7	TMEIC Corporation
8	CITIZEN FINEDEVICE CO.,LTD.
9	Imperix
10	High Voltage Asia Pte Ltd
11	Hitachi, Ltd.
12	OMRON
13	Fuji Electric Co., Ltd.
14	AVL JAPAN K.K.
15	dSPACE Japan K.K.
16	SHIZUKI ELECTRIC CO., INC.
17	SANYO DENKI CO., LTD.
18	IWATSU
19	ISAHAYA ELECTRONICS CORPORATION
20	Yokogawa Test & Measurement Corporation
21	Smart Energy Laboratory Co.,Ltd.
22	PUES
23	RTDS TECHNOLOGIES

24	TAIYO KOGYO CO., LTD.
25	MathWorks
26	IHI Corporation
27	Mersen Japan K.K.
28	Headspring Inc.
29	DSP Technology Co.,Ltd.
30	PONY ELECTRIC CO.,LTD
31	Plexim GmbH
32	EICH.CORPORATION CO.,LTD
33	TEXIO TECHNOLOGY CORPORATION
34	ICPE 2027-ECCE Asia
35	The Japan Steel Works, Ltd.
36	ModelingTech Energy Technology Co., Ltd.
37	TAKASAGO, LTD.
38	KYOWAKIDEN INDUSTRY CO.,LTD.

■ EV Parts Display

A	Furukawa Electric Co., Ltd.
B	Mitsubishi Electric Corporation
C	AISIN CORPORATION
D	DENSO CORPORATION
E	Meidensha Corporation

Program at a Glance

	May 31 (Sun.)	June 1 (Mon.)	June 2 (Tue.)	June 3 (Wed.)	June 4 (Thu.)
8:00					
9:00		8:30 - 9:00 Opening Ceremony	8:30 - 10:15 Plenary Sessions 4, 5, 6	8:30 - 10:15 Plenary Sessions 7, 8, 9	8:30 - 9:50 Oral Sessions 12
10:00		9:00 - 10:45 Plenary Sessions 1, 2, 3			
11:00	10:00-13:00 Student and Young Engineers Meeting		10:45 - 12:05 Oral Sessions 4	10:45 - 12:05 Oral Sessions 8	10:10 - 12:10 Commemoration of the 10th IPEC Commemorative Lecture
12:00		11:15 - 12:35 Oral Sessions 1			
13:00			12:40- 14:00 Poster Sessions	12:15- 12:40 Meet PELS Leaders	12:20 - 13:20 Commemorative Awards Luncheon Awards Ceremony
14:00		12:50-14:10 Women in Engineering Meeting	(Online) 12:20- 14:00 Oral Sessions 5	12:40- 14:10 PELS Region-10 Chapter Chairs Meeting	
15:00	14:00-15:40 Industrial Seminar	13:30-14:30 Students and Young Engineers Poster Competition		12:40- 14:00 Poster Sessions	12:20- 14:00 Oral Sessions 9
16:00		14:30 - 16:10 Oral Sessions 2	14:20 - 16:00 Oral Sessions 6	14:20 - 16:00 Oral Sessions 10	14:00 - 15:40 Oral Sessions 13
17:00	16:00-17:40 Industrial Seminar				
18:00		16:30 - 18:10 Oral Sessions 3	16:20 - 18:20 Oral Sessions 7	16:20 - 18:40 Oral Sessions 11	
19:00	18:00-19:30 Welcome Reception				
20:00				19:00-21:00 Banquet	
21:00					

Industrial Seminar

Sunday, May 31 14:00 – 15:40

Convention Hall 2 (2F)

Chairs: Prof. Kan Akatsu (Yokohama National University)
Prof. Kantaro Yoshimoto (Tokyo Denki University)

[Seminar 1] 14:00 – 14:30

Dr. Manabu Souda

TMEIC

“Power Electronics Technology Enables a Carbon Neutral Society”



Dr. Manabu Souda

[Seminar 2] 14:35 – 15:05

Dr. Masahiro Sasaki

Fuji Electric, Co., Ltd.

“Technical Trend of Silicon Carbide Power Semiconductor Devices”



Dr. Masahiro Sasaki

[Seminar 3] 15:10 – 15:40

Dr. Zhongwei Guo

Shindengen Electric Mfg. Co., Ltd.

“Control Techniques for Three-Phase Bidirectional Vehicle-to-Everything(V2X) Systems”



Dr. Zhongwei Guo

[Seminar 4] 16:00 – 16:30

Dr. Ryohei Kitayoshi

Yaskawa Electric Corporation

“Σ-X series: AC Servo Drive for Achievement of Digital Solution”



Dr. Ryohei Kitayoshi

[Seminar 5] 16:35 – 17:05

Dr. Koji Terashima

Isuzu Advanced Engineering Center, Ltd.

“Progress and Challenges of Ultra-High-Speed Motors for Vehicle Drive”



Dr. Koji Terashima

[Seminar 5] 17:10 – 17:40

Dr. Yoshinori Yamashita

Mitsubishi Electric

“Synchronous Reluctance Motor Systems for Railway Vehicles and Energy-Saving Technologies”



Dr. Yoshinori Yamashita

Plenary Sessions

Plenary Session 1/2/3

Convention Hall 3/4 (2F)

Monday, June 1 9:00 – 10:45

[Plenary Session 1]

Prof. Frede Blaabjerg

Aalborg University

“Power Electronics Technology - Trends and Applications”



Prof. Frede Blaabjerg

[Plenary Session 2]

Prof. Akira Chiba

Institute of Science Tokyo

“Developments of Bearingless Motor and Drives”



Prof. Akira Chiba

[Plenary Session 3]

Prof. Shin-ichiro Sakai

JAXA (Japan Aerospace Exploration Agency)

“Looking Back on SLIM's Moon Landing, Looking Ahead to the Future”



Prof. Shin-ichiro Sakai

Plenary Sessions

Plenary Session 4/5/6 Convention Hall 3/4 (2F)

Tuesday, June 2 8:30 – 10:15

[Plenary Session 4]

Prof. Fang Z. Peng

University of Pittsburgh

“Taming the Beast – A Personal Journey and Research Quest for Safe and Resilient Electricity”



Prof. Fang Z. Peng

[Plenary Session 5]

Prof. Yuting Gao

Wuhan University

“Research on High-Inertia Brushless Doubly-Fed Flywheel Energy Storage Motor System”



Prof. Yuting Gao

[Plenary Session 6]

Prof. Sehoon Oh

Daegu Gyeongbuk Institute of Science and Technology

“Robot Control in the Era of Physical AI: Bridging the Gap Between Learning and Precision Control”



Prof. Sehoon Oh

Plenary Sessions

Plenary Session 7/8/9 Convention Hall 3/4 (2F)

Wednesday, June 3 8:30 – 10:15

[Plenary Session 7]

Prof. Sewan Choi

SEOULTECH

“EV OBC at a Turning Point: Beyond Two-Stage Limits to De-Risked, Cost-Competitive Single-Stage Architectures”



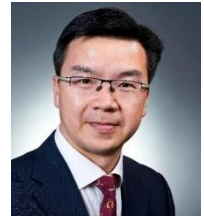
Prof. Sewan Choi

[Plenary Session 8]

Prof. Jinjun Liu

Xi'an Jiaotong University

“The Quest for a Fully Autonomous Distribution-Grid/Microgrid Incorporating DERs”



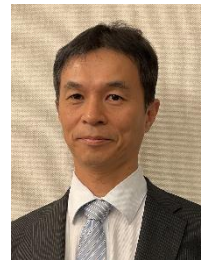
Prof. Jinjun Liu

[Plenary Session 9]

Dr. Kansuke Fujii

Fuji Electric Co., Ltd.

“Developing Power Conditioning System (PCS) for Renewable Energy in Japan”



Dr. Kansuke Fujii

Technical Sessions: Oral Sessions 1

Monday, June 1 11:15 – 12:35

Room 101A (1F)

[Oral] Motor Drive and Control

[O1-1] Control Theory for Motor Drives 1

Chairs: Ikuya Sato (Fuji Electric Co., Ltd.)
Mateja Novak (Aalborg University)

[O1-1-01]

Reinforcement Learning-Based Current Control of PMSMs using PPO with Temporal Memory

*Juan Escarate¹, Esin Ilhan Caarls¹, Jan M. Schellekens¹, Georgios Papafotiou¹ (1. Eindhoven University of Technology (Netherlands))

[O1-1-02]

Online Parameter Estimation for MTPA Control of PMSMs in Stator Flux Linkage Synchronous Frame

*Kosuke Motoi¹, Yukinori Inoue¹, Masayuki Sanada¹ (1. Osaka Metropolitan University (Japan))

[O1-1-03]

Estimation Method for Iron Loss Equivalent Resistance of Permanent Magnet Synchronous Motor

*Takumi Takemae¹, Kantaro Yoshimoto¹ (1. Tokyo Denki University (Japan))

[O1-1-04]

Vector control of switched reluctance motors with adjustable tradeoff between torque ripple and RMS current

*Hayato Takahashi¹, Keitaro Kwarazaki¹, Nobukazu Hoshi¹ (1. Tokyo University of Science (Japan))

Room 101B (1F)

[Oral] Semiconductor Power Conversion » Sophisticated Modulation, control and analysis

[O1-2] Advanced Digital Control and Adaptive Algorithms

Chairs: Bulent Sarioglu (University of Wisconsin-Madison)
Tomoyuki Mannen (Utsunomiya University)

[O1-2-01]

Experimental Validation of an LLM-Based PI Gain Auto-tuning Method for a Half-bridge Inverter

*Wataru Kodaka¹, Ryosuke Ota¹, Keiji Wada¹ (1. Tokyo Metropolitan University (Japan))

[O1-2-02]

Experimental Verification of Multi-Sampling Deadbeat Control in a MW-class Grid-tied Inverter with an LC-type Output Filter

*Sota Kado¹, Kohsuke Seki², Yoshihiro Tawada², Tomoki Yokoyama¹ (1. Tokyo Denki University (Japan), 2. TMEIC (Japan))

[O1-2-03]

An Adaptive Nonlinear Control for Power Converters to Mitigate Transient Overreach of Distance Relays

*Qianli Xing¹, Henrik Johansson¹, Nathaniel Nathaniel Taylor¹, Ilka Jahn¹, Zhenbin Zhang² (1. KTH Royal Institute of Technology (Sweden), 2. Shandong University (China))

[O1-2-04]

Fully Closed-Loop Control with Propagation Delay Compensation for the Soft-Switched Bidirectional Phase-Shifted Full Bridge Converter

*JT Luterbach¹, Andrew M. Knight¹, Philippe Gray¹ (1. University of Calgary (Canada))

Technical Sessions: Oral Sessions 1

Room 101C (1F)

[Oral] Semiconductor Power Conversion » Emerging technologies in Packaging, thermal management, system integration and Reliability (Advanced fault protection systems, Diagnostics)

[O1-3] Monitoring and Diagnostics of Semiconductor Devices and Capacitors

Chairs: Guo-Quan Lu (Virginia Tech)
Kenji Natori (Chiba University)

[O1-3-01]

Analysis of Relationship between Gate Drive Condition and Detection Sensitivity of Bond Wire Lift-Off in IGBT Modules using Convolutional Neural Networks (CNNs)

*Thatree Mamee¹, Katsuhiko Hata², Makoto Takamiya³, Takayasu Sakurai³, Shin-ichi Nishizawa⁴, Wataru Saito⁴
(1. Pilot Plant Development and Training Institute (PDTI), King Mongkut's University of Technology Thonburi (KMUTT) (Thailand), 2. College of Engineering, Shibaura Institute of Technology (Japan), 3. Institute of Industrial Science, The University of Tokyo (Japan), 4. Research Institute for Applied Mechanics, Kyushu University (Japan))

[O1-3-02]

Fully Integrated Active Gate Driver IC With Real-Time Timing Control of Drive-Strength Switching Using Gate Current Sensing for SiC MOSFETs

Taiyu Liu¹, Michihiro Ide¹, *Makoto Takamiya¹ (1. The University of Tokyo (Japan))

[O1-3-03]

Condition Monitoring of a DC-link Capacitor with the Instantaneous Output Power of a Propulsion Inverter with One-Pulse Modulation

*Kazunori Hasegawa¹, Takuma Yamasoto¹, Kazuki Fujimoto², Yuji Oyama², Norifumi Iida² (1. Kyushu Institute of Technology (Japan), 2. TOYO DENKI SEIZO K.K. (Japan))

[O1-3-04]

Analysis and Experimental Verification of Current Sharing among Parallel-Connected DC-Link Capacitors with Stray Inductances

*Kazunori Hasegawa¹, Sakurako Nasu¹ (1. Kyushu Institute of Technology (Japan))

Room 102 (1F)

[Oral] Industrial Instrumentation and Control

[O1-4] Industrial Instrumentation and Control 1

Chairs: Reon Sasaki (The University of Tokyo)
Subham Sahoo (Aalborg University)

[O1-4-01]

A Comparison of Linear and Sliding Mode Formation Control for a Multi Quadrotor System

Luis F. Canaza Ccari¹, *Muhammad Rehan¹ (1. KFUPM (Saudi Arabia))

[O1-4-02]

High-Robustness and High-Responsiveness Motion Control Based on Multi-Sampling Deadbeat Control

Hiroki Kubota¹, *Masami Iwase¹, Tomoki Yokoyama¹ (1. Tokyo Denki University (Japan))

[O1-4-03]

LLM-Guided Multi-Agent Co-Design Framework for Circuit Parameter Design and Power Device Selection in Power Converters

*Qingyang Tan¹, Keiji Wada¹ (1. Tokyo Metropolitan University (Japan))

[O1-4-04]

Feedforward Flow Rate Control for Pipe Resonance Cancellation via Iterative Learning-Based Parameter Identification

*Koki Hattori¹, Wataru Ohnishi¹, Takafumi Koseki¹ (1. The University of Tokyo (Japan))

Technical Sessions: Oral Sessions 1

Room 103 (1F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O1-5] Converter-Grid Interactions Under Unbalanced and Distorted Conditions

Chairs: Hiroki Ishikawa (Gifu University)

Zong-Zhen Yang (National Taiwan University of Science and Technology)

[O1-5-01]

Impedance Asymmetry: How Control Design Shapes Converter-Grid Instability

*Chirag Ramgopal Shah¹, Marta Molinas¹, Sjur Føyen¹, Roy Nilsen¹ (1. Norwegian University of Science and Technology (Norway))

[O1-5-03]

Deduction and Analysis of Transient Synchronization Model of DFIG-Based Wind Turbines Considering DC Voltage Dynamics

*Jingyi Bu¹, Zhanqi Huang¹, Chao Wu¹, Yong Wang¹ (1. Shanghai Jiao Tong University (China))

[O1-5-04]

Passivity-Based Voltage Regulation of a PV-Fed

Boost for Colombia's Distributed Generation: Design and Validation

*Juan David Noriega¹, Fredy Martinez¹ (1. Universidad Distrital Francisco Jose De Caldas (Colombia))

Room 107 (1F)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[O1-6] Resonant Converters

Chairs: Wilmar Martinez (KU Leuven - EnergyVille)

Kazuhiro Umetani (Kyushu University)

[O1-6-02]

Talkative Power Conversion on IPOS LLC Resonant Converter Using Multi-Spread Phase Shift Keying Under Spread Spectrum Modulation

*Young-Min Lee¹, Jun-Suk Lee¹, Jee-Hoon Jung¹ (1. Ulsan National Institute of Science and Technology (UNIST) (Korea))

[O1-6-03]

A High-Power-Density IPT-based CLLC Converter With the Air-Core PCB Transformer

*Junrui Liu¹, Bowang Zhang¹, Yilin Zhang¹, Youhao Hu¹, Wei Han¹ (1. HKUST(GZ) (China))

[O1-6-04]

Enhanced Magnetics Utilization and Core Size Reduction in CLLC Converters

*Jamil Hassan¹, Aswin Palanisamy¹, Jun-ichi Itoh², Dylan Lu¹, Yam Siwakoti¹ (1. University of Technology Sydney (UTS) (Australia), 2. Nagaoka University of Technology (Japan))

Technical Sessions: Oral Sessions 1

Room 108 (1F)

[Oral] Semiconductor Power Conversion

[O1-7] Medium Voltage Power Electronics

Chairs: Shiori Idaka (Mitsubishi Electric Europe B.V.)

[O1-7-01] Invited Paper

Solid-State Transformers for Medium Voltage PV Applications

Jiacai Zhuang^{1,2}, Minle Shi², *Wei Liu¹, Guoqing Cai¹, Yuan Zhuang¹ (1. Sungrow Power Supply Co. Ltd. (China), 2. Hefei University of Technology (China))

[O1-7-02] Invited Paper

Characterization of 3.3 kV SiC Switches: Short-Circuit Robustness of Uni-directional MOSFETs and Switching Performance of Monolithic BiDFETs

Qihao Luo¹, Pengyu Fu¹, Juchen Yang¹, Euler Valdivieso¹, Yizhou Cong¹, Zhining Zhang¹, *Jin Wang¹, Anant Agarwal¹, Ajit Kanale², Ashish Kumar², Stanley Atcitty³ (1. The Ohio State University (USA), 2. Wolfspeed, Inc. (USA), 3. Sandia National Laboratories (USA))

[O1-7-03] Invited Paper

10kV-rated Power Electronics Building Block with Series-Connected 3.3kV SiC MOSFETs

*Drazen Dujic¹, Jules Mace¹, Rui Wang² (1. Power Electronics Laboratory, EPFL (Switzerland), 2. Hunan University (China))

[O1-7-04] Invited Paper

The High Power Grid Lab: A novel PHIL Research Infrastructure for Medium-Voltage Power Electronics

*Christina Bischoff¹, Georg Ziegler¹, Rüdiger Schwendemann¹, Lukas Stefanski¹, Marc Hiller¹ (1. Karlsruhe Institute of Technology (KIT) (Germany))

Hall 1 (2F)

[Oral] Vehicle Electrification-related Technologies

[O1-8] Technologies for 50,000rpm traction motor of XEV Part I

Chairs: Kan Akatsu (Yokohama National University)

[O1-8-01] Invited Paper

Power Converter Topologies and PWM Strategies for Ultra-High-Speed Motor Drives in Electric Vehicles

*Keitaro Kawarazaki¹, Yuichiro Deguchi¹, Nobukazu Hoshi¹ (1. Tokyo University of Science (Japan))

[O1-8-02] Invited Paper

Control Technique for High-speed Motor Drive Systems

*Kantaro Yoshimoto¹, Yuto Hirao¹, Towa Shibuya¹, Tomoki Yokoyama¹ (1. Tokyo Denki University (Japan))

[O1-8-03] Invited Paper

Dynamic Behavior of a Passive Common-Noise Canceller During Control Transitions in Three-Phase PWM Inverter-Fed Motor Drives

*Jinxing Zhou¹, Koji Orikawa² (1. Hokkaido University (Japan), 2. Hokkaido University of Science (Japan))

[O1-8-04] Invited Paper

Measurement of Stator AC Losses in a High-Speed Machine with Aluminum Distributed Winding

*Hiroya Sugimoto¹, Shoichi Oaku¹, Yuto Yamada¹, Itsuki Fukasawa¹, Jun Ebinuma¹ (1. Tokyo Denki University (Japan))

Technical Sessions: Oral Sessions 1

Hall 2 (2F)

[Oral] Linear Drives

[O1-9] Industrial/Medical Applications of Magnetic Bearings

Chairs: Junichi Asama (Shizuoka University)
Wolfgang Gruber (Johannes Kepler University, Austria)

[O1-9-01] Invited Paper

Sensorless Detection and Prevention of Thrombus Using Magnetic Bearing in Blood Pump

*Wataru Hijikata¹, Kohei Hatakenaka¹, Tatsuki Fujiwara¹, Katsuhiko Ohuchi², Yusuke Inoue³ (1. Institute of Science Tokyo (Japan), 2. Juntendo University (Japan), 3. Asahikawa Medical University (Japan))

[O1-9-02] Invited Paper

Stability and Robustness Evaluation of the Miniature MagLev Drive System in NeoVAD Prototype: In Vitro Static and Pulsatile Study

*Yaxin Wang¹, Nobuyuki Kurita^{1,2}, Victor Tedesco¹, Ethan Maddin¹, Hoi Hong Chan¹, O. H. Frazier¹ (1. Baylor College of Medicine (USA), 2. Texas Children Hospital (USA))

[O1-9-03] Invited Paper

Proposal of a Modeling Method for Axial Magnetic Bearing Actuators Considering Magnetic Saturation and Eddy Currents and Its Verification on an Actual Device

*Daiki Miwa¹, Atsushi Sakawaki¹, Ryota Takeuchi¹ (1. Daikin Industries, LTD (Japan))

[O1-9-04] Invited Paper

Sensorless Bearingless Slice Motor Using Magnet-Free Rotor for Extracorporeal Circulatory Blood Pumps

*Tadahiko Shinshi¹, Zeqiang He¹ (1. Institute of Science Tokyo (Japan))

Online Session (Online)

[Oral] Motor Drive and Control

[O1-10] Rotating Machines and Motor Drives

Chairs: Yuto Kobayashi (National Institute of Technology, Akita College)

[O1-10-01]

Optimization Design for Enhancing Thermal Performance of High-Speed Permanent Magnet Motors Based on Taylor-Couette Flow Characteristics

*Jiayu Zhang¹, Shan Li¹, Jiayi Yao¹, Dengjie Lu¹, Wei Sun¹ (1. SMERI (China))

[O1-10-02]

Improved Current Sampling Scheme for Sensorless Control of SPMSM Drives with Two Shunt Resistors

*Zhongyu Li¹, Zhicong Xu², Peng Ouyang², Hanbing Dan¹, Mei Su¹ (1. Central South University (China), 2. Aecc South Industry Company Limited (China))

[O1-10-03]

Magnitude and Symmetrical Optimal Based Parameter Design Method for Direct Torque Control Driven-PMSM

*Jinhui Wang¹, Yixiao Luo¹, Kai Yang¹ (1. School of Electrical and Electronic Engineering, Huazhong University of Science and Technology, Wuhan (China))

[O1-10-04]

An Improved Torque Control Method to Simulate the Propeller Characteristics under Various Inflow Velocities and Rotational Speeds

*Jianzhi Zhu¹, Jiaying Zhu¹, Bowei Chen¹, Yilin Ma¹, Huan Yang¹, Rongxiang Zhao¹ (1. Zhejiang Univ. (China))

Technical Sessions: Oral Sessions 1

Monday, June 1 12:50 – 14:30

Online Session (Online)

[Oral] Semiconductor Power Conversion

[O1-2-1] Control and Diagnostic Technologies

Chairs: Rintaro Kusui (Nagaoka University of Technology)

[O13-5-05]

Power Distribution Control of a Photovoltaic-Electric Vehicle Integrated System Based on Reinforcement Learning

*Xian Zhou¹, Yu Zeng¹, Yujia Kuang¹, Dehong Zhou¹, Xin Liu¹, Zhan Li², Jianxiao Zou¹, Josep Pou³ (1. University of Electronic Science and Technology of China (China), 2. Hunan University (China), 3. City University of Hong Kong (Hong Kong))

[P1-13-01] A Voltage-Only Control of Series-Stacked Active Power Decoupler for Wide Capacitance Range

*Lyuyi Lin^{1,2}, Biliang Huang², Ji Xiang¹ (1. Zhejiang University (China), 2. JOULWATT TECHNOLOGY CO., LTD. (China))

[P1-13-17] Diagnosis of Open-Circuit Faults in Three-Level ANPC Inverters Based on Digital Twin

*Chang Li¹, Zhiyao Lu¹, YiLan Xue¹, PengYu Luo¹, WeiLin Li¹, WenJie Liu¹ (1. Northwestern Polytechnical University (China))

[O7-1-02]

Power-decoupled DAB-buck Converter with Discrete Pulse Control for Fast Lithium-ion Battery Charging

Xiao Li¹, Chengpeng Zhou¹, *Jin Sha¹, Xuanyan Liu¹, Jinsong Shen² (1. School of Electrical Engineering of Southwest Jiaotong University (China), 2. Monolithic Power Systems (China))

[O8-3-01]

Loss-Aware DC-Bus Voltage Control for Open-Winding PMSM in Electric Vehicles

*Xuanyi Zhu¹, Zechuan Lin², Kemeng Chen¹, Yifei Han¹, Xi Xiao¹ (1. Tsinghua University (China), 2. Maynooth University (Ireland))

Technical Sessions: Oral Sessions 2

Monday, June 1 14:30 – 16:10

Room 101A (1F)

[Oral] Motor Drive and Control

[O2-1] Sensorless Control

Chairs: Atsushi Shinohara (Kagoshima University)
Somboon Sangwongwanich (Chulalongkorn University)

[O2-1-01]

Simple Unity Power Factor Control Method for Direct Torque Control of Permanent Magnet Synchronous Motor Drives

*Hiroshi Enokura¹, Yukinori Inoue¹, Masayuki Sanada¹, Taichi Kawakami² (1. Osaka Metropolitan University (Japan), 2. Osaka Metropolitan University College of Technology (Japan))

[O2-1-02]

Model-based Spatial Harmonic Compensation in Signal-Injection Sensorless Control of IPMSMs

*Hirotaka Kato¹, Jun-ichi Itoh¹, Gyu Cheol Lim², Jung-Ik Ha² (1. Nagaoka University of Technology (Japan), 2. Seoul National University (Korea))

[O2-1-03]

Low Speed Sensorless Control Using a Dynamic Range ADC under Sinusoidal PWM Excitation

*Kaito Watanabe¹, Sari Maekawa¹, Naoya Yamashita², Akihiro Doi², Akihisa Mieda² (1. Meiji University (Japan), 2. DAIKIN INDUSTRIES (Japan))

[O2-1-04]

ANN based Sinusoidal Modulation Low Speed Sensorless Control Without Signal Injection

*Ning Ma¹, Sari Maekawa¹ (1. Meiji University (Japan))

[O2-1-05]

A Novel Position Sensorless Flux Vector Control Combined with V/f Control for Permanent Magnet Synchronous Motors

*Taiki Mikami¹, Tetsuya Matsuyama², Masato Komizo², Nobukazu Hoshi¹ (1. Tokyo University of Science (Japan), 2. Panasonic Industry Co., Ltd. (Japan))

Technical Sessions: Oral Sessions 2

Room 101B (1F)

[Oral] Semiconductor Power Conversion » Sophisticated Modulation, control and analysis

[O2-2] Implementation and Analysis of Next-Gen GaN and UHF Circuits

Chairs: Yu Zuo (Katholieke Universiteit Leuven)

Masataka Minami (Kindai University)

[O2-2-01]

Verification of Boost DC-DC Converter with 1MHz Multi-Sampling Deadbeat Control

*Takumi Hamazu¹, Yuki Ueda¹, Shigenori Nakatani¹, Ryo Saito², Atsuo Kawamura³, Tomoki Yokoyama¹ (1. Tokyo Denki University (Japan), 2. Hasetec (Japan), 3. Yokohama National University (Japan))

[O2-2-02]

Novel GaN MBDS-Based Current-Source Three-Phase Buck-Boost PFC Rectifier System

*takanobu ohno¹, Johann Walter Kolar¹, Matthias Kasper², Spasoje Miric¹ (1. Vienna University of Technology (Austria), 2. Infineon (Austria))

[O2-2-03]

Triangular Current Mode Control for High-Frequency Inverter Operation without Bottom-Current Detection

*Yuki Mashita¹, Rintaro Kusui¹, Takumi Iwamoto¹, Kodai Nishikawa¹, Hiroki Watanabe¹, Jun-ichi Itoh¹ (1. Nagaoka University of Technology (Japan))

[O2-2-04]

Multidimensional Capacitance Characterization of Monolithic Bidirectional GaN HEMTs using Four-Port S-Parameter Measurements

*Magnus Haitz^{1,2}, Cristino Salcines¹, Mathias C. J. Weiser², Aline Reck², Ingmar Kallfass² (1. Robert Bosch GmbH (Germany), 2. University of Stuttgart (Germany))

[O2-2-05]

Multidimensional Capacitance Model for Monolithic Bidirectional GaN HEMTs

*Magnus Haitz^{1,2}, Cristino Salcines¹, Ingmar Kallfass² (1. Robert Bosch GmbH (Germany), 2. University of Stuttgart (Germany))

Technical Sessions: Oral Sessions 2

Room 101C (1F)

[Oral] Semiconductor Power Conversion » Emerging technologies in Packaging, thermal management, system integration and Reliability (Advanced fault protection systems, Diagnostics)

[O2-3] Thermal Management for Semiconductor Devices 1

Chairs: Frede Blaabjerg (Aalborg University)
Shuhei Fukunaga (The University of Osaka)

[O2-3-01]

Advanced Thermal Management Solutions for WBG-based Integrated Modular Motor-Drives

*Alberto Castellazzi¹, Imad Mohamed Ameer¹ (1. Kyoto University of Advanced Science (Japan))

[O2-3-02]

Cooling System Design Tool for Converter Thermal Analysis and Junction Temperature Estimation

*Tian Luo¹, Haiyan Ma¹, Weichi Zhang¹, Yunni Li², Wiktor Rubak³, Pablo Arevalo-Aguilar⁴ (1. Hitachi Energy China Ltd (China), 2. Hitachi Energy Ltd. (Switzerland), 3. Hitachi Energy Poland Sp. z o.o. (Poland), 4. Hitachi Energy Spain s.a.u (Spain))

[O2-3-03]

Compact Two-Phase Dielectric Fluid Cooling System for Power-Dense PCBs

*Lars van Eeuwijk¹, Jasper Kadijk¹, Remco Bonten¹, Jan Schellekens¹, Bas Vermulst¹ (1. Eindhoven University of Technology (Netherlands))

[O2-3-04]

Thermal and Mechanical Characterization of One-Component, Non-Curing Gap Fillers for Top-Side Cooled MOSFETs

*Joel Schön¹, Zerdest Pervane¹, Jörg Franke¹, Patrick Bründl¹ (1. Institute for Factory Automation and Production Systems, Universität Erlangen-Nürnberg (Germany))

[O2-3-05]

POD-CGaNet for Fast PCB Thermal Prediction and Heatsink Design

*Jiaze Kong¹, Bangli Du¹, Xiaobing Shen¹, Yu Zuo¹, Wilmar Martinez¹ (1. KU Leuven - Energyville (Belgium))

Technical Sessions: Oral Sessions 2

Room 102 (1F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O2-4] Dual- and Multi-Active-Bridge Converters

Chairs: Bashir Bakhshideh Zad (University of Mons)
Ryo Haneda (Keio University)

[O2-4-01]

A Simplified Variable-Frequency plus DPS Control for Minimized Current Stress of DAB Converter Within the Whole Operating Range

*Mulinsen Zhang¹, Linxiao Gong¹, Weidong Qie¹, Lingfeng Jiang¹, Yong Wang¹ (1. Shanghai Jiao Tong University (China))

[O2-4-02]

Voltage-Gain-Based Control of Dual-Active-Bridge DC–DC Converters with Fast Dynamic Response and DC-Bias Current Suppression

*gaoxiang chen¹, Ka-Hong Loo¹, chuan sun² (1. The Hong Kong Polytechnic University (Hong Kong), 2. Macau University of Science and Technology (Macau))

[O2-4-03]

Analytical closed form solution of minimum ZVS currents in a DC-DC Dual Active Bridge Converter

*PROSEN DEY¹, Kaushik Basu¹ (1. Indian Institute of Science Bangalore (India))

[O2-4-04]

Analytical Quantification of the Soft Switching Boundaries for Triple Active Bridge Converters

*Samuel Ghobrial¹, Carlos Teixeira¹, Brendan McGrath¹, Richardt Wilkinson¹ (1. School of Engineering, RMIT University (Australia))

[O2-4-05]

Control Strategy for MVDC to LVDC Modular Quadruple-Active-Bridge Converter Station

*Hyunggun Jung¹, Sungmin Kim¹ (1. Hanyang University ERICA Campus (Korea))

Room 103 (1F)

[Oral] Semiconductor Power Conversion

» New generation Power device, Passive components and materials

[O2-5] Wide-Bandgap Power Devices Gate Driving and Reliability

Chairs: Morten Rahr Nielsen (Aalborg University)
Takashi Sawada (Nagoya University)

[O2-5-01]

Short-circuit Protections of Parallel-Connected SiC MOSFET Modules Based on Electro-thermal Design with Internal Capacitance

*Makiko Hirano¹, Kazuya Kodani¹, Akihisa Matsushita¹ (1. Toshiba Corporation (Japan))

[O2-5-02]

Implementation of Gate Oscillation Suppression Method that Does Not Deteriorate Switching Characteristics

*Ryoga Kiguchi¹, Hiromu Takubo¹, Masakazu Gekinozu¹ (1. Fuji Electric Co., Ltd. (Japan))

[O2-5-03]

Trade-off Design on Gate-Circuit for Paralleled 2.3kV SiC MOSFET Power Modules

*Narendra Shankar Walawalkar¹, Nianzun Qi¹, Morten Rahr Nielsen¹, Stig Munk-Nielsen¹ (1. Aalborg University (Denmark))

[O2-5-04]

Evaluating Bidirectional GaN HEMT, SiC MOSFET, and Si IGBT for ARCP Inverter Auxiliary Circuits

*Thomas Lehmeier¹, Yan Zhou¹, Adrian Amler¹, Ajay Poonjal Pai², Martin März¹ (1. Institute of Power Electronics, Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany), 2. Sanan Semiconductor (Germany))

[O2-5-05]

Potential of a Darlington Configuration using Si-SBJT and Si-SJMOSFET as a Power-switching Device

*Koji Yano¹, Daiki Mitsui¹ (1. University of Yamanashi (Japan))

Technical Sessions: Oral Sessions 2

Room 107 (1F)

[Oral] Semiconductor Power Conversion » Latest solution for EMI and EMC

[O2-6] EMI Analysis and Reduction Techniques for Power Converters

Chairs: Marcelo Lobo Heldwein (Technical University of Munich)
Katsuya Nomura (Kwansei Gakuin University)

[O2-6-01]

Common-mode Noise Reduction through the Combination of Passive Common-noise Cancellers with Various Turn Ratios

*Koji Mitsui¹, Koki Notake¹ (1. IHI Corporation (Japan))

[O2-6-02]

Aggregated EMI modeling for single-phase PFC multi-converter system

*Shuting Li¹, Dinesh Kumar², Pooya Davari¹ (1. Aalborg Univ. (Denmark), 2. Danfoss Drives A/S (Denmark))

[O2-6-03]

Steering Electromagnetic Interference Spectrum to Reduce EMI Filters in Power Converters

Le Yang¹, *SHUO WANG¹ (1. University of Florida (USA))

[O2-6-04]

Automated Near-Field EMI Scanning System Using Robotic Arm for Wide-Bandgap-Based Power Converters

Yuyang Wang¹, Haodong Yang¹, Qiang Wu¹, Weiping Fu¹, Xiaoqing Song¹, *Alan H. Mantooth¹ (1. University of Arkansas (USA))

[O2-6-05]

Comparison of Machine Learning Techniques for Analysing Wide Bandgap Switching Behavior and EMI in Half-Bridge Structures

Thrisha Rajkumar¹, Mark Ford¹, *Ian Laird¹, Saeed Jahdi¹ (1. University of Bristol (UK))

Room 108 (1F)

[Oral] Semiconductor Power Conversion

[O2-7] Reliability of Passive Components and Power Semiconductor Devices

Chairs: Kazunori Hasegawa (Kyushu Institute of Technology)

[O2-7-01] Invited Paper

Application-oriented capacitor testing method with realistic electro-thermal stress emulation

*Bo Yao¹, Zhaoxin Wang¹, Xing Wei¹, Yichi Zhang¹, Lei Qi², Huai Wang¹ (1. Aalborg university (Denmark), 2. North China Electric Power University (China))

[O2-7-02] Invited Paper

Impedance monitoring method of a DC-link capacitor in a V2X EV charger with three bidirectional converters

*Tomoyuki Nagano^{1,2}, Kazunori Hasegawa², Shigeki Yamate¹, Atsushi Tokii¹ (1. GS Yuasa International Ltd. (Japan), 2. Kyushu Institute of Technology (Japan))

[O2-7-03] Invited Paper

EMC: a Limiting Factor of WBG Power Electronics Development ?

*Jean-Luc Schanen¹, Genevieve Frantz¹ (1. Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab (France))

[O2-7-04] Invited Paper

A Novel Method for Compensating the Parasitic Oscillation of Conduction Voltage Drop in IGBT Modules

*Lele Wei¹, Shuangzhe Chen¹, Dangsheng Zhou², Sufei Wang², Tianhao Wu², Ke Ma¹ (1. School of Electrical Engineering, Shanghai Jiao Tong University (China), 2. R&D Center Shenzhen Hopewind Electric Co., Ltd., Shenzhen (China))

Technical Sessions: Oral Sessions 2

Hall 1 (2F)

[Oral] Vehicle Electrification-related Technologies

[O2-8] Technologies for 50,000rpm traction motor of XEV Part II

Chairs: Keiichiro Kondo (Waseda University)

[O2-8-01] Invited Paper

Design of 50,000 rpm motor (IPMSM)

*Ren Tsunata¹, Riku Shinohara¹, Masaki Kimura¹, Masatsugu Takemoto¹, Jun Imai¹ (1. Okayama University (Japan))

[O2-8-02] Invited Paper

Experimental Study on High-speed Quasi-coreless SPMSM for Vehicle Drives

Ayaka Sakuma¹, *Takashi Kosaka¹, Shota Yasuo¹, Mio Tamaki¹ (1. Nagoya Institute of Technology (Japan))

[O2-8-03] Invited Paper

Basic Study on Iron Loss Estimation Technique for Non-oriented Electrical Steel Sheets under High-Frequency Excitation including Harmonics

*Daisuke Miyagi¹, Mayu Fukuoka¹, Yuta Saito¹, Hiroyasu Kobayashi¹ (1. Chiba University (Japan))

[O2-8-04] Invited Paper

Improvement of PMSM loss estimation accuracy focusing on over 50,000 rpm

*Kan Akatsu¹, Atsuya Sano¹ (1. Yokohama National University (Japan))

Hall 2 (2F)

[Oral] Industrial Instrumentation and Control

[O2-9] Ultra-high-speed Control System Based on USPM Controller

Chairs: Naoki Motoi (Kobe University)
Masato Koyama (Mie University)

[O2-9-01] Invited Paper

Development of an FPGA-Based Drone Controller Equipped with a 50 MHz ADC

*Daisuke Hiroe¹, Takumi Hamauzu¹, Yuki Ueda¹, Yu Kasakawa¹, Tetsuya Fukushima¹, Hinata Nishimura¹, Tomoki Yokoyama¹ (1. Tokyo Denki University (Japan))

[O2-9-02] Invited Paper

Improvement of PMSM Online Identification and Position-Sensorless Drive Using High-Frequency Injection by USPM's 1MHz Sampling

*Masato Koyama¹, Yuki Takahashi¹, Mikito Satake¹, Naomichi Ogawa¹ (1. Mie University (Japan))

[O2-9-03] Invited Paper

High-Speed Force Control Using 10-MHz Multi-Sampling Deadbeat Control and 10-MHz Disturbance Observer

*Koki Kodama¹, Daisuke Hiroe², Tomoyuki Shimono¹, Hidemine Obara¹, Tomoki Yokoyama² (1. Yokohama National Univ. (Japan), 2. Tokyo Denki Univ. (Japan))

[O2-9-04] Invited Paper

10MHz Multisampling Deadbeat Position Control of Piezoelectric Actuator

*Shohei Arikawa¹, Tomoki Yokoyama², Naoki Motoi¹ (1. Kobe University (Japan), 2. Tokyo Denki University (Japan))

[O2-9-05] Invited Paper

Experimental Verification of Velocity Control for a PMLSM Drive System Using 10 MHz Multi-Layer Multi-Sampling Deadbeat Control

Takuma Yabuki¹, Daisuke Hiroe¹, Takumi Hamauzu¹, Tomoyuki Shimono², Atsuo Kawamura², *Tomoki Yokoyama¹ (1. Tokyo Denki University (Japan), 2. Yokohama National University (Japan))

Technical Sessions: Oral Sessions 2

Online Session (Online)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O2-10] Semiconductor Power Conversion

Chairs: Sihoon Choi (Nagoya University)
Pengfeng LIN (Shanghai Jiao Tong University)

[O2-10-01]

A constant current/voltage charging system for EV wireless power transfer with zero phase angle input

*zijian tang¹, miaomiao cheng¹ (1. Hunan University (China))

[O2-10-02]

A Talkative Power Conversion Scheme with Peak Current Control for 1-MHz SEPIC Converter

*Yiwen Liu¹, Wanying Weng¹, Keming Liu¹, Guoao Li¹, Jiande Wu¹, Xiangning He¹ (1. Zhejiang University (China))

[O2-10-03]

A Reconfigurable Multi-Topology Inverter Platform with Per-Unit Mapping for Power Electronics Education

*Yuying Zheng¹, Zefan Rong¹, Xin Xiang¹, Heya Yang¹, Wuhua Li¹ (1. Zhejiang University (China))

[O2-10-04]

A Coupled Electrochemical-Hydraulic Model for Loss Analysis in Vanadium Redox Flow Battery

*Runtian Li¹, Yue Wang¹, Tianyi Zhang¹, Mengyang Du¹, Gan Liang¹, Yonghui Liu¹ (1. School of Electrical Engineering, Xi'an Jiaotong University (China))

[O1-5-02]

Voltage Vector Decomposition-Based Power Decoupling Strategy for Grid-Connected Dual-Output Converter Under Unbalanced Grid Faults

*Kai Liao¹, Dehong Zhou¹, Yu Zeng¹, Xin Liu¹, Zewei Shen¹, Jianxiao Zou¹ (1. University of Electronic Science and Technology of China (China))

Technical Sessions: Oral Sessions 3

Monday, June 1 16:30 – 18:10

Room 101A (1F)

[Oral] Vehicle Electrification-related Technologies

[O3-1] Battery Diagnosis and Estimation

Chairs: Xing Wei (Aalborg University)
Yuki Okuda

[O3-1-01]

Fault Detection and Diagnosis Within Battery Systems Using Autoencoders and Explainable AI

*Michael Theiler¹, Can Karaali¹, Christian Endisch¹ (1. Technische Hochschule Ingolstadt, Institute of Innovative Mobility (IIMo), Research team Electromobility and Learning Systems (Germany))

[O3-1-02]

Robust State-of-Health Estimation for Lithium-Ion Batteries Using Impedance-Optimized Parameters and an Ensemble Learning Approach

*Yura Kim¹, Jaehyeong Lee¹, Dongcheol Lee¹, Woonki Na², Jonghoon Kim¹ (1. Chungnam National University, Department of Electrical Engineering (Korea), 2. California State University Fresno, Department of Electrical Engineering (USA))

[O3-1-03]

Dynamic EIS for Battery Temperature Estimation under Real-time Operating Conditions

*Jaea Lee¹, Miyoung Lee¹, Yura Kim¹, Jiwoong Kim¹, Woonki Na², Jonghoon Kim¹ (1. Chungnam National University (Korea), 2. California State University (USA))

[O3-1-04]

BMIC-Based Electrochemical Impedance Spectroscopy Calibration Method for Battery Modules with Parasitic Element Compensation

*Miyoung Lee¹, Yura Kim¹, Jaea Lee¹, Jiwoong Kim¹, Woonki Na², Jonghoon Kim¹ (1. Chungnam National University (Korea), 2. California state university (USA))

[O3-1-05]

Explainable XGBoost-SHAP-Based Classification of Battery Degradation Environments Using Multi Features

*Garam Yang¹, Jonghoon Kim¹, Woonki Na² (1. Chungnam National University, Department of Electrical Engineering (Korea), 2. California State University, Department of Electrical Engineering (USA))

Technical Sessions: Oral Sessions 3

Room 101B (1F)

[Oral] Semiconductor Power Conversion » Sophisticated Modulation, control and analysis

[O3-2] High-Efficiency Soft-Switching and Loss Optimization

Chairs: Tomokazu Mishima (Yamaguchi University)

[O3-2-01]

ZVS Modulation Using DCM for Four-Quadrant Operation of Full-Bridge Grid-Tied Inverters

*Cheng Huang¹, Sota Sasaki¹, Takanori Isobe¹ (1. University of Tsukuba (Japan))

[O3-2-02]

Duty Cycle Calculations for Soft-Switched GaN-based Current Source Converters

*Gean Sousa¹, Christos Leontaris¹, Marcelo Lobo Heldwein¹ (1. Technical University of Munich (Germany))

[O3-2-03]

RMS Current Reduction Method in DAB Matrix Converters Using Variable-Carrier-Frequency PWM

*Yu Hashizume¹, Shunsuke Takuma¹, Satoshi Miyawaki¹, Yoshiya Ohnuma¹ (1. Nagaoka Power Electronics Co., Ltd. (Japan))

[O3-2-04]

Analysis and Optimal Selection of Modulation Methods for CHB Inverters Based on Harmonic and Efficiency Performance

*Duho Eum¹, Min-Sol Kim¹, Youngjong Ko¹ (1. Pukyong National University (Korea))

[O3-2-05]

Enhanced Single Pulse Width Modulation for Achieving Wide-Range ZVS and High Efficiency in Multi-Active-Bridge Converters

*Seul Lee¹, Byengjoo Byen², Eun S. Lee¹ (1. Hanyang University (Korea), 2. LG Energy Solution (Korea))

Room 101C (1F)

[Oral] Semiconductor Power Conversion » Emerging technologies in Packaging, thermal management, system integration and Reliability (Advanced fault protection systems, Diagnostics)

[O3-3] Reliability and Lifetime Assessment of Semiconductor Devices

Chairs: Homer Alan Mantooh (University of Arkansas)

Kazunori Hasegawa (Kyushu Institute of Technology)

[O3-3-01]

Predicting the switching lifetime of GaN HEMTs in LLC converters and Totem-Pole PFCs

*Hiroshi Yamashita¹, Hirokazu Oki¹, Toshiyuki Zaitsumi¹ (1. ROHM Co., Ltd. (Japan))

[O3-3-02]

Lifetime Predictive Model of SiC MOSFETs using Neural Network for Condition Monitoring Application

*KIATTISAK TONGON¹, Surin Khomfoi¹ (1. King Mongkut's Institute of Technology Ladkrabang (Thailand))

[O3-3-03]

Outlier Screening of Predicted Cycle Life for Lifetime Modeling in Power Cycling Tests of Power Semiconductor Devices

*Yichi Zhang¹, Yi Zhang², Bo Yao¹, Jiahong Liu¹, Frede Blaabjerg¹, Huai Wang¹ (1. Aalborg University (Denmark), 2. Hong Kong Polytechnic University (Hong Kong))

[O3-3-04]

Comparative Life-Cycle Environmental Impact Analysis of L and LCL Filter Topologies for Three-Phase Inverters

Ning Wang¹, Chaochao Song¹, Fabio Sporchia¹, Massimo Pizzol¹, *Ariya Sangwongwanich¹ (1. Aalborg University (Denmark))

[O3-3-05]

Components Degradation and Failure Interdependence in Power Electronics Converters

*Jinwoo Song¹, Claudia Fecarotti¹, Antonis Stathatos¹, Chengmin Li¹, Georgios Papafotiou¹ (1. Eindhoven University of Technology (Netherlands))

Technical Sessions: Oral Sessions 3

Room 102 (1F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O3-4] Converter-Based Power System Applications

Chairs: Michael Hartmann (TU Graz, Austria)

Yushi Koyama (Toshiba Corporation)

[O3-4-01]

Active Source-Decoupling Strategy Using Virtual DC Machine for UPS Applications with Hybrid Energy Storage

*DongHwan Lee¹, JaeJung Jung¹ (1. School of Electronic and Electrical Engineering, Kyungpook Nation Univ. (Korea))

[O3-4-02]

Novel Unified Power Flow Controller (UPFC)

based on Active Coupled-Inductor π -Network

*Amirhossein Malekipour¹, Michael M.C. Merlin¹, Bortecene Yildirim², Mohamed Dahidah² (1. The University of Edinburgh (UK), 2. Newcastle University (UK))

[O3-4-04]

Line Current Interruption Using a Full-Bridge Series Compensator in Loop Distribution Systems

*Takasumi Hiratsuka¹, Tomoyuki Mannen¹ (1. Utsunomiya University (Japan))

[O3-4-03]

A Wideband Harmonic Compensation Method for Distributed Converters

*Lucas Savoi Araujo¹, Daniel dos Santos Mota¹, Giuseppe Guidi¹ (1. SINTEF Energy Research (Norway))

[O3-4-05]

A Fast and Adaptive Fisher Discriminant Analysis

Framework for Robust Fault Detection in HVDC Transmission Lines

Mohamed Mostafa Ahmed¹, Faizan Mustafa², Mohamed Abdel-fattah¹, Muhammad Khalid^{3,4}, Ijaz Ahmed³, *Hasnain Ahmad³, A. M. Hamada⁵ (1. Faculty of Technology and Education, Helwan university (Egypt), 2. Pakistan Institute of Engineering and Applied Sciences (Pakistan), 3. Interdisciplinary Research Center for Sustainable Energy Systems (IRC-SES), King Fahd University of Petroleum and Minerals (Saudi Arabia), 4. Electrical Engineering Department, (KFUPM) (Saudi Arabia), 5. Faculty of Industrial and Energy Technology, Borg Al Arab Technological University (Egypt))

Technical Sessions: Oral Sessions 3

Room 103 (1F)

[Oral] Semiconductor Power Conversion

» New generation Power device, Passive components and materials

[O3-5] Application Circuits of New Generation Power Devices

Chairs: Wai Keung Mo (The University of Southern Denmark)
Ryohei Okada (Takusyoku Univeristy)

[O3-5-01]

5 kW 2.79 MHz four-cells series connected Class-E push-pull using GaN HEMT and scaling power to 60 kW for Float Zone Silicon Production

*Fahmeem Ahmad¹, Hassan Mujtaba¹, Stefan Liccardi¹, Jannick Kjaer Jorgensen¹, Benoit Biddogia², Stig Munk-Nielsen¹ (1. Aalborg University (Denmark), 2. Topsil Globalwafers A/S (Denmark))

[O3-5-02]

Voltage Balancing of Dual-Output IPOS LLC Resonant Converter Using an Integrated Transformer

Seunghoon Lee¹, *Youngwoo Jo², Jaeseong Lim², Honnyong Cha² (1. Hyosung Corporation (Korea), 2. Kyungpook National University (Korea))

[O3-5-03]

Analysis and Design of an Integrated-Transformer TriMagiC ConverterTM for 48 V-to-1 V PoL Applications

*Ryota Nozaki¹, Itsuki Masuda¹, Sihoon Choi², Yu Yonezawa², Jun Imaoka², Masayoshi Yamamoto², Mitsunao Fujimoto³, Katsuya Kameda³ (1. Department of Electrical Engineering, Nagoya University (Japan), 2. Institute of Materials and Systems for Sustainability (IMaSS), Nagoya University (Japan), 3. Research and Development dept, Diamet Corporation (Japan))

[O3-5-04]

Estimation of Switching Losses at Zero-Voltage Switching Considering the AC Winding Resistance of an Extremely Highly Efficient 850-V 100-kW 16-kHz Dual-Active-Bridge Converter

*Ryo Haneda¹, Masahiro Isoda¹, Hirofumi Akagi², Takahiro Nozaki¹ (1. Keio University (Japan), 2. Institute of Science Tokyo (Japan))

[O3-5-05]

An Active Technique for Turn-On Current Overshoot Suppression in GaN HEMT Half-Bridges

Manish Mandal¹, Harish S¹, *Kaushik Basu¹ (1. Indian Institute of Science Bengaluru (India))

Technical Sessions: Oral Sessions 3

Room 107 (1F)

[Oral] Rotating Electrical Machine » Permanent Magnet Machines

[O3-6] Permanent Magnet Machines

Chairs: David Gerada (University of Nottingham, UK)
Junji Kitao (Mitsubishi Electric Corporation)

[O3-6-01]

Effect of Magnetic Path Width on Torque and Power Density of a Distributed Winding SPMSM

*Mahiro Yoshimatsu¹, Masayuki Sanada¹, Yukinori Inoue¹ (1. Osaka Metropolitan University (Japan))

[O3-6-02]

Design of a Novel Multi-unit Hetero-topology Compound Stator Permanent Magnet Machine for Wide-Speed-Range High-Efficiency Drive

Zaixin Song¹, Yongtao Liang¹, *Yuan Gao¹, Zhijian Zhang¹ (1. The Hong Kong Polytechnic University (Hong Kong))

[O3-6-03]

Robust Design and Optimization of PM Servo Machine Considering Manufacturing Tolerances

*Cheng Peng^{1,2}, Dawei Li^{1,2}, yu zhao^{1,2}, Ronghai Qu^{1,2} (1. State Key Laboratory of High-Density Electric Energy Conversion (China), 2. School of Electrical and Electronic Engineering Huazhong University of Science and Technology (China))

[O3-6-04]

Effect of Parallel Conductor Arrangement on Circulating Current Loss in Permanent Magnet Synchronous Motors with Different Capacities

*Sota Hoshiyasu¹, Takayuki Komine², Yasuhito Takahashi¹, Koji Fujiwara¹ (1. Doshisha Univ. (Japan), 2. Toyo Denki Seizo K.K. (Japan))

[O3-6-05]

Study of Bridge Shape for Iron Loss Reduction in Variable Flux-Linkage IPMSM with Bridges in Stator Slots

*Takuto Yabu¹, Masayuki Sanada¹, Yukinori Inoue¹ (1. Osaka Metropolitan University (Japan))

Room 108 (1F)

[Oral] Semiconductor Power Conversion

[O3-7] Recent trends and applications of multilevel power conversion technologies

Chairs: Makoto Hagiwara (Hokkaido University)

[O3-7-01] Invited Paper

Design of Modular Multilevel Converters Incorporating Internal Energy-Based Virtual Inertia Control for HVDC Transmission

*Kenichiro Sano¹, Masatoshi Ito¹, Mitsuyoshi Enomoto¹ (1. Institute of Science Tokyo (Japan))

[O3-7-02] Invited Paper

A New Heatsink-Less MMCC-based Active Power Filter for Air Conditioners

*Yohei Kubota¹, Motoki Nishio¹, Natsumi Obinata¹, Keiichi Kato¹, Keiichi Ishida¹, Shinya Shimizu¹, Takuro Arai² (1. Carrier Japan Corporation (Japan), 2. Toshiba Corporation (Japan))

[O3-7-03] Invited Paper

Impact of Negative-Sequence Current Injection on Converter Design of Modular Multilevel Converters

*Takuya Kajiyama¹, Kaho Nada¹, Toshiyuki Fujii¹ (1. Mitsubishi Electric Corporation (Japan))

[O3-7-04] Invited Paper

Design and Evaluation of a Control Scheme for the Single-Phase Solid-State Transformer

*Yi-Hua Pan¹, Yu-Chen Su¹, Hong-Quan Nguyen², Ming-Hung Yu² (1. National Tsing Hua University (Taiwan), 2. Industrial Technology Research Institute (Taiwan))

[O3-7-05] Invited Paper

Modular Magnetic-Coupled Converter (MMCC) Based Power Electronic Transformer with Mixed Voltage-Levels Switches for System Volume Reduction

*Zhan Wang¹, Sixing Du¹, jinjun Liu¹ (1. School of Electrical Engineering, Xi'an Jiaotong University (China))

Technical Sessions: Oral Sessions 3

Hall 1 (2F)

[Oral] Education in Electrical Engineering

[O3-8] Engineering Education for Power Electronics, Motion Control, and Related Technologies

Chairs: Masataka Minami (Kindai University)

[O3-8-01] Invited Paper

Undergraduate Research from Energy Storage to Intelligent Systems

*Jimin Oh¹ (1. Kyungpook National University, Korea, Republic of (Korea))

[O3-8-02] Invited Paper

Initiatives to Develop Human Resources in the Field of Electrical Engineering

*Hideo Ishii¹ (1. Waseda University (Japan))

[O3-8-03] Invited Paper

Modernizing Electrical Engineering Education with Simulation-Based Learning

*Jiro Doke¹ (1. MathWorks (Japan))

[O3-8-04] Invited Paper

Introduction to power electronics engineer education at the Japan Power Electronics Association

Kei Kitani¹, Kenichi Hiramoto¹, *Toshihisa Shimizu² (1. Japan Power Electronics Association (Japan), 2. Tokyo Metropolitan University (Japan))

[O3-8-05] Invited Paper

Overview of Yokohama Power Electronics College for Recurrent and Reskilling Education

*Atsuo Kawamura¹, Hidemine Obara¹, Masataka Shiraki² (1. Yokohama National University (Japan), 2. Yokohama Universities Venture Club (Japan))

Hall 2 (2F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O3-9] AC-DC and DC-AC Converters

Chairs: Jong-Won Shin (Seoul National University)
Kazuto Takagi (GS Yuasa International Ltd.)

[O3-9-04]

Voltage control of a three-phase boost integrated inverter using an unfolding strategy for rectifier loads

*So Watanabe¹, Tomoyuki Mannen¹ (1. Utsunomiya University (Japan))

[O3-9-01]

EMI Analysis and Comparison: Interleaved Totem-Pole Based Single-Stage and Two-Stage Topology

*Thong Van Minh Ta¹, Ba Phu Do¹, Ngoc Quy Do¹, Minji Kim¹, Sewan Choi¹ (1. Seoul National University of Technology and Science (Korea))

[O3-9-02]

An Enhanced Input Impedance Control Strategy with Third Harmonic Injection for Interleaved Vienna Rectifier

*Jizhe Wang¹, Shuai Yang, Tadashi Suetsugu², Fujio Kurokawa³ (1. Oita University (Japan), 2. Fukuoka University (Japan), 3. Nagasaki Institute of Applied Science (Japan))

[O3-9-03]

Expanding an Output Voltage Range of a Matrix DAB AC-DC Converter with Power Decoupling Operation

*Makoto Ishii¹, Shohei Komeda¹, Shunsuke Takuma², Yoshiya Ohnuma² (1. Tokyo University of Marine Science and Technology (Japan), 2. Nagaoka Power Electronics Co., Ltd., (Japan))

[O3-9-05]

Overvoltage Mitigation with Integrated Minimum-Loss Discontinuous PWM in SiC Inverter Systems

*Ji-Soo Park¹, Kyo-Beum Lee¹, Bong-ki Lee² (1. Ajou University (Korea), 2. LS Electric (Korea))

Technical Sessions: Oral Sessions 3

Hall 3 & 4 (2F)

[Oral] Semiconductor Power Conversion

[O3-10] Recent Digital Active Gate Drive Technologies

Chairs: Hidemine Obara (Yokohama National University)

[O3-10-01] Invited Paper

A New Active Gate-Drive Circuit and Control Signal Generation Method for a One-Pulse Active Gate Control

*Daiki Yamaguchi¹, Shinji Sato¹, Fumiki Kato¹ (1. National Institute of Advanced Industrial Science and Technology (Japan))

[O3-10-02] Invited Paper

A Development of a 4-bit Logic Active Gate Driver to Improve the Performance of Three-Phase Inverters

Thanh-Hoa Nguyen-Thi^{1,3}, Long Van Pham¹, *Chi-Hieu Pham¹, Trong-Minh Tran¹, Obara Hidemine² (1. Hanoi University of Science and Technology (Viet Nam), 2. Yokohama National University (Japan), 3. Hung Vuong University (Viet Nam))

[O3-10-03] Invited Paper

A Real-Time Feedback Control of Surge Voltage in a Three-Phase Inverter by Digital Active Gate Drive

*Hidemine Obara¹, Katsuhiko Hata² (1. Yokohama National University (Japan), 2. Shibaura Institute of Technology (Japan))

[O3-10-04] Invited Paper

Feedback Control of Conducted EMI in a Three-Phase Inverter Using Digitally Controlled Gate Drive

Shimon Shigetomi¹, *Katsuhiko Hata¹, Hidemine Obara² (1. Shibaura Institute of Technology (Japan), 2. Yokohama National University (Japan))

[O3-10-05] Invited Paper

Turn-ON Peak Current Suppression of SiC-MOSFETs Under Variable Switching Current Utilizing Gate Resistor Array

*Tomoyuki Mannen¹ (1. Utsunomiya University (Japan))

Online Session (Online)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O3-11] Semiconductor Power Conversion

Chairs: Kenji Natori (Chiba University)

Xiaoling Xiong (North China Electric Power University)

[O3-11-01]

A Novel Hybrid Capacitive-Inductive Isolated DC Solid State Transformer for MVDC Power Distribution System

*Borui Wang¹, Jingyuan Wang¹, Yuying He², Jingxin Hu¹ (1. Nanjing University of Aeronautics and Astronautics (China), 2. Hohai University (China))

[O3-11-02]

Calculation of Port Short-circuit Fault Current for T-type Non-isolated Converter in HVDC Grids

*Xingran Peng¹, Yingzhou Peng¹, Qinghua Chen¹, Jiaye Yan¹, Xiaoliang Yu¹, Zhikang Shuai¹ (1. College of Electrical and Information Engineering, Hunan University (China))

[O3-11-03]

Enhanced Damping for Coordinated Operation of Multiple Photovoltaic-Battery Grid-Forming Systems

*Kai Yin¹, Zhe Zhang², Yongheng Yang¹ (1. College of Electrical Engineering, Zhejiang University, Hangzhou, China (China), 2. Monolithic Power Systems, Inc., Hangzhou, Zhejiang, China (China))

[O3-11-04]

Improved Equivalent Circuit Model-Based Grid Support Capacity Estimation for Lithium-ion Battery Energy Storage Systems

Shaoxin Shi¹, *Qiao Peng¹, Jinhao Meng² (1. Sichuan University (China), 2. Xi'an Jiaotong University (China))

[O3-11-05]

Optimal Inter-Phase SOC Balancing Control Strategy Based on Output Current Synthesis in Cascaded Battery Energy Storage Systems

*Yuqi Shen¹, Chunzhen Liu¹, Tong Liu¹, Alian Chen¹ (1. Shandong University (China))

Technical Sessions: Oral Sessions 4

Tuesday, June 2 10:45 – 12:05

Room 101A (1F)

[Oral] Motor Drive and Control

[O4-1] Control Theory for Motor Drives 2

Chairs: Akio Toba (Fuji Electric Co., Ltd.)
Shih-Gang Chen (National Taipei University of Technology)

[O4-1-01]

Employing the Magnetic Coenergy for Precise Torque Ripple Calculation from Flux Linkages

*Stephan Goehner¹, Johannes Stoss¹, Aaron Griessbaum¹, Marc Hiller¹, Andreas Liske¹ (1. Karlsruhe Institute of Technology (Germany))

[O4-1-02]

A Radial Force Mode Control for Resonance Vibration Suppression in IPMSM Using Multi-phase Motor

*Yoshinari Tsuji¹, Shojiro Fujita¹, Kan Akatsu¹ (1. Yokohama National University (Japan))

[O4-1-03]

Auto-Tuning Algorithm of PI Gains for Current and Speed Controllers of PMSM Drives

*Yunchan Bae¹, Belete Belayneh Negesse², Jang-Mok Kim¹ (1. Pusan National University (Korea), 2. Hyowon Power Tech (Korea))

[O4-1-04]

The Role of Filters in Sensorless Vector Control Systems for Induction Motors Using Rotor-Flux-Induced Voltage Method

*Ayumi Obitsu¹, Keiichiro Kondo¹, Shunsuke Tobayashi² (1. Waseda University (Japan), 2. TMEIC (Japan))

Room 101B (1F)

[Oral] Semiconductor Power Conversion » Sophisticated Modulation, control and analysis

[O4-2] Grid-Tied Systems and Stability Control for Decentralized Power

Chairs: Pooya Davari (Aalborg University)
Toshiji Kato (Doshisha University)

[O4-2-01]

Precise Virtual Admittance Synthesis for Enhanced Grid-Forming Performance

Ruzica Cvetanovic¹, Paolo Sbabo⁴, *Lazar Stojanović², Paolo Mattavelli², Massimo Bongiorno³ (1. Innovation Center of the School of Electrical Engineering in Belgrade, University of Belgrade (Serbia), 2. Department of Management and Engineering, University of Padua (Italy), 3. Department of Electrical Engineering, Chalmers University of Technology (Sweden), 4. Department of Information Engineering, University of Padua (Italy))

[O4-2-02]

Experimental Validation of Inertial Response Speed Equivalence Between Grid-Following and Grid-Forming Inverters

*Ryoki Shimizu¹, Kenichiro Sano¹ (1. Institute Science Tokyo (Japan))

[O4-2-03]

Impedance-Based Characterization and Experimental Stability Analysis of Grid-Forming Converters with Virtual Admittance Control

*Dominik Schulz¹, Lucas Ehrlich¹, Rüdiger Schwendemann¹, Andreas Liske¹, Marc Hiller¹ (1. Institute of Electrical Engineering (ETI), Karlsruhe Institute of Technology (KIT) (Germany))

[O4-2-04]

The Impact of Voltage Feedforward Strategies on Voltage-Source Characteristics and Stability of Grid-Forming Converters

*Yongzihao Dai¹, Chao Wu¹, Xiaoling Xiong², Yong Wang¹ (1. Shanghai Jiao Tong University (China), 2. North China Electric Power University (China))

Technical Sessions: Oral Sessions 4

Room 101C (1F)

[Oral] Semiconductor Power Conversion » Emerging technologies in Packaging, thermal management, system integration and Reliability (Advanced fault protection systems, Diagnostics)

[O4-3] Thermal Management for Semiconductor Devices 2

Chairs: Alberto Castellazzi (Kyoto University of Advanced Science)
Paul Sochor (Infineon Technologies)

[O4-3-01]

Fabrication-Friendly 3D Structural Design of a High-Power-Density Three-Phase Inverter for Liquid Immersion Cooling

*Norihiro Izu¹, Daiki Satou¹ (1. Tokyo Denki University (Japan))

[O4-3-02]

Shunt Resistor-Integrated Power Module with Slit Design for Reduced Temperature Coefficient of Resistance

*Sihoon Choi¹, Thiyu Sansika Warnakulasooriya¹, Jun Imaoka¹, Masayoshi Yamamoto¹, Keishi Nakamura², Koji Shigesawa² (1. Nagoya University (Japan), 2. KOA Co., Ltd. (Japan))

[O4-3-03]

Design and Prototyping of A 3.3 kV Double Side Cooled SiC MOSFET Power Module with Porous Silver Interconnect and Microchannel Cooler

Li Zhang¹, Zachary Zintak¹, Peiyuan Sun¹, Joshua Gardner¹, *Guo-Quan Lu¹ (1. Virginia Tech (USA))

[O4-3-04]

Effect of Temperature-Dependent Saturation Current on Voltage Balancing of Series-Connected SiC MOSFETs during Short-Circuit Events

*Enyao Xiang¹, Chengmin Li¹, Dongsheng Yang¹ (1. Eindhoven University of Technology (Netherlands))

Room 102 (1F)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[O4-4] Isolated DC-DC Converters

Chairs: Jeehoon Jung (Ulsan National Institute of Science and Technology)
Kodai Nishikawa (Nagaoka University of Technology)

[O4-4-01]

Comprehensive Comparison of the Single-Phase and Three-Phase Unidirectional DC/DC Converters for High-Power Medium-Voltage Applications

*Stefan Subotic¹, Max Dupont¹, Ralph Burkart², Thomas Gradinger², Drazen Dujic¹ (1. Power Electronics Laboratory, EPFL, Lausanne, Switzerland (Switzerland), 2. Hitachi Energy Research, Baden-Dattwil, Switzerland (Switzerland))

[O4-4-02]

Analysis of Three-Level Full -Bridge ZVZCS DC-DC Converter with Double Phase-Shift PWM

Jirasak Songboonkaew¹, Anuwat Jangwanitler¹, *Prasopchok Hothongkham² (1. King Mongkut's Institute of Technology Ladkrabang, Bangkok (Thailand), 2. Rajamangala University of Technology Rattanakosin, Nakhon Prathom (Thailand))

[O4-4-03]

800 V : 1 V Direct-to-Chip Single-Stage Isolated DC-DC Converter Architecture

*Aswin Palanisamy¹, Jamil Hassan¹, Ricardo P Aguilera¹, Dylan Lu¹, Dong Dong², Yam P Siwakoti¹ (1. University of Technology Sydney (Australia), 2. Virginia Polytechnic Institute and State University (USA))

[O4-4-04]

Implement Inductor less Input for GaN High Step-Up Push-Pull Resonant Converter Based on Boundary Condition Mode

*Peerawat Poomsuwan¹, Anusak Billsalam¹, Koson Chaicharoenaudomrung¹ (1. King Mongkut's University of Technology North Bangkok (Thailand))

Technical Sessions: Oral Sessions 4

Room 103 (1F)

[Oral] Semiconductor Power Conversion

» New generation Power device, Passive components and materials

[O4-5] Passive Components and Materials Advanced Modeling

Chairs: Yuhao Zhang (The University of Hong Kong)
Jun Imaoka (Nagoya University)

[O4-5-01]

Supervised Machine Learning for Magnetic Core Loss Modeling with Symbolic Regression

*Wonju Lee¹, Haoran Li¹, Minjie Chen¹ (1. Princeton University (USA))

[O4-5-02]

AI for Magnetics: Extracting Physical Parameters of Power Magnetics from Pre-trained Neural Networks

*Davit Grigoryan¹, Han Cui², Minjie Chen¹ (1. Princeton University (USA), 2. University of Tennessee Knoxville (USA))

[O4-5-03]

MagLearn 2: A Short-Window Seq2Seq Framework for Transient Modelling of Power Magnetics under PWM Excitations

Binyu Cui¹, *Jingrong Yang¹, Yuming Huo¹, Lizhong Zhang¹, Alfonso Martinez², Song Liu¹, Jun Wang¹ (1. Univ. of Bristol (UK), 2. Würth Elektronik (Germany))

[O4-5-04]

Duty-Dependent Steinmetz Parameter Fitting for Improved Core Loss Modeling under DC Bias

Yu-Chen Liu¹, *Ya-Chih Hsiao¹, Yun-Shan Hsieh¹ (1. National Taipei University of Technology (Taiwan))

Room 107 (1F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O4-6] Converter-Based Energy Resources Control and Modeling

Chairs: Daifei Zhang (University of Toronto)
Naomitsu Urasaki (University of the Ryukyus)

[O4-6-01]

Novel AI-Based Input Current Control of Three-Phase PFC Rectifiers

*Patrick Mederitsch¹, Johann Kolar¹, Uwe Drofenik Drofenik¹ (1. TU Wien (Austria))

[O4-6-02]

An HRA Based PSO MPPT Algorithm for Photovoltaic Power Systems

YA-TING Lee², Sy Ngo³, *Min-Hsuan Hung¹, Chian-song Chiu¹ (1. Chung-Yuan Christian University (Taiwan), 2. National Taichung University of Science and Technology (Taiwan), 3. Thu Dau Mot University (Viet Nam))

[O4-6-03]

Loss-Compensated Modeling and Multi-Objective Optimization for DCPO in Photovoltaic Systems

Meilin Yang¹, *Guanying Chu¹, Ruihang Li¹, Qinglei Bu¹ (1. Xi'an Jiaotong-Liverpool University (China))

[O4-6-04]

Active Power Disparity Limits of Cascaded H-Bridge Converter-Based Energy Systems Under Inter-Phase Power Imbalances

*Enrique Alejandro Nunes Di Pierri¹, Gaowen Liang², Ezequiel Rodriguez Ramos², Glen Ghias Farivar³, Amer Mohammad Yusuf Mohammad Ghias¹, Salvador Ceballos⁴, Josep Pou⁵ (1. Nanyang Technological University (Singapore), 2. Nanyang Technological University (Singapore), 3. University of Melbourne (Australia), 4. Tecnalia, Basque Research and Technology Alliance (BRTA) (Spain), 5. City University of Hong Kong (Hong Kong))

Technical Sessions: Oral Sessions 4

Room 108 (1F)

[Oral] Industrial Instrumentation and Control

[O4-7] Advanced Control Strategies for Intelligent Mechatronic Systems

Chairs: Shota Yabui (Tokyo City University)
Takenori Atsumi (Chiba Institute of Technology)

[O4-7-01] Invited Paper

Simple Robust Loop-Shaping Method for Multi-Actuator HDD Servo Control

*Takenori Atsumi¹, Shota Yabui² (1. Chiba Institute of Technology (Japan), 2. Tokyo City University (Japan))

[O4-7-02] Invited Paper

Accurate Parameter Design Method for P-PI Controller with Feedforward in Motor Positioning Systems

*Yoshiyuki Urakawa¹ (1. Nippon Institute of Technology (Japan))

[O4-7-03] Invited Paper

Real-Time Delay Estimation Using Sequentially Updated Correlation Computation

*Takuto Fujiwara¹, Tomoyuki Shimono¹ (1. Yokohama National University (Japan))

[O4-7-04] Invited Paper

Loop-Shaping Method for Multiple AFCs Based on Time Response to Compensate Periodic Disturbances in HDDs

*Shota Yabui¹, Takumi Kobayashi¹, Takenori Atsumi² (1. Tokyo City University (Japan), 2. Chiba institute of technology (Japan))

Hall 1 (2F)

[Oral] Vehicle Electrification-related Technologies

[O4-8] Vehicle Electrification technologies

Chairs: Takashi Kato (Nissan Motor Co.,LTD)

[O4-8-01] Invited Paper

Development of a High Torque Density Motor for Electric Vehicle Using Variable Magnetic Flux Halbach Array Magnets

*Tsuyoshi Goda¹, Yu Kuwahara¹, Hiroaki Kajiura¹, Takuro Nakaoka¹ (1. DENSO CORPORATION (Japan))

[O4-8-02] Invited Paper

Novel Voltage Pulse-Pattern for Loss Reduction with Torque Ripple Mitigation of PMSMs Operated by Voltage Source Inverter

*Toru Matsuura¹, Kensuke Sasaki¹ (1. NISSAN MOTOR CO., LTD. (Japan))

[O4-8-03] Invited Paper

T-Type Three Level Inverter as a Next Milestone of EV Efficiency – a View from System and Semiconductor Perspective

*Dusan Graovac¹, Mark Münzer¹, Waldemar Jakobi¹, Christoph Bauer¹, Bijan Hatam¹, Radovan Vuletic¹, Mathias Weinmann¹, Tatsuya Arai², Holger Müller¹ (1. Infineon AG (Germany), 2. Infineon Technologies Japan K.K. (Japan))

[O4-8-04] Invited Paper

Integrated Bi-Directional Chopper with a Single-Cell Auxiliary Converter for Dual-Source Traction Systems

*Ryota Kondo¹, Kenji Fujiwara¹, Yusuke Shirouchi¹, Kikuo Izumi¹, Atsuya Suzuki², Takahiro Urakabe², Makoto Hagiwara² (1. Mitsubishi Electric Corporation (Japan), 2. Institute of Science Tokyo (Japan))

Technical Sessions: Oral Sessions 4

Hall 2 (2F)

[Oral] Rotating Electrical Machine

[O4-9] Motor and Actuator Specialized for Robot

Chairs: NOBORU NIGUCHI

[O4-9-01] Invited Paper

A Novel Axial Strain-Wave Magnetic Gear with High Torque Density and High Reduction Ratio

*Masahiko Sakai¹ (1. Kobe City College of Technology (Japan))

[O4-9-02] Invited Paper

Design and Evaluation of Motors for Service Robots with High Back Drivability Balancing Inertial and Steady State Components

*Yoshihiro Okumatsu¹, Yohei Okamoto¹ (1. Toyota motor corporation (Japan))

[O4-9-03] Invited Paper

Development of a bio-inspired underwater robot using quasi-direct-drive

*Muhammad Naveed Raza¹, Kaisei Harada¹, Shuto Uchikai¹, Yuto Konno¹, Jun Shintake¹ (1. The Department of Mechanical and Intelligent Systems Engineering, The University of Electro-communications (Japan))

[O4-9-04] Invited Paper

Design and torque estimation of magnetic strain wave gear for lightweight lower limb exoskeletons

*Fumiya Kitayama¹, Yuto Matsumoto¹, Ota Tsujimoto¹ (1. Ibaraki university (Japan))

Hall 3 & 4 (2F)

[Oral] Motor Drive and Control

[O4-10] Bearingless Machines and Drives 1

Chairs: Junichi Asama (Shizuoka University)
Takahiro Noguchi (University of Minnesota)

[O4-10-01] Invited Paper

Comparative Evaluation of Bearingless Motor Topologies for a 9 kW Compressor

*Wolfgang Gruber¹, Andreas Josef Pröll¹, Josef Passenbrunner², Sebastian Mezger³ (1. Johannes Kepler University Linz (Austria), 2. Linz Center of Mechatronics GmbH (Austria), 3. ebm-papst Mulfingen GmbH & Co. KGaA & Co. KG (Germany))

[O4-10-02] Invited Paper

Experimental Validation of Control Strategy of Outer Rotor Multi-Monopole Bearingless Motors with Combined Winding

*Hiroya Sugimoto¹, Ryosuke Yamanaka¹, Hiroki Komurasaki¹ (1. Tokyo Denki University (Japan))

[O4-10-03] Invited Paper

Design and Evaluation of a Magnetically Levitated Axial Gap Motor for Low-Pressure Venous Blood Pumping in Fontan Patients

*Nobuyuki Kurita^{1,2}, Victor Tedesco^{1,3}, Ethan Maddin^{1,3}, Iki Adachi^{1,2}, Junichi Asama⁴, Yaxin Wang^{1,3} (1. Baylor College of Medicine (USA), 2. Texas Children's Hospital (USA), 3. Texas Heart Institute (USA), 4. Shizuoka University (Japan))

[O4-10-04] Invited Paper

4-DOF Rotor Dynamics of an Interior Permanent Magnet Bearingless Slice Motor

*Jungha Kim¹, Minkyun Noh¹ (1. Korea Advanced Institute of Science and Technology (KAIST) (Korea))

Technical Sessions: Oral Sessions 4

Online Session (Online)

[Oral] Application of Power Electronics in Electric Railway and Related Public Transportation » Application of Power Electronics in Electric Railway and Related Public Transportation

[O4-11] Application of Power Electronics in Electric Railway and Related Public Transportation 1

Chairs: Takafumi Koseki (The University of Tokyo)

[O4-11-01]

Research on Retrofit of Flexible Traction Power Supply System Based on MMC Architecture

*Jinpeng ZHU¹, Xiaoqiong HE¹, Kun YANG¹, Chengxuan LI¹, Haocheng Sun¹ (1. Southwest Jiaotong University (China))

[O4-11-02]

Voltage Balance Control for Single-Phase Cascaded H-Bridge Rectifier Based on Improved FCS-MPC

*Jia Tang¹, Xiaoqiong He¹, Chengxuan Li¹, Zitong Huang¹ (1. Southwest Jiaotong University (China))

[O4-11-03]

Improved Coordinated Droop-Control Strategy for Flexible Traction Power Supply Systems

*Hongxin Peng¹, Xiaoqiong He¹, Chengxuan Li¹, Jinpeng Zhu¹ (1. Southwest Jiaotong University (China))

Technical Sessions: Oral Sessions 5

Tuesday, June 2 12:20 – 14:00

Online Session (Online)

[Oral] Power Electronics Applied to Home Appliance and V2X

[O5-1] Power Electronics Applied to Home Appliance and V2X

Chairs: Toshiyuki Zaitso (Rohm Co., Ltd.)

[O5-1-01]

Bi-Level ADMM Optimization Architecture for Energy Routers Based on Graph Theory

*Zhenshuo Ma¹, Zilong Wang¹, Yanjie Cui¹, Alian Chen¹ (1. Shandong University (China))

[O5-1-02]

A Bridge-Arm Reused Quasi-Single-Stage AC-DC Converter and Its Modulation Strategy

*Jinyu Li¹, Fei Liu¹, Xinbo Ruan¹ (1. Nanjing University of Aeronautics and Astronautics (China))

[O5-1-03]

Dynamic Analysis of PV Converters Considering Input Capacitance and Sampling Frequency

*Yifeng Han¹, Zhilei Yao¹ (1. Shanghai Maritime University (China))

[O5-1-04]

Two-stage Autonomous Thermal Anomaly Tracking for Lithium-Ion Energy Storage Systems with Vision Foundation Model

Huixin Xu¹, *Chaoyu Dong², Qian Xiao¹, Yu Jin¹, Lijun Deng³, Hongjie Jia¹ (1. Tianjin University (China), 2. Nanyang Technological University (Singapore), 3. Jiangxi Science and Technology Normal University (China))

[O13-5-01]

An Enhanced Physics-Informed Neural Network for Lithium-Ion Battery State-of-Health Prediction

*Beier Huang¹, Yu Zeng¹, Dehong Zhou¹, Chenyao Xu², Xiaozhou Han³, Zewei Shen¹, Jianxiao Zou¹, Josep Pou² (1. University of Electronic Science and Technology of China (China), 2. City University of Hong Kong (Hong Kong), 3. The Hong Kong Polytechnic University (Hong Kong))

Technical Sessions: Oral Sessions 6

Tuesday, June 2 14:20 – 16:00

Room 101A (1F)

[Oral] Motor Drive and Control

[O6-1] Controls and Drives of Electric Machines 1

Chairs: Hitoshi Haga (Shizuoka University)
Dong-Choon Lee (Yeungnam University)

[O6-1-01]

Hybrid Remote-State PWM for Zero-Sequence Current Suppression in Open-End Winding PMSM

*Gwangseop Lee¹, Minkyu Kim¹, Hojoong Kim¹, Taeyoung Chung², Honggeuk Park², Sanghun Han², Jaeho Hwang², Min Kim², Kibok Lee¹ (1. Korea University (Korea), 2. Hyundai Motor Company (Korea))

[O6-1-02]

Comparative Evaluation of IGBT and SiC AC–DC Converters for a SynRG Biogas Generator

*Azusa Takahashi^{1,2}, Tatsuya Higashi², Takeshi Serizawa², Junichi Asama³, Ryunosuke Hayashi¹, Wataru Kitagawa¹, Takaharu Takeshita¹ (1. Nagoya Institute of Technology (Japan), 2. Daihatsu Motor Co., Ltd. (Japan), 3. Shizuoka Univ. (Japan))

[O6-1-03]

Validation of instantaneous MPPT control for wind power generation using high-efficiency and high-gear-ratio gearbox

*Takahiro Kohri¹, Masato Koyama¹, Yasutaka Fujimoto², Hiroshi Matsuki³, Kenta Nagano⁴ (1. Mie University (Japan), 2. Yokohama National University (Japan), 3. Ashikaga University (Japan), 4. Tokyo University of Science (Japan))

[O6-1-04]

Design and Analysis of Modular Multilevel Converters for Wind Turbines with Trapezoidal EMF Profiles in MVDC Collector Systems

*Peizhou Xia¹, MJ Jansen¹, Paul Judge¹ (1. The University of Edinburgh (UK))

[O6-1-05]

Active Damping Control Utilizing Zero-Sequence Current in Three-Phase Electrolytic Capacitor-Less Dual Inverter

*Taiju Sakurai¹, Hitoshi Haga¹ (1. Shizuoka University (Japan))

Technical Sessions: Oral Sessions 6

Room 101B (1F)

[Oral] Semiconductor Power Conversion » Sophisticated Modulation, control and analysis

[O6-2] Advanced Control and Design of Multi-Cell and Multi-Port Power Converters

Chairs: Yu Chen, Liu (National Taipei University of Technology)

Masataka Ishihara (Okayama University)

[O6-2-01]

Sensor-less Voltage Balancing of Flying Capacitor Multi-Level Converters in Current Control Systems

*Asahi Mori¹, Kenji Natori¹, Yukihiko Sato¹ (1. Chiba University Department of Electrical and Electronics Engineering (Japan))

[O6-2-02]

A Time-Sharing Control for Multi-Active-Bridge Converters Enabling Advanced Modulations

*Martin Scohier¹, Olivier Deblecker¹, Bashir Bakhshideh Zad¹ (1. University of Mons (Belgium))

[O6-2-03]

Variable-Amplitude Modulation for Non-isolated MMC DC-DC Transformer with Light-load Efficiency Elevation

*Zhiqing Ren¹, Jianjun Ma¹, Runbo Chen¹, Wei Cheng², Dazhen Xu¹, Miao Zhu³ (1. College of Smart Energy, Shanghai Jiao Tong University Shanghai, Shanghai, China (China), 2. State Power Investment Corporation Limited (China), 3. School of Electronic Information and Electrical Engineering, Shanghai Jiao Tong University, Shanghai, China (China))

[O6-2-04]

Design Methodology for Minimization of Output Inductor and Precise Control in a Non-Isolated DC-DC Converter with Auxiliary H-Bridge Cells

*Yusuke Sato¹, Hidemine Obara¹, Noboru Shimosato², Jin Xu² (1. Yokohama National University (Japan), 2. Myway Corporation (Japan))

[O6-2-05]

Experimental Verification of a Circuit Design Method for Improving Frequency Characteristics of a ZETA Converter Based on Eliminating Right-Half-Plane Zero

*Keishi Takenaka¹, Iori Inui¹, Hiroshi Enokura¹, Taichi Kawakami¹, Takanori Isobe² (1. Osaka Metropolitan University College of Technology (Japan), 2. University of Tsukuba (Japan))

Technical Sessions: Oral Sessions 6

Room 101C (1F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O6-3] Modular Multilevel Converters

Chairs: Yu-Chen Su (National Tsing Hua University)
Wataru Kawamura (TMEIC Corporation)

[O6-3-01]

Four-Dimensional Trapezoidal Modulation for MMC-Based Push-Pull Inter-Line DC Power Flow Controller: Concept and Implementation

*Zhiqi Jin¹, Hongyi Zhang¹, Miao Zhu¹, Jin Xu², Pengfeng Lin¹ (1. Shanghai Jiao Tong University (China), 2. Myway Plus Corporation (Japan))

[O6-3-02]

SDBC-Based Unidirectional 3-Phase AC/DC Converters Using Square-Wave Zero-Sequence Voltage Control

*Atsuya Suzuki¹, Makoto Hagiwara² (1. Institute of Science Tokyo (Japan), 2. Hokkaido University (Japan))

[O6-3-03]

Experimental Verification of SDBC-Based DC/Three-Phase Converter Applying Virtual Inertia Control and Volt-Var Control

*Naoya Kashimura¹, Atsuya Suzuki¹, Makoto Hagiwara² (1. Institute of Science Tokyo (Japan), 2. Hokkaido University (Japan))

[O6-3-04]

Experimental Validation of Virtual Inertia Control Using Modular Multilevel Converters

*Masaya Shimizu¹, Kenichiro Sano¹ (1. Institute of Science Tokyo (Japan))

[O6-3-05]

Three-Phase AC–DC Single-Stage MMC Enabled by Bidirectional-Switch Based Submodules with Ultra-Low-Capacitance

*Philippe Adrien Gray¹, Khai Huynh¹, Flavio Alegretti Ramos¹, Phuc Luong¹ (1. University of Calgary (Canada))

Room 102 (1F)

[Oral] Industrial Instrumentation and Control

[O6-4] Industrial Instrumentation and Control 2

Chairs: Takenori Atsumi (Chiba Institute of Technology)
Jingxuan Wu (Aalborg University)

[O6-4-01]

Unlocking Embodied Probabilistic Computational Features in Motor Drives

*Subham Sahoo¹, Huai Wang¹, Frede Blaabjerg¹ (1. Aalborg University (Denmark))

[O6-4-02]

Quantized Probabilistic AI for Gear Fault Diagnosis in Motor Drives

*Subham Sahoo¹, Huai Wang¹, Frede Blaabjerg¹ (1. Aalborg University (Denmark))

[O6-4-03]

Sampled Current Offset Compensation in Remote-State PWM-Driven Torque Control System

*Yuto Kobayashi¹ (1. National Institute of Technology, Akita College (Japan))

[O6-4-04]

Design and Control of a Multi-Degree-of-Freedom Magnetically Levitated Planar Motor

*Keigo Nakata¹, Wataru Ohnishi¹, Takafumi Koseki¹, Yuichiro Nakamura², Kenji Takahashi², Hiroyuki Sekiguchi² (1. The University of Tokyo (Japan), 2. Mitsubishi Electric (Japan))

[O6-4-05]

Integration of Gaussian Process Regression and Iterative Learning Control for Scanning Stage with Iron-Core Linear Motors

*Reon Sasaki¹, Wataru Ohnishi¹, Pai-Hsueh Yang², Hounng-Joong Kim³, Koichi Sakata⁴, Takafumi Koseki¹ (1. The University of Tokyo (Japan), 2. Nikon Research Corporation of America (USA), 3. Koverly (Korea), 4. Nikon (Japan))

Technical Sessions: Oral Sessions 6

Room 107 (1F)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[O6-5] Non-Isolated DC-DC Converters

Chairs: ching-jan chen (National Taiwan University)
Kansuke Fujii (Fuji Electric)

[O6-5-01]

Precise output voltage trajectory tracking control for boost converters with variable current loads based on nonlinear noncausal stable inversion

*Wataru Ohnishi¹, Shota Miyoshi, Takafumi Koseki¹, Motoki Sato² (1. The University of Tokyo (Japan), 2. Toyo Denki Seizo K.K. (Japan))

[O6-5-02]

Three-Level Buck Converter With Moderate-Range Input Operation: Comparison of CRM and Fixed-Frequency Control

*Si-Yun Ding¹, Jhih-Cheng Hu¹, Xiang-Yu Xie¹, Chih-Chia Liao², Yu-En Li¹, Ming-Shi Huang¹ (1. National Taipei University of Technology(NTUT) (Taiwan), 2. Delta Electronics, Inc. (Taiwan))

[O6-5-03]

Compact Single-Turn Coupled Inductor for MHz-Range Buck Converters with Zero-Voltage Switching

*Adrian Keil¹, Gean Maia de Sousa², Vincent Lorentz^{3,1}, Thomas Heckel¹, Marcelo Lobo Heldwein² (1. Fraunhofer Institute for Integrated Systems and Device Technology IISB (Germany), 2. Technical University of Munich (Germany), 3. University of Bayreuth (Germany))

[O6-5-04]

High-Current 48-V Converter with Integrated Coupled Inductors for Extreme Power Density

*Jonas Brüsshaver Andresen¹, Michael Andersen¹, Ziwei Ouyang¹ (1. Technical University of Denmark (Denmark))

[O6-5-05]

A New Full-Bridge Buck-Boost Converter with Coupled-Inductor Inverter for EV Solar Roof Application

*Kahee Kim¹, Dongmin Choi¹, Seongjun Kim¹, Jaeil Baek¹, Gun-Woo Moon¹ (1. KAIST (Korea))

Room 108 (1F)

[Oral] Semiconductor Power Conversion

[O6-6] AC Grid-Tied Power Converters Promising Harmonics/EMC Reductions and Voltage Stabilizations

Chairs: Kazuto Takagi (GS Yuasa International Ltd.)
Hidemine Obara (Yokohama National University)

[O6-6-01] Invited Paper

Harmonic Generation and Assessment in Grid-Connected Inverter-Based Resources

*Naotaka Okada¹, Kentaro Fukushima¹, Hiro Nakayama¹ (1. Central Research Institute of Electric Power Industry (Japan))

[O6-6-02] Invited Paper

Control method for three-phase PWM inverters with common-mode voltage elimination

*Shinji Sato¹, Daiki Yamaguchi¹, Fumiki Kato¹ (1. National Institute of Advanced Industrial Science and Technology (AIST) (Japan))

[O6-6-03] Invited Paper

Analysis of Common-mode Voltage in Parallel Operation of Transformerless UPS

*Koji Kato¹, Hisakatsu Igarashi¹ (1. GS Yuasa International Ltd. (Japan))

[O6-6-04] Invited Paper

An Effect of Tri-Port Transformer on Line-Interactive UPS

Toshiro Hirose¹, *Kazuhide Domoto¹, Kei Egashira¹ (1. Nishimu Electronics Industries (Japan))

[O6-6-05] Invited Paper

Concept of Quasi-Grid-Forming Converter and Its Accurate Low-Frequency Oscillation Damping Using State-Feedback Control

*Yuxin Pu¹, Jia Liu¹, Canyu Li¹, Jinjun Liu¹ (1. Xi'an Jiaotong University (China))

Technical Sessions: Oral Sessions 6

Hall 1 (2F)

[Oral] Semiconductor Power Conversion

[O6-7] Power Conversion Technologies to Advance Green Transformation

Chairs: Satoshi Ikeda (Panasonic Corporation)

[O6-7-01] Invited Paper

Analysis of a Medium Voltage DC-DC Converter

*Uwe Drofenik¹, Bernhard Suppan¹ (1. TU Wien (Austria))

[O6-7-02] Invited Paper

Control of Grid-Forming HVDC Converters for Offshore Wind Application

*Jian Sun¹, Benjamin Lee¹ (1. Rensselaer Polytechnic Institute (USA))

[O6-7-03] Invited Paper

Effective Generated Power Control for a Hybrid Power Generation System of Solar Power Generation and Micro Wind Power Generation

Hiroki Ishikawa¹, *Irham Izzatur Rahman¹, Kazuma Yamawaki¹, Kouhei Budo¹ (1. Gifu University (Japan))

[O6-7-04] Invited Paper

Cooperative Control for Multiple VSM Inverters using Estimators to Compensate the Wireless Communication Time Delays

*Yushi Miura¹, Ryuta Waizumi¹ (1. Nagaoka University of Technology (Japan))

[O6-7-05] Invited Paper

Three-phase Inverter Based on Floating-Output Series Boost-Cells Operated with Multiple Sources for Renewable Energy Applications

*Masataka Minami¹, Haruki Inoue¹, Hinano Ushiba¹, Alberto Castellazzi² (1. Kindai University (Japan), 2. Kyoto University of Advanced Science (Japan))

Hall 2 (2F)

[Oral] Rotating Electrical Machine

[O6-8] Evaluation of Motor Life Cycle CO2 Emission

Chairs: Kensuke Sasaki (Nissan Motor)

[O6-8-01] Invited Paper

Evaluation of Motor Life Cycle CO2 Emission - Trends of Life Cycle Assessment -

Yoshihiro Miyama¹, *Yoshihiro Miyama², Shogo Miyazaki³ (1. Tohoku University (Japan), 2. Mitsubishi Electric Corporation (Japan), 3. Honda Motor Co., Ltd. (Japan))

[O6-8-02] Invited Paper

CO2 Emissions from the Manufacture of Motor Steel and Magnet Wire

*Kohei Aiso¹, Keiichi Tomizawa², Keiji Fukaura³ (1. Shibaura Institute of Technology (Japan), 2. Furukawa Electric Co., Ltd. (Japan), 3. Essex Solutions (Japan))

[O6-8-03] Invited Paper

Life Cycle Assessment of CO2 Emissions in Electric Machines: Materials and Manufacturing of Permanent Magnets, Aluminum, and Resins

Hiroya Sugimoto¹, Fumihiko Saito², Takashi Matsumoto³, Keiji Takizawa³, Tomohiro Iwasaki⁴, *Tomohira Takahashi⁵ (1. Tokyo Denki University (Japan), 2. Shin-Etsu Chemical Co., Ltd. (Japan), 3. TOYOTA MOTOR CORPORATION (Japan), 4. Sumitomo Bakelite Co., Ltd. (Japan), 5. Mitsubishi Electric Co. (Japan))

[O6-8-04] Invited Paper

CO2 Life Cycle Assessment of Electrical Machines

*Junichi Asama¹, Tomohira Takahashi², Kensuke Sasaki³, Shuhei Sakima⁴, Shojiro Naka⁵ (1. Shizuoka University (Japan), 2. Mitsubishi Electric Corporation (Japan), 3. Nissan Motor Co., Ltd. (Japan), 4. Yaskawa Electric Corporation (Japan), 5. Daikin Industries, Ltd. (Japan))

[O6-8-05] Invited Paper

CO2 Evaluation in Life Cycle Assessment of Electrical Machines

-Techniques for CO2 reduction-

*Kan Akatsu¹, Tomoyuki Okubo^{1,2}, Tomohiro Iwasaki³, Daichi Washio¹ (1. Yokohama National University (Japan), 2. JFE steel Corporation (Japan), 3. Sumitomo Bakelite Co., Ltd (Japan))

Technical Sessions: Oral Sessions 6

Hall 3 & 4 (2F)

[Oral] Motor Drive and Control

[O6-9] Enhanced Sensorless Drives with New Technology

Chairs: Kazuhiro Ohyama (Fukuoka Institute of Technology)

[O6-9-01] Invited Paper

The Investigation of Robustness against Motor Parameter Variations of Redefined Extended Electromotive Force on the VSD Coordinate for Dual Three-Phase Synchronous Motor

Shinji Doki¹, *Rongjiao HAO¹, Yugo Yoshida¹ (1. Nagoya University (Japan))

[O6-9-02] Invited Paper

Online Inductance Identification Without Signal Injection Using Oversampling for Sensorless Control of PMSMs

*Ryosuke Morita¹, Sari Maekawa¹, Takeshi Shibayama², Toshimitsu Aizawa² (1. Meiji University (Japan), 2. Toshiba Corporation (Japan))

[O6-9-03] Invited Paper

Torque and Current Control Systems for PMSM Drives in a Stator Flux-Linkage Synchronous Frame

*Yukinori Inoue¹, Masayuki Sanada¹ (1. Osaka Metropolitan Univ. (Japan))

[O6-9-04] Invited Paper

Experimental Results of Fast Startup Tuning with Motor Type Identification for IM and PM

*Yoshiyasu Takase^{1,2}, Kazuhiro Ohyama², Yasumasa Hamabe¹, Noor Aamir Baloch¹ (1. YASKAWA ELECTRIC CORPORATION (Japan), 2. Fukuoka Institute of Technology (Japan))

[O6-9-05] Invited Paper

Position Sensorless Control of Interior Permanent Magnet Synchronous Motors for Low-Speed Operation Based on Model Predictive Control

*Atsushi Matsumoto¹ (1. Chubu University (Japan))

Technical Sessions: Oral Sessions 6

Online Session (Online)

[Oral] Semiconductor Power Conversion » Emerging technologies in Packaging, thermal management, system integration and Reliability (Advanced fault protection systems, Diagnostics)

[O6-10] Semiconductor Power Conversion

Chairs: Tomoyuki Mannen (Utsunomiya University)

Wei Han (Hong Kong University of Science and Technology (Guangzhou))

[O6-10-01]

IGBT Junction Temperature Monitoring Under Practical Operating Conditions Considering Conduction Voltage Drop Variations

*Shuangzhe Chen¹, LeLe Wei¹, Dangsheng Zhou², Sufei Wang², Tianhao Wu², Ke Ma¹ (1. School of Electrical Engineering, Shanghai Jiao Tong University (China), 2. R&D Center Shenzhen Hopewind Electric Co., Ltd., Shenzhen (China))

[O6-10-02]

Hybrid Collaborative FCS-MPC Strategy for Junction Temperature Optimization of Power Switching Devices in MMC

*Chengxuan Li¹, Dong Wang¹, Xiaoqiong He¹, Hongxin Peng¹, Yuhao Hui¹ (1. Southwest Jiaotong University (China))

[O6-10-03]

An Optimized Update-Time Method for Mitigating Transient DC-Bias in Triple Active Bridge Converters

*Zitong Huang¹, Xiaoqiong He¹, Jia Tang¹ (1. Southwest Jiaotong University (China))

[O6-10-05]

Design, Packaging and Evaluation of a Si/SiC Hybrid Five-Level ANPC Power Module

*Ziyu Gu¹, Jupeng Pang¹, Chao Wang¹, Ruifeng Yue¹, Yan Wang¹, Kui Wang¹, Yongdong Li¹ (1. Tsinghua University (China))

[P1-1-10] Unified Soft-Switching Control for Bridgeless Buck PFC- EF_2 Class Resonant Single-Stage LED Driver

*Ramin Khalili¹, Tey Kok Soon¹, Saad Mekhilef^{2,3}, Marizan Mubin² (1. Department of Computer System & Technology, Faculty of Computer Science & Information Technology, University of Malaya, 50603, Kuala Lumpur, Malaysia. (Malaysia), 2. Power Electronics & Renewable Energy Research Laboratory (PEARL), Department of Electrical Engineering, Faculty of Engineering, University of Malaya, 50603, Kuala Lumpur, Malaysia. (Malaysia), 3. School of Engineering, Swinburne University of Technology, Hawthorn, VIC 3122, Australia. (Australia))

Technical Sessions: Oral Sessions 7

Tuesday, June 2 16:20 – 18:00

Room 101A (1F)

[Oral] Vehicle Electrification-related Technologies

[07-1] EV Chargers and Power Conversion

Chairs: Subrata Saha (aisin corporation)
Ryota Kondo (Mitsubishi Electric Corporation)

[07-1-01]

Input-Parallel Output-Parallel LLC Resonant Converter Design for 400V and 800V Charging Compatibility

*Yu Zuo¹, Qingcheng Sui¹, Bangli Du¹, Jiaze Kong¹, Yang Li¹, Hans Wouters¹, Diego Acevedo¹, Wilmar Martinez¹ (1. KU Leuven (Belgium))

[07-1-03]

Comprehensive Efficiency Evaluation of DC Electric Vehicle Charger

*Jeykishan Kumar K¹ (1. Central Power Research Institute (India))

[07-1-04]

An all-in-one magnetic integration for single-stage onboard charger

*Dinh Bao-Hung Nguyen¹, Ba Phu Do¹, Huu-Phuc Kieu², Sewan Choi¹ (1. Seoul National University of Science and Technology (Korea), 2. Van Lang University (Viet Nam))

[07-1-05]

Active Power Decoupling Using a Single Load-Side Inductor for Isolated AC-DC Converters in OBCs

*Yuki Yamaguchi¹, Masamichi Yamaguchi¹, Kodai Nishikawa¹, Hiroki Watanabe¹, Jun-ichi Itoh¹ (1. Nagaoka University of Technology(Japan))

Technical Sessions: Oral Sessions 7

Tuesday, June 2 16:20 – 18:00

Room 101B (1F)

[Oral] Semiconductor Power Conversion » Sophisticated Modulation, control and analysis

[07-2] System Identification, Synchronization, and Stability Analysis Methods

Chairs: Tomasz Pajchrowski (Poznan University of Technology)
Taichi Kawakami (Osaka Metropolitan University College of Technology)

[07-2-01]

Modeling and Analysis of Grid-Forming Wind Power Converter Under the LTP Framework

*Tianyu Jiang¹, Chen Zhang¹, Haoxiang Zong¹, Marta Molinas² (1. Shanghai Jiao Tong University (China), 2. Norwegian University of Science and Technology (Norway))

[07-2-02]

Enhanced Three-Phase Phase Lock Loop for Per-Phase Detection under Unbalanced Condition

*Bi Yu¹, Seong-Jong Kim¹, Hyun-Jun Choi¹, Sang-Heon Chae², Jung-Sik Choi² (1. Kumoh National Institute of Technology (Kit) (Korea), 2. Korea Electronics Technology Institute (Korea))

[07-2-03]

A Comparative Study of Passivity-Based Stability Analysis Methods for Grid-Connected Converters

*Tsai-Yen Hao¹, Yu-Chen Su¹ (1. National Tsing Hua University (Taiwan))

[07-2-04]

Improved Lyapunov-Hamiltonian Control Law Applied to Three-Phase AC/DC for Stabilizing AC/DC Grid Interconnection

Mickael Cotonnec¹, *Burin Yodwong², Pongsiri Mungporn², Serge Pierfederici¹, Phatiphat Thounthong² (1. Université de Lorraine (France), 2. King Mongkut's University of Technology North Bangkok (Thailand))

[07-2-05]

Uneven-Phase Quaternary Random Pulse Position Modulation with Inductor Current Ripple Suppression

Hung-Chi Chen¹, *HSIANG-KAI Wu¹ (1. National Yang Ming Chiao Tung University (NYCU) (Taiwan))

Technical Sessions: Oral Sessions 7

Room 101C (1F)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[O7-3] Multilevel Converters

Chairs: Behrooz Bahrani (Monash University)
Hitoshi Haga (Shizuoka University)

[O7-3-01]

Voltage Balancing Control of Input Capacitors in a Three-Level Buck/Boost Converter

*Moritz Bosch¹, Raffael Schwanninger², Martin März² (1. Fraunhofer Institute for Integrated Systems and Device Technology IISB (Germany), 2. Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany))

[O7-3-02]

A New Scalable Control Method for a DC-DC Converter Combining a Multilevel Converter and a Linear Circuit

*Ryoji Tsuruta¹, Takahiro Urakabe², Hideaki Fujita² (1. Mitsubishi Electric Corporation (Japan), 2. Institute of Science Tokyo (Japan))

[O7-3-03]

Experimental Investigation of a T-type Multi-level Linear Amplifier

*Tomohiko Igarashi^{1,2}, Hirohito Funato² (1. The Polytechnic University of Japan (Japan), 2. Utsunomiya University (Japan))

[O7-3-04]

Efficiency Improvement of Active-Clamped Linear Amplifier by Multi-stage

Shuto Yagawa¹, *Moeka Sasaki¹, Hirohito Funato¹ (1. Utsunomiya university (Japan))

[O7-3-05]

Control and Communication Network for a Three-Phase 13.8 kV Power Conditioning System Based on a Multilevel Flying-Capacitor Topology

Vladimir Mitrovic¹, Arthur Coimbra Mendes², Mingze Gao², David Nam², Rolando Burgos³, *Dushan Boroyevich³ (1. Research Associate (USA), 2. Student (USA), 3. Professor (USA))

Room 102 (1F)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[O7-4] Solid-State Transformers

Chairs: Uwe Drofenik (TU Wien)
Takanori Isobe (University of Tsukuba)

[O7-4-02]

System-Level Modeling of Single-Phase Solid-State Transformers for High-Speed, Resource-Efficient FPGA-Based Real-Time Simulation

*Deokyong Woo¹, Sungmin Kim¹ (1. Hanyang University ERICA Campus (Korea))

[O7-4-03]

Circulating Current Mitigation in Capacitively Coupled DC/DC Converters of Solid-State Transformers

*Daniel Neuner¹, Michael Hartmann¹ (1. Graz University of Technology (Austria))

[O7-4-04]

An Overload-Capability-Enhanced SPS-VF Control for DAB Converters in SST Application

*Weidong Qie¹, Linxiao Gong¹, Mulinsen Zhang¹, Lingfeng Jiang¹, Ming Liu¹, Yong Wang¹ (1. Shanghai Jiao Tong University (China))

[O7-4-05]

A Novel Single-Stage Isolated Three-Phase-HF-Link Matrix-Type Three-Phase Cycloconverter (i3X-CCV)

*Yifan Zhao¹, Isabelle Tung¹, Daifei Zhang¹ (1. University of Toronto (Canada))

Technical Sessions: Oral Sessions 7

Room 103 (1F)

[Oral] Industrial Instrumentation and Control

[O7-5] Industrial Instrumentation and Control 3

Chairs: Jun ISHIKAWA (Tokyo Denki University)
Youssef Fassi (CEA)

[O7-5-01]

Electromagnetic Measurement Based Defect Detection of Metal Pipes Using Machine Learning

*Seiya Hiroki^{1,2}, Kuniyuki Motojima¹ (1. Gunma University (Japan), 2. YOKOWO Co., Ltd. (Japan))

[O7-5-02]

Feature-Enhanced Sensorless Metallic Object Detection in Wireless Power Transfer Systems Using Machine Learning

*Dat Khanh Nguyen¹, YEN-CHI PAN¹, YING-SHAN KE¹, KUN-CHE HO¹ (1. National Formosa University (Taiwan))

[O7-5-03]

Aging-aware Home Energy Management System under Probabilistic Forecasts

*Dario Slaifstein¹, Jhon Jairo Quiñones Cortes¹, Laura Ramírez-Elizondo¹, Mathijs de Weerd¹, Pavol Bauer¹ (1. Delft University of Technology (Netherlands))

[O7-5-04]

An Adaptive Fisher Discriminant Analysis Framework for Intelligent Fault Detection in Overhead AC Transmission Networks

Mohamed Mostafa Ahmed¹, Faizan Mustafa², Mohamed Abdel-fattah¹, Muhammad Khalid^{3,4}, *Ijaz Ahmed³, A. M. Hamada⁵ (1. Faculty of Technology and Education, Helwan university (Egypt), 2. Pakistan Institute of Engineering and Applied Sciences (Pakistan), 3. Interdisciplinary Research Center for Sustainable Energy Systems (IRC-SES), King Fahd University of Petroleum and Minerals (Saudi Arabia), 4. Electrical Engineering Department, (KFUPM) (Saudi Arabia), 5. Faculty of Industrial and Energy Technology, Borg Al Arab Technological University (Egypt))

[O7-5-05]

Noncausal State Estimation for Iterative Learning Control

*Kentaro Tsurumoto¹, Wataru Ohnishi¹, Takafumi Koseki¹, Nard Srijbosch², Tom Oomen² (1. The University of Tokyo (Japan), 2. Eindhoven University of Technology (Netherlands))

Technical Sessions: Oral Sessions 7

Room 107 (1F)

[Oral] Rotating Electrical Machine

[O7-6] Induction and Reluctance Motors

Chairs: David Gerada (University of Nottingham, UK)
Kyohei Kiyota (Institute of Science Tokyo)

[O7-6-01]

A Study on Optimization of Rotor Ventilation Hole Shape in Induction Motor using Genetic Algorithms

*Shigekazu Sakabe¹, Tsuyoshi Funaki¹, Masahiko Miwa², Masatsugu Oyamada³ (1. Osaka-Univ. (Japan), 2. JSOL (Japan), 3. TMEIC (Japan))

[O7-6-02]

Hybrid Inverse Design for Reducing Stray Load Losses in Induction Motors via Machine Learning

*Masatsugu Oyamada¹, Sunao Wakasugi¹, Sadaaki Kunimatsu², Ikuro Mizumoto² (1. TMEIC Corporation (Japan), 2. Kumamoto University (Japan))

[O7-6-03]

Loss evaluation of the High-speed solid rotor induction motor with grooves

*Kosei Kiyoura¹, Tadahiro Matsumoto¹, Sho Uchiyama¹, Takashi Okitsu¹, Takayuki Mizuno¹ (1. Meidensha Corporation (Japan))

[O7-6-04]

Stability Enhancement of Compensated V/f Induction Motor Drive Using Active Damping

*Dongyeob Han¹, Sungmin Kim¹ (1. Hanyang University (Korea))

[O7-6-05]

Overload Operation Capability of Synchronous Reluctance Motors

*Nicola Bianchi¹, Lino Di Leonardo¹, Ludovico Ortombina¹, Wen Soong² (1. University of Padova (Italy), 2. Adelaide University (Australia))

Technical Sessions: Oral Sessions 7

Room 108 (1F)

[Oral] Power Electronics Applied to Home Appliance and V2X

[07-7] Next-generation power electronics and data science applications in home and consumer appliances

Chairs: Hideki Omori

[07-7-01] Invited Paper

Control of the LLC Converter with Wide Load Range

*Xin Wu¹, Haoxiang Wang¹, Haihong Long¹, Wenxin Wang¹, Dehong Xu¹ (1. Zhejiang University (China))

[07-7-02] Invited Paper

Analysis of Single-Stage Isolated Three-Phase Power Factor Corrector

*Yun Yen Chen¹, Chun Ming Tsai¹, Yu Chen Chang¹, Huang Jen Chiu¹ (1. TAIWAN TECH (Taiwan))

[07-7-03] Invited Paper

Light-Load Efficiency Enhancement of a Two-Phase Interleaved Flyback Converter with Hybrid Buffer for 54 V DC Distribution

Ching-Ming Lai¹, *Chuan-Min Ke¹, Syuan-Ming Liou¹, Tomokazu Mishima² (1. National Chung Hsing University (Taiwan), 2. Yamaguchi University (Japan))

[07-7-04] Invited Paper

Recent Advances in Air Conditioning Power Electronics and a Preliminary Study Using Artificial Intelligence and Data Science

*Haruka Matsuo¹, Masafumi Jochi², Koichi Arisawa¹ (1. Living Environment Systems Laboratory, Mitsubishi Electric Corporation (Japan), 2. Power Device Works, Mitsubishi Electric Corporation (Japan))

[07-7-05] Invited Paper

Split-Phase Energy Management System using Low Voltage GaN Devices

*Pelle Weiler¹, Toshiyuki Fujita¹, Hiroshi Fujimoto¹, Takayuki Miyajima², Yoshiki Yasuda², Akio Yamagiwa² (1. The University of Tokyo (Japan), 2. Daikin Industries, Ltd. (Japan))

[07-7-06] Invited Paper

Investigation of enhancing household energy efficiency through time-shifting of heat pump water heaters in DC power supply systems

*Keito Yokomichi¹, Atsushi Morimoto¹, Yoshiki Yasuda¹, Akio Yamagiwa¹, Yumiko Iwafune², Toshiyuki Fujita³, Hiroshi Fujimoto³ (1. Daikin Industries, Ltd. (Japan), 2. Institute of Industrial Science, The University of Tokyo (Japan), 3. Graduate School of Frontier Sciences, The University of Tokyo (Japan))

Technical Sessions: Oral Sessions 7

Hall 1 (2F)

[Oral] Semiconductor Power Conversion

[O7-8] EMI Reduction and Reliability in Next-Generation Power Electronics

Chairs: Katsuya Nomura (Kwansei Gakuin University)

[O7-8-01] Invited Paper

A study on smoothing and DC-link capacitor layout for EMI mitigation design of SiC power module

*Takaaki Ibuchi¹, Tsuyoshi Funaki¹ (1. Univ. of Osaka (Japan))

[O7-8-02] Invited Paper

Noise Feedback Mechanisms Causing Turn-Off Switching Instability for Next-Generation Power Devices Packaged in Power Module

*Hiroto Sakai^{1,2}, Kotaro Kobashi¹, Masataka Ishihara², Kazuhiro Umetani³, Eiji Hiraki² (1. ROHM Co., Ltd. (Japan), 2. Okayama Univ. (Japan), 3. Kyushu Univ. (Japan))

[O7-8-03] Invited Paper

Passive Cancellation for Reduction of Input and Output Side Common-Mode Noise in Three-Phase PWM Inverters

*Shotaro Takahashi¹, Yuta Miwa², Masashi Kato² (1. Nagoya Institute of Technology (Japan), 2. Akita University (Japan))

[O7-8-04] Invited Paper

Active and Integrated Approaches for High-Density EM Noise Mitigation in Power Electronics Converters

*Fang Luo¹, Ali Anwar¹, Masayaki Hijikata¹, Yuxuan Wu¹ (1. Stony Brook University (USA))

[O7-8-05] Invited Paper

Thermomechanical Stress Analysis of Planar Coils with Ceramics and FR4 Substrates

*Masaki Takahashi¹, Shaokang Luan¹, Zhongchao Sun¹, Ariya Sangwongwanich¹, Hongbo Zhao¹ (1. AAU Energy, Aalborg University (Denmark))

Hall 2 (2F)

[Oral] Semiconductor Power Conversion

[O7-9] Power Semiconductors

Chairs: Shiori Idaka (Mitsubishi Electric Europe B.V.)

[O7-9-01] Invited Paper

SiC Device Technology: Past, Present, and Future

*Alan Mantooth¹, Zhong Chen¹, Thomas White¹ (1. University of Arkansas (USA))

[O7-9-02] Invited Paper

Testing Automotive Power Modules according to AQG 324

*Markus Thoben¹, Peter Dietrich², Gabor Farkas³, Thomas Harder⁴, Frank Heidemann⁵, Waldemar Jakobi⁶, Martin Rittner⁷, Stefan Schmitt⁸, Oliver Senftleben⁹, Stefan Thiemann¹⁰, Marc Tüllmann⁶ (1. FH Dortmund (Germany), 2. Richardson RFPD (Germany), 3. Siemens Digital Industries (Hungary), 4. ECPE European Center for Power Electronics (Germany), 5. NI / Emerson T&M (Germany), 6. Infineon Technologies (Germany), 7. Robert Bosch (Germany), 8. Semikron Danfoss (Germany), 9. BMW AG (Germany), 10. Valeo (Germany))

[O7-9-03] Invited Paper

Adjustable Hybrid Switch Converter for EV and PV Applications

Tanya Thekemuriyil¹, Jaspera Rohner¹, Munaf Rahimo², Silvia Mastellone¹, Thiago Batista Soeiro³, *Renato Minamisawa¹ (1. University of Applied Sciences and Arts of Northwestern Switzerland (Switzerland), 2. MTAL GmbH (Switzerland), 3. University of Twente (Netherlands))

[O7-9-04] Invited Paper

Next-Generation Power Devices: Emerging Materials, Architectures, and Applications (Invited)

*Yuhao Zhang¹, Xin Yang¹, Zineng Yang¹, Hehe Gong¹ (1. The University of Hong Kong (Hong Kong))

Technical Sessions: Oral Sessions 7

Hall 3 & 4 (2F)

[Oral] Semiconductor Power Conversion

[07-10] Emerging Power Conversion Technologies and Applications

Chairs: Sen-Tung Wu (National Taiwan University of Science and Technology)

[07-10-01] Invited Paper

Analysis and Design of Current-Fed Dual Active Bridge Converter

*Wei Yu Chen¹, Yun Yen Chen¹, Yu Chen Chang¹, Huang Jen CHANG Chiu¹ (1. TAIWAN TECH (Taiwan))

[07-10-02] Invited Paper

Three-Level Half-Bridge Series-Series Resonant Converter for Solid-State Transformer System in Microgrid Applications

*Laskar Pamungkas¹, Yu-Chen Chang², Wei-Yang Du², Huang-Jen Chiu² (1. Enercentrik Tech. Co., Ltd. (Taiwan), 2. National Taiwan University of Science and Technology (Taiwan))

[07-10-03] Invited Paper

Design of a High-Capacity Inductor Evaluation Inverter Using an LCCL Resonant Circuit

*Kaiki Ueda¹, Ryosuke Ota¹, Keiji Wada¹ (1. Tokyo Metropolitan University (Japan))

[07-10-04] Invited Paper

Transient Response Optimization Techniques for Digital Buck Converter

Yi-Feng Lin¹, *Zi-Xian Yang¹, Ciao-Yi Lin¹ (1. National Ilan University (Taiwan))

[07-10-05] Invited Paper

Development of a Low Voltage Stress 800V Electric Vehicle Charger

*Zhan-Qing Qiu¹, Yao-Hui Xu², Sen-Tung Wu¹ (1. National Taiwan University of Science and Technology (Taiwan), 2. National Formosa University (Taiwan))

Online Session (Online)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[07-11] Semiconductor Power Conversion

Chairs: Satoshi Ikeda (Panasonic Corporation)
Zhenbin Zhang (Shandong Uni. & TU-Munich)

[07-11-01]

A Dual-mode Modulation Strategy for Integrated LLC-Buck-Boost Converter with High Power Efficiency

*Hengkai Dang¹, Sixing Du¹, Jinjun Liu¹ (1. Xi'an Jiaotong University (China))

[07-11-02]

Design of High-Frequency Magnetically Integrated Transformer for LLC Resonant Converter

*Ximo Wang¹, Zilong Li², Jing Sheng³, Yu Dou¹, Nihan Tong³, Chushan Li^{1,3} (1. ZJU-UIUC Institute, Zhejiang University (China), 2. Hebei Key Laboratory of Equipment and Technology Demonstration of Flexible DC Transmission, Hebei University of Technology (China), 3. College of Electrical Engineering, Zhejiang University (China))

[07-11-03]

Isolated ZVS Buck-Boost Converter Suitable for Wide Input or Output Voltage Ranges

*Lingxuan Xiao¹, Xinbo Ruan¹ (1. Nanjing University of Aeronautics and Astronautics Nanjing, China (China))

[07-11-04]

A Parallel Resonant Soft-Switching Power Amplifier for Active Magnetic Bearing

*Cai Li¹, Miaomiao Cheng¹ (1. College of Electrical and Information Engineering, Hunan University (China))

[01-6-01]

A Hybrid Modulation for Three-Phase LLC Converter With Enhanced Efficiency Over Wide Voltage Range

*Ning Guo¹, Jinjun Liu¹, Sixing Du¹, Zhifeng Deng¹, Hengkai Dang¹ (1. School of Electrical Engineering, Xi'an Jiaotong University (China))

[P1-12-10] Power-Flow-Path-Constructed Topology Derivation Method for Multiport Inverters

*Chuanjing Chen¹, Dehong Zhou¹, Kai Liao¹, Yu Zeng¹, Xin Liu¹, Zewei Shen¹, Jianxiao Zou¹ (1. University of Electronic Science and Technology of China (China))

Technical Sessions: Oral Sessions 8

Wednesday, June 3 10:45 – 12:05

Room 101A (1F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O8-1] Grid-Forming Converters Control Principles and Stability

Chairs: Georgios Konstantinou (UNSW Sydney)
Hiroaki Kakigano (Ritsumeikan University)

[O8-1-01]

An Enhanced Dispatchable Virtual Oscillator Control With Explicit Large-Signal Stability Boundary

*Zheran Zeng¹, Dongsheng Yang¹ (1. Eindhoven University of Technology (Netherlands))

[O8-1-02]

Impact of Virtual Impedance Position on the Transient Stability of Dual-Loop Grid-Forming Converters

*zhenzhen xie¹, Chuanxu Zhang², Chao Wu¹, Yong Wang¹ (1. Shanghai Jiao Tong University (China), 2. Shanghai University of Electric Power (China))

[O8-1-03]

High-Frequency Passivity Analysis of Virtual Admittance-Based Dual-Loop Grid-Forming Converters

*STEPHEN ARINZE OBI¹, JAE-JUNG JUNG¹ (1. Kyungpook National Univ. (Korea))

[O8-1-04]

Performance Comparison of Grid-Forming/Grid-Following IBRs Using Large Signal Stability Analysis Methods

*Takuro Umihara¹, Guoqing Gao¹, Frede Blaabjerg¹ (1. Aalborg University (Denmark))

Room 101B (1F)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[O8-2] Switched Capacitor DC-DC Converters

Chairs: Younghoon Cho (Konkuk University)
Keisuke Kusaka (Nagaoka University of Technology)

[O8-2-01]

Experimental Verification of a Modified Series-Parallel Switched-Capacitor Converter Intended for High-Voltage Input and Low-Power DC Supply

*Wataru Kawamura¹, Takuya Yokoyama¹, Hiroshi Mochikawa², Koji Maki² (1. TMEIC Corporation (Japan), 2. Toshiba Corporation (Japan))

[O8-2-02]

Automatic Current Sharing of Two-Phase Series Capacitor Always-Dual-Path Hybrid DC-DC Converter Based on Interleaved Operation

*Ryota Onuma¹, Katsuhiro Hata¹, Sho Kobayashi¹ (1. Shibaura Institute of Technology (Japan))

[O8-2-03]

Experimental Verification of Two-Phase Series Capacitor Always-Dual-Path Hybrid DC-DC Converter with Fixed Duty Cycle Suitable for High Step-Down Ratio and Large Output Current

*Sho Kobayashi¹, Ryota Onuma, Katsuhiro Hata (1. Shibaura Institute of Technology (Japan))

[O8-2-04]

Analysis and Digital Implementation of Current-Mode Control for a Hybrid Switched-Capacitor Converter for Datacenter

Yu-Rong Wu¹, *Kai-Yu Huang¹, Ching-Jan Chen¹, Yi-Rong Huang², Kuo-Chi Liu³, Yi-Min Shiu³, Shih-Hao Kuo³ (1. National Taiwan University (Taiwan), 2. National Taiwan University of Science and Technology (Taiwan), 3. Richtek Technology (Taiwan))

Technical Sessions: Oral Sessions 8

Room 101C (1F)

[Oral] Vehicle Electrification-related Technologies

[O8-3] Design and Control of Automotive Inverters

Chairs: Ariya Sangwongwanich (Aalborg University)
Yuki Hidaka (Ritsumeikan University)

[O8-3-02]

Enhancing the Lifetime of Electric Semi-Truck Drive Inverters through Adaptive Switching

Md Tariquzzaman¹, *Yue Cao¹ (1. Oregon State University (USA))

[O8-3-03]

An Integrated On-Board Charger Configuration with a Dual Two-Level Inverter Open-End Winding Motor for Common-Mode Voltage Elimination

Yuttana Kumsuwan¹, *Thidarat Thanakam¹ (1. Chiang Mai University (Thailand))

[O8-3-04]

Hybrid Framework for Efficient Space-Vector Modulation of Three-Level Traction Inverters

*Alexander Pavlenko^{1,2}, Marcelo Lobo Heldwein¹ (1. Technical University of Munich (Germany), 2. Audi AG (Germany))

Room 102 (1F)

[Oral] Motor Drive and Control

[O8-4] Controls and Drives of Electric Machines 2

Chairs: Tetsuya Kojima
Ming-Yen Wei (Department of Electrical Engineering, National Formosa University, Taiwan)

[O8-4-01]

Unified Control Framework for a uniCSC-Based Variable Reluctance Machine Drive System

David Sirianni¹, *takanobu Ohno^{1,2}, Matthias Reiser¹, Spasoje Miric^{1,2} (1. University of Innsbruck (Austria), 2. TU Wien (Austria))

[O8-4-02]

Asymptotic Tracking of Multi-Frequency Currents for Switched Reluctance Motors Using a Multiple Synchronous Rotating Frame Approach

*Shou Qiu¹, Fabio Muhammad Rizal¹, Kyohei Kiyota¹ (1. Institute of Science Tokyo (Japan))

[O8-4-03]

Post-Fault Control Strategy of Open-Winding Machines Under Inverter Open-Circuit Fault With Torque Ripple Reduction

*ABD ALRAHMAN DAWARA¹, Annette Muetze (1. Graz University of Technology (Austria))

[O8-4-04]

Required Current Control Bandwidth and Allowable Voltage-Detection Delay for DSP-Based Current-Source-Type Electric Motor Emulator

*Gensui Tanaka¹, Hiroki Watanabe¹, Junichi Itoh¹ (1. Nagaoka University of Technology (Japan))

Technical Sessions: Oral Sessions 8

Room 103 (1F)

[Oral] Power Electronics Applied to Home Appliance and V2X

[O8-5] Power Electronics Applied to Home and V2X 1

Chairs: Yasuhito Takahashi (Doshisha University)
Drazen Dujic (Power Electronics Laboratory, EPFL)

[O8-5-01]

Efficiency-Oriented Design of LLC Resonant Converters Using Time-Domain Analysis and Particle Swarm Optimization

*Bing-Hong Su², Che-Wei Hsu¹, Chyi-Jiunn Lee¹, Yu-Shan Cheng⁴, Zong-Zhen Yang², Yi-Feng Luo³, Yi-Hua Liu¹ (1. Department of Electrical Engineering, National Taiwan University of Science and Technology (Taiwan), 2. Graduate Institute of Energy and Sustainability Technology, National Taiwan University of Science and Technology (Taiwan), 3. Graduate Institute of A.I. Cross-disciplinary Technology, National Taiwan University of Science and Technology (Taiwan), 4. Department of Electrical Engineering, National Taiwan Ocean University (Taiwan))

[O8-5-02]

Development of Low Leakage Inductance Transformer Using Multilayer Flexible Printed Circuit Folding Coil

*Naoki Takagi^{1,2,3}, Tsutomu Hamada³, Kuniaki Hattori³, Tetsuo Endoh^{1,2}, Yoshikazu Takahashi¹ (1. Center for Innovative Integrated Electronic Systems, TOHOKU UNIVERSITY (Japan), 2. School of Engineering, TOHOKU UNIVERSITY (Japan), 3. Tamura Corporation (Japan))

[O8-5-03]

A Three-Level LLC Resonant Converter Integrated With An Interleaved Buck Converter For Photovoltaic Energy Storage Combined Systems

*Po Chen Liu¹, Bo Fong Xie¹, Wei Tong Shi¹, Cheng Chi Yu¹, Ching Chun Chuan¹ (1. National Kaohsiung University of Science and Technology (Taiwan))

[O8-5-04]

ZVS-Enhanced Design of a Single-Stage DAB Microinverter Using Dual Inductors Based on Bidirectional-GaN devices

*Wenhao Wu¹, Yuxuan Li¹, Mingzhi Nie¹, Wen Yuan², Xuebei Ren², Junzhong Xu¹, Yong Wang¹ (1. Shanghai Jiao Tong University (China), 2. Xiaomi Corporation (China))

Room 107 (1F)

[Oral] Application of Power Electronics in Electric Railway and Related Public Transportation

[O8-6] Application of Power Electronics in Electric Railway and Related Public Transportation 2

Chairs: Hiroyasu Kobayashi (Chiba University)
Ibrahim Diab (Delft University of Technology (TU Delft))

[O8-6-01]

Transient Characteristics and Traction System Performance of Series Resonant Permanent Magnet Synchronous Generator Systems During Railway Vehicle Traction

*Kenshin Murashima¹, Keiichiro Kondo¹, Minoru Kondo² (1. Waseda University (Japan), 2. Railway Technical Research Institute (Japan))

[O8-6-02]

Proposal of Braking Method for Reducing Mechanical Brake Loss Using a Train Automatic Stop-Position Controller in DC Electric Railways

*Yuji Kagaya¹, Keiichiro Kondo¹, Hiroyasu Kobayashi², Toshiya Ando³, Toshio Hosaka³, Takumi Nagashima³ (1. Waseda University (Japan), 2. Chiba University (Japan), 3. Odakyu Electric Railway Co. (Japan))

[O8-6-03]

Verification Test for Electric Power Coordination Control System Incorporating Onboard Energy Storage System

*Takeshi Konishi¹, Yoshiaki Taguchi¹, Aruto Watanabe¹ (1. Railway Technical Research Institute (Japan))

[O8-6-04]

Analysis of Error in Modeling Traction Vehicles as Current Sources in Power Flow Simulations

*Yiannis Tsitouridis¹, Ibrahim Diab¹, Pavol Bauer¹ (1. TU Delft (Netherlands))

Technical Sessions: Oral Sessions 8

Room 108 (1F)

[Oral] Motor Drive and Control

[O8-7] Bearingless Machines and Drives 2

Chairs: Minkyun Noh (Korea Advanced Institute of Science and Technology, Korea)
Wolfgang Gruber (Johannes Kepler University, Austria)

[O8-7-01] Invited Paper

Performance Enhancement of Miniature Twin ps = 1 Bearingless Motors for RVAD and Fontan Circulation Assist Devices

Eric Severson¹, *Takahiro Noguchi¹, Pranava Sinha², William Smith³ (1. University of Minnesota (USA), 2. Department of Surgery, University of Minnesota (USA), 3. Perfusion Solution Inc. (USA))

[O8-7-02] Invited Paper

Review on True Sensorless Control of Bearingless Motors with High Frequency Signal Injection

Zeqiang He¹, Zhengzhang Yan¹, Zikai Yang¹, *Jiahao Chen¹ (1. ShanghaiTech University (China))

[O8-7-03] Invited Paper

Investigation of Unbalanced Magnetic Pull Torque in Axial-Flux Bearingless Motor Using Unequal-Tooth-Pitch Stator

*Junichi Asama¹, Tomoki Sugita¹, Nobuyuki Kurita² (1. Shizuoka University (Japan), 2. Baylor College of Medicine (USA))

[O8-7-04] Invited Paper

Force and Torque Generation Mechanism of Bearingless Split Teeth Flux Reversal Motor

*Krishan Kant¹, David Trumper² (1. IIT Delhi (India), 2. MIT (USA))

Online Session (Online)

[Oral] Semiconductor Power Conversion » Sophisticated Modulation, control and analysis

[O8-8] Semiconductor Power Conversion

Chairs: Hongyi Zhang (Shanghai Jiao Tong University)
kenichi sakimoto (Kawasaki Heavy Industries, Ltd.)

[O8-8-01]

GaN-Based High-Frequency Inverter with Load-Independent Resonant Filter for Wide-Range Time-Varying Loads in Electrosurgery

*Xinchun Feng¹, Ziyue Guo¹, Feishuang Sun¹, Yu Dou¹, Chushan Li¹, Wuhua Li¹ (1. Zhejiang University (China))

[O8-8-02]

Characterization and Modeling of Nonlinear Transistor Output Impedance for Very High Frequency Converters

*Sixue Li¹, Matthieu Beley², Loris Pace², Arthur Perodou², Fan Zhang¹ (1. State Key Laboratory of Electrical Insulation and Power Equipment (China), 2. Ecole Centrale Lyon, INSA Lyon, Univ. Claude Bernard Lyon 1, Ampère CNRS UMR 5005 (France))

[O8-8-03]

Efficient Electromagnetic Parameter Evaluation for High-Frequency Transformers Using MATLAB-COMSOL Collaboration

*Zilong Li^{1,2}, Chushan Li^{3,4}, Yu Dou⁴, Rui Lu³, Ximo Wang⁴, Yongjian Li^{1,2}, Wuhua Li³ (1. State Key Laboratory of Intelligent Power Distribution Equipment and System, Hebei University of Technology (China), 2. Hebei Key Laboratory of Equipment and Technology Demonstration of Flexible DC Transmission, Hebei University of Technology (China), 3. College of Electrical Engineering, Zhejiang University (China), 4. Zhejiang University–University of Illinois at Urbana-Champaign Institute, Zhejiang University (China))

[O8-8-04]

Double Open Circuit Faults and Power Flow Analysis for Triple-Active-Bridge Converter with Tolerant Strategy

*Zetong Li¹, Qinglei Bu¹, Guanying Chu¹, Xu Han², Xue Wang² (1. Xi'an Jiaotong-Liverpool Univ. (China), 2. Suzhou City Univ. (China))

Technical Sessions: Oral Sessions 9

Wednesday, June 3 12:20 – 14:00

Online Session (Online)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[O9-1] Semiconductor Power Conversion

Chairs: Ching-Chun Chuang (National Kaohsiung University of Science and Technology)
Yoshiya Ohnuma (Nagaoka Power Electronics)

[O9-1-01]

An MTOGI-Based Parallel Control with DC-Offset Rejection for Multi-Harmonic Voltage Emulation in Single-Phase DC-AC Inverters

Haoming Chen¹, Heng Guo¹, Junhui Luo¹, Wenlong Ding¹, *Bin Duan¹, Chenghui Zhang¹ (1. Shandong Univ. (China))

[O9-1-02]

Dead-Time Effect Mitigation Strategy for TCM-Based Grid-Tied Microinverter With Hysteresis Current Control

*Jiaxiong Xu¹, Jiawei Zhang¹, Miao Yu¹ (1. Zhejiang University (China))

[O9-1-03]

P/Q- ω /E Admittance Modeling of Multi-GFM Microgrid System Considering Power Coupling and Analysis of Power Response Characteristics

*Yilin Yin¹, Wanjun Lei¹, Weiqi Zhu¹, Haonan Teng¹, Ziyue Wang² (1. Xi'an Jiaotong University (China), 2. State Grid Beijing Urban District Power Supply Company (China))

[O9-1-04]

Dual Time-Scale Coordinated Harmonic Mitigation Strategy for Distribution Networks with High Penetration of Power Electronics

*Xiaoqing Yin¹, Hao Yi¹, Zebin Yang¹, Zhenxiong Wang¹, Yao Zhang¹ (1. Xi'an Jiaotong University (China))

[O9-1-05]

Predictive Fault-Tolerant Control Strategy for Multi-phase Interleaved Parallel DC-DC Converter

*Zhenning Hou¹, Zhiyao Lu¹, Chang Li¹, Yilan Xue¹, Zefan Yang¹, Weilin Li¹, Wenjie Liu¹ (1. Northwestern Polytechnical University (China))

Technical Sessions: Oral Sessions 10

Wednesday, June 3 14:20 – 16:00

Room 101A (1F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O10-1] Grid-Forming Converters Fault Ride Through and Grid Support

Chairs: Jae-Jung JUNG (Kyungpook National University)
Kenichiro Sano (Institute of Science Tokyo)

[O10-1-01]

Energization of Power Transformer from Low Power Rating Grid-Forming VSI under Black Start Scenario

*Dev Kumar Manhar¹, Ayush Bhatia¹, Avanish Tripathi⁶, Rabindra Mohanty², Sunil Kumar Aharwal³, Purn Prakash Chand⁴, Rahul Negi⁵ (1. Indian Institute of Technology Delhi (India), 2. Indian Institute of Technology Delhi (India), 3. NRLDC, Grid-India (India), 4. NRLDC, Grid-India (India), 5. NRLDC, Grid-India (India), 6. Indian Institute of Technology Delhi (India))

[O10-1-02]

Overcurrent-Limiting Control Method for Grid-Forming Inverters Based on Seamless Transition to GFL Mode

*Hojun Lee¹, Eunsoo Lee¹, Hyunjun Kim², Eunsuk Shin² (1. Department of Electrical Engineering, Hanyang University (Korea), 2. ZetaElec Co., Ltd (Korea))

[O10-1-03]

An Implementation of Current-Limiting Scheme on 60 kVA Three-Phase Four-Wire Grid-Forming Inverter Using Dynamic Virtual Impedance

*Preenapan Panya¹, Surapong Suwankawin¹ (1. Chulalongkorn University (Thailand))

[O10-1-04]

Negative Sequence Injection during Ride-Through in Grid Forming Inverters

Ruben Alexis Inzunza¹, *Daisuke Kanda¹ (1. TMEIC (Japan))

[O10-1-05]

Study and Implementation of a Three-Phase Three-Level Neutral-Point Clamped Inverter with Virtual Inertia Characteristics

Hsiang-Chun Cheng¹, Tsorng-Juu Liang¹, Kai-Hui Chen¹, Wen-Chung Chen¹, *Yi-Shin Chen¹, Ching-Feng Liu¹ (1. National Cheng Kung University (Taiwan))

Technical Sessions: Oral Sessions 10

Room 101B (1F)

[Oral] Motor Drive and Control

[O10-2] Controls and Drives of Electric Machines 3

Chairs: Tetsuji Daido (Nagasaki University)
Ki-Bum Park (KAIST)

[O10-2-01]

Voltage Phase Control Characteristics of Square-Wave-Driven PMASynRM Considering Cross-Saturation

*Soichiro Bunno¹, Masayuki Sanada¹, Yukinori Inoue¹, Makoto Yoshida² (1. Osaka Metropolitan University (Japan), 2. SMAC (Japan))

[O10-2-02]

Torque Ripple Reduction Control of a 12-Phase PMSM under Unbalanced Short-Circuit-Induced Back-EMF

*Taeyun Kim², Kyubeom Lee², Jaehoon Choi³, Yongsug Suh¹ (1. Department of Electrical Engineering, Jeonbuk National University, Jeonju (Korea), 2. Dept. of Graduate school of Mechanical-Aerospace-Electric Convergence Engineering, Jeonbuk National University, Jeonju (Korea), 3. Power Conversion System Research Center, Korea Electrotechnology Research Institute, Gwangju (Korea))

[O10-2-03]

Study on Magnet Eddy Current Loss Driven by Voltage Source Inverter and Voltage Pulse Pattern for its Loss Reduction

*Kensuke Sasaki¹, Kan Akatsu² (1. Nissan Motor Co., Ltd. (Japan), 2. Yokohama National University (Japan))

[O10-2-04]

Saliency-Based Rotor Temperature Estimation of Permanent Magnet Synchronous Motors

*Andreas Lang^{1,2}, Richard Spießberger³, Manfred Schrödl⁴, Gerald Kalteis³ (1. Project Assistant (Austria), 2. Software Engineer (Germany), 3. Univ. Assistant (Austria), 4. Professor (Austria))

[O10-2-05]

Circulating Bearing Currents and Inductive Coupling in Coaxial Electrical Drive Systems

*Hans-Georg Kneidinger¹, Annette Muetze¹ (1. Graz University of Technology (Austria))

Technical Sessions: Oral Sessions 10

Room 101C (1F)

[Oral] Vehicle Electrification-related Technologies

[O10-3] Power Systems and Infrastructure

Chairs: Sebastian Rivera (Technische Universiteit Delft)
Kenta Emori (Nissan Motor Co., Ltd.)

[O10-3-01]

Ultra-High-Efficiency EV Charging System Powered by PV Panels

*Yasuyuki Kanai¹, Fujio Kurokawa² (1. EXEO Group, Inc. (Japan), 2. Nagasaki Institute of Applied Science (Japan))

[O10-3-02]

Grid expansion planning for HDEVs charging

*Manfredo Sartori¹, Laura Ramirez Elizondo¹, Pavol Bauer¹ (1. TU Delft (Netherlands))

[O10-3-03]

Active isolated converters for single-galvanic isolation stage based multi-outlet EV fast charging station

*Indrashis Haldar^{1,2}, Levy Costa¹, Dongsheng Yang¹, Bas Vermulst¹, Xinwei Xu², Thomas Gerrits² (1. Eindhoven University of Technology (Netherlands), 2. Siemens eMobility B.V. (Netherlands))

[O10-3-04]

Redundant and Fault-Tolerant Three-Port Bidirectional HV/LV DC-DC Converter for On-Board Automotive Applications: Design and Control

*Muhammad Attique Qamar¹, Arya Venugopal¹, Patrick Salcher¹, Thomas Langbauer¹, Roberto Petrella^{2,3} (1. Architectures & Topologies, Division Power Electronics, Silicon Austria Labs GmbH (SAL) (Austria), 2. System Level Integration Technologies, Division Power Electronics, Silicon Austria Labs GmbH (SAL) (Austria), 3. Polytechnic Department of Engineering and Architecture (DPIA), University of Udine (Italy))

[O10-3-05]

Three-Phase and Single-Phase Grid Compatible Bidirectional On-Board Charger

*CHANDRIMA CHATTERJEE¹, Adnan Khan¹, Soumya Shubhra Nag¹ (1. Indian Institute of Technology Delhi (India))

Room 102 (1F)

[Oral] Semiconductor Power Conversion

» New generation Power device, Passive components and materials

[O10-4] Passive Components and Other Devices

Chairs: Koji Orikawa (Hokkaido University of Science)
Hongbo Zhao (Aalborg University)

[O10-4-01]

Rethinking the Anhysteretic Curve of Soft Magnetic Materials based on Instantaneous Core loss

Binyu Cui¹, *Jun Wang¹ (1. University of Bristol (UK))

[O10-4-02]

An Improved Modeling for Capacitance Network of Planar Transformer Using The Section-Based Voltage Distribution

Yu-Chen Liu¹, *Quang-Huy Nguyen¹, Kuan-Yi Chen¹, Shang-Syun Wu¹ (1. National Taipei University of Technology (Taiwan))

[O10-4-03]

Inductor Design for Multilevel Converters Based on a Waveform-Emulation Iron-Loss Evaluation Method

*Yuto Saito¹, Keiji Wada¹ (1. Tokyo Metropolitan University (Japan))

[O10-4-04]

Pareto Optimization of Mn-Zn Ferrite Inductors with Elliptical Cross-Sections

*Till Piepenbrock¹, Sebastian Schachten¹, Jakub Kucka¹, Joachim Böcker¹ (1. Paderborn University (Germany))

[O10-4-05]

Model and thermal considerations for a DC current limiter based on high mobility semiconductor

*Luiz Guilherme Enger¹, Fabian Gartner¹, Nikolaos Fotias², Jochen Bardong¹, Peter Leitner¹, Jérémy Létang¹ (1. Silicon Austria Labs GmbH (Austria), 2. Eaton Research Labs, Eaton European Innovation Centre (Czech Republic))

Technical Sessions: Oral Sessions 10

Room 103 (1F)

[Oral] Power Electronics Applied to Home Appliance and V2X

[O10-5] Power Electronics Applied to Home and V2X 2

Chairs: Motoshi Matsushita (DAIKIN INDUSTRIES, LTD.)
Ching-Ming Lai (National Chung Hsing University)

[O10-5-01]

A Switched Capacitor Equalizer with Variable Switching Frequency for Battery Packs

*Cheng-Hsiang Huang¹, Zong-Zhen Yang², Yi-Hua Liu¹, Yi-Feng Luo³, Guan-Jhu Chen⁴, Bo-Jun Xu¹ (1. Department of Electrical Engineering, National Taiwan University of Science and Technology (Taiwan), 2. Graduate Institute of Energy and Sustainability Technology National Taiwan University of Science and Technology (Taiwan), 3. A.I. Cross-disciplinary Technology National Taiwan University of Science and Technology (Taiwan), 4. Department of Electrical Engineering National Changhua University of Education (Taiwan))

[O10-5-02]

Cascaded Voltage and Current Control for Boost-type Third-Harmonic Current Injection Active Filter

*Subin Kang¹, Minhyeok Yun¹, Hyeonsik Kim¹ (1. Gachon University (Korea))

[O10-5-03]

A 1.2 MHz Phase-Shift Self-Oscillating Class-D Amplifier Using GaN Power Stage Design

YU-CHEN LIU¹, *Rou-An Chen¹, De-An Sun¹ (1. National Taipei University of Technology (NTUT), Department of Electrical Engineering (Taiwan))

[O10-5-04]

Efficient LED Dimming Solutions Through Twin Bus Design

*Che-Wei Hsu¹, Bing-Hong Su², Tsung-Hui Chen¹, Yu-Shan Cheng⁴, Zong-Zhen Yang², Yi-Feng Luo³, Yi-Hua Liu¹ (1. Department of Electrical Engineering, National Taiwan University of Science and Technology (Taiwan), 2. Graduate Institute of Energy and Sustainability Technology, National Taiwan University of Science and Technology (Taiwan), 3. Graduate Institute of A.I. Cross-disciplinary Technology, National Taiwan University of Science and Technology (Taiwan), 4. Department of Electrical Engineering, National Taiwan Ocean University (Taiwan))

[O10-5-05]

Charge Pump Circuits for Negative Voltage Turn-Off in Gate Drivers

Won Hyo Jeong¹, Gyu Cheol Lim¹, *Minha Kim¹, Jung-Ik Ha¹ (1. Seoul National University (Korea))

Technical Sessions: Oral Sessions 10

Room 107 (1F)

[Oral] Application of Power Electronics in Electric Railway and Related Public Transportation

[O10-6] Application of Power Electronics in Electric Railway and Related Public Transportation 3

Chairs: Ryo Takagi (Kogakuin University)

Takeshi Konishi (Railway Technical Research Institute)

[O10-6-01]

Resonance Suppression Method on Train Depots for AC Electric Traction Systems in Consideration of the Voltage Stiff Converters

*Masataka Akagi¹, Hiroaki Morimoto¹, Gaku Morita¹, Akinori Hori¹, Yoshihisa Noto², Tomoaki Ito² (1. Railway Technical Research Institute (Japan), 2. Japan Railway Construction, Transport and Technology Agency (Japan))

[O10-6-02]

Current Reduction in MMC-SDBC Based STATCOM for Negative-Sequence Compensation Using Integrated Battery Energy Storage

*SUMAN CHANDRA GHOSH¹, Sano Kenichiro¹ (1. INSTITUTE OF SCIENCE TOKYO (Japan))

[O10-6-03]

Real-world evidence of interoperability problems in AC traction power systems

*Carla Petta¹, Mattias Carlehäll², Lars Abrahamsson², Johnny Holmberg³, Steinar Danielsen⁴, Ilka Jahn¹, Stefan Östlund¹, Staffan Norrga¹ (1. KTH (Sweden), 2. Trafikverket (Sweden), 3. Alstom (Sweden), 4. Bane NOR (Norway))

[O10-6-04]

Suppression of Transient Recovery Voltage in a Hybrid DC Circuit Breaker Using an IGBT and Two-Stage Fuse Configuration

*Hiroya Ichike¹, Taichi Nakano¹, Reon Sasaki¹, Yuki Inada², Yasushi Yamano², Wataru Ohnishi¹ (1. The University of Tokyo (Japan), 2. Saitama University (Japan))

[O10-6-05]

A Novel Substation Output Voltage Control Method Aiming at Maximum Energy Efficiency of DC-electrified Railway

*Hiroyasu Kobayashi¹, Taichi Kanto¹, Daisuke Miyagi¹ (1. Chiba University (Japan))

Technical Sessions: Oral Sessions 10

Room 108 (1F)

[Oral] Human Factor and Image Recognition

[O10-7] Advanced Technologies in Human Factors and Related Fields

Chairs: Sho Yokota (Toyo University)
Kaoru Mitsuhashi (Teikyo University)

[O10-7-01] Invited Paper

Ease Chair: an low-cost, highly reliable manual wheelchair driving assistance device utilizing servo brakes

*Daisuke Chugo¹, Yikun Yang¹, Satoshi Muramatsu², Sho Yokota³, Takayuki Ishii⁴, Isamu Nishiwaki⁵, Hiroshi Hashimoto⁶ (1. Kwansai Gakuin University (Japan), 2. Tokai University (Japan), 3. Toyo University (Japan), 4. Office Ishii, Inc. (Japan), 5. Amena (Japan), 6. Advanced Institute of Industrial Technology (Japan))

[O10-7-02] Invited Paper

Study on Tacit Knowledge from Focal and Non-Focal Gaze Point

*Koji Makino¹, Hidenori Omori², Masahiro Nakamura², Shoma Sasamoto¹, Xiao Sun¹, Hidetsugu Terada¹ (1. University of Yamanashi (Japan), 2. Kofu Municipal Hospital (Japan))

[O10-7-03] Invited Paper

Skill Evaluation of Deburring in Manufacturing using Motion Curved Surface

*Kaoru Mitsuhashi¹, Atsushi Shimohira², Akihito Suzuki², Takehiro Fujimoto² (1. Teikyo University (Japan), 2. Fujimoto Kogyo Co., Ltd. (Japan))

[O10-7-04] Invited Paper

Effectiveness of Gamification in Contest-Based and PBL Manufacturing Education Course

*Kaoru Mitsuhashi¹ (1. Teikyo University (Japan))

[O10-7-05] Invited Paper

Development of Golf Putting Training System with Real-Time Feedback

*Sho Yokota¹, Daisuke Chugo², Hiroshi Hashimoto³ (1. Toyo University (Japan), 2. Kwansai Gakuin University (Japan), 3. Advanced Institute of Industrial Technology (Japan))

Online Session (Online)

[Oral] Industrial Instrumentation and Control

[O10-8] Industrial Instrumentation and Control

Chairs: Tomoyuki Shimono (Yokohama National University)
Yuto Kobayashi (National Institute of Technology, Akita College)

[O10-8-01]

Detecting Sensor Spoofing Attacks on Grid-Tied Photovoltaic Inverters via Physical Watermark

*Yiqi Chen¹, Kaikai Pan¹, Qidi Zhong¹, Rui Wang¹ (1. Zhejiang University (China))

[O10-8-02]

Finite Control Set Collaborative Model Predictive Control of Three Port DC Converters Based on Inductance Parameter Identification

*Jiaqi Zhao¹, Wanjun Lei¹, Linqiang Hu¹, Banghong Liu¹, Hongyi Zhou¹ (1. Xi'an Jiaotong University (China))

[O10-8-03]

Distributed Cooperative Control of Wind Farm for Inertial Response Enhancement

*Le Li¹, Jiale Liu^{2,3}, Weisi Deng², Weidong Gao², Pengying Zou², Xudong Zou¹, Donghai Zhu¹ (1. State Key Laboratory of Advanced Electromagnetic Technology (Huazhong University of Science and Technology) (China), 2. Power Dispatching and Control Center, China Southern Power Grid Co., Ltd. (China), 3. South China University of Technology (China))

[P1-6-08] Nonlinear Friction Identification and Economic Model Predictive Control of Built-in Direct-Drive Wave Energy Converters

*Guodong Fan¹, Weimin Wu^{1,2}, Yunfeng Xu¹, Chengqi Xiao¹, Hengyu Wang¹, Mingsan Ouyang², Wei Zhu¹ (1. Shanghai Maritime University (China), 2. Anhui University of Science and Technology (China))

Technical Sessions: Oral Sessions 11

Wednesday, June 3 16:20 – 18:40

Room 101A (1F)

[Oral] Semiconductor Power Conversion

[O11-1] Research Results of MEXT Program Innovative Power Electronics Technologies

Chairs: Toshihisa Shimizu (Tokyo Metropolitan University)

[O11-1-07] Invited Paper

Present Status and Future Prospects of GaN Vertical Power Devices

*Hiroshi Amano^{1,2}, Jun Suda^{2,1} (1. Institute for Materials and Systems for Sustainability (IMaSS), Nagoya University (Japan), 2. Department of Electronics, Nagoya University (Japan))

[O11-1-01] Invited Paper

Solid-State Transformers Connected to 6.6-kV Distribution System in Japan

*Keiji Wada¹, Ryosuke Ota¹, Kan Akatsu², Hidemine Obara², Takao Tsuji², Takanori Isobe³, Tomoyuki Mannen⁴ (1. Tokyo Metropolitan University (Japan), 2. Yokohama National University (Japan), 3. Tsukuba University (Japan), 4. Utsunomiya University (Japan))

[O11-1-02] Invited Paper

Development of high-switching-frequency power converters with GaN power devices

*Hiroo Sekiya¹, Daisuke Miyagi¹, Kenji Natori¹, Hiroyasu Koabayashi¹, Hiroshi Osawa¹, Wenqi Zhu², Yukihiko Sato¹ (1. Chiba University (Japan), 2. Tokyo University of Science (Japan))

[O11-1-03] Invited Paper

Integrated Power Electronics Technology with WBG devices

*Yoshikazu Takahashi¹, Keita Suzuki¹, Naoki Takagi¹, Yoshihiro Tateishi¹, Akira Kitamura¹, Satoharu Tanai¹, Shoichiro Otani¹, Tetsuo Endoh¹ (1. Tohoku University (Japan))

[O11-1-04] Invited Paper

Ultra-low loss magnetic materials for innovative power electronics

*Satoshi Okamoto¹ (1. Tohoku University (Japan))

[O11-1-05] Invited Paper

Development of Transformers and Inductors for High-Frequency Power Conversion Using Magnetic Anisotropic Soft Magnetic Materials

*Tutomu Mizuno¹, Toshiro Sato¹ (1. Faculty of Engineering, Shinshu University (Japan))

[O11-1-06] Invited Paper

Development of novel capacitors for next-generation power electronics systems: antiferroelectric ceramic capacitors and high-voltage/high-temperature polymer solid capacitors

*Hiroki Habazaki¹, Hiroki Taniguchi² (1. Hokkaido University (Japan), 2. Nagoya University (Japan))

Technical Sessions: Oral Sessions 11

Room 101B (1F)

[Oral] Motor Drive and Control

[O11-2] Controls and Drives of Electric Machines 4

Chairs: Kohei Aiso (Shibaura Institute of Technology)
Tomasz Pajchrowski (Poznan University of Technology)

[O11-2-01]

Comparative Study of Motor Parameter Identification in IPMSM Drive System

*Ryoya Matsuzawa¹, Yukinori Inoue¹, Masayuki Sanada¹ (1. Osaka Metropolitan University (Japan))

[O11-2-02]

Torque estimation using DC-Link Current Control and Loss Compensation for permanent magnet synchronous motors

*Koich Takae¹, Kan Akatsu² (1. Nidec Corporation (Japan), 2. National university in Yokohama (Japan))

[O11-2-03]

Comparative Study of a Multiphase Single-Tooth H-Bridge VSI and a Three-Phase Two-Level VSI for a PMSM

*Felix Gliese¹, Christoph Sachs¹, Jürgen Haag¹, David Cello¹, Jörg Roth-Stielow² (1. Esslingen University (Germany), 2. University of Stuttgart (Germany))

[O11-2-04]

A Hybrid Control Strategy for Single-Inverter Dual Parallel IPMSM Drives

*Byung-Joon Jung¹, Kyo-Beum Lee¹ (1. Ajou University (Korea))

[O11-2-05]

Torque Control of PMSM in Flux-Weakening Region Based on Cascaded-Loop Voltage Angle Control

*Hyeonho Jeong¹, Jiwon Yoo¹ (1. Inha University (Korea))

Room 101C (1F)

[Oral] Vehicle Electrification-related Technologies » Vehicle Electrification-related Technologies

[O11-3] Charging Optimization and Energy Management

Chairs: Arman Oshnoei (Aalborg University)
Hiroaki Matsumori (Nagoya Institute of Technology)

[O11-3-01]

Iterative Coordination of Mobility-Aware V2G Optimization and Power Flow in Distribution Networks

*Alvaro Menendez Agudin¹, Manfredo Sartori¹, Gautham Ram Chandra Mouli¹ (1. TU Delft (Netherlands))

[O11-3-02]

Ship energy management method based on conditional diffusion interval prediction and distributed DeePC

Liangwang ma¹, *Liang zou¹, Xingdou liu¹, Zhiyun han¹, Rongzhao jia¹ (1. Shandong University (China))

[O11-3-03]

A Swarm Intelligence Approach to Optimize Vehicle-to-Vehicle Charging Considering Dynamic Pricing Scenario

*MAHWISH MEMON¹, Ijaz Ahmed², Muhammad Rehan^{2,3}, Amjad Ali^{2,3}, Muhammad Khalid^{2,3}, Claudio Rossi¹ (1. Department of Electrical, Electronic, and Information Engineering "Guglielmo Marconi", University of Bologna, 2. Interdisciplinary Research Center for Sustainable Energy Systems, King Fahd University of Petroleum and Minerals (KFUPM), 3. (KFUPM))

[O11-3-04]

When Wolves Manage the Load: Multi-Objective EV Charging in Residential Grids

*Yanty Rumengan¹, Fransisco Danang Wijaya¹, Lesnanto Multa Putranto¹, M Isnaeni B.S¹ (1. Universitas Gadjah Mada (Indonesia))

[O11-3-05]

Charging Strategy Impact on EV Battery: From DC Fast Charging to Dynamic Wireless Charging

*Cristian Giovanni Colombo¹, Harutaka Suzuki², Ryosuke Ota², Michela Longo¹ (1. Politecnico di Milano (Italy), 2. Tokyo Metropolitan University (Japan))

Technical Sessions: Oral Sessions 11

Room 102 (1F)

[Oral] Motor Drive and Control

[O11-4] Model Predictive Control

Chairs: Takayuki Miyajima (Daikin Industries)
Frede Blaabjerg (Aalborg University)

[O11-4-01]

Enhanced Model Predictive Current Control for OW-PMSM System

*Chenguang Zhang¹, Niko Nevaranta¹, Pasi Peltoniemi¹ (1. Lappeenranta-Lahti University of Technology LUT (Finland))

[O11-4-02]

Inductance Compensation Based Model Predictive Current Control for PMSM System

*Chenguang Zhang¹, Niko Nevaranta¹, Pasi Peltoniemi¹ (1. Lappeenranta-Lahti University of Technology LUT (Finland))

[O11-4-03]

Two-Step Model Predictive Current Control for OW-PMSM System

*Chenguang Zhang¹, Niko Nevaranta¹, Pasi Peltoniemi¹ (1. Lappeenranta-Lahti University of Technology LUT (Finland))

[O11-4-04]

Modulated Model Predictive Current Control Based on Flux Saturation Model of IPMSMs

*Yongho Kim¹, Young-Doo Yoon² (1. Department of Automotive Engineering(Automotive-Computer Convergence), Hanyang University (Korea), 2. Department of Automotive Engineering, Hanyang University (Korea))

[O11-4-05]

Computationally Efficient Sphere Decoder based Model Predictive Control for 5L-ANPC Converters

Jiyuan Gong¹, *Zhixun Ma¹, Fuad Afif Herya², Tri Desmana Rachmildha² (1. Tongji University (China), 2. Institut Teknologi Bandung (Indonesia))

[O11-4-06]

CHIL-Based 3-Level GaN Motor Drive Modeling for Hydrogen-Electric Aircraft Digital Twin Study

Xuli Quan¹, Hui Li¹, *Jiangbiao He² (1. Florida State Univ. (USA), 2. University of Tennessee, Knoxville (USA))

Technical Sessions: Oral Sessions 11

Room 103 (1F)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[O11-5] Wireless Power Transfer Circuits and Control Techniques

Chairs: Amir Babaki (The University of Southern Denmark)
Ryosuke Ota (Tokyo Metropolitan University)

[O11-5-01]

Dual-Transitter Coil-Based Series-Stacked Class E Inverter with Optimal Operating Strategy for High-Frequency WPT System

*Chang-Yeob Chu¹, Dongmin Kim², Youngseok Lee¹, Ki-Bum Park¹ (1. Korea Advanced Institute of Science and Technology (Korea), 2. Korea University of Technology and Education (Korea))

[O11-5-02]

Model-Based Current Balancer Design for MHz-Band Paralleled Inverters in Wireless Power Transfer Systems

*Masamichi YAMAGUCHI¹, Kodai NISHIKAWA¹, Hiroki WATANABE¹, Jun-ichi Itoh¹ (1. Nagaoka University of Technology (Japan))

[O11-5-03]

MHz-Driven Synchronous Rectification and Pulse-Width-Modulation Receiver-side Power Control for Class-E2 Wireless Power Transfer

*Tomokazu Mishima¹, Tianyu Yang², Shigehiro Yamamoto², Ching-Ming Lai³ (1. Yamaguchi University (Japan), 2. Kobe University (Japan), 3. National Chung Hsing University (Taiwan))

[O11-5-04]

Performance Comparison of Analog and Digital Implementations of a Synchronous Rectification Method for 6.78 MHz Applications

*Israel Yepez Lopez¹, Jiasheng Huang¹, Drazen Dujic¹ (1. Power electronics laboratory (PEL), École Polytechnique Fédérale de Lausanne (EPFL) (Switzerland))

[O11-5-05]

Multi-Step Finite Control Set-Model Predictive Control for Pulse-Skipping Operation in Inductive Power Transfer Systems with Constant Voltage Load

Zeinab Karami Hassan Abadi¹, *Giuseppe Guidi², Jon Are Suul³ (1. Department of Engineering Cybernetics, Norwegian University of Science and Technology (NTNU), Trondheim, Norway. (Norway), 2. SINTEF Energy Research, Trondheim, Norway (Norway), 3. Department of Engineering Cybernetics, NTNU,)

[O11-5-06]

Fundamental Study on Transmission-Power Compensation in a Dynamic Wireless Power Transfer System with an Active Buffer Circuit

*Riku Takahashi Takahashi¹, Ryosuke Ota¹, Shohei Komeda², Daniel-loan Stroe³ (1. Tokyo metro politan University (Japan), 2. Tokyo University of Marine Science and Technology (Japan), 3. Aalborg University (Denmark))

Technical Sessions: Oral Sessions 11

Room 107 (1F)

[Oral] Application of Power Electronics in Electric Railway and Related Public Transportation

[O11-6] Advanced Power Conversion and Control for Railways

Chairs: Takafumi Koseki (The University of Tokyo)

[O11-6-01] Invited Paper

Development of methods to mitigate fluctuations in power supply voltage caused by variations in the load of Shinkansen trains

*Haruna Ohnishi¹, Toshimasa Shimizu¹, Ken Kunomura¹ (1. Central Japan Railway Company (Japan))

[O11-6-02] Invited Paper

Effective Energy Management Using Battery Systems Installed in Railway Ground-based or Onboard Equipment

*Mami Mizutani¹, Masayuki Nogi¹, Makoto Ide¹, Isao Takahashi¹, Manato Mori¹ (1. Toshiba Corp. (Japan))

[O11-6-03] Invited Paper

Reduction of power compensators in AC feeding system by feeder voltage regulation by train's power converters

*Yuto Uchiyama¹, Yuta Mori¹, Ken Kunomura¹, Hidemitsu Tanaka¹, Tsutomu Uranaka¹, Toyokazu Hamajima¹, Toshiaki Takami¹, Akihiro Koyanagi¹, Haruna Ohnishi¹, Kota Yamaguchi¹ (1. Central Japan Railway Company (Japan))

[O11-6-04] Invited Paper

Future Vision of Railway EMS with Serendie

*Kosuke Shinji¹, Ryuta Higuchi¹, Yasutaka Imamura¹, Takuma Ishiyama¹, Jungo Sato¹ (1. Mitsubishi Electric Corporation (Japan))

Room 108 (1F)

[Oral] Semiconductor Power Conversion

[O11-7] Modeling and Control of Grid-Forming Converters

Chairs: Xiongfei Wang (Tsinghua University)

[O11-7-01] Invited Paper

The Impact of Frequency Coupling in dq frame on the Passivity Properties of Grid-connected Converter.

*Chirag Ramgopal Shah¹, Marta Molinas¹, Shan He², Sjur Føyen¹, Roy Nilssen¹ (1. Norwegian University of Science and Technology (Norway), 2. Hefei University of Technology (China))

[O11-7-02] Invited Paper

A General Control Solution for Offshore AC, DC, and Hybrid Energy Hubs

*Liang Huang¹, Alban Jacques Duvivier², Daniel Muller², Ching-Shu Shu³, Lorenzo Zeni³, Frede Blaabjerg¹ (1. Aalborg University (Denmark), 2. Technical University of Denmark (Denmark), 3. Ørsted A/S (Denmark))

[O11-7-03] Invited Paper

A Single-Phase Grid-Forming Converter Using a Single DC-link Current Sensor

*Wenzhuo Cui¹, Zicheng Zhang¹, Jingyang Fang¹, Le Fang², Wei Dong², Ying Yang² (1. Sch. Control Sci. Eng., Shandong Univ., Jinan (China), 2. State Grid Zhejiang Electr. Power Res. Inst., Hangzhou, Zhejiang (China))

[O11-7-04] Invited Paper

Impedance Modeling and Verification of Grid-Forming Inverters in Different Reference Frames

*Yiyang Liao¹, Yitong Li¹, Yaoyu Hu¹, Wenjie Ning¹, Jinjun Liu¹ (1. State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University (China))

[O11-7-05] Invited Paper

Fast Current and Power Response of Grid-Forming Converters During Fault Ride-Through

*Liang Zhao¹, Zejie Li², Fangzhou Zhao³, Zhangcan Xu¹, Xiongfei Wang³ (1. KTH Royal Institute of Technology (Sweden), 2. National Institute of Clean and Low Carbon Energy (China), 3. Tsinghua University (China))

[O11-7-06] Invited Paper

Simplified Virtual Impedance Implementation Without Sequence Decomposition for Independent Positive/Negative-Sequence Shaping in Grid-Forming Converters

*Jaekeun Lee¹, Yifei Li², Xiongfei Wang³, Jae-Jung Jung⁴, Shenghui Cui¹ (1. Department of Electrical and Computer Engineering, Seoul National University (Korea), 2. Department of Energy, Aalborg University (Denmark), 3. Department of Electrical Engineering, Tsinghua University (China), 4. School of Electronic and Electrical Engineering, Kyungpook National University (Korea))

Technical Sessions: Oral Sessions 11

Online Session (Online)

[Oral] Semiconductor Power Conversion

[O11-8] Semiconductor Power Conversion

Chairs: Chengxuan Li (Southwest Jiaotong University)
Shin-ichi Hamasaki (Nagasaki University)

[O11-8-01]

A 48-V to 12-V/150-A Hybrid Switched-Capacitor Converter with CLC Output Filter

*Shunliang Liu¹, Yenan Chen¹ (1. Zhejiang University (China))

[O11-8-02]

Simplified Adaptive Duty-Cycle Class E Power Amplifier Suitable for On-Chip Integration

*Chang Liu¹, Shuang Li¹, Ruihan Ma¹, Ming Liu², Chengbin Ma¹ (1. Global College, Shanghai Jiao Tong University (China), 2. School of Electrical Engineering, Shanghai Jiao Tong University (China))

[O11-8-03]

Enhanced Grid-forming Architecture with Both Voltage Support and Agile Power Feed-in for Renewable Energy Generation

Hongwei Zhou^{1,2}, *Ronghui AN¹, Ziwen Zhao¹, Jinjun Liu¹ (1. Xi'an Jiaotong University (China), 2. TBEA Xi'an Electric Technology Co., Ltd (China))

[O11-8-04]

All-Pass Filter Phase Reshaping Strategy for Suppressing Synchronous Resonance in Virtual Oscillator-based Grid-Forming Inverters

*Mingyue Wang¹, Yaopeng Huang¹, Xianzhe Pang¹, Zhida Shang¹, Alian Chen¹, Cheng Cheng¹, Wenbo Wang² (1. Shandong university (China), 2.

[O11-8-05]

Analysis and Enhancement of Transient Stability for Grid-Forming Inverters During Deep Voltage Sag Recovery

*Shumei Chi¹, Chunzhen Liu¹, Xianzhe Pang¹, Rui Zhang¹, Alian Chen¹, Yangbin Ke² (1. Shandong University (China), 2. TBEA Xi'an Electric Technology Co., Ltd. (China))

[O11-8-06]

Sensitivity Analysis on Impedance Matching Network in Wireless Power Transfer System Considering Capacitors Tolerance

*Yu Xiao¹, Zhan Liu¹, Shuang Li¹, Ming Liu¹, Chengbin Ma¹ (1. Shanghai Jiao Tong University (China))

Technical Sessions: Oral Sessions 12

Thursday, June 4 8:30 – 9:50

Room 101A (1F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O12-1] Grid-Following Converters Synchronization and Grid Connection

Chairs: Surapong Suwankawin (Chulalongkorn University)
Cheng Huang (University of Tsukuba)

[O12-1-01]

Initial Synchronization Schemes for Grid-connected Three-phase Inverters

Asma Ahmad Mirza¹, *Inam Nutkani¹, Carlos Teixeira¹, Brendan McGrath¹ (1. RMIT University, Melbourne, Australia (Australia))

[O12-1-02]

Development of a Grid-Compliant Single-Phase DC-AC Converter

*Chao-Hsu Liao¹, Hong-Ying Jian¹, Wei-Tong Yin¹, Ming-Shi Huang¹, Chun-Yen Chen¹ (1. National Taipei University of Technology (Taiwan) (Taiwan))

[O12-1-03]

Implementation and Analysis of a PR Controller for Efficient Bidirectional Power Flow in Single-Phase Converters

*Vishnu K¹, Sumit Kumar Pramanick¹, Anil Verma¹ (1. Indian Institute of Technology Delhi (India))

[O12-1-04]

A Study on Time-Synchronized Grid-Tied Inverters Controlled by GPS Signals Without Voltage Sensors

*Daichi Kawamoto¹, Hidemine Obara¹ (1. Yokohama National University (Japan))

Room 101B (1F)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[O12-2] Auxiliary-Circuit-Based Converters for Soft Switching and Performance Enhancement

Chairs: Wai Keung Mo (The university of southern denmark)
Ryosuke Ota (Tokyo Metropolitan University)

[O12-2-01]

Experimental Verification and Loss Analysis of Non-isolated Boost Converter Utilizing an Auxiliary Chopper for Fuel Cell Vehicles

*Hironobu Shakado¹, Makoto Hagiwara² (1. Institute of Science Tokyo (Japan), 2. Hokkaido University (Japan))

[O12-2-02]

High Conversion Ratio Single Switch Integrate Boost-Flyback DC-DC Converter Based on Quasi-Resonant Technique

Anusak Bilsalam¹, Natthakamon Pradumsuk¹, Jirachaya Jumpa¹, *Wachiravit Patarapongsatit¹, Juthathip Haema¹ (1. King Mongkut's University of Technology North Bangkok (Thailand))

[O12-2-03]

Isolated, Multi-Resonant, Soft-Switching DC-DC Converter With a Fractional-Turn Planar Transformer for Ultra-High Step-Down Applications

*Kumar Joy Nag¹, Aleksandar Prodic¹ (1. University of Toronto (Canada))

[O12-2-04]

Cost-Effective Electrical Variable Capacitor Utilizing Fast Recovery Diode for RF Plasma

*Heewon Choi¹, Yongsug Suh¹ (1. Jeonbuk National University, Korea (Korea))

Technical Sessions: Oral Sessions 12

Room 101C (1F)

[Oral] Semiconductor Power Conversion » Latest solution for EMI and EMC

[O12-3] Active Gate Drive Techniques for EMI Reduction in Power Converters

Chairs: Sari Maekawa

[O12-3-01]

Optimized SiC MOSFET Switching Control with Adaptive Dynamic Gate Resistance

*Pratik Limbu¹, Sui Ping Cheung¹, Tin Ho Li¹ (1. Hong Kong Applied Science and Technology Research Institute (ASTRI) (Hong Kong))

[O12-3-02]

A Study on Efficiency Improvement of a Three-Phase Inverter by Partial Active Gate Control Considering Load Power Factor

*Daisuke Saito¹, Hidemine Obara¹, Katsuhiro Hata² (1. Yokohama National University (Japan), 2. Shibaura Institute of Technology (Japan))

[O12-3-03]

EMI Suppression in Asymmetric H-Bridge SRM Drives Using Active Gate Drive

*Hajime Takayama¹, Kazuki Matsumoto¹, Shiu Mochiyama², Shuhei Fukunaga³, Michihiro Shintani¹, Takashi Hikiyama² (1. Kyoto Institute of Technology (Japan), 2. Kyoto University (Japan), 3. The University of Osaka (Japan))

[O12-3-04]

EMI Optimization of Capacitive Power Transfer as Scalable Low-Cost Multi-Load Supply for Isolating Gate Drivers

*Adrian Amler¹, Thomas Lehmeier¹, Madlen Hoffmann¹, Martin März^{1,2} (1. Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany), 2. Fraunhofer Institute for Integrated Systems and Device Technology IISB (Germany))

Room 102 (1F)

[Oral] Rotating Electrical Machine

[O12-4] Special Machines

Chairs: Doga Ceylan (Eindhoven University of Technology)
Takahiro Noguchi (University of Minnesota)

[O12-4-01]

Experimental Verification of Magnetization Position Dependence for Concentrated-Winding Variable Magnetomotive Force Memory Motors

*Manari Mizuno¹, Kazuto Sakai¹, Sari Maekawa¹ (1. Meiji University (Japan))

[O12-4-03]

Flux-Modulated-type Magnetic Gear for AAMs featuring a Halbach Array Magnet Rotor and Unequally Divided Magnets

*Emiri Asahina¹, Yuichi Tachiya¹, Kenji Nakamura¹, Motoki Ohta², Mamoru Kimura², Shin Kusase³ (1. Tohoku University (Japan), 2. Shimane University (Japan), 3. MARC Institute Co., Ltd. (Japan))

[O12-4-04]

Simplifying Acoustic Connection Conditions for Thermoacoustic Generators Using a Three-Phase Inverter With Vector Control

*Shunya Ichikawa¹, Roi Aoki¹, Tsutomu Mizuno¹, Mitsuhide Sato¹, Mariko Senga², Shinya Hasegawa² (1. Shinshu University (Japan), 2. Tokai University (Japan))

Technical Sessions: Oral Sessions 12

Room 103 (1F)

[Oral] Power Electronics Applied to Home Appliance and V2X » Power Electronics Applied to Home Appliance and V2X

[O12-5] Power Electronics Applied to Home and V2X 3

Chairs: Koichi Arisawa
Giuseppe Guidi (SINTEF Energy)

[O12-5-01]

Frequency Domain Performance Analysis of Dynamic Decoupling Current Control in Buck and Boost Multiple Converters

*Toshiyuki Fujita¹, Masahiro Mae¹, Hiroshi Fujimoto¹, Takayuki Miyajima², Yoshiki Yasuda², Akio Yamagiwa² (1. The University of Tokyo (Japan), 2. Daikin Industries Ltd. (Japan))

[O12-5-02]

Unified Framework for Nonlinear Modeling and Stability Analysis of Grid-Following and Grid-Forming Converters

*Shuai Yuan¹, Zhixiang Zou¹ (1. Southeast University (China))

[O12-5-03]

Enhanced Inertia Provision of Grid-Forming MMC in HVDC Systems

*Zhangcan Xu¹, Liang Zhao¹, Xiongfei Wang², Ilka Jahn¹ (1. KTH Royal Institute of Technology (Sweden), 2. Tsinghua University (China))

[O12-5-04]

Optimal cost analysis of grid-connected electric vehicle station with integrated PV array and ESU

*Nedim Tutkun¹, Mehmet Simsir² (1. Istanbul Ticaret University (Turkey), 2. Karabük University (Turkey))

Room 107 (1F)

[Oral] Motor Drive and Control

[O12-6] Industry Technology Session in Motor Drive and Control

Chairs: Akio Toba (Fuji Electric Co., Ltd.)
Dong-Choon Lee (Yeungnam University)

[O12-6-01]

Latest Technologies for an Adjustable-Speed Pumped-Storage Hydropower System with Doubly-Fed Induction Machine and Secondary Excitation Converter

*Yushi Koyama¹, Hironari Kaneda¹, Junji Mori¹, Tomoyoshi Toshimitsu¹, Ayumu Tokiwa² (1. Toshiba Corporation (Japan), 2. TMEIC Corporation (Japan))

[O12-6-02]

Voltage Distortion Reduction and Low-Voltage Compensation Using Combined Two-Phase Overmodulation PWM

*Yuichiro Minato¹ (1. Murata machinery, LTD (Japan))

[O12-6-03]

Development of an LSTM Based Motor and Reduction Gear Vibration Detection Technology for Electric Vehicles Without Additional Sensors

*Jae Sang Lim¹, Youngrook Chung¹, Seok Ham¹, Yong Hyun Ryu¹, Ho Rim Choi¹, Dae Un Sung¹ (1. Hyundai Motor Company (Korea))

[O12-6-04]

Simplified Real-time Simulation for Evaluating Power Electronics Systems

*Naoto Kikuchi¹, Soichiro Ichikawa¹, Hayato Honda² (1. TMEIC Corporation (Japan), 2. Mitsubishi Electric Software Corporation (Japan))

Technical Sessions: Oral Sessions 12

Room 108 (1F)

[Oral] Application of Power Electronics in Electric Railway and Related Public Transportation

[O12-7] **Key technology for green transformation and efficient energy management in electric railway systems**

Chairs: Ken Kunomura (Central Japan Railway Company)

[O12-7-01] **Invited Paper**

Development of Tokaido Shinkansen Rolling Stock and its Energy Conservation

*Keiji Sato¹, Toyokazu Hamajima¹ (1. Central Japan Railway Company (Japan))

[O12-7-02] **Invited Paper**

Voltage lowering operation at DC traction substations for making use of regenerative energy

*Shun Iwatsuki¹, Takehiko Nakamura¹, Daisuke Kumagai¹ (1. East Japan Railway Company (Japan))

[O12-7-03] **Invited Paper**

Two-stage Energy Management for PV-Integrated DC Railway Traction Systems

*Wei Liu¹, Qian Xu¹, Haonan Liu¹, Xiaodong Zhang¹, Dingxin Xia¹, Jingjie Chen¹ (1. Southwest Jiaotong University (China))

[O12-7-04] **Invited Paper**

Study on replacing all frequency converters on the Tokaido Shinkansen with electronic frequency converters

*Kota Yamaguchi¹, Toshimasa Shimizu¹, Yuto Uchiyama¹, Haruna Onishi¹ (1. Central Japan Railway Company (Japan))

Hall 1 (2F)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[O12-8] **Reliability of power converters with control and diagnosis**

Chairs: Kyo-Beum Lee (Ajou University)

[O12-8-01] **Invited Paper**

Variable Timing Control for Switching Loss

Reduction in Active Gate Driver

*Jinkyung Kim¹, Younghoon Cho¹ (1. Konkuk Univ. (Korea))

[O12-8-02] **Invited Paper**

Output Current Ripple Minimization for Capacitor Reliability Optimization in High Step-Down Multiphase Interleaved Buck Converters

Mei-Fang Wang¹, *Wei Chang¹, Ting-Yu Ling¹, Sung-Ping Chen¹, Yu-Zhen Zhu¹, Tzung-Lin Lee¹ (1. National Sun Yat-sen University (Taiwan))

[O12-8-03] **Invited Paper**

Open-Fault Diagnosis of a Dual Active Bridge Converter using Convolutional Neural Networks

*Jae-Hwan Moon¹, Kyo-Beum Lee¹ (1. Ajou University (Korea))

[O12-8-04] **Invited Paper**

A Fault Diagnosis for OEW-IPMSM Drives Fed by Common DC Bus using High-Frequency Injection

*Jeong-Hwan Jeon¹, Kyo-Beum Lee¹ (1. Ajou University (Korea))

Technical Sessions: Oral Sessions 12

Online Session (Online)

[Oral] Motor Drive and Control » Controls and Drives of Electric Machines

[O12-9] Controls and Drives of Electric Machines

Chairs: Keitaro Kawarazaki (Tokyo University of Science)
Shin-ichi Hamasaki (Nagasaki University)

[O12-9-01]

A Data-Driven Method for Motor Topology Generation Using Latent Diffusion Model

*Bowe Chen¹, Shihao Zhang¹, Jianzhi Zhu¹, Yilin Ma¹, Huan Yang¹, Rongxiang Zhao¹ (1. Zhejiang univ (China))

[O12-9-02]

Deep Transfer Learning-based Fault Diagnosis Scheme for Auxiliary Inverter Drive Systems in Unmanned Ships with Multi-source Signal Monitoring

*Dengjie Lu¹, Shan Li^{2,1}, Jiayu Zhang¹, Shan Jiang¹, Zhi Yang¹ (1. Shanghai Marine Equipment Research Institute (SMERI) (China), 2. College of Electrical Engineering, Zhejiang University (China))

[P2-7-15] Duty Cycle Division-Based Power Allocation Control of Dual-DC-Port Inverters for Multisource Electric Vehicles

*Tiecheng Lan¹, Dehong Zhou¹, Kai Liao¹, Jianxiao Zou¹, Yu Zeng¹ (1. University of Electronic Science and Technology of China (China))

[O12-4-02]

Design and Evaluation of a High-Power Density Axial-Flux Motor-Propeller System for eVTOL Distributed Electric Propulsion

*Yanlei Yu¹, Chengming Liu¹, Christopher. H. T. Lee¹ (1. Nanyang Technological University (Singapore))

Technical Sessions: Oral Sessions 13

Thursday, June 4 14:00 – 15:40

Room 101A (1F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O13-1] Grid-Following Converters Power Quality and Parallel Operation

Chairs: Morten Rahr Nielsen (Aalborg University)

Hiroki Watanabe (Nagaoka University of Technology)

[O13-1-01]

A Novel Single-Phase Three-Wire Inverter with a Decoupling Circuit

*Noriyuki Nosaka¹, Satoshi Iwai¹, Mitsuru Sato¹, Qingyun Piao¹, Takeshi Uematsu¹ (1. OMRON Corporation (Japan))

[O13-1-02]

Inherent Damping Characteristics of Feedforward-Based Harmonic Current Controllers in Active Power Filters

*Juhee Park¹, Deokyong Woo¹, Sungmin Kim¹ (1. Hanyang University ERICA Campus (Korea))

[O13-1-03]

Current Limiting Method for Extending Grid Compensation Capability of Single-Star Multilevel Converter with Zigzag Transformer

*Yeongung Kim¹, Jae-Jung Jung¹ (1. Kyungpook National University (Korea))

[O13-1-04]

Optimal Power Oscillation Mitigation in Parallel Converters Under Unbalanced AC Grid

*Guillermo Huerta¹, Maurice Roes¹, George Papafotiou¹ (1. Eindhoven University of Technology (Netherlands))

[O13-1-05]

Qualification Challenges of Solid-State Transformers: Standards, Medium Voltage Power Semiconductors, and Auxiliary Circuits

Ahmed Eldistawy¹, Debi Prasad Nayak¹, Nadia Mei Lin Tan², *Marco Liserre^{1,2} (1. Fraunhofer ISIT (Germany), 2. Kiel university (Germany))

Technical Sessions: Oral Sessions 13

Room 101B (1F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O13-2] Wireless Power Transfer Systems and Coil Design Techniques

Chairs: Ki-Bum Park (KAIST)

Shohei Komeda (Tokyo University of Marine Science and Technology)

[O13-2-01]

Preliminary Study on a Misalignment-Tolerant Coil Structure for Dual-Field Dynamic Wireless Power Transfer Systems

*Ryosuke Ota¹, Harutaka Suzuki¹, Hiroyuki Yano¹, Cristian Giovanni Colombo², Michela Longo² (1. Tokyo Metropolitan University (Japan), 2. Politecnico di Milano (Italy))

[O13-2-02]

Design Method of Transmitter and Receiver Coils Applied to Rotating Dynamic Wireless Power Transfer Experimental System

*Yusuke Tanaka¹, Daiki Satou¹ (1. Tokyo Denki University (Japan))

[O13-2-03]

Multiple Transmitters with Controlled Amplitude and Phase of Transmitter Currents to Eliminate Cross-Interference Effects for Large-Area Wireless Power Transfer Systems

*Masataka Ishihara¹, Kodai Matsuura¹, Akihiro Konishi², Kazuhiro Umetani³, Eiji Hiraki¹ (1. Okayama University (Japan), 2. Sojo University (Japan), 3. Kyushu University (Japan))

[O13-2-04]

Modeling of Wave Propagation in Spatially Distributed Multi-Load Capacitive Power Transfer for Wireless Charging Applications

*Adrian Amler¹, Lukas Best¹, Martin März^{1,2} (1. Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany), 2. Fraunhofer Institute for Integrated Systems and Device Technology IISB (Germany))

[O13-2-05]

Study on Wireless Power Transfer System Integrating Cell Voltage Equalizer Using Series-Resonant Voltage Multiplier

*Shion Kubo¹, Satou Daiki¹ (1. Tokyo Denki University (Japan))

Technical Sessions: Oral Sessions 13

Room 101C (1F)

[Oral] Semiconductor Power Conversion

[O13-3] Industry Technology Session in Semiconductor Power Conversion 1

Chairs: Ryota Kondo (Mitsubishi Electric Corporation)
Sewan Choi (Seoul National Univ of Science and Technology)

[O13-3-01]

HVDC Valve Tower for the JEAG 5003 and the Nankai Trough Megathrust Earthquake Scenario

*Akihiro Mukai¹, Choji Yamazaki¹, Hitoshi Teramoto², Kenta Suzuki², Toru Kitamura², Hiroko Kuse², Masashi Shigemitsu² (1. TMEIC (Japan), 2. Mitsubishi Electric Corporation (Japan))

[O13-3-02]

Molded Interconnect Substrate (MIS)-Based GaN Power Module Enabling High-Efficiency and Compact System Integration

Qinghong Liu¹, *Ziying Li¹, Chang Huang¹, Qingyuan Tang¹ (1. Fenghua Semiconductor Technology Co., Ltd. (China))

[O13-3-03]

Compact and High-Efficiency Uninterruptible Power System for Medium-Capacity Applications

*Nobuyuki Momochi¹, Masamichi Kanoh¹, Ryo Murata¹ (1. TMEIC Corporation (Japan))

[O13-3-04]

Demonstration of Microgrid Stabilization with Virtual Synchronous Generator and Flywheel Energy Storage System

*Kenichi Sakimoto¹, Takaaki Matsuo¹, Toshiyuki Kawamoto², Akira Yagi², Jomar Balute³, Xavier Broncano³ (1. Kawasaki Heavy Industries, Ltd. (Japan), 2. IKS Co., Ltd. (Japan), 3. Amber Kinetics Philippines Inc. (Philippines))

[O13-3-05]

A Novel Feed-Forward Voltage-Injection Active EMI Filter for Two-Stage Grid-Connected PV Inverters

Sarayut Jitprasong², *Pawaret Ampai¹, Surapong Suwankawin¹ (1. Chulalongkorn University (Thailand), 2. A.P.Y. Engineering Co., Ltd. (Thailand))

Technical Sessions: Oral Sessions 13

Room 102 (1F)

[Oral] Rotating Electrical Machine

[O13-4] General Topics for Rotating Electrical Machines

Chairs: Hiroya Sugimoto (Tokyo Denki University)
Yujing Liu (Chalmers University of Technology)

[O13-4-01]

Applying a Magnetic Composite Material onto a Motor Rotor for the Reduction of AC Copper and Permanent Magnet Eddy Current Losses

*Ren Washioka¹, Takashi Nakamura¹, Kensuke Masuda¹, Jun Kitajima¹, Tsutomu Mizuno¹, Masami Nirei², Mitsuhide Sato¹
(1. Shinshu university (Japan), 2. National Institute of Technology Nagano College (Japan))

[O13-4-02]

Flux Linkage Estimation and Condition Monitoring of an IPMSM with Mechanically Adjustable Flux Linkage

*Matthew Bagnara¹, Gabriel Weissitsch², Behrooz Bahrani¹, Greg Heins¹, Edmund Marth², Gerd Bramerdorfer² (1. Monash University (Australia), 2. Johannes Kepler University Linz (Austria))

[O13-4-03]

Benchmarking of Traction Electric Machines Considering Sustainability and Performance

*Edoardo Lagorio¹, Simone Ferrari¹, Federica Graffeo¹, Chengyang Ye¹, Irving Sixto Aguilar Zamorate³, Vittorio Ravello², Raffaele Bonavolontà², Andrea Tonoli¹, Silvio Vaschetto¹, Gianmario Pellegrino¹ (1. Politecnico di Torino (Italy), 2. CRF - Stellantis (Italy), 3. Tecnológico de Monterrey (Mexico))

[O13-4-04]

Reimagining Hairpin Windings: 3D Transposition through Additive Manufacturing

*Yitbarek Tedla Bekele¹, Olga Korolova², Andreas Biebighäuser², Amir Ebrahimi³, Bernd Ponick¹ (1. Leibniz University Hannover (Germany), 2. ProFluxx GmbH (Germany), 3. University of Bremen (Germany))

[O13-4-05]

A High Performance Dry-Winding Cooling Technique for Electrical Machines

*David Gerada¹, Zeyuan Xu¹, Fengyu Zhang¹, Chris Gerada¹, Andrew Page², David Tate², Tadashi Sawata² (1. University of Nottingham (UK), 2. Collins Aerospace (UK))

Technical Sessions: Oral Sessions 13

Room 103 (1F)

[Oral] Power Electronics Applied to Home Appliance and V2X

[O13-5] Power Electronics Applied to Home and V2X using Machine Learning

Chairs: Toshiyuki Fujita (Shibaura institute of technology)
Chaoyu Dong (Nanyang Technological University)

[O13-5-02]

SOC Estimation for 1000V Energy Storage Systems: Implementation and Validation of an Extended Kalman Filter-Based Approach

Wei-Feng Chin¹, *TZU-WEI CHIANG², Kuan-Ting Lai² (1. Orient Technology (Singapore), 2. National Taipei University of Technology (Taiwan))

[O13-5-03]

A Study on Topological Analysis and Necessary Processing of Distribution Networks Simulation Data

*IN KWON PARK¹, Yi Zhang¹, Gilsung Byeon² (1. RTDS Technologies (Canada), 2. Korea Electrotechnology Research Institute (KERI) (Korea))

[O13-5-04]

Adaptive Synchronverter Algorithm with Q-learning for University Microgrid

Mohd Brado Frasetyo¹, *Fransisco Danang Wijaya¹, Husni Rois Ali¹ (1. Universitas Gadjah Mada (Indonesia))

Technical Sessions: Oral Sessions 13

Room 107 (1F)

[Oral] Motor Drive and Control

[O13-6] Practical Technique of Motor Drive Systems

Chairs: Ufot Ekong (TMEIC)

Wang Shuo (University of nottingham Ningbo China)

[O13-6-01]

Effects of Power Superposition on Motor Control Characteristics and Extracted Power in a Power Superposition System on PMSM Power Lines

*Taiga Fujii¹, Takeshi Kiribuchi², Yukinori Inoue¹, Masayuki Sanada¹ (1. Osaka Metropolitan University (Japan), 2. OMRON (Japan))

[O13-6-02]

Electric Motor Emulator for Variable-frequency-driven Induction Motor with Stator Interturn Fault

*Koroku Nishizawa¹, Ikuya Sato¹ (1. Fuji Electric Co., Ltd. (Japan))

[O13-6-03]

Four Switches Three Phase Inverter Space Vector Overmodulation Analysis

*Shuo Wang¹, Abraham M Alcaide², Giampaolo Buticchi¹, Alberto Castellazzi³ (1. university of nottingham Ningbo China (China), 2. Universidad de Sevilla (Spain), 3. Kyoto university of advanced science (Japan))

[O13-6-04]

Encoder Power Supply Using Common-Mode Current with a Zero-Phase Inductor and Y-Capacitors

*Takumi Nakagaki¹, Kodai Nisikawa¹, Hiroki Watanabe¹, Jun-ichi Itoh¹, Takeshi Kiribuchi² (1. Nagaoka University of Technology (Japan), 2. Omron Cooperation (Japan))

[O13-6-05]

Direct Measurement and Analysis of Iron loss Using the H-coil Method During Low-order Harmonic Current Suppression in PMSMs

*Kaiki Akizuki¹, Toshiyuki Fujita¹, Sakahisa Nagai¹, Hiroshi Fujimoto¹, Michihiro Nakagawa², Naoya Yamashita², Takayuki Miyajima², Yoshiki Yasuda², Akio Yamagiwa² (1. The University of Tokyo (Japan), 2. DAIKIN INDUSTRIES, Ltd. (Japan))

Technical Sessions: Oral Sessions 13

Room 108 (1F)

[Oral] Semiconductor Power Conversion » Application-oriented power converter and control

[O13-7] Grid-forming Control of Power Converters and Systems

Chairs: Shan Jiang (UNSW Sydney)

[O13-7-01] Invited Paper

A Current-Limiting Strategy for Grid-Forming Converters under Varying Line Reactance-to-Resistance Ratios

*Yian Guo¹, Huizhong Wang¹, Yaohua Li², Yi Tang² (1. Energy Research Institute @ NTU, Interdisciplinary Graduate Programme, Nanyang Technological University, Singapore (Singapore), 2. School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore (Singapore))

[O13-7-02] Invited Paper

A New Partitioning Method for Renewable Energy Systems in Black-Start Based on Graph Theory

*Lingjun Yao¹, Yi Xiao¹, Yongheng Yang¹, Frede Blaabjerg² (1. College of Electrical Engineering, Zhejiang University (China), 2. Department of Energy, Aalborg University (Denmark))

[O13-7-03] Invited Paper

An Improved Voltage Regulation Method for Grid-Forming Converter in Low Voltage Distribution Grids Considering Current Limiting

*Haoyuan Yu¹, Liang Huang², Hanwen Zhang³, Junjie Xiao¹, Fan Yang¹, Hang Ren², Zian Qin¹ (1. Delft University of technology (Netherlands), 2. Aalborg University (Denmark), 3. University of Bath (UK))

[O13-7-04] Invited Paper

Power Reference Adjustment Using Current Saturation Ratio to Improve Synchronization Stability of Grid-Forming Converters

*Tianyi Xu¹, Shan Jiang¹, Georgios Konstantinou¹ (1. University of New South Wales (Australia))

[O13-7-05] Invited Paper

Dynamic Output Impedance of Grid-Forming Inverters under Current Limiting

Bowen Yang¹, *Yongheng Yang², Gab-Su Seo¹ (1. National Laboratory of the Rockies (USA), 2. Zhejiang University (China))

Hall 1 (2F)

[Oral] Semiconductor Power Conversion

[O13-8] Industry Technology Session in Semiconductor Power Conversion 2

Chairs: Yusuke Hayashi (Toshiba Corporation)
Ruben Inzunza (TMEIC)

[O13-8-01]

Design and Variation Analysis of Wireless Power Transfer System

Kenichiro Hitosugi¹, *Yudai Funaki¹, Kimiyoshi Kobayashi¹ (1. Shindengen Electric Manufacturing Co., Ltd. (Japan))

[O13-8-02]

A Light Load Control Scheme for Three-Phase Isolated Buck Matrix-type Rectifier with Regenerative Active Snubber

*Tomotaka Nagai¹, Yuki Ishikura¹ (1. Murata Manufacturing Co., Ltd. (Japan))

[O13-8-03]

Evaluation and Efficiency Improvement Strategies of a 1-kV 500-kW Dual-Active-Bridge Converter Using SiC Modules

*Kenshi Nagumo¹, Akira Komuro¹, Yudai Ogata¹, Shuji Tanaka¹, Kei Matsumoto¹, Takushi Jimichi¹ (1. TMEIC Corporation (Japan))

[O13-8-04]

Over 1 MHz operation Totem-Pole PFC ASIC with next generation Wide Bandgap device GaN

*Yasuo Tom Higuchi¹, Genki Tsuruyama¹, Yuhei Yamaguchi¹ (1. ROHM Co., Ltd. Marketing Headquarters (Japan))

[O13-8-05]

Switching-Node-to-Ground Short Protection Applicable to 48V GaN DC-DC Converters for AI Server Power Systems

*Yuhei Yamaguchi¹, Isao Takobe², Genki Tsuruyama¹ (1. ROHM Co., Ltd. Marketing Headquarters (Japan), 2. ROHM Co., Ltd. LSI Development Headquarters (Japan))

Technical Sessions: Oral Sessions 13

Online Session (Online)

[Oral] Semiconductor Power Conversion » Advanced Power conversion topology

[O13-9] Semiconductor Power Conversion

Chairs: Rui Wang (Hunan University)
Kansuke Fujii (Fuji Electric)

[O13-9-01]

Scalable Design and Control of Multiple-Parallel Grid-Forming Converter Static Var Generators

Muhammad Waqas Qaisar^{1,2}, Jingyang Fang^{1,2}, *Pengfeng Lin³, Vladimir Terzija⁴ (1. Shenzhen Research Institute of Shandong University, Shandong University (China), 2. School of Control Science and Engineering, Shandong University (China), 3. School of Electrical Engineering, Shanghai Jiao Tong University (China), 4. School of Engineering, Newcastle University (UK))

[O13-9-02]

A Parallel Differential Power Processing Scheme with Mismatching Detection

*Xue Wang¹, Qinglei Bu², Guansong Shan², Liping Wang¹ (1. Suzhou City University (China), 2. Xi'an Jiaotong-Liverpool University (China))

[O13-9-03]

Resonance Characteristic Investigation and External Damping Strategy Analysis of APF System

*Zhilong Zhang¹, Hao Yi¹, Xin Jiang¹, Qiru Li¹, Zebing Yang¹, Fang Zhuo¹, Ruru Zheng^{1,2} (1. Xi'an Jiaotong University (China), 2. Yandangshan Institute of Electrical Technology (China))

[O13-9-04]

Generalized Topology Derivation via Graph Theory for Switch-Minimized Hybrid Multilevel Inverters

*Jincheng Huang¹, Mi Dong¹, Liansheng Huang², Xiaojiao Chen², Xianyong Xu³, Bokovi Yao⁴, Xian Liu⁵ (1. Central South University (China), 2. Institute of Plasma Physics, Chinese Academy of Sciences (China), 3. State Grid Hunan Electric Power Company (China), 4. University of Lomé (Togo), 5. Hunan Hangxin Intelligent Technology Co., Ltd. (China))

[O13-9-05]

Reverse Derivation Method for ANPC Inverter Topology Enabling Consistent Operating Modes

*Bohui Dong¹, Mi Dong¹, Jincheng Huang¹, Chenyao Xu², Liansheng Huang³, Xiaojiao Chen³, Xianyong Xu⁴, Bokovi Yao⁵, Xian Liu⁶ (1. Central South University (China), 2. City University of Hong Kong (Hong Kong), 3. Institute Of Plasma Physics Chinese Academy Of Sciences (China), 4. STATE GRID HUNAN ELECTRIC POWER COMPANY LIMITED (China), 5. University of Lomé (Togo), 6. Hunan Hangxin Intelligent Technology Company Limited (China))

[O7-4-01]

A Low-cost Single-Stage Unidirectional Solid-state Transformer with Mixed-Frequency Conversion

*Zhifeng Deng¹, Jinjun Liu¹, Sixing Du¹, Ning Guo¹, Tong Wu¹ (1. Xi'an Jiaotong University (China))

Poster Sessions

Tuesday, June 2 12:40 – 14:00

Poster 1-1 (Event & Exhibition Hall)

[P1-1] Advanced Power conversion topology 1

Chair: Ikuya Sato (Fuji Electric Co., Ltd.)

[P1-1-01] Assessment of Transformer Mismatch in LLC-Based Two-Stage Solid-State Transformers

*Samuel Soares Queiroz¹, João Victor Guimarães França¹, Levy Ferreira Costa¹ (1. Eindhoven University of Technology (Netherlands))

[P1-1-02] Transformerless Dual-Grounded Boost Inverter Featuring Multiplexed Switching and Reactive Grid Support for PV Systems

*hanlei tian tian¹, jie qiu¹, junyu fan¹, peisong han², yangyang chen¹, jinliang huang¹, wei han¹ (1. The Hong Kong University of Science and Technology (China), 2. Yanshan University (China))

[P1-1-03] Rapid Control Prototyping of Multi-Phase-Shift Modulation for Dual Active Bridge Converter using dSPACE MicroLabBox II

*Melinya Kamonlaksameekit¹, Satit Owatchaiphong¹, Narong Thumputi¹ (1. KING MONGKUT'S UNIVERSITY OF TECHNOLOGY NORTH BANGKOK (Thailand))

[P1-1-04] Single Input Multi Output Converter Design by Three-Port Network Analysis

*Junho Shin¹, Jung-Ik Ha¹, Jong-Won Shin¹ (1. Seoul National Univ. (Korea))

[P1-1-05] Asymmetric Switched-Capacitor Multilevel Inverter with Reduced Components and Common-Ground Connection

*Jinliang HUANG¹, Hanlei TIAN¹, Bowang ZHANG¹, Wei HAN¹ (1. The Hong Kong University of Science and Technology (Guangzhou) (China))

[P1-1-06] DC Voltage Control of Single-Stage Isolated AC-DC Converter based on Half-bridge DAB Converter with PFC capability

*Hayate Akiyama¹, Takashi Ohno¹, Hiroki Watanabe¹, Jun-ichi Itoh¹ (1. Nagaoka University of technology (Japan))

[P1-1-07] 67 W/cm³ High Power Density DCX with Capacitive Isolation and Integrated Magnetics for Low-Voltage DC Power Supply

*Keigo Arita¹, Yusuke Hayashi¹ (1. Toshiba (Japan))

[P1-1-08] Voltage and Power Sharing Analysis of an ISOP DC/DC Stage With Fault-Tolerance Capability

*Samuel Soares Queiroz¹, Levy Ferreira Costa¹ (1. Eindhoven University of Technology (Netherlands))

[P1-1-09] A Modulation Strategy for Generating Sinusoidal Output Voltage Under Arbitrary Power Factor Conditions in Flying-Capacitor Linear Amplifiers

*Shunsaku Nomoto¹, Keisuke Kusaka¹ (1. Nagaoka University of Technology (Japan))

[P1-1-11] Synthesis of Hybrid Integrated Multi-Output Converters with Inherent ZVS Operation

*Anubhav Sharma¹, Debjit Rana¹, Santanu Kumar Mishra¹ (1. Indian Institute of Technology, Delhi (India))

[P1-1-12] Virtual Reactance Circuit for Miniaturizing the Grid-Side Inductor Based on Four-Terminal Network Theory

Riki Yamazaki¹, Shunta Hayashi¹, *Keisuke Kusaka¹ (1. Nagaoka University of Technology (Japan))

[P1-1-13] Mixed-sensitivity Based Multi-variable Controller Design For Boost integrated Buck-Type Double-Input DC-DC Converter

*Veerachary Mummadi¹, Varun Mishra¹ (1. Indian Institute of Technology Delhi (India))

Poster Sessions

Tuesday, June 2 12:40 – 14:00

Poster 1-1 (Event & Exhibition Hall)

[P1-1-14] Analysis of Neutral Point Clamped Dual Active Bridge Converter Over a Wide Output Voltage Range

*Shashank Santosh Panikkar¹, Florian Floh¹, Markus Makoschitz^{1,2}, Rupak Chakraborty² (1. Chair of Electrical Engineering, Technical University of Leoben (Austria), 2. Power and Renewable Gas Systems, Austrian Institute of Technology (Austria))

Poster 1-2 (Event & Exhibition Hall)

[P1-2] Advanced Power conversion topology 2

Chair: Yoshiya Ohnuma (Nagaoka power Electronics)

[P1-2-01] Multiphase Flyback Converter with Clamping Circuit for Multiple-Output Converter

*Narong Thumputi¹, Satit Owatchaiphong¹ (1. King Mongkut's University of Technology North Bangkok (Thailand))

[P1-2-02] A Half-Bridge Converter with Coupled Inductor for Electric Power Systems in Satellites

*Seongjun Kim¹, Dongmin Choi¹, Kahee Kim¹, Jaeil Baek¹, Gun-Woo Moon¹ (1. KAIST (Korea))

[P1-2-03] Benchmark of Conventional and Center-Tapped Dual Active Bridge Converter

*Suo Matsunaga¹, Queena Qurrota Ayun¹, Isitha Kapugamage¹, Alberto Castellazzi¹ (1. Kyoto University of Advanced Science (Japan))

[P1-2-04] Transient Response of Buck-Boost DC-DC Converter with Large Proportional Gain

Kazuhiro Kajiwara¹, *Koushi Aoki¹, Yudai Furukawa¹, Fujio Kurokawa¹ (1. Nagasaki Institute of Applied Science (Japan))

[P1-2-05] Toroidal Core Transformer based Multiport Power Combiner for RF Plasma Source

*Kuang Shi¹, Ming Liu¹, Shuang Li¹, Wei Liu¹, YongZhi Zhu¹ (1. Shanghai Jiao Tong University (China))

[P1-2-06] Implementation of Bidirectional Buck-Boost Converter using Gallium Nitride Technology

*Kaisana Boonmepit¹, Jedsada Jindahom¹, Satit Owatchaiphong¹, Narong Thumputi¹ (1. King Mongkut's University of Technology North Bangkok (Thailand))

[P1-2-07] Experimental Verification of Current Balancing in Parallel MHz WPT Systems Using a Coupled Inductor Pair

*Rintaro Kusui¹, Taiga Osada¹, Hiroki Watanabe¹, Jun-ichi Itoh¹ (1. Nagaoka University of Technology (Japan))

[P1-2-08] Fully Soft Switched Dual Active Bridge Converter for Wide Range of Voltage and Power Applications Using Variable Inductor and SPS Modulation

*Priya Priya¹, Baylon G. Fernandes¹ (1. Indian Institute of Technology, Bombay (India))

[P1-2-09] A Bootstrapped Gate Driver with Integrated LDO for GaN Power Devices

Pang-Jung Liu¹, *Yu-Jie Lin¹, Yu-Hui Hsiao¹, Chang-Jing Yang², Wei-Hsiang Chao² (1. National Taipei University of Technology (Taiwan), 2. Ancora Semiconductors Inc. (Taiwan))

[P1-2-10] Optimized Morphological Filter for Power Spike Detection

*Yevgen Biletskiy², Zhihao Yu¹, Liuchen Chang² (1. UNB graduate (Canada), 2. Professor UNB (Canada))

[P1-2-11] Fast Black Start of Grid-Forming Inverters in Multi-Transformer Feeders via Simultaneous Accelerated Soft-Magnetization

*Jiyu Lee¹, Jae-Jung Jung², Shenghui Cui¹ (1. Seoul National University (Korea), 2. Kyungpook National University (Korea))

Poster Sessions

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Poster 1-3 (Event & Exhibition Hall)

[P1-3] Application-oriented power converter and control 1

Chair: Atsushi Nakajima (PandaPower Co., Ltd. / Tokyo Denki Univ.)

[P1-3-01] A novel active compensation based low-frequency power supply for Remanent Flux Elimination

*Haohan Yang¹, Yunqing Pei¹, Lantian Shao¹, Wenhui Pei¹ (1. Xi'an Jiaotong University (China))

[P1-3-02] A Stackable, Industry-Aligned Pathway in Smart Electric Power: Renewable Generation Technology, Distributed Microgrids Engineering, and a Professional Master's in Intelligent Power Systems

*Fredy Martinez¹ (1. Universidad Distrital Francisco Jose de Caldas (Colombia))

[P1-3-03] Performance Evaluation of Low-Pass Filters for D-Σ Direct Digital Control with Capacitor Current Compensation in 3Φ3W Grid-Connected Inverters

Tsai-Fu Wu¹, *Chien-Chih Hung¹, Jui-Yang Chiu¹, Yu-Xian Li¹, Xi-Ming Duan¹ (1. National Tsing Hua University (Taiwan))

[P1-3-04] Analysis and suppression of low frequency circulating current for transformer-coupled parallel rectifiers with common DC bus

*Kaiwen Feng¹, Zipeng Liu¹, Min Wu¹, Jiazhi Wang¹, Jinjun Liu¹ (1. Xi'an Jiaotong University (China))

[P1-3-05] Compensation Method for Current Asymmetry Induced by a DC-link Capacitor at Active 3rd-order Harmonic Injection Rectifier

*Jin Yoo¹, Jisun Ham¹, Shenghui Cui¹ (1. Seoul National University (Korea))

[P2-1-07] Offset-Suppression-Based Current Control for Three-Phase Four-Wire Grid Connected Inverters under Current Measurement Offset Effects

*Yaow-Ming Chen¹, Irham Fadlika^{1,2}, Wen-Yen Li¹ (1. National Taiwan University, Dept. of Electrical Engineering (Taiwan), 2. State University of Malang (Indonesia))

Poster 1-4 (Event & Exhibition Hall)

[P1-4] Application-oriented power converter and control 2

Chair: Kenta Emori (Nissan Motor Co., Ltd.)

[P1-4-01] An Improved DPWM Method for Single-Phase 3L-NPC Converters in Solid-State Transformers Featuring Enhanced Efficiency and Current Quality

Haiguo Tang¹, Lei Ren², *Xing Fang¹, Junzhong Xu¹, Yong Wang¹ (1. Shanghai Jiao Tong University (China), 2. Xiang Dian Electric Manufacturing Group Co.,Ltd. (China))

[P1-4-02] A Hybrid Control for Series Half Three-Level CLLC Converter With Minimized RMS Current in Solid State Transformer

Xiong Wang², Cheng Yang², Lu Bai², Xiaobo Zhang², Yuanzhen Xu³, *Chaofan Cui¹, Wei Lv¹ (1. SHANGHAI JIAO TONG UNIVERSITY (China), 2. State Grid Yulin Electric Power Supply Company (China), 3. NR Electric Co., Ltd. (China))

[P1-4-03] Adaptive Voltage Restoration-Based Droop Control Strategy Enabling CC-CV Operation for IPOPOP xEV Auxiliary Converters

*Mu ho Lee¹, Taek Keun Jung¹, Jong Soo Kim¹ (1. Daejin Univ. (Korea))

[P1-4-04] Control of an Input-Series Output-Parallel Asymmetric Triple Active Bridge for Medium-Voltage DC Renewable Applications

Ahmed Eldistawy¹, Jun-Hyung Jung¹, Endalkachew Degarege Almwu², *Nadia Mei Lin Tan², Marco Liserre^{1,2} (1. Fraunhofer ISIT (Germany), 2. Kiel university (Germany))

[P1-4-05] Interleaved LLC-Converter for a DC-Arc-Plasma Torch

*David Hirning¹, Jörg Haarer¹, Mattea Eckstein¹, Chris Hermann¹, André Haspel¹, Ingmar Kallfass², Jörg Roth-Stielow¹ (1. ILEA University of Stuttgart (Germany), 2. ILH University of Stuttgart (Germany))

[P1-4-06] Orthogonally Decoupled Integrated Inductor-Transformer for the DAB Converter

*Camilo Suarez¹, Diego Acevedo¹, Wilmar Martinez¹ (1. KU Leuven (Belgium))

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Poster 1-4 (Event & Exhibition Hall)

[P1-4-07] A Natural Power Factor Corrector and Soft Switching Design for AC-DC Single-Stage TAB Converters

Cheng Yang¹, *Mulinsen Zhang³, Xiong Wang¹, Lu Bai¹, Xiaobo Zhang¹, Shaofei Liu², Wer Lyu³ (1. State Grid Yulin Electric Power Company (China), 2. NR Electric Co., Ltd (China), 3. Shanghai Jiao Tong University (China))

[P1-4-08] Variable Inductor–Variable Capacitor (VIVC) Technique with Parameter Identification for Adaptive WPT Systems

*Po-Yi Chiang¹, Sangmin Lee², Ching-Ming Lai¹, Chunting Chris Mi² (1. National Chung Hsing University (Taiwan), 2. San Diego State University (USA))

[P1-4-09] Two-Port Network Design for a Double-Sided LC-Compensated Capacitive Wireless Power Transfer with Robustness to Coupling Variation

*Beomsoon Chung¹, Jongun Baek¹, Jong-Won Shin¹ (1. SEOUL NATIONAL UNIVERSITY (Korea))

[P1-4-10] Improving Transient Synchronization Stability and Voltage Support of Grid-Forming Converters Under Grid Faults

Wenlong Zhang¹, Lingling Tan¹, Haixiang Liu¹, *zhenzhen xie², Chao Wu², Yong Wang² (1. SHANDONG ELECTRIC POWER ENGINEERING CONSULTING INSTITUTE CORP.,LTD. (China), 2. Shanghai Jiao Tong University (China))

[P1-4-11] Analysis of Maximum Low-Voltage Ride-Through Support Capability of Grid-Forming Converters

Canyu Li¹, *Jia Liu¹, Jinjun Liu¹ (1. Xi'an Jiaotong University (China))

[P1-4-12] Interoperable Control Method of Three-Phase and Single-Phase Wireless Power Transfer Systems

*Jinwook Jung¹, Sunghyuk Choi¹, Juwon Lee¹, Won Hyo Jeong¹, Minsuk Seo¹, Jung-Ik Ha¹ (1. Seoul National University (Korea))

[P1-4-13] RIFT: Residual-based Iterative Fault Tolerance Algorithm for Reconfigurable Cascaded Multilevel Converters in BESS Applications

*Behrouz Mohammadzadeh¹, Giulia Tresca¹, Andrea Volpini¹, Pericle Zanchetta¹ (1. University of Pavia (Italy))

[P1-4-14] Arm Current Limiting of Grid-Forming Modular Multilevel Converters With Second-Order Harmonic Injection

Ye Zhu¹, *Shan Jiang², Georgios Konstantinou² (1. ShanghaiTech University (China), 2. UNSW Sydney (Australia))

[P1-4-15] Development of a Course on Resilient Electric Power Engineering

*Alexis Kwasinski¹ (1. University of Pittsburgh (USA))

Poster 1-5 (Event & Exhibition Hall)

[P1-5] Application-oriented power converter and control 3

Chair: Kazuyasu Takimoto (TOSHIBA CORPORATION)

[P1-5-01] LLC Resonant Converter Using Si-IGBT and SiC-MOSFET Hybrid Switches for Low Negawatt Cost Modular AC-DC Solid State Transformer

*Hiroki Nemoto¹, Keigo Arita¹, Yusuke Hayashi¹, Ryosuke Iijima¹ (1. Toshiba Corporation (Japan))

[P1-5-02] Robust Power Converter Health Monitoring via Domain-Specific Foundation Model

*Xinyuan Liao¹, Xinyue Zhang¹, Junwei Liu¹, Chao Wu², Yang Wu³, Yi Zhang¹ (1. The Hong Kong Polytechnic University (Hong Kong), 2. Shanghai Jiaotong University (China), 3. Nanyang Technological University (Singapore))

[P1-5-03] Comparative Study of SiC MOSFETs and Si IGBTs for A Parallel Half-Bridge Modules Based Bidirectional SSCB

Yannal Nawafleh¹, Daixin Chen¹, Baher Abu Sba¹, Ahmed Ismail¹, Yue Zhao¹, *Xiaoqing Song¹ (1. University of Arkansas (USA))

[P1-5-04] Online Estimation of Battery Resistances in a Battery Integrated Modular Multilevel Converter

*Lars Leister¹, Niklas Katzenburg¹, Phil Neugebauer¹, Lukas Stefanski¹, Marc Hiller¹ (1. Karlsruhe Institute of Technology (Germany))

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Poster 1-5 (Event & Exhibition Hall)

[P1-5-05] NSGA-II-Based Multi-Objective Optimization for Voltage Unbalance Mitigation Using PSDs and SVGs in Low-Voltage Distribution Networks

*Wei Feng¹, Hang Su², Zebin Yang^{1,3}, Zhixiong Li², Heng Du², Fang Zhuo^{1,3}, Weifeng Ge², Ruru Zheng³ (1. Xi'an Jiaotong University (China), 2. Junlang Electric Co.,Ltd. (China), 3. Yandangshan Institute of Electrical Technology (China))

[P1-5-06] Design of a Receiving Bi-polar Pad with a Relay Coil for Enhanced Interoperability

*Chang-Su Shin¹, Dong-Hee Kim¹, Minyeong Choe¹ (1. Chonnam National University (Korea))

[P1-5-07] A Study on an Interoperable Wireless Power Transfer System Using a Bipolar Pad

*So Jeong Kang¹, Dong-Hee Kim¹, Seung Jin Jo¹ (1. Chonnam National University (Korea))

[P1-5-08] Parity-Time Symmetric WPT System with Receiver Equivalent Negative Resistance for Stabilizing Output Power Over Long Distances

*Yilin ZHANG¹, Bowang ZHANG², Weikang HU¹, Youhao HU¹, Wei HAN¹ (1. The Hong Kong University of Science and Technology (Guangzhou) (China), 2. The Hong Kong University of Science and Technology (Hong Kong))

[P1-5-09] Pareto Optimal DC-Link Capacitor Selection

*Nikolas Förster¹, Sebastian Schachten², Oliver Wallscheid², Jakub Kucka¹ (1. Paderborn University (Germany), 2. University of Siegen (Germany))

[P1-5-10] Automated Gate-Profile Optimization to Maximize the Potential of Active Gate Drivers

*Kai-Jimmy Shen¹, Clara Yue Feng¹, Laurids Schmitz¹, Rik W De Doncker¹ (1. ISEA - RWTH Aachen University (Germany))

[P1-5-11] Digital Modeling and Optimal Design of DAB Converter for Efficiency Improvement

*Chaochao Song¹, Ning Wang¹, Chen Liu¹, Frede Blaabjerg¹, Pooya Davari¹ (1. AAU Energy, Aalborg University, Denmark (Denmark))

[P1-5-12] Power Leveling Control of H-MMC with Energy Storage System for Variable Frequency Generator

*Hiroki Isoda¹, Hayato Takashima¹, Shin-ichi Hamasaki¹, Tetsuji Daido¹ (1. Nagasaki University (Japan))

[P1-5-13] Fault-Ride-Through Strategy of PEMFC-Based Grid-Forming Converter with Stable Stoichiometric Utilization

*Imbo Kong Kong¹, Euntaek Nam¹, Inchan Hwang¹, Suyong Chae¹ (1. POSTECH (Korea))

[P1-5-14] Ripple Current Mitigation in DC-Link Capacitor for Two-Stage Single-Phase DC-AC Inverters based on Clamping Modulation Scheme

*Geonhu Park¹, Juyeon Lee¹, June-Seok Lee¹ (1. Dankook University (Korea))

[P1-5-15] Enhanced Dead-Time Compensation Method for Reducing Impacts of Current Polarity Detection Inaccuracy in 3-Level Hybrid ANPC Inverter

*Joonhyung Kim¹, Juyeon Lee¹, June-Seok Lee¹ (1. Dankook University (Korea))

Poster 1-6 (Event & Exhibition Hall)

[P1-6] Industrial Instrumentation and Control

Chair: Wataru Ohnishi (The University of Tokyo)

[P1-6-01] Adaptive Positive/Negative Sequence Current Extraction Using an MPC-Cascaded Kalman Filter Under Unbalanced Three-Phase Conditions

*ZHENGWEI DONG¹, Zhi Chen², Yifan Shi, Liwei Zhou¹ (1. University of Texas at Arlington (USA), 2. Nanyang Technological University (Singapore))

[P1-6-02] Interface artificial intelligence models to tertiary controllers: A GoogleNet-Fuzzy logic framework

*Jingxuan Wu¹, Shuting Li¹, Saeed Peyghami¹, Frede Blaabjerg¹ (1. Aalborg University (Denmark))

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Poster 1-6 (Event & Exhibition Hall)

[P1-6-03] Online Fault Diagnosis and Fault-Tolerant Operation of Power-Electronic Converters Using a Multi-Scale Convolutional Neural Network With Model Predictive Control

*Ning Li¹, Stephen Finney¹, Paul D. Judge¹ (1. University of Edinburgh (UK))

[P1-6-04] Scalable Modelling and Optimisation Framework based on Common Potential for Lattice Modular Converters

*Xinyun Zhang¹, Michael Merlin¹ (1. The University of Edinburgh (UK))

[P1-6-05] Neural-Network-Based Predictive Control for LLC Converters

*Qingcheng SUI¹, Yu ZUO¹, Yang LI¹, Wilmar MARTINEZ¹ (1. EnergyVille - KU Leuven (Belgium))

[P1-6-06] Modeling of FRA-Based Loop Transfer Characteristic Measurement System for SMPSs' Stability Evaluation

*Hideaki Funaki¹, Yushi Miura¹ (1. Nagaoka University of Technology (Japan))

[P1-6-07] Inertia Measurement Using Active Power Reference Step for Grid-Supporting Inverters

*Shuhei Kadota¹, Hideaki Funaki¹, Yushi Miura¹ (1. Nagaoka University of Technology (Japan))

[P1-6-09] Dynamic Characteristics Improvement of PMD Battery Charger with Fuzzy Logic Control

*Gijeong Yoon¹, Sungjoon Cho², Yeongsu Bak¹ (1. Keimyung University (Korea), 2. Daegu University (Korea))

[P1-6-10] Design of 2-DOF controller using convolution-based data-driven simulation

*Teppey Yamada¹, Fujimoto Yasutaka¹ (1. Yokohama National Univ. (Japan))

[P1-6-11] Adaptive Differentiable Predictive Control for Parameter-Varying Power Electronic Systems

*YUAN LI¹, Shuai Zhao¹, Mateja Novak¹, Huai Wang¹, Frede Blaabjerg¹ (1. Aalborg University (Denmark))

[P1-6-12] Digital Twin-Based Quality Inspection of Starter Motor Power Transmission Modules

Qi-You Huang¹, Zhong-Han Tsai², *Wei-Che Lin¹, Mi-Ching Tsai^{1,2} (1. Electric Motor Technology Research Center, National Cheng Kung University (Taiwan), 2. Department of Mechanical Engineering, National Cheng Kung University (Taiwan))

[P1-6-13] Application of Autonomous Mobile Robots with Visual Guidance, Energy-Saving Navigation, and Electric Lifting Devices in the Smart Industry

*Ming-Yen Wei¹, Po-Hsien Wu¹ (1. Department of Electrical Engineering, National Formosa University (Taiwan))

[P1-6-14] Adaptive Barrier Function-based Nonsingular Terminal Sliding Mode Control for Wireless Motor System

*YOUHAO HU¹, BOWANG ZHANG², WEIKANG HU², JUNRUI LIU¹, WEI HAN¹ (1. The Hong Kong University of Science and Technology (Guangzhou) (China), 2. The Hong Kong University of Science and Technology (Hong Kong))

[P1-6-15] Broadband Control for Virtual Impedance Circuits Based on a Model-Matching Approach

*Kazutada Yamashita¹, Keita Ohata¹, Keisuke Kusaka¹, Kodai Nishikawa¹, Hiroki Watanabe¹, Jun-ichi Itoh¹ (1. Nagaoka University of Technology (Japan))

[P1-6-16] Deadbeat Positioning Control Based on PWM Hold

*Tamon Miyauchi¹, Qige Chen¹, Jun Ishikawa¹ (1. Tokyo Denki University (Japan))

[P1-6-17] A Novel Resonance Suppression method for LCL-Type Grid-Connected Inverters Based on Model Predictive Control

*Kaiwen Feng¹, Huilin Xu², Zipeng Liu¹, Jiazhi Wang¹, Jiang Liu², Jinjun Liu¹ (1. Xi'an Jiaotong University (China), 2. Xi'an University Of Science And Technology (China))

[P1-6-18] A High-Bandwidth Single-Turn Pickup Coil Current Sensor

*Haonan Jiang^{1,2}, Shuzhen You^{1,2}, Longyang Yu^{1,2}, Wei Mu³, Shenglei Zhao^{1,2}, Yue Hao^{1,2}, Jincheng Zhang^{1,2} (1. Xidian University (China), 2. Guangzhou institute of technology, Xidian University (China), 3. Department of Engineering, University of Cambridge (UK))

Poster Sessions

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Poster 1-7 (Event & Exhibition Hall)

[P1-7] Rotating Electrical Machines 1

Chair: Yasuhito Takahashi (Doshisha University)

[P1-7-01] Design and Optimization of High-Speed IPMSM Stators Using Fe-Co Electrical Steel for Enhanced Power Density in Aerospace Propulsion

*DAEYEONG JI¹, DONGWOO LEE², JAEHWAN LEE², HOJOON LEE¹ (1. Dankook University (Korea), 2. Cheongju University (Korea))

[P1-7-02] An Integrated Design Approach for Power Factor and Efficiency Enhancement in PM Vernier Machines Using Hybrid Stator with Magnetic End Caps

*Po-Wei Huang^{1,2}, Tsung-Wei Chang³, Shen-Han Jian², I-Hua Jiang², Mi-Ching Tsai^{1,2} (1. Department of Mechanical Engineering, National Cheng Kung University (Taiwan), 2. Electric Motor Technology Research Center, National Cheng Kung University (Taiwan), 3. Department of Vehicle Engineering, National Kaohsiung University of Science and Technology (Taiwan))

[P1-7-03] Comparative Study of PM Synchronous Machine and PM Vernier Machine for eVTOL Applications

*Ziang Wang^{1,2}, Dawei Li^{1,2}, Yu Zhao^{1,2}, Ronghai Qu^{1,2} (1. State Key Laboratory of High-Density Electric Energy Conversion (China), 2. School of Electrical and Electronic Engineering Huazhong University of Science & Technology (China))

[P1-7-04] Data-Driven Bayesian Inference for High-Fidelity Material Property Characterization in Electrical Machines

*Marc Ramos Friedmann¹, Calina Ciuhu¹, Doga Ceylan¹, Marko Merdzan¹, Elena Lomonova¹ (1. Eindhoven University of Technology (Netherlands))

[P1-7-05] Study on Increasing Power Density of Motor for Large Drones

*Satoru Ota¹, Kazuma Hikida¹, Takashi Okitsu¹, Masatsugu Takemoto², Ren Tsunata² (1. Power Electronics & Drive Systems Research Dept., Advanced Technology Research Laboratories, Research & Development Group, MEIDENSHA CORPORATION (Japan), 2. Graduate School of Environmental, Life, Natural Science and Technology, Okayama University, Okayama (Japan))

[P1-7-06] Study on Magnet Eddy Current Loss Reduction by Applying Copper Foil around the Magnets in Interior Permanent Magnet Synchronous Motors

*Junji Kitao¹, Takahiro Mizuta¹ (1. Mitsubishi Electric Corporation (Japan))

[P1-7-07] Speed Oscillation Damping Algorithm for I-F Speed Control of Synchronous Motors

*Yerim Shim¹, Dongyeob Han², Jaeyong Kim², Sungmin Kim² (1. Hyundai Elevator (Korea), 2. Hanyang university ERICA campus (Korea))

[P1-7-08] Geometry Optimization of Brushless Permanent Magnet Synchronous Machines for Household Appliances

*Nejat Saed¹, Klaus Krischan¹, Annette Muetze¹ (1. Graz University of Technology (Austria))

[P1-7-09] Methods for Calculating and Reducing Surge Voltages Caused by Recovery Currents of Diodes Connected to Synchronous Generators

*Daisuke Kori¹, Takayuki Koyama², Hiroyuki Sato², Shuhei Sato² (1. Hitachi, Ltd Research Department (Japan), 2. Hitachi Industrial Products, Ltd (Japan))

[P1-7-10] Controllability-Oriented Design Method of Electrically-Excited Synchronous Machines in Pumped-Storage Hydropower Plants

*Seyedali Seyedbouzari¹, Annette Muetze¹, Johann Peter Bacher¹, Boštjan Polajžer² (1. Graz University of Technology (Austria), 2. University of Maribor (Slovenia))

[P1-7-11] Torque Ripple Reduction Mechanism of Flux Barrier in Synchronous Reluctance Motor

*Yuki Hidaka¹, Kazumasa Ide² (1. Ritsumeikan University (Japan), 2. Nagoya University (Japan))

[P1-7-12] Torque Ripple Optimized Design of a Synchronous Reluctance Machine with Concentrated Windings

*Mario Nikowitz¹, Manfred Schrödl¹ (1. TU Wien (Austria))

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Poster 1-7 (Event & Exhibition Hall)

[P1-7-13] Step-out Suppression using External Impedance for Motor-generator set Driven Synchronous Reluctance Motors in Equivalent Load Testing

*Yamamoto Shunsuke¹, Yuki Hidaka², Takumi Murakami², Fumiya Koga³, Sunao Wakasugi³, Masatsugu Oyamada³ (1. Nagaoka University of Technology (Japan), 2. Ritsumeikan University (Japan), 3. TMEIC Corporation (Japan))

[P1-7-14] Comparative Evaluation of Rotor Segmentation Strategies for Eddy-Current Loss Reduction in Additively Manufactured Multi-Material Synchronous Reluctance Rotors

*Siddique Akbar¹, Amir Ebrahimi³, Bernd Ponick² (1. Profluxx GmbH (Germany), 2. Institute for Drive Systems and Power Electronics (Germany), 3. Institute for Electrical Drives, Power Electronics and Components (Germany))

Poster 1-8 (Event & Exhibition Hall)

[P1-8] Controls and Drives of Electric Machines 1

Chair: Hiroki Ishikawa (Gifu University)

[P1-8-01] Impact of Inverter Nonlinearities and Stator Coupling on Flux Observation in Triple-Stator Induction Machine

Abdulrahman Ali M Alharbi¹, Shafiq Odhano¹, *Saleh Ali¹, Volker Pickert¹, Fajer Alelaj² (1. Newcastle University (UK), 2. Kuwait Institute for Scientific Research (UK))

[P1-8-02] Predefined-Time Adaptive Dynamic Programming and Fractional-Order Sliding Mode Control for Loss Optimization in Flywheel Energy Storage Systems

*Xue Wang¹, Yuting Gao¹, Takashi Kosaka² (1. Wuhan University (China), 2. Nagoya Institute of Technology (Japan))

[P1-8-03] Direct Instantaneous Torque Control of Switched Reluctance Motor Using T-Type Three-Phase Four-Leg Converter

*Dexu Lv¹, Wen Ding¹, Zhuobo Dong¹, Zhanyuan Su¹, Da Wang¹ (1. Xi'an Jiaotong University (China))

[P1-8-04] Quasi-adaptive speed control of a PMSM using the Gain Scheduling technique

*Tomasz Pajchrowski¹, Jerzy Zawieja¹ (1. Poznan University of Technology (Poland))

[P1-8-05] A Start-up Method for a Synchronous Reluctance Generator in Islanded Operation

*Tetsuji Daido¹, Yuya Kanda¹, Arashi Yoshioka¹, Shin-ichi Hamasaki¹ (1. Nagasaki University (Japan))

[P1-8-06] Sensorless Position Control for PMSMs at Low Speeds Using a Single-Shunt Current Sensor

*Hibiki Tamiya¹, Yoshitaka Iwaji¹ (1. Ibaraki University (Japan))

[P1-8-07] Controller-Hardware-in-the-Loop Investigations for a Partly Superconducting Medium-Speed Wind Turbine Generator Prototype

*Nick Thönelt¹, Benedikt Schmitz-Rode¹, Nils Rickertsen¹, Lukas Stefanski¹, Marc Hiller¹ (1. Karlsruhe Institute of Technology (Germany))

[P1-8-08] Capacitance Reduction Method for Smoothing Capacitors in Motor Drive Inverter Circuits

*Fuma Saruta¹, Yoshitaka Iwaji² (1. Graduate School of Science and Engineering, Ibaraki Univ. (Electrical & Electronic) (Japan), 2. Ibaraki University, Graduate School of Science and Engineering (Electrical & Electronic) (Japan))

[P1-8-09] A Novel Fault-Tolerant Control Approach for a Six-Phase Motor Drive Under Open-Circuit Faults

*Germán Fañanás-Puigjaner¹, Sergio Busquets-Monge¹, Gabriel Garcia-Rojas¹, Fabio Bernardi², Davide Barater², Àlber Filbà-Martínez³ (1. Universitat Politècnica de Catalunya (Spain), 2. University of Modena and Reggio Emilia (Italy), 3. Catalonia Institute for Energy Research (Spain))

[P1-8-10] Admittance Shaping Control for Reduced DC-Link Capacitance IPMSM Drives

*Ko OUE¹, Nami FUNAMOTO¹, Nobuo HAYASHI¹, Masaki KONO¹, Takayuki MIYAJIMA¹, Kazuya TSUBOUCHI¹ (1. DAIKIN Industries (Japan))

[P1-8-11] MTPA Control between Different Pole Numbers during Pole Change in Multiphase IM Drive System

*Taito Matsumoto¹, Shinji Doki¹, Hirotaka Kato², Jun-ichi Itoh², Masashi Kobayashi³ (1. Nagoya University (Japan), 2. Nagaoka University of Technology (Japan), 3. Toyota Motor Corporation (Japan))

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Poster 1-8 (Event & Exhibition Hall)

[P1-8-12] Real-Time DC-Link Capacitor Stress Reduction in Two-Level Three-Phase Inverters Using Adaptive Multi-Carrier PWM Method

*Enes Ayaz¹, Shahriar Sarmast Ghahfarokhi¹, Staffan Norrga¹, Hans-Peter Nee¹ (1. KTH royal institute of technology (Sweden))

[P1-8-13] Fault-Tolerant Control of a Nine-Phase Permanent Magnet Synchronous Machine Using an Adapted Vector Space Decomposition Matrix

*Michael Mangels¹, Michael Ebnicher¹, Jörg Kammermann¹, Hans-Georg Herzog¹ (1. Technical University of Munich, TUM School of Engineering and Design, Professorship of Energy Conversion Technology (Germany))

[P1-8-14] Comprehensive Analysis of Bearing Stress Reduction with Modulation and Output Filters

*Minchul Kim¹, Younghoon Cho¹ (1. Konkuk Univ. (Korea))

[P1-8-15] Design of the Voltage Feedback Flux Weakening Controller for PMSM Based on Small Signal Voltage Model

*Jaeyong Kim¹, Dongyeob Han¹, Yerim Shim¹, Sungmin Kim¹ (1. Hanyang University ERICA Campus (Korea))

[P1-8-16] MTPA Angle Search Method Using Virtual Signal Injection with Inductance Identification

*Taishi Arai¹, Sari Maekawa¹, Sho Shibata², Shizunori Hamada² (1. Meiji University (Japan), 2. MEIDENSHA CORPORATION (Japan))

Poster 1-9 (Event & Exhibition Hall)

[P1-9] Sensorless Control and Model Predictive Control

Chair: Motoki Sato (ToyodenkiSeizo K.K.)

[P1-9-01] Study of Initial Speed Estimation for Induction Motors with Speed Sensorless Control Utilizing Cross-Coupling between d - q Axes

*Yuto Suzuki¹, Yoshitaka Iwaji¹, Naoki Kunihiro², Takashi Kaneko² (1. Ibaraki Univ. (Japan), 2. Hitachi, Ltd. (Japan))

[P1-9-02] Impact of Speed and Position Estimation Errors on Sensorless PMSM Drive Dynamic Performance

*Rui Cai¹, Kaiyuan Lu¹, Shuai Zhao¹, Dong Wang² (1. Aalborg Univ. (Denmark), 2. Sichuan Univ. (China))

[P1-9-03] Sensorless Model Predictive Flux Control of a Five-Phase Induction Machine

Hammad Hasan¹, Omar Al Zaabi¹, *Abdul R. Beig¹ (1. Khalifa University (United Arab Emirates))

[P1-9-04] ANN-based Sensorless Control Method for Estimating Rotor Speed and Position of PMSM

*Gyuri Kim¹, Junhyeok Choi¹, Yeongsu Bak¹ (1. Keimyung University (Korea))

[P1-9-05] Sensorless Vector Control of a Concentrated-Winding SPMSM Using 1/3N Carrier Frequency Components

*KOTARO KYONO¹, Hisao Kubota¹ (1. Meiji university (Japan))

[P1-9-06] MPC-Based Direct Torque Control in the abc Frame for Induction Motors

Kaif Ahmed Lodi¹, Abdul R Beig¹, *Majid Poshtan², Apparao Dekka³ (1. Khalifa University (United Arab Emirates), 2. California Polytechnic State University (USA), 3. Lakehead University (Canada))

[P1-9-07] Multistep Direct Model Predictive Control for Current Source Inverter fed Permanent Magnet Synchronous Motor Drives

*Andrés Carvajal¹, Annette Muetze¹ (1. Graz University of Technology (Austria))

[P1-9-08] Comparison of Position Sensorless IPMSM Drive Using RFVC DTC in Experiments

*Akimasa Kikunaga¹, Atsushi Shinohara¹, Kichiro Yamamoto¹ (1. Kagoshima University (Japan))

[P1-9-09] Sensorless Control of SPMSM at Low Speeds Using High-Frequency Voltage Injection Based on Magnetic Saturation Induced by d -Axis Current

*Kaito Kikuchi¹, Sari Maekawa¹, Yura Satoshi² (1. Meiji University (Japan), 2. TOYODA GOSEI CO., LTD. (Japan))

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Poster 1-9 (Event & Exhibition Hall)

[P1-9-10] MRAS-Based Speed Sensorless Control of PMSM Enhanced by Ultrasonic Cuttlefish Optimization

Jinlun Liu, Mianzhi Wu¹, *Zirui Zhuang (1. University of Pennsylvania (USA))

[P1-9-11] Effect of BPF Dynamics on Stability of High-Frequency Signal-Injection Sensorless Control

*Hyeonseok Shin¹, Jiwon Yoo¹ (1. Inha University (Korea))

[P1-9-12] Robust Simplified Sensorless Control for Synchronous Reluctance Motors Under Magnetic Saturation

*Hinako Teranishi¹, Sari Maekawa¹, Hiroaki Ueta², Koroku Nishizawa², Satoru Fujita², Ikuya Sato² (1. Meiji University (Japan), 2. FUJI ELECTRIC CO., LTD. (Japan))

Poster 1-10 (Event & Exhibition Hall)

[P1-10] Vehicle Electrification-related Technologies 1

Chair: Yuki Okuda

[P1-10-01] Solid-State Circuit Breaker Design for High-Available DC/DC Converters in Automated Electric Vehicles

*Shouzheng Wang^{1,2}, Christian Winter³, David Cello¹ (1. Esslingen University (Germany), 2. University of Stuttgart (Germany), 3. Robert Bosch GmbH (Germany))

[P1-10-02] Acquisition of EIS Without DC-Side Sensors Based on Inverter and Current Reconstruction

*ding luo¹, dong jiang¹, min zhou¹, tao cai¹, yang cao¹ (1. Hust Univ (China))

[P1-10-03] Motor Performance Allocation Method for 2-in-1 Motor Drive System to Improve Electric Vehicle Driving Efficiency

*Yuki Nishimura¹, Yoshihiro Miyama¹, Kan Akatsu² (1. Mitsubishi Electric Corporation (Japan), 2. Yokohama National University (Japan))

[P1-10-04] Design and Experimental Validation of a 30kW Three-Level Vienna Rectifier for High-Efficiency EV Fast Charging

*Won-Jun Jung², Sang-Hyeok Lee², Young-Dal Lee¹, Yu-Jin Choi¹, Eun-Song Oh¹, Seo-Woo Yun¹ (1. Chonnam National University (Korea), 2. KETI (Korea))

[P1-10-05] Conceptualization and Evaluation of DC link Cooling for a 6-phase 500-kW Inverter with Respect to Life Time

*Artem Rodionov¹, Jedsada Yodwong¹, Sebastiaan De Boott², Yujing Liu¹ (1. Chalmers University of Technology (Sweden), 2. Rogers Corporation (Belgium))

[P1-10-06] A Low-Cost Scalable Coupled Inductor Topology for High-Speed Active Balancing of Battery Modules

*Hourong Song¹, Branislav Hredzak¹, Hang Zhou¹, Yuxin Yang¹, John Fletcher¹, Rui Li² (1. The University of New South Wales (Australia), 2. Shanghai Jiao Tong University (China))

[P1-10-07] High-accuracy Lithium-ion Battery State of Health Estimation using Limited Data in Electric Vehicle Applications

*Shiv Shankar Sinha¹, Pinki Saini¹, Pallavi Bharadwaj¹ (1. Indian Institute of Technology Gandhinagar (India))

[P1-10-08] A Modular Multilevel Converter-based Inductive Coupler for High Voltage MW-scale Offshore Charging Applications

*Giuseppe Guidi¹, Jon Are Suul^{1,2} (1. Sintef (Norway), 2. Dept. of Engineering Cybernetics, NTNU (Norway))

[P1-10-09] Robust Control Strategy for EV Charging Focusing on DC/DC Stage of Integrated Onboard Chargers

Nattapon Somboonpanya^{1,3}, Lotfi Baghli³, Ehsan Jamshidpour³, Matheepot Phattanasak², *Surin Khomfoi¹ (1. Department of Electrical Engineering, School of Engineering, King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand (Thailand), 2. Department of Teacher Training in Electrical Engineering Faculty of Technical Education King Mongkut's University of Technology North Bangkok, Bangkok, Thailand (Thailand), 3. Université de Lorraine - GREEN, France (France))

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Poster 1-10 (Event & Exhibition Hall)

[P1-10-10] Comparison of V2L Dynamic Performance: Interleaved totem-pole based Single-stage vs. Two-Stage OBC

Quy Ngoc Do¹, *Thong Van Minh Ta¹, Sewan Choi¹ (1. Seoul National University of Science&Technology (Korea))

[P1-10-11] Development of a Lithium-Ion Battery Self-Heating System for Low-Temperature Operation Using a Multi-Software Simulation Platform

Sheng-Chieh Chang¹, Guan-Hao Su¹, *Yu-Shan Cheng¹, Zong-Zhen Yang², Yi-Hua Liu² (1. National Taiwan Ocean University (Taiwan), 2. National Taiwan University of Science and Technology (Taiwan))

[P1-10-12] Unified Current Limiter-Breaker for Medium-Voltage DC Buses in All-Electric Aircraft

Adil Ayub Sheikh¹, Dong-Choon Lee¹, *Saeed Peyghami², Frede Blaabjerg² (1. Yeungnam University, South Korea (Korea), 2. Aalborg University, Denmark (Denmark))

[P1-10-14] Revisiting Z-Score Analysis: A Simple yet Effective Approach for Cross-Chemistry Detection of Abnormal Cells in Lithium-Ion Batteries

*Shinichi Domae¹, Alberto Castellazzi¹ (1. Kyoto University of Advanced Science (Japan))

[P1-10-15] A Four-Quadrant Current-Fed DAB-based Partial Power Converter for EV Ultra-Fast Charging

*Aabid Ahmad Dar¹, Vishnu Mahadeva Iyer¹, Vinod John¹ (1. Indian Institute of Science (India))

Poster 1-11 (Event & Exhibition Hall)

[P1-11] Application of Power Electronics in Electric Railway and Related Public Transportation 4

Chair: Ken Kunomura

[P1-11-01] Modeling and Suppression of Circulating Currents in Parallel Inverters Considering Switching Frequency Discrepancies

*Genglu Song¹, Shubao Li¹, Yufei Liang², Zinan Lou¹, Yaozhi Zhao³, Yongda Wu³, Lei Xie³, Yaoqin Jia¹, Yan Zhang¹ (1. Xi'an Jiaotong University (China), 2. Xi'an University of Technology (China), 3. Nanjing Electronic Devices Institute (China))

[P1-11-02] Expanding the Capabilities of Electric Railway DC Systems Using the Modular Bridge Rectifier

*Sebastian Rivera¹, Julian Rojas¹, Felipe Calderon-Rivera¹, Pavol Bauer¹ (1. Delft University of Technology (Netherlands))

[P1-11-03] Installation and Evaluation of a Real-Time Condition Monitoring System for Propulsion Inverters in Commercial Rolling Stock

*Kazuki Fujimoto¹, Kazunori Hasegawa³, Shoichiro Watanabe² (1. TOYO DENKI SEIZO K.K. (Japan), 2. Tokyo Denki University (Japan), 3. Kyushu Institute of Technology (Japan))

Poster 1-12 (Event & Exhibition Hall)

[P1-12] Advanced Power conversion topology 3

Chair: Ruben Inzunza (TMEIC)

[P1-12-01] A Five-Level Switched-Midpoint Boost Inverter with Extended Voltage Gain

*Sze Sing Lee¹, Andy Chua¹, Anurag Sharma¹, Mohamed Dahidah², Kuan Tak Tan³ (1. Newcastle University in Singapore (Singapore), 2. Newcastle University (UK), 3. Singapore Institute of Technology (Singapore))

[P1-12-02] Highly Integrated DC-DC Converter Eliminating Output Current Ripple for Green Hydrogen Production

*Daniel Baggen¹, Niklas Fritz¹, Tianlong B. Albert¹, Rik W. De Doncker¹ (1. ISEA RWTH Aachen University (Germany))

[P1-12-03] Gate Driver for Multi-Level Power Converter

*Hideo Pratama¹, Cheng-Syun Lee¹, Yao-Ching Hsieh¹ (1. National Sun Yat-sen University (Taiwan))

Poster Sessions

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Poster 1-12 (Event & Exhibition Hall)

[P1-12-04] Interleaved Hybrid Flyback-Forward Converter with Double Step-down Voltage and Natural Current Sharing

*Van Dai Bui¹, Jonas Andresen¹, Andreas Stybe Petersen¹, Bima Nugraha Sanusi¹, Ziwei Ouyang¹ (1. Technical University of Denmark (Denmark))

[P1-12-05] Multi-objective Optimization Framework for DC–DC Converters Using Genetic Algorithms

*Minsung Kang¹, Itsuki Masuda¹, Sihoon Choi², Koichi Shigematsu², Jun Imaoka², Masayoshi Yamamoto² (1. Nagoya University (Japan), 2. Institute of Materials and Systems for Sustainability (IMass), Nagoya University (Japan))

[P1-12-06] Control and Loss Optimization of the HiLEM Topology - a PV Partial Power Converter

*Marcus Becker¹, Lukas Stefanski¹, Marc Hiller¹ (1. Karlsruhe Institute of Technology (Germany))

[P1-12-07] Switching Performance and Loss Analysis of SiC/Si-Hybrid Sparse NPC Inverters

*Simon Quergfelder¹, Julian Sax¹, Thomas Heckel¹, Thomas Menrath¹, Bernd Eckardt¹, Martin März^{2,1} (1. Fraunhofer Institute for Integrated Systems and Device Technology (Germany), 2. Chair of Power Electronics, Friedrich-Alexander University (Germany))

[P1-12-08] Control System Development of Medium-Voltage Modularized-Bridge-Rectifier Solid-State Transformer with RT-HIL Validation

*Zhenchao Li¹, Drazen Dujic¹ (1. EPFL (Switzerland))

[P1-12-09] Experimental Verification of a Single-Stage Isolated AC–DC Converter with Bidirectional GaN Switches

*Naoto Izumoto¹, Takahiro Ohori¹ (1. Panasonic Electric Works Co., Ltd. (Japan))

[P1-12-11] A ZVS-PWM Resonant Step Up/Down DC/AC Converter

Chien-Ming Wang¹, Yu-Zhe Lee¹, Tzu-Yuan Lan¹, *Sheng-Feng Lee¹, Chen-Hsiang Fan¹ (1. National Ilan University (Taiwan))

[P1-12-12] A New DC-DC Converter with Enhanced CM Noise Characteristics and Capacitive Isolation

*Minseok Park¹, Jong-Won Shin¹ (1. Seoul National University (Korea))

[P1-12-13] Design of Active-Clamp Push-Pull Converter with Decoupled Transformer for Low Conduction Loss

*Youngrok An¹, Junho Shin¹, Donghan Seo¹, Jong-Won Shin¹ (1. Seoul National Univ. (Korea))

[P1-12-14] Operating Characteristics of Primary Side Two Phase Active Clamp Forward Converter for Wide Input Voltage Range

Atsushi Fujii¹, *Motoki Sumii¹, Seiya Abe¹ (1. Kyusyu Institute of Technology (Japan))

[P1-12-15] Design and Implementation of Bidirectional Three-Level Neutral-Point-Clamped Full-Bridge CLLLC Resonant Converter

Yu-Sheng Wu¹, Tsorng-Juu Liang¹, Kai-Hui Chen¹, Wei-Chiang Kuo¹, *Ching-Feng Liu¹, Yi-Shin Chen¹ (1. National Cheng Kung University (Taiwan))

[P1-12-16] A Nonredundant Topology Derivation Method Based on Graph and Number Theory for Quadratic DC-DC Converters

*Xinghao Zhao¹, Mi Dong¹, Hongsheng He¹, Yunhao Sui¹, Liansheng Huang², Xiaojiao Chen², Xianyong Xu³, Bokovi Yao⁴, Xian Liu⁵ (1. Central South University (China), 2. Institute of Plasma Physics, Chinese Academy of Sciences (China), 3. State Grid Hunan Electric Power Company (China), 4. University of Lomé (Togo), 5. Hunan Hangxin Intelligent Technology Co., Ltd. (China))

Poster Sessions

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Poster 1-13 (Event & Exhibition Hall)

[P1-13] Application-oriented power converter and control 4

Chair: Shin-ichi Hamasaki (Nagasaki University)

[P1-13-02] A General and Efficient Method of Filter Structure Selection and Parameter Optimization Design for Grid-Connected Inverters

*Yuxi Cai¹, Haoran Ling¹, Wei Zhang¹, Zhigao Cui¹, Aihua Li¹, Ronghui An² (1. Rocket Force University of Engineering (China), 2. Xi'an Jiaotong University (China))

[P1-13-03] Underwater Wireless Power Transfer Using Cylindrical Spiral Coils with LLC-S Resonant Topology

*Yong-Dong Chang¹, Hao Kai Chang¹ (1. National Penghu University of Science and Technology (Taiwan))

[P1-13-04] An Improved Modulation Strategy for Full ZVS of Single-Stage Magnetically Integrated Interleaved Totem-Pole AC-DC Converter

*Wenjie Du¹, Wenjie Chen¹, Chufan Zhou¹, Jianxiang Chen¹, Hanjie Qi¹, Xu Yang¹ (1. School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China (China))

[P1-13-05] An Improved Inductor-Transformer Magnetic Integration Structure for a Single-Stage Bidirectional AC-DC Converter

*Chufan Zhou¹, Wenjie Chen¹, Wenjie Du¹, Hanjie Qi¹, Jianxiang Chen¹, Xu Yang¹ (1. Xi'an Jiaotong University (China))

[P1-13-06] Enhancing Stability of Multiple Parallel-Connected MMCs through Reactive Power Circulation

Mandy Shi¹, Ye Zhu², *Georgios Konstantinou¹ (1. UNSW Sydney (Australia), 2. ShanghaiTech University (China))

[P1-13-07] Secure FSK-Based Talkative Power Conversion in DC-DC Converters with Embedded AES

Hwa-Pyeong Park¹, *Geun-Ho Yoon¹, Wan Kim¹ (1. Korea Institute of Energy Technology (Korea))

[P1-13-08] High Resolution Online Battery Impedance Measurement via ILP-Optimized Switching Frequency Selection

Hwa-Pyeong Park¹, *Jia Hong¹, Wan Kim¹ (1. Korea Institute of Energy Technology (Korea))

[P1-13-09] Application of Parity-Time Symmetry to Dynamic Wireless Power Transfer for Constant Voltage Load

*Yuya Deguchi¹, Aoi Oyane¹, Hiroshi Fujimoto¹ (1. The University of Tokyo (Japan))

[P1-13-10] A Unified Voltage Loop with Neutral-Point Auxiliary Control for Three-Level Buck Converter

*Jun-Hyeong Kwon¹, Hyeon-Uk Go¹, Min-Seong Kim¹, Sang-Kil Lim², Seong-Mi Park³, Yipei Wang⁴, Sung-Jun Park¹ (1. Department of Electrical Engineering Chonnam National University Gwangju, South Korea (Korea), 2. Department of Electronic Engineering, Chosun University Gwangju, South Korea (Korea), 3. Department of Lift Engineering, Korea Lift College, Gyeongsangnam-do, South Korea (Korea), 4. Institute of Automation, Qilu University of Technology (Shandong Academy of Sciences), Jinan 250014, China (China))

[P1-13-11] Revisiting Grid-Forming and Grid-Following Converter Stability via Subsystem Interaction

*Jin Wang¹, Mebtu Bihonegn Beza¹, Anant Narula¹, Massimo Bongiorno¹, Jan R. Svensson² (1. Department of Electrical Engineering, Chalmers University of Technology (Sweden), 2. Hitachi Energy Research (Sweden))

[P1-13-12] Burst-Mode Operation of ZVS GaN Half-Bridge for Low-Current Capacitor-Charging and Increased Electrocaloric Heat Pump System Efficiency

*Adrian Söllner¹, Sakyo Hirose², Stefan Mönch¹ (1. University Stuttgart (Germany), 2. Murata Manufacturing Co., Ltd. (Japan))

[P1-13-13] Design and Optimization of a 1500-V, 150-kHz All Silicon Carbide Modular Power Stage for Solid-State Transformer Applications

Baher Abu Sba¹, Ahmed Ismail¹, Eric Allee¹, Hui Cao¹, Taehyun Kim¹, *Yue Zhao¹ (1. University of Arkansas (USA))

[P1-13-14] Study on Real-Time Reinforced Learning for Wide-Range Operation of Buck Converter

*Ayumu Endo¹, Ryo Echigoya¹, Hirokazu Matsumoto¹, Yuki Sato¹ (1. Aoyama Gakuin University (Japan))

Poster Sessions

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Poster 1-13 (Event & Exhibition Hall)

[P1-13-15] Comparative Study of Rigid and Flexible PCBs for Power Converter Implementation in Portable Power Solutions

*Richard Angsetya¹, F. Selin Bagci¹, Katherine A. Kim¹ (1. National Taiwan University (Taiwan))

[P1-13-16] A Cell-Selection PWM with Phase-Shifted Variable-Frequency Carriers for Modular Multilevel Converters

*Kei Sekiguchi¹, Takahiro Ishiguro¹, Shogo Kurita², Ryuichi Morikawa² (1. Toshiba Corporation (Japan), 2. TMEIC Corporation (Japan))

Poster 1-14 (Event & Exhibition Hall)

[P1-14] Application-oriented power converter and control 5

Chair: kenichi sakimoto (Kawasaki Heavy Industries, Ltd.)

[P1-14-01] High-Efficiency Synchronous Rectification Method Using Analog Phase Detection for EV Chargers

*Jisoo Kim¹, Seul Lee¹, Junyeong Oh¹, Eunsoo Lee¹ (1. Department of Electrical Engineering, Hanyang University (Korea))

[P1-14-02] Experimental Demonstration of Rebar Loss Reduction Using Sendust Magnetic Concrete for Wireless Power Transfer

*Norika Miura¹, Shuntaro Inoue¹, Yuko Kano¹, Koji Shigeuchi¹, Shin Tajima¹ (1. Toyota Central R&D Labs., Inc. (Japan))

[P1-14-03] A Maximum Power Point Tracking Method for Stabilizing Power Output of Perovskite Solar Cells

*Makito Nakahira¹, Haruto Miyata¹, Juan Padron¹, Toshimasa Miyazaki¹, Yushi Miura¹, Kiyoshi Ohishi¹, Yousuke Ibusuki¹ (1. Nagaoka University of Technology (Japan))

[P1-14-04] Modulation and Capacity Analysis of Active-Filtering Grid-Forming Energy Storage in DRU-HVDC Systems

*Haonan Li¹, Xu Yang¹, Min Wu¹, Jiaxuan Niu¹, Hongyi Zhou¹, Wenjie Chen¹ (1. School of Electrical Engineering Xi'an Jiaotong University (China))

[P1-14-05] Power Angle Constrained Large-Signal Modeling and Stability Analysis of Grid-Connected Inverter

*Boyuan Cui¹, Liang Huang², Poh Chiang Loh¹, Frede Blaabjerg² (1. The Chinese University of Hong Kong (Hong Kong), 2. Aalborg University (Denmark))

[P1-14-06] Two-Step Load Voltage Identification for Inductive Power Transfer Systems Using Linear Kalman Filtering

ANDREW NGINI MWANGI¹, *SUNG-JIN CHOI¹ (1. University of Ulsan (Korea))

[P1-14-07] Derivation and Validation of the Critical ZVS Boundary in Parity-Time Symmetric Wireless Power Transfer Systems

*Zhen Huang^{1,2}, Bowang Zhang³, Youhao Hu², Hanlei Tian², Jinliang Huang², Wei Han² (1. Sun Yat-sen University (China), 2. The Hong Kong University of Science and Technology (Guangzhou) (China), 3. The Hong Kong University of Science and Technology (Hong Kong))

[P1-14-08] Design of a 20 kW SiC Current Source Inverter System for Machine Drives

*Patrick Cujic¹, Tobias Blaich¹, Lorenz Hahn¹, Benjamin Bachowsky¹, Tobias Zeller¹, Dennis Bank, Rüdiger Schwendemann¹, Marc Hiller¹ (1. Karlsruhe Institute of Technology (Germany))

[P1-14-09] Experimental Investigation of Continuous Switching Operation of Solid-State Circuit Breaker for Engine Protection on Electric Hybrid Aircraft

*Ryuji Iijima¹, Shunsuke Noguchi¹, Yuichi Tsuboi¹ (1. Japan Aerospace Exploration Agency (Japan))

Poster Sessions

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Poster 1-14 (Event & Exhibition Hall)

[P1-14-10] A Wireless Power Transfer Based Impedance Matching Method for Inductively Coupled Plasma RF Sources

*SiYu Feng¹, Shuang Li², Chengbin Ma², Ming Liu¹ (1. The school of Electrical Engineering, Shanghai Jiao Tong University (China), 2. The Global College, Shanghai Jiao Tong University (China))

[P1-14-11] Analysis and Design of Inertia Measurement Methods for Grid-Forming Converters in Power-Electronized Power Systems

*Yifan Yang¹, Jiaqi Niu¹, Yuehang Zhao¹, Chunyu Xu¹, Zhaoyu Guo¹, Yonghui Liu¹ (1. Xi'an Jiaotong University (China))

[P1-14-12] Low-Switch Count, Single-Stage, 3- Φ /1- Φ DC-AC Bidirectional Converter Employing Y- Δ Transformer Configurations

*Dharani Deepika Pidiyar¹, Shiladri Chakraborty¹ (1. INDIAN INSTITUTE OF TECHNOLOGY BOMBAY (India))

[P1-14-13] Small Signal Stability Analysis of Multi-Inverter Dominated Power Systems

*Kang Wang¹, Sijia Li¹, Xiangchen Zhu¹, Hang Ren¹, Kuangpu Liu¹, Zhe Chen¹ (1. Aalborg University (Denmark))

[P1-14-14] H-type Multilevel Inverter with Common-Ground Concept for Grid-Connected Transformerless PV Applications

*Junyu FAN¹, Zhishen LUO¹, Hanlei TIAN¹, Wei HAN¹ (1. HKUST (China))

[P1-14-15] Impact of Current Limiters on the Transient Stability of Grid-Forming Inverters Employing the Virtual-Power Method

*ANTONIS MAKRIGIORGIS¹, Antonios Antonopoulos¹ (1. NTUA (Greece))

[P1-14-16] Auxiliary-Less Precharge Strategy for Flying-Capacitor Current-Fed DAB Converters

*Takashi Ohno¹, Hiroki Watanabe¹, Jun-ichi Itoh¹ (1. Nagaoka University of Technology (Japan))

[P1-14-17] A Soft Mode Transition Method for Dual-Active-Bridge Microinverters with Adaptive Mode Boundary Conditions

*Minseok Kim¹, Suyong Chae¹ (1. Pohang University of Science and Technology (Korea))

[P1-14-18] Physics-Informed Neural Network for Voltage Gain Modeling of LLC Resonant Converters with Wide Voltage Range

Yuqian Zhang¹, *Yu Zuo², Yang Li², Jiase Kong², Fanghao Tian², Wilmar Martinez² (1. The Australian National University, School of Computing (Australia), 2. KU Leuven, Power Electronics (Belgium))

[P1-14-19] CVCF Control of a Matrix Converter-Based Single-Phase Three-Wire Isolated AC-DC Converter under Standalone Operation with Unbalanced Loads

*Ryoki Onodera¹, Hiroki Watanabe¹, Junichi Itoh¹, Naoto Izumoto², Takahiro Ohori² (1. Nagaoka University of Technology (Japan), 2. Panasonic Electric Works Co., Ltd. (Japan))

Poster Sessions

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Poster 2-1 (Event & Exhibition Hall)

[P2-1] Application-oriented power converter and control 6

Chair: Koji Kato (GS Yuasa International Ltd.)

[P2-1-01] Adaptive Droop of Distributed Generators for Inertia Emulation in a Cascaded Series Microgrid

Jayvie Gabriel Templonuevo¹, *Inam Nutkani¹, Richardt Wilkinson¹, Carlos Teixeira¹, Brendan McGrath¹ (1. RMIT University, Melbourne, Australia (Australia))

[P2-1-02] Placement of Grid Forming Inverters and Synchronous Condensers in the Grid

Md Zahir Hossain¹, *Inam Nutkani¹, Lasantha Meegahapola¹ (1. RMIT University, Melbourne, Australia (Australia))

[P2-1-03] A High Performance Model Training Framework for Large-scale BOM Classification in Automated Power Electronics Schematics Design

Jiahua Ying¹, Bowen Su¹, Ran Ou¹, Huan Chen¹, *Kai Sun¹ (1. Department of Electrical Engineering, State Key Laboratory of Power System Operation and Control, Tsinghua University, Beijing, China (China))

[P2-1-04] Techno-Economic Analysis of Pulsed Power Electrolysis

*Muhammad Yousuf¹, Andre Chambers², Glen Farivar¹, Mengran Li¹, Dragan Nestic¹, Michael John Brear¹ (1. The University of Melbourne (Australia), 2. The University of British Columbia (Canada))

[P2-1-05] Explainable and Non-Invasive Ultrasound-based Capacitor Condition Monitoring in Power Converters

*Youssof Fassi¹, Vincent Heiries², Jérôme Boutet², Clément Chambon², Sébastien Boisseau² (1. Univ. Grenoble Alpes, CEA-Liten (France), 2. Univ. Grenoble Alpes, CEA-Leti (France))

[P2-1-06] AC Impedance Measurement: Cell-Balancing Circuit Based on a Median–Gaussian Filter

*Seongjong Kim¹, Hwa pyeong Park², Yu Bi¹, Hyunjoon Choi¹, SangHeon Chae³ (1. Kumoh National Institute of Technology (kit) (Korea), 2. Korea Institute of Energy Technology (Korea), 3. Korea Electronics Technology Institute (Korea))

[P2-1-08] Voltage Vector-Generalized Variable Switching Frequency DPWM for Overvoltage Mitigation

*Min-Gi Kim¹, Kyo-Beum Lee¹, Heon su Lee² (1. Ajou University (Korea), 2. LS Electric (Korea))

[P2-1-09] Power-Response Matrix Framework: Intuitive Frequency-Domain Analysis of an Offshore Wind Farm

*Lazar Stojanović², Anant Narula¹, Massimo Bongiorno¹, Paolo Mattavelli² (1. Chalmers University of Technology (Sweden), 2. University of Padova (Italy))

[P2-1-10] Accurate and Tailor-Made Semiconductor Device Models for System Simulations Across Diverse Circuit Topologies and Operating Conditions

*Paul Sochor¹, Andreas Huerner², Jaime Zapata-Amores² (1. Infineon Technologies (Japan), 2. Infineon Technologies AG (Germany))

[P2-1-11] Operating Characteristics of a Non-Resonant AC–AC Converter for Induction Heaters with Buck–Boost Operation Using Work Coil

*Takuo Kawarabayashi¹, Shohei Komeda¹ (1. Tokyo University of Marine Science and Technology (Japan))

[P2-1-12] Designing efficient coils for a 500 W Inductive Wireless Power Transfer (WPT) system using Finite Element Method Magnetics (FEMM)

Suwatchari Phuangchaosuan¹, Uthen Kamnarn¹, Accarat Chaoumead², Kittisak Srisawas², Nouredine Takorabet³, *Duanraem Phaengkiao² (1. Department of Electrical Engineering, Rajamangala University of Technology Lanna (Thailand), 2. Department of Electrical Engineering, Rajamangala University of Technology Lanna Phitsanulok (Thailand), 3. Université de Lorraine-GREEN (France))

[P2-1-13] Robust controller design for series-series compensation based WPT system

*Veerachary Mummadi¹, Ayush Bhaskar¹ (1. Indian Institute of Technology Delhi (India))

Poster Sessions

Wednesday, June 3 12:40 – 14:00

Poster 2-2 (Event & Exhibition Hall)

[P2-2] Emerging technologies in Packaging, thermal management, system integration and reliability 1

Chair: Kenchi Nagayoshi (Electronics Division, Toyota Industries Corporation)

[P2-2-01] 200 MHz PCB Rogowski Coil Current Sensor for WBG Switching Applications

*Julian Sax¹, Simon Quergfelder¹, Thomas Heckel¹, Bernd Eckardt¹, Martin März^{1,2} (1. Fraunhofer Institute for Integrated Systems and Device Technology (Germany), 2. Chair of Power Electronics, Friedrich-Alexander-University Erlangen-Nuremberg (Germany))

[P2-2-02] High-Speed Short-Circuit Protection with Parasitic Inductance in 3.3 kV SiC-MOSFET Power Modules

*Yusuke Takada¹, Takashi Hirao¹, Hiroshi Suzuki¹, Yusuke Kanno², Yasuhiko Kouno² (1. Research & Development Group, Hitachi, Ltd. (Japan), 2. Railway System Business Unit, Hitachi, Ltd. (Japan))

[P2-2-03] Electroluminescence-Based Online Condition Monitoring of Gate Switching Instability in SiC MOSFETs

*Lukas A. Ruppert¹, Nikita Huber¹, Christian Schmitz¹, Rik W. De Doncker¹ (1. Institute for Power Electronics and Electrical Drives, RWTH Aachen University (Germany))

[P2-2-04] Discontinuous Pulse Width Modulation for Simultaneous Thermal Stress Reduction in Power Devices and DC-link Capacitors of NPC Inverter

*Dong-Jin Lee¹, Ui-Min Choi¹ (1. Seoul National University of Science and Technology (Korea))

[P2-2-05] Asymmetric PWM for Reliability Enhancement of Multi-Chip IGBT Module in Motor Drive Inverters

*Junseong Hwang¹, Ui-Min Choi¹ (1. Seoul National University of Science and Technology (Korea))

[P2-2-06] Current Balance Improvement in a Multi-Chip Power Module Using a Slitted Conductor Structure

*Shota Tashiro¹, Yuta Ichikura¹, Kazuyasu Takimoto¹, Takahiro Ishiguro¹ (1. Toshiba Corporation (Japan))

[P2-2-07] Investigation of the Impact of Active Short Circuit on Traction Inverter

*Linhua Lai¹, Maciej Brzycki¹, Nimananda Sharma², Artem Rodionov¹, Yujing Liu¹ (1. Department of Electrical Engineering, Chalmers University of Technology (Sweden), 2. Volvo group (Sweden))

[P2-2-08] Thermal Fault Diagnosis of Power Modules Using Digital Twins

*Zhongchao Sun¹, Stefan Meyer¹, Asger Bjørn Jørgensen¹ (1. Aalborg Univ. (Denmark))

[P2-2-09] Online Parameter Estimation Based Digital Twin and EKF for Health Indicators of Buck Converters

*Boyang Jin¹, Chunlin Lv¹, Jinjun Liu¹, Pingjunjin Tan¹ (1. Xi'an Jiaotong University (China))

[P2-2-10] Dynamic Maintenance Scheduling of PV Inverters through Condition Monitoring

*Seyed Amir Hosseini¹, Muhammad Usman Tahir¹, Pooya Davari¹, Saeed Peyghami¹ (1. AAU Energy, Aalborg University (Denmark))

[P2-2-11] Effect of Redundant Leg Topology on the Reliability of PV Inverters

*Muhammad Usman Tahir¹, Seyed Amir Hosseini¹, Pooya Davari¹, Saeed Peyghami¹ (1. AAU Energy, Aalborg University (Denmark))

[P2-2-12] Physics-Integrated PDE-Constrained Deep Learning for Lifetime Prediction of Power Semiconductor Modules

*Yichi Zhang¹, Yi Zhang², Bo Yao¹, Frede Blaabjerg¹, Huai Wang¹ (1. Aalborg University (Denmark), 2. Hong Kong Polytechnic University (Hong Kong))

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Poster 2-2 (Event & Exhibition Hall)

[P2-2-13] Thermal Optimization of 75kW Phase-Shift Dual Active Bridge LLC Resonant Converters Through Variable Inductance for Electric Vehicle Applications by Finite Element Solution

*Wai Keung Mo¹, Kasper Mayntz Paasch¹, Thomas Ebel¹ (1. The university of Southern Denmark (Denmark))

[P2-2-14] Optimal Operation Parameter Determination for Enhancing Overcurrent Capability in Grid-connected Converters

*Zhenhong Lai¹, Zebin Yang¹, Xiaobin Mu², Weiwei Xu³, Xin Ning³, Hao Yi¹, Lei Chen³, Fang Zhuo¹ (1. School of Electric Engineering, Xi'an Jiaotong University (China), 2. State Key Laboratory of Advanced Power Transmission Technology, State Grid Smart Grid Research Institute co. Ltd. (China), 3. State Grid Zhejiang Electric Power Research Institute, State Grid Zhejiang Electric Power Co., Ltd. (China))

[P2-2-15] Experimental Validation of Driving Force for a Temperature-Sensitive Magnetic Fluid Heat Transport System Utilizing an Electromagnet

*Masataka Anazawa¹, Keisuke Kusaka¹ (1. Nagaoka University of Technology (Japan))

Poster 2-3 (Event & Exhibition Hall)

[P2-3] Emerging technologies in Packaging, thermal management, system integration and reliability 2

Chair: Takaya Sekiguchi (Hitachi, Ltd.)

[P2-3-01] Modular Accelerated Lifetime Testing Platform for Autonomous Testing of Multiple Proximal SiC MOSFETs to Inform Data-Driven RUL Estimation

Paul Bradford¹, *Hongjie Wang¹ (1. Utah State University (USA))

[P2-3-02] Condition Monitoring of Power Electronic Devices Using Modulation-Based Thermal Impedance Spectroscopy

Alireza Aghdaei¹, *Rattapon Wayamanon², Sven Kalker¹, Lukas A. Ruppert¹, Rik W. De Doncker¹ (1. RWTH Univ. (Germany), 2. TGGS Univ. (Thailand))

[P2-3-03] Design of a Full Bridge Power Module for a Dual Active Bridge Converter

Weiping Fu¹, Xiaoling Li¹, Yuxiang Chen¹, Liyang Du¹, Saroj Majakoti¹, *Alan Mantooth, David Huitink¹, David Underwood² (1. University of Arkansas (USA), 2. Micro Cooling Concepts, Inc (USA))

[P2-3-04] Improved Noise Source Modeling for BCM Single-Phase Grid-Connected Inverters With Zero Current Detection Delay

*Chen Liu¹, Chao Chao Song¹, Frede Blaabjerg¹, Pooya Davari¹ (1. Aalborg University (Denmark))

[P2-3-05] A Design Procedure for Current-Injection Active EMI Filter by Taking Load-Pulling Effect into Consideration

Jakrapong Wongsasulux², *Surapong Suwankawin¹, Thattam Narksook¹, Achirawat Kaitkansiri¹, Pawaret Ampai¹ (1. Chulalongkorn University (Thailand), 2. Delta Electronics (Thailand) (Thailand))

[P2-3-06] Wireless Power Transmission Method using Superimposed PWM signal

*Atsushi YOSHIDA¹, Kosuke MORIYA¹, Hiyang SUNG¹, Kyungmin SUNG¹ (1. National Institute of Technology, Ibaraki College (Japan))

[P2-3-07] Impact of Core Segmentation on Eddy Current Loss in Mn-Zn Ferrite Cores at High Frequencies

*Naoya Miyata¹, Itsuki Masuda¹, Jun Imaoka², Masayoshi Yamamoto² (1. Department of Electrical Engineering, Nagoya University (Japan), 2. Institute of Materials and Systems for Sustainability (IMaSS), Nagoya University (Japan))

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Poster 2-3 (Event & Exhibition Hall)

[P2-3-08] Electro-thermal Stability of Planar and Trench Gate SiC Power MOSFETs in Linear Mode Operation

*Yisi Liu¹, Olayiwola Alatise², Asad Mahmood², Jose Ortiz Gonzalez², Ian Laird¹, Phil Meller¹, Saeed Jahdi¹ (1. University of Bristol (UK), 2. University of Warwick (UK))

[P2-3-09] Comparative Analysis of Flatwise and Edgewise Windings for Improved Thermal Management in Transformers

*Karl Raymond Dela Cruz Roque¹, Itsuki Masuda¹, Sihoon Choi², Jun Imaoka^{1,2}, Masayoshi Yamamoto^{1,2}, Matti Kauhanen³, Kengo Tashiro⁴ (1. Department of Electrical Engineering, Nagoya University (Japan), 2. Institute of Materials and Systems for Sustainability (IMaSS), Nagoya University (Japan), 3. ABB Drives Oy (Finland), 4. HighQ Power Oy (Finland))

[P2-3-10] Geometrically Constrained Optimization of Planar Transformers for DCM Flyback Converters

*Tianming Luo¹, Kamran Kamran^{1,2}, Ziwei Ouyang¹ (1. Technical University of Denmark (Denmark), 2. STMicroelectronics S.R.L. (Italy))

[P2-3-11] Parameter Estimation Techniques for DC-link Capacitors in Three-level NPC Inverters

*Diana Lopez-Caiza¹, Ariya Sangwongwanich¹, Mateja Novak¹, Frede Blaabjerg¹ (1. Aalborg University (Denmark))

[P2-3-12] Prediction and Mitigation of EMI from Near-Field Coupling Effects in Interleaved PFC Converters

Tyler McGrew¹, *Che-An Cheng¹, Qiang Li¹ (1. Center for Power Electronic Systems, Virginia Tech (USA))

[P2-3-13] Reliability Evaluation of 650 V E-Mode GaN Devices Under HTRB and H3TRB Stress

*Mateja Novak¹, Kaichen Zhang¹, Senyu Du¹, Arlene Rementeria¹, Shuai Zhao¹, Dao Zhou¹, Francesco Iannuzzo² (1. Aalborg University (Denmark), 2. Politecnico di Torino (Italy))

[P2-3-14] Link between Black Box and Physical EMC Models of Power Electronics Converters

Bayan Hamami^{2,1}, Yandry Alexander Jacome Montero¹, Genevieve Frantz¹, *Jean-Luc SCHANEN¹ (1. Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab (France), 2. Industrial Automation Schneider Electric Grenoble (France))

Poster 2-4 (Event & Exhibition Hall)

[P2-4] Device-related technologies, Passive components and materials 2

Chair: Yasuo Higuchi (Rohm Co., Ltd.)

[P2-4-01] Investigation of AC Resistance in Carbon Nanotube Ribbon Conductors for Planar Magnetics

*Tianming Luo¹, Bima Nugraha Sanusi¹, Ziwei Ouyang¹ (1. Technical University of Denmark (Denmark))

[P2-4-02] A Comparison of Transformer Copper Loss for Different Winding Configurations in a 200-kW, 16-kHz Dual Active Bridge Converter

*Ryohta Shimamoto¹, Qichen Wang¹, Toshihisa Tajyuta¹, Koji Maruyama¹ (1. Fuji Electric Co. Ltd. (Japan))

[P2-4-03] Design and Comparative Evaluation of Three-Phase Coupled Inductors

*Yunni Li¹, Thomas Gradinger¹ (1. Hitachi Energy Research (Switzerland))

[P2-4-04] Bayesian Inference-based Multi-Fidelity Surrogate Modeling for Circuit-Level Inductor-Optimization

*Nobuto Misono¹, Yuki Sato¹, Hirokazu Matsumoto¹ (1. Aoyama Gakuin University (Japan))

[P2-4-05] Utilization of Multi-Winding Transformers with Single Active Bridge Converter for Power Quality Enhancement in Multiple-Output Power Supply

*Satit Owatchaiphong¹, Kitsada Poonsawad¹, Wiranya Mungtorbua¹, Athiphat Kanavittaya¹, Narong Thumputi¹ (1. King Mongkut's University of Technology North Bangkok (Thailand))

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[P2-4-06] Minimal Implementation Method of Active Gate Driver for Improving Performance of DC-DC Converters

*Shuhei Fukunaga¹, Hajime Takayama², Takashi Hikiyama³ (1. The University of Osaka (Japan), 2. Kyoto Institute of Technology (Japan), 3. Kyoto University (Japan))

[P2-4-07] A Fractional-Turn Transformer for Hybrid Switched Capacitor Converters

*Tongrui Sun¹, Xu Yang¹, Panming Li¹, Wei Zhou¹, Xingwei Huang¹, Keliang Chen¹, Wenjie Chen¹ (1. School of Electrical Engineering, Xi'an Jiaotong University (China))

[P2-4-08] Small-Signal Measurements for Fringing Effects of Air Gaps on Winding Losses in Magnetic Components

Shaokang Luan¹, *Henrik Hansen¹, Hongbo Zhao¹ (1. Aalborg University (Denmark))

[P2-4-09] Flip Chip SiC Power Module for Common-Mode Noise Reduction with an Integrated Shunt Resistor

*Thiyu Sansika Warnakulasooriya¹, Sihoon Choi², Yu Yonezawa², Jun Imaoka², Masayoshi Yamamoto² (1. Department of Electrical Engineering, Nagoya University (Japan), 2. Institute of Materials and Systems for Sustainability, Nagoya University (Japan))

[P2-4-10] A Modular Test Bench for Real-Time Characterization of DC-Link Capacitors under Pulsed Load Conditions

*Mario Wasner¹, Martin Hübner¹, Peer Orzelek¹, Ulrich Unterhinninghofen¹, Marek Galek¹ (1. Munich University of Applied Sciences (Germany))

[P2-4-11] MOSFET Package with Integrated Si-Capacitor-Based RC Snubber for Reduced Switching Surge and Loss

*Takenori Yasuzumi¹, Susumu Obata¹, Kazuhito Higuchi¹, Tatsuya Ohguro² (1. Toshiba Corp. (Japan), 2. Toshiba Electric Devices & Storage Corp. (Japan))

[P2-4-12] Development of a Compact Auxiliary Inductance Employing Mn-Zn Ferrite for a 200-kHz DAB Converter

*Hiroaki Kakigano¹ (1. Ritsumeikan University (Japan))

[P2-4-13] Flexible Multi-Layer Foil Based Self-Resonant Transformer for High-Density LLC Converter

*Sajib Ahmed¹, Dylan Lu¹, Saad Mekhilef², Yam Siwakoti¹ (1. School of Electrical and Data Engineering, Faculty of Engineering and IT, University of Technology Sydney (Australia), 2. School of Engineering, Swinburne University of Technology (Australia))

[P2-4-14] Magnetic Core Selection in High-Frequency DAB and LLC Transformer Design Considering Both Core Loss and Saturation Flux Density Constraints

*Ryohei Okada², Keiji Wada¹ (1. Tokyo Metropolitan University (Japan), 2. Takushoku University (Japan))

[P2-4-15] Parallel Operation of GaN-based Monolithic Bidirectional Switches for Energy Storage Systems

Shuwei He¹, Yuzhou Yao¹, Zhining Zhang¹, *Jin Wang¹, Jacob Mueller², Luciano A. Garcia Rodriguez², Stanley Atcity² (1. The Ohio State University (USA), 2. Sandia National Laboratories (USA))

[P2-4-16] Empirical and Analytical Modelling of Capacitance Induced Dissipation Losses in Power Semiconductors

*Kaushik Mirdoddi^{1,3}, Roberto Petrella^{2,3} (1. System-Level Integration Technologies, Power Electronics Division, Silicon Austria Labs GmbH, Villach, Austria (Austria), 2. Power Electronics Division, Silicon Austria Labs GmbH, Villach, Austria (Austria), 3. PEMD Laboratory, Polytechnic Department of Engineering and Architecture, University of Udine, Udine, Italy (Italy))

[P2-4-17] Development of a Current Overshoot Detection Circuit for Power Semiconductor Switches

Satoshi Sugahara², *Takashi Toriyabe¹, Takato Sugawara¹ (1. Fuji Electric Co., Ltd. (Japan), 2. Fukuyama University (Japan))

[O6-10-04]

Demonstration of A 1700V Enhancement Mode pGaN Gate HEMT Power Device on Sapphire Substrate

*Ju Gao¹, Ziheng Liu¹, Jiayin He¹, Wenbo Xia¹, Chengkang Ao¹, Hongjie Peng¹, Lanlan Wang¹, Yimeng Cai², Yi Sun², Zhaohui Cheng³, Yong Xie³, Jin Wei¹, Jinyan Wang¹ (1. Peking University (China), 2. ZhiCheng Semiconductor (Anhui) Co., Ltd (China), 3. Dongke Semiconductor (Anhui) Co., Ltd (China))

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Poster 2-5 (Event & Exhibition Hall)

[P2-5] Sophisticated Power Conversion 1

Chair: Motoki Sato (ToyodenkiSeizo K.K.)

[P2-5-01] Carrier-Based PWM for Circulating Current Suppression in Dual-Parallel NPC Inverters

*Tae-Hyeon Kim¹, Ui-Min Choi¹ (1. Seoul National University of Science and Technology (Korea))

[P2-5-02] On the Use of Online Adaptive Space Vector Modulation for Constrained Active Thermal Control

*Ignacio Acosta¹, Chengmin Li¹, Petros Karamanakos², Georgios Papafotiou¹ (1. Eindhoven University of Technology (Netherlands), 2. Tampere University (Finland))

[P2-5-03] A Carrier-Based Discontinuous PWM Method for Mitigating Neutral-Point Voltage Fluctuation in Two-Parallel Interleaved Vienna Rectifier

*Juyeon Lee¹, June-Seok Lee¹ (1. Dankook University (Korea))

[P2-5-04] Voltage Error Compensation Method for PS-PWM in Single-Phase Seven-Level CHB Inverters

*Yisoo Park¹, Eunwoo Lee¹, Hyewon Kang¹, June-Seok Lee¹ (1. Dankook University (Korea))

[P2-5-05] High-Accuracy Synchronization Method for Wireless Control of Power Modules with Built-in Gate Drive Circuits

*Satoshi Mikami¹, Keiji Wada¹, Shigeyoshi Goka¹ (1. Tokyo Metropolitan University (Japan))

[P2-5-06] Modulation Technique for Dual-Transformer Series-Resonant Converters to Balance Switch Currents and Limit Switching Frequency Variation

*SangHyeon Lee¹, Lukas Antonio Budiwicaksana¹, Dong-Choon Lee¹ (1. Yeungnam University (Korea))

[P2-5-07] Zero Voltage Switching Technique Using Synchronous Rectifier Control of PWM LLC Resonant Converter for Light Load Efficiency

*Yeonghun Jeong¹, Dongmin Choi¹, Taewoo Kim², Jaeil Baek¹, Gun-woo Moon¹ (1. KAIST (Korea), 2. IMEC USA (USA))

[P2-5-08] Reduction in Capacitor of Flying-Capacitor for a 3+1-Level Converter

*Akihide Mizukawa¹, Keisuke Kusaka¹ (1. Nagaoka University of Technology (Japan))

[P2-5-09] Carrier-based PWM for Current Source Inverters with Overlap-Time Compensation and Switching-Loss Minimization

*takanobu ohno¹, Predrag Pejovic², Spasoje Miric³ (1. Innsbruck Univ. (Austria), 2. Belgrade Univ. (Serbia), 3. TUWien (Austria))

[P2-5-10] Investigation of Control Quantization in Decentralized Modular Active Cell Control for Multi-Active Bridge Converters

*Niklas Stöcklein¹, Raffael Schwanninger¹, Martin Lindner¹, Martin März¹ (1. Institute for Power Electronics, Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany))

[P2-5-11] Boosted Gate Driving with Active Damping to Reduce Turn-Off Losses in High-Power SiC MOSFETs

*Max J. Watson¹, Sebastian Neira¹, Stephen Finney¹, Paul D. Judge¹ (1. University of Edinburgh (UK))

[P2-5-12] Propagation–Coupling Factorization Model for 2-D Waveguide Wireless Power Transfer

Naoya Takahashi¹, *Yuichi Masuda², Katsuhiko Hata¹ (1. Shibaura Institute of Technology (Japan), 2. The University of Tokyo (Japan))

[P2-5-13] A Virtual SVM Strategy with Simultaneous Capacitor Voltages Balancing and Common-Mode Voltage Reduction for Three-Level Neutral-Point-Clamped Inverters

Yuttana Kumsuwan¹, *Sutthimat Mueangngoen¹ (1. Chiang Mai University (Thailand))

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[P2-5-14] State-Space-Bilinear SOGI Digital Filter Design for Spread Spectrum Modulation of a Single-Phase PWM Rectifier

*Chang Min Lee¹, Jee Hoon Jung¹ (1. Ulsan National Institute of Science and Technology (UNIST) (Korea))

[P2-5-15] Improved Current Regulation in CRM-Operated Totem-Pole PFC by Replacing the Blank Interval with a Modified DCM at the Zero Crossing

*Sota Sasaki¹, Cheng Huang¹, Takanori Isobe¹ (1. University of Tsukuba (Japan))

[P2-5-16] Optimizing ZVS-Capable DCM for High-Efficiency Grid-Tied Inverters: Can It Be Better than BCM?

*Cheng Huang¹, Sota Sasaki¹, Takanori Isobe¹ (1. University of Tsukuba (Japan))

[P2-5-17] Passive Common-Noise Canceller using Edgewise Winding for SiC Traction Inverters

*Takashi Sawada^{1,2}, Satoshi Ogasawara¹, Kazumasa Ide¹, Koji Shiozaki¹ (1. Nagoya University (Japan), 2. Power Design Laboratory Co., Ltd. (Japan))

Poster 2-6 (Event & Exhibition Hall)

[P2-6] Rotating Electrical Machines 2

Chair: Takahiro Sato (Muroran institute of technology)

[P2-6-01] Reluctance Torque Characteristics of PM-assisted Half-Wave Rectified Variable Field Flux Motor

*Taiga Yamaguchi¹, Tong Wang¹, Takashi Abe¹, Yoshitsugu Otomo¹ (1. Nagasaki University (Japan))

[P2-6-02] Rare-Earth-Free Variable Magnetization PM Reluctance Motor

*TAKAHIRO MORIOKA¹, Kazuto Sakai¹, Sari Maekawa¹ (1. Meiji University (Japan))

[P2-6-03] Propagation of Pulsed Voltage With a Rise Time of Shorter Than 100 ns Driven by SiC Pulsar Within Random Wound Motor

*Takafumi Okuda^{1,2}, Yuki Nomura^{1,2}, Hirofuku Ishikawa³, Takahiro Umemoto⁴, Yusuke Kikuchi⁵, Takashi Nakamura^{1,2} (1. The University of Osaka (Japan), 2. NexFi Technology Inc., (Japan), 3. Mitsubishi Electric Corp. (Japan), 4. The University of Tokyo (Japan), 5. University of Hyogo (Japan))

[P2-6-04] A Design Consideration of the Dual-three Phase Type Multiphase Induction Motor Drive System (IMTS) for Electric Vehicle Traction

*Kyohei Kiyota¹, Keigo Matsuzaki¹, Akira Chiba¹, Masashi Kobayashi² (1. Institute of Science Tokyo (Japan), 2. Toyota Motor Corporation (Japan))

[P2-6-05] Measurement and Uncertainty Analysis of Asynchronous Machines Using Dual Test Benches and Complementary Software Tools

*Nijjan Yagal¹ (1. VEM Motors GmbH (Germany))

[P2-6-06] A Simple Online Method to Estimate the Operating Characteristics of Inverter-Fed Induction Motors

*Hideaki Hirahara¹, Shu Yamamoto¹ (1. The Polytechnic University of Japan (Japan))

[P2-6-07] Evaluation of the Acoustic Noise Influenced by Current Waveform and Current Control Method in the Low-Speed Range of SRMs

*Muhammad Fabio¹, Shou Qiu¹, Kyohei Kiyota¹ (1. Institute of Science Tokyo (Japan))

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[P2-6-08] Torque Estimation of Switched Reluctance Motors Using Magnetic Circuit Model

Hiroki Ishikawa¹, *Hirokazu Yoshino¹, Kohei Budo¹ (1. Gifu University (Japan))

[P2-6-09] Analytical Modeling of Back Electromotive Force in Surface Permanent Magnet Vernier Motor

*Yasuhiro Kataoka¹ (1. Akita Prefectural University (Japan))

[P2-6-10] Application of Parameter Topology Simultaneous Optimization to a 42 Pole 36 Slot Outer Rotor Permanent Magnet Synchronous Motor

Wataru Sekiyama¹, *Hidenori Sasaki¹ (1. Hosei University (Japan))

[P2-6-11] Proposal and Validation of a Ringing Loss Analysis Model for PWM Inverter-Driven Motor Systems

*Masakazu Akahane¹, Kazunobu Hayashi¹, Kan Akatsu² (1. HIOKI E.E. CORPORATION (Japan), 2. Yokohama National University (Japan))

[P2-6-12] Insights to Spectral Based Acoustic Emissions Detection of Partial Discharge

*Colin Sim¹, Stephen Pierson¹, Han Hu¹, Alan Mantooth¹ (1. University of Arkansas (USA))

[P2-6-13] Contactless Permanent Magnet Temperature Detection of PMSM based on the Input DC Power of the Auxiliary Inverter

*Ryo Hamba¹, Keisuke Kusaka¹, Yoshihisa Hojo² (1. Nagaoka University of Technology (Japan), 2. Toyo Denki Seizo K.K. (Japan))

[P2-6-14] Estimation of Winding Loss by measuring Temperature Rises at End-winding and Active-winding for High Slot Fill Winding

*Shoichi Oaku¹, Jun Ebinuma¹, Yuto Yamada¹, Hiroya Sugimoto¹ (1. Tokyo Denki University (Japan))

[P2-6-15] Quantification of Manufacturing-Induced Degradation in stator cores of electric machines and the restorative Role of annealing

*Sima Soltanipour¹, Douglas Jutsell Nilsson², Torbjörn Thiringer², Joachim Lindström¹ (1. Volvo Cars Corporation (Sweden), 2. Chalmers University of Technology (Sweden))

[P2-6-16] AC Loss Asymmetry in Fractional-Slot PM Machines with Form-Wound Double-Layer Flat-Wire Windings

*Wenting Wang¹, Linnan Sun¹, Tianjie Zou¹, Gaurang Vakil¹, Zeyuan Xu¹, Zhaokai Li², David Gerada¹, Chris Gerada¹ (1. University of Nottingham (UK), 2. Politecnico di Milano (Italy))

Poster 2-7 (Event & Exhibition Hall)

[P2-7] Controls and Drives of Electric Machines 2

Chair: Kazuhiro Ohyama (Fukuoka Institute of Technology)

[P2-7-01] Voltage-Error-Based Angular Compensation for Torque Accuracy Improvement in IPMSM Drives

*Hye-Won Kang¹, Joon-Seok Kim¹, June-Seok Lee¹ (1. Dankook University (Korea))

[P2-7-02] Implementation of Field-Oriented Control with a Multi-Loop Control Structure for LC-Filtered Motor Inverters

Chih-Chung Tseng¹, Chi-Yang Chang¹, Ho-An Chen², *Wei-Che Lin², Mi-Ching Tsai^{2,3} (1. Department of Electrical Engineering, National Cheng Kung University (Taiwan), 2. Electric Motor Technology Research Center, National Cheng Kung University (Taiwan), 3. Department of Mechanical Engineering, National Taiwan University (Taiwan))

[P2-7-03] Energy Saving Optimal Trajectories for Induction Motor Drive System Considering Inverter Loss

*Kaoru Inoue¹, Kinya Manabe¹, Toshiji Kato¹ (1. Doshisha University (Japan))

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Poster 2-7 (Event & Exhibition Hall)

[P2-7-04] Mitigation of Current Steady-State Error in PMLSM via Multi-Sampling Deadbeat Current Control with Extended State Observer

*Hozumi Kurotaki¹, Akira Takakura¹, Tomoki Yokoyama², Toshiyuki Murakami¹, Takahiro Nozaki¹ (1. Keio Univ. (Japan), 2. Tokyo Denki Univ. (Japan))

[P2-7-05] Enhanced Disturbance Rejection With Discrete Virtual-Impedance-Based complex vector control for High-Speed PMSMs

*Syed Mohammad Maaz¹, Lukas Antonio Budiwicaksana¹, Dong-Choon Lee¹ (1. Yeungnam University (Korea))

[P2-7-06] Operation and Control of High-Power Medium-Voltage Traction Motor Drive at All Integer Pulse Numbers Through Carrier Interleaved Parallel VSI

*Ashish Kumar Panda¹, Sourav Ghimirey¹, Avaniash Tripathi² (1. Phd Research Scholar at IIT Delhi (India), 2. Associate Professor at IIT Delhi (India))

[P2-7-07] Technique for Passenger Entrapment Prevention in Elevators using Sensorless Control

*KYEONG JUN KWON¹, JUN HYEOK LEE², CHAN HWI KANG², YOUNG DOO YOON¹ (1. Hanyang University Department of Automotive Engineering (Korea), 2. Hanyang University Department of Automotive Engineering(Automotive-Computer Convergence) (Korea))

[P2-7-08] Reinforcement Learning-based Torque Control of Synchronous Machines

*Lara Broghammer^{1,2}, Dennis Hufnagel¹, Tobias Schindler¹, Armin Dietz¹, Oliver Wallscheid² (1. Technische Hochschule Nürnberg Georg Simon Ohm (Germany), 2. Univ. Siegen (Germany))

[P2-7-09] A Hybrid Flux-Weakening Control Method for Maximum-Speed Operation of a Wound Field Synchronous Motor

*Han-Vit Kim¹, Do-Hyeon Kim¹, June-Seok Lee¹ (1. Dankook University (Korea))

[P2-7-10] Oversampling based High-Speed Sensorless Control for PMSM

*Yuto Fukasawa¹, Sari Maekawa¹ (1. Meiji University (Japan))

[P2-7-11] Zero-Sequence Current Suppression Control Considering Interference Inductance in Open-End Concentrated Winding SynRM

*Ryo Kokubu¹, Shou Qiu¹, Kyohei Kiyota¹ (1. Institute of Science Tokyo (Japan))

[P2-7-12] Frequency Estimation for Three-Phase Power Grid With Modified Cost Function Recursive Least Squares

*Tuomo Matias Pälvilä¹, Alekski Mattsson¹, Pasi Peltoniemi¹ (1. LUT University (Finland))

[P2-7-13] New Parallel Drive System of an Induction Motor and a Permanent Magnet Synchronous Motor with a Single Inverter

*Natsuki Yamamoto¹, Kohei Kamada¹, Yoshitaka Kawabata¹ (1. Ritsumeikan University (Japan))

[P2-7-14] Interleaved Multilevel Inverter for Power Hardware-in-the-Loop Machine Emulation Considering Harmonics

*André Haspel¹, Chirs Hermann¹, David Hirning¹, Mattea Eckstein¹, Ingmar Kallfass², Jörg Roth-Stielow¹ (1. University of Stuttgart, Institute for Power Electronics and Electrical Drives (Germany), 2. University of Stuttgart, Institute of Robust Power Semiconductor Systems (Germany))

[P2-7-16] Feasibility Verification of Reinforcement Learning-Based Compensation for Inverter Nonlinearities

Hyunuk Seo¹, Hyunyong Choi², Jongjun Won², *JAEHOOON SHIM² (1. Korea Institute of Machinery and Materials (KIMM) (Korea), 2. Myongji University (Korea))

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Poster 2-8 (Event & Exhibition Hall)

[P2-8] Motor Drives, Condition Monitoring and Diagnostics

Chair: Takahiro Noguchi (University of Minnesota)

[P2-8-01] Uncertainty-Aware IGBT Aging State Classification for Traction Inverters Using Bayesian Residual Networks

*Jiahong Liu², Subham Sahoo¹, Xing Wei¹, Bo Yao¹, Yichi Zhang¹, Yongjie Liu¹, Frede Blaabjerg¹, Huai Wang¹ (1. Aalborg University (Denmark), 2. State Grid Jiangsu Electric Power Company Ltd. (China))

[P2-8-02] Event-triggered exponentially robust state estimation for nonlinear systems via generalized estimator

Muhammad Binyamin², Muhammad Tufail², Muhammad Rehan¹, *Sadeq Ali Qasem Mohammed¹, Ijaz Ahmed¹, Muhammad Khalid¹ (1. King Fahd University of Petroleum and Minerals (Saudi Arabia), 2. Pakistan Institute of Engineering & Applied Sciences (PIEAS) (Pakistan))

[P2-8-03] Precise Initial Rotor Position Estimation and Encoder Alignment Using Interpolation of Limited Data for PMSMs

*Bijen Mali¹, Dong-Choon Lee¹ (1. Yeungnam University (Korea))

[P2-8-04] An Indirect Tool Condition Monitoring Method on Embedded Systems for Spindle Motors

Damian Vilchis-rodriguez¹, *Cheng Zhang¹, Sinisa Durovic¹, Graham Fick², Sanket Gore², Phil Bates², Judith Apsley¹ (1. The University of Manchester (UK), 2. Round Bank Engineering Ltd (UK))

[P2-8-05] 10 MHz oversampling based Online estimating insulation degradation in motor windings

*Tomoki Hara¹, Sari Maekawa¹ (1. Meiji University (Japan))

[P2-8-06] Differentiable Predictive Current Control for PMSM Drives

*YUAN LI¹, Mateja Novak¹, Shuai Zhao¹, Huai Wang¹, Frede Blaabjerg¹ (1. Aalborg University (Denmark))

[P2-8-07] Real-Time DC-Link Capacitance Identification for Motor Drive Systems With Torque Ripple Mitigation

*Taewon Park¹, Younghoon Cho¹ (1. Konkuk university (Korea))

Poster 2-9 (Event & Exhibition Hall)

[P2-9] Linear Drives

Chair: TAKAFUMI KOSEKI (The University of Tokyo)

[P2-9-01] Robust Fractional-Order PI-PD Controller Design for Unstable Magnetic Levitation System

*Akanksha Dwivedi¹, Ahmad Ali¹, Lalit Singh² (1. Indian Institute of Technology Patna (India), 2. Department of Atomic Energy, NPCIL-BARC, India (India))

[P2-9-02] Online-Trained Dead-Time Compensator for PMLSM Considering End Effect

*Zhi Chen¹, You Zhou², Christopher H. T. Lee¹ (1. Nanyang Technological University (Singapore), 2. Huazhong University of Science and Technology (China))

[P2-9-03] Model Predictive Control of Nonlinear Wave Energy Converter for Broadening Operational Frequency Range

*Hidetoshi Miyazaki¹, Takahiro Sato¹ (1. Muroran Institute of Technology (Japan))

[P2-9-04] Verification of Online Winding Resistance Identification Method for Linear Switched Reluctance Motor under PWM Drive

*Sakuya Ebashi¹, Seiya Tashiro¹, Ryo Takagi¹, Tadashi Hirayama¹ (1. Kogakuin University (Japan))

Poster Sessions

Wednesday, June 3 12:40 – 14:00

Poster 2-10 (Event & Exhibition Hall)

[P2-10] Vehicle Electrification-related Technologies 2

Chair: Nobukazu HOSHI (Tokyo University of Science)

[P2-10-01] Comparison of Electric Vehicle Battery Chemistries: Lithium-Ion and Solid-State

*Jesse Thornburg¹ (1. Grid Fruit, LLC (USA))

[P2-10-02] Grid-BESS Hybrid Strategy for Partial Power EV Charging

*Di Wu¹, Yue Cao¹, Liangcai Shu¹, Krzysztof Puczek³, Reza Davoodnezhad², Michael Golombok², Dongsheng Yang¹ (1. Eindhoven University of Technology (Netherlands), 2. Shell (Netherlands), 3. Delta Electronics (Poland))

[P2-10-03] Deep Reinforcement Learning Based Fast-Charging Strategy for Lithium-Ion Batteries Using Twin Delayed DDPG

Ying-Ting Huang¹, *Guan-Hao Lu¹ (1. National Taipei University of Technology (Taiwan))

[P2-10-04] A Novel Blockchain-Assisted V2V Energy Trading System Design Addressing Charging Difficulties in Emergencies or in Remote Areas

Zaixin Song¹, *Yuan Gao¹, Yongtao Liang¹, Zhijian Zhang¹ (1. The Hong Kong Polytechnic University (Hong Kong))

[P2-10-05] Design and Implementation of a Non-Isolated 11 kW On-board Charger for Three-Phase and Single-Phase Operation

Konstantinos Theodosiou¹, *Michael Hartmann¹ (1. Technical University of Graz (Austria))

[P2-10-06] Physics-Informed State of Charge Estimation for LiFePO₄ Cells

*Hoda Sorouri¹, Arman Oshnoei¹, Monica Marinescu², Remus Teodorescu¹ (1. Department of Energy, Aalborg University, 9220 Aalborg East, Denmark (Denmark), 2. Department of Mechanical Engineering, Imperial College London, London SW7 2AZ, UK. (UK))

[P2-10-07] Impact of Triple-Phase-Shift Modulation on the Efficiency–Cost Optimization of Single-Stage Dual Active Bridge Converters for Wide-Voltage DC Fast Charging

*Sadik Cinik^{1,2}, Tomislav Turcak¹, Khan Reyyan Ahmad¹, Asim Ibrahim^{1,2}, Giuseppe De Falco¹, Xiongfei Wang³, Ariya Sangwongwanich² (1. Infineon Technologies Austria AG (Austria), 2. Aalborg University (Denmark), 3. Tsinghua University (China))

[P2-10-08] Study on Machine Learning Modeling Methods for Capacitance Estimation of LC Series Circuit Type Cell Voltage Equalizer

*Yuya Sekiguchi¹, Daiki Satou¹ (1. Tokyo Denki University (Japan))

[P2-10-09] Calorimetric-Based Condition Monitoring and Reliability Assessment of Power Semiconductor Devices in Electric Vehicle Inverters

*Shahriar Sarmast Ghahfarokhi¹, Enes Ayaz¹, Stanislaw Oliszewski², Staffan Norrga¹, Hans Peter Nee¹ (1. KTH Royal Institute of Technology (Sweden), 2. Wrocław University of Science and Technology (Poland))

[P2-10-10] Single-Stage Integrated OBC-APM Topology with Reduced Device Count for EV Application

*Anmol Arun Meshram¹, Siva Prabhakar¹, Sandeep Anand¹ (1. Indian Institute of Technology Bombay (India))

[P2-10-11] Optimal Primary Coil Placement in a Dual-Field Dynamic Wireless Power Transfer System

*HARUTAKA SUZUKI¹, Ryosuke Ota¹, Cristian Giovanni Colombo², Michela Longo² (1. Tokyo Metropolitan University (Japan), 2. Politecnico di Milano (Italy))

[P2-10-12] EMI and Loss Reduction via DC Link Optimization for Battery Based Automotive Multilevel Converters

*Wolfgang Grupp¹, Tobias Manfred Högerl¹, Johannes Buberger¹, Andreas Wiedenmann¹, Julian Estaller¹, Kevin Krakow², Thomas Weyh¹ (1. Universität der Bundeswehr München (Germany), 2. Helmut Schmidt Universität Hamburg (Germany))

Poster Sessions

Wednesday, June 3 12:40 – 14:00

Poster 2-10 (Event & Exhibition Hall)

[P2-10-13] Comparison of Unfolder and Pseudo-DC link Single-stage Topologies for Phase-Modular 3-phase Off-Board LEV Chargers

*Biswajit Sahoo¹, Shiladri Chakraborty¹ (1. IIT Bombay (India))

[P2-10-14] Design and Implementation of a Multi-Stage Constant Current Charging Strategy for LFP Battery Chargers

Anh-Tuan Le-Nguyen¹, *Chang-Hua Lin¹, Hwa-Dong Liu², Jenn-Jong Shieh³ (1. National Taiwan University of Science and Technology (Taiwan), 2. National Taiwan Normal University (Taiwan), 3. Feng Chia University (Taiwan))

[P2-10-15] Energy Control Strategy with Compact Flywheel Battery for Grid Support and Fast EV Bus Charging

*Atsushi Nakajima¹, Jahangir Hossain², Biplob Hossain², Kiyoharu Nakao⁴, Yoichi Ito³, Kazuo Rikkaku⁴, Morihiro Saito⁶, Yoshifumi Shimogaki⁷, Koji Shibasaki⁸, Hiroya Sugimoto⁵, Daiki Satou⁵ (1. PandaPower Co., Ltd. / Tokyo Denki University (Japan), 2. University of Technology Sydney (Australia), 3. GS Yuasa Corporation (Japan), 4. PandaPower Co., Ltd. (Japan), 5. Tokyo Denki University (Japan), 6. Motion System Tech, Inc. (Japan), 7. Exedy Corporation (Japan), 8. Maruwa Electronic Inc. (Japan))

Poster 2-11 (Event & Exhibition Hall)

[P2-11] Home and Consumer Appliances

Chair: Motoshi Matsushita (DAIKIN INDUSTRIES, LTD.)

[P2-11-01] Normalized Quadruple Sine Phase-Locked Loop for Three-Phase Distorted and Unbalanced Power Grids

Hao-Min Zhang¹, Yi-Hung Liao¹, *Jian-Chun Huang¹ (1. NATIONAL CENTRAL UNIVERSITY (Taiwan))

[P2-11-02] High-Efficiency Active-Clamp Flyback DC to DC Converter with Dual Transformers for 1.2 kW Power Applications

Chihchiang Hua¹, *JunYou Wang¹ (1. Department of Electrical Engineering, National Yunlin University of Science and Technology Address : No. 123, Section 3, University Road, Douliu City, Yunlin County (Taiwan))

[P2-11-03] Efficient Voltage Harmonic Control of DC-AC Inverters With Low Computational Burden

*Shih-Gang Chen¹, Shih-Sian Lee¹, Jun-Ming Hsu¹ (1. National Taipei University of Technology (Taiwan))

[P2-11-04] Inrush Current in an Inverter-Equipped Refrigerator Connected to a Power Outlet at Various Source-Voltage Phase-Angles and Its Suppressor

*Fuka Ikeda², Toshihiko Tanaka¹, Hidetoshi Kanazawa³ (1. Hiroshima Institute of Technology (Japan), 2. Fukuoka Institute of Technology (Japan), 3. Kanazawa Fellowship Laboratory (Japan))

[P2-11-05] A Scalable Infrastructure for Distributed Energy Resources Based on MEC-RM Architecture

*Koki SAITO¹, Yuta HASUHARA¹, Teruo KOBAYASHI², Shigehide FUWA², Midori SUGAYA¹ (1. Shibaura Institute of Technology (Japan), 2. ENERES Co.,Ltd. (Japan))

[P2-11-06] Input Current Harmonics Reduction in Non-isolated Buck-boost ZVS AC-DC LED Driver using Triangular Current Mode

*Hiroki Watanabe¹, Daisuke Ueda², Jun-ichi Itoh¹ (1. Nagaoka University of Technology (Japan), 2. Panasonic Electric Works Co. Ltd (Japan))

Poster Sessions

Wednesday, June 3 12:40 – 14:00

Poster 2-12 (Event & Exhibition Hall)

[P2-12] Human Factor and Image Recognition

Chair: Sho Yokota (Toyo University), Kaoru Mitsuhashi (Teikyo University)

[P2-12-01] Deep Learning Block-Set: A Simulink Native Deep Learning Framework

*Alexander Oerder¹, Tim Kappler¹, Johnny Abu Akdeh, Marc Hiller¹, Andreas Liske¹ (1. Karlsruhe Institute of Technology (Germany))

[P2-12-02] YOLOv8-Based Image Recognition Framework for Disease Detection in Agricultural Systems

*Cheng-Chi Yu¹, Da Cheng Peng¹, Jia Hong Lyu¹, Po Chen Liu¹, Ching Chun Chuan¹ (1. Department of Electrical Engineering, National Kaohsiung University of Science and Technology (NKUST) (Taiwan))

Poster 2-13 (Event & Exhibition Hall)

[P2-13] Sophisticated Power Conversion 2

Chair: Rintaro Kusui (Nagaoka University of Technology)

[P2-13-01] A Hybrid-bridge Resonant Converter with WideZVS and Minimum Current Operation for Wide Gain Range Applications

Yinan Li¹, *Xiaodong LI¹, Chuan Sun¹, Akshay Rathore² (1. Macau University of Science and Technology (Macau), 2. National University of Singapore (Singapore))

[P2-13-02] Optimization of TPS Modulation for LCL Resonant DAB Converters

Rui Wang¹, Chuan Sun¹, *Xiaodong LI¹, Akshay Rathore² (1. Macau University of Science and Technology (Macau), 2. National University of Singapore (Singapore))

[P2-13-03] A Unipolar PWM to Reduce Common-Mode Voltage in Three-Level Inverters Based on Neutral-Point Voltage Balancing

*Paiboon Kiatsookkanatorn¹, Somboon Sangwongwanich², Phongsathorn Sangsuwan¹, Surapong Suwankawin² (1. Rajamangala University of Technology Suvarnabhumi(RUS), Suphanburi (Thailand), 2. Chulalongkorn University Bangkok (Thailand))

[P2-13-04] Volt-Second Balance Control with Magnetizing Current Estimation for Primary-side Regulation Double-Clamp ZVS Flyback Converter

*Song Ding¹, Yaoqing Wang¹, Qinsong Qian¹, Weifeng Sun¹ (1. Southeast University (China))

[P2-13-05] Multi-mode Control for an Asymmetric Half-bridge Flyback Converter

*Younghoon Cho¹, Paul Jang², Jong-Won Shin¹ (1. Seoul National University (Korea), 2. Tech University of Korea (Korea))

[P2-13-06] Relative Impact of Dead Time in Medium Voltage SiC MOSFET-Based Converters

*Morten Rahr Nielsen¹, Gao Liu¹, Narendra Shankar Walawalkar¹, Michael Møller Bech¹, Stig Munk-Nielsen¹ (1. Aalborg University (Denmark))

[P2-13-07] Switching Loss Optimization for Three-Phase Hybrid NPC Inverter with Flying-Capacitor Leg

*chengjun li¹, dong jiang¹, yikang mao¹, hui liu¹ (1. Huazhong University of Science and Technology (China))

[P2-13-08] Coordinated Control of DC-link Capacitor Voltages of NPC Converters for Doubly Fed Machines in Adjustable-Speed Pumped-Storage Hydropower Systems

*Jiantao Zhang¹, Takuro Arai¹, Yushi Koyama¹, Hironari Kaneda¹, Teruyuki Ishizuki¹, Junji Mori¹ (1. Toshiba Corporation (Japan))

Poster Sessions

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Poster 2-13 (Event & Exhibition Hall)

[P2-13-09] Stability Analysis of Grid-Following Inverter with Digital Symmetric Component Separator

*Shota Tanaka¹, Toshiji Kato¹, Kaoru Inoue¹ (1. Doshisha University (Japan))

[P2-13-10] A Novel Integral Sliding Mode Controller Applied for Grid-connected Modular Multilevel Converter

*Hieu Chi Pham¹, Long Van Pham¹, Phuong Viet Pham¹ (1. Hanoi University of Science and Technology (Viet Nam))

[P2-13-11] Detection and Localization for Subsequent Sub-Module Fault in a Cascaded Multilevel Converter Based on Line-to-Line Voltage Waveforms

*Yosuke Aoki¹, Yushi Miura¹ (1. Nagaoka University of Technology (Japan))

[P2-13-12] Novel Current Modulation Method for Active Temperature Control in Parallel Operated Half-Bridge Power Stages

*Chris Hermann¹, Julian Tomsik¹, David Hirning¹, André Haspel¹, Ingmar Kallfass², Jörg Roth-Stielow¹ (1. ILEA - University of Stuttgart (Germany), 2. ILH - University of Stuttgart (Germany))

[P2-13-13] Active Power Decoupling with Capacitor Voltage Utilization Factor Design for Single-phase and Three-phase Compatible T-type Converter in EV On-board Chargers

*Ryohei Higashide¹, Hiroki Watanabe¹, Jun-ichi Itoh¹ (1. Nagaoka University of Technology (Japan))

[P2-13-14] Common-Mode Voltage Reduction Pulse-Width Modulation for Three-Phase Converters

*Shinji Sato¹, Daiki Yamaguchi¹, Fumiki Kato¹ (1. National Institute of Advanced Industrial Science and Technology (AIST) (Japan))

[P2-13-15] Simplified Soft-Switching Constraints for High-Power Multi-Active Bridge Converters

*Jonghun Yun¹, Jaekeun Lee², Giovanni De Carne¹, Shenghui Cui² (1. Karlsruhe Institute of Technology (Germany), 2. Seoul National University (Korea))

[P2-13-16] Hybrid Thermal Digital Twin for Power Modules with Data-Driven Residual Correction

Martin Votava¹, Oke Olayinka Adebayo³, Riccardo Sancio¹, *Marco Liserre² (1. Kiel University (Germany), 2. Kiel University; Fraunhofer ISIT (Germany), 3. Department of Mechanical and Aerospace Engineering, Missouri University of Science and Technology (USA))

[P2-13-17] Analysis of Parallel Operation Effects in Grid-Connected Inverters with LCL Filters

*Chhaya Seng¹, Dongmin Kim¹, Jinlei Sun¹, Hanju Cha¹ (1. Chungnam National University (Korea))

Poster Sessions

Wednesday, June 3 12:40 – 14:00

Poster 2-14 (Event & Exhibition Hall)

[P2-14] Device-related technologies, Passive components and materials 1

Chair: Noriyuki Nosaka (OMRON Corporation)

[P2-14-01] Magnetic-Field-Based Switching Stage Detection for Closed-Loop Active Gate Driving to Suppress Overshoot and Oscillatory Switching Behaviour in SiC Power Modules

*Yuxiao Bai¹, Mason Parker¹, Ilker Sahin², Sebastian Neira Castillo¹, Paul Judge¹, Stephen Finney¹ (1. University of Edinburgh (UK), 2. ASELSAN (Turkey))

[P2-14-02] Toward Direct Aging Detection of SiC MOSFETs Using Switching-Delay Measurements

*Laurids Schmitz¹, Xin Yen Woon¹, Franz Hendrik Groote¹, Kai-Jimmy Shen¹, Rik W. De Doncker¹ (1. ISEA - RWTH Aachen University (Germany))

[P2-14-03] Online Junction-Temperature Sensing of GaN GITs Utilizing the Gate Diode Forward Voltage

*Tianlong Albert¹, Tudor Sechel¹, Daniel Baggen¹, Rik W. De Doncker¹ (1. RWTH Aachen University (Germany))

[P2-14-04] Optimized Short-Circuit Turn-Off Performance in IGBTs with High Desaturation Current

*Michael Walter¹, Mark-M. Bakran¹ (1. Universität Bayreuth (Germany))

[P2-14-05] A SiC MOSFET double-side cooled press packutilising liquid metal for die connections

*Stefan Meyer¹, Asger Bjørn Jørgensen¹, Szymon Michael Beczkowski¹, Kaichen Zhang, Nicholas Baker² (1. Aalborg University (Denmark), 2. University of Alabama (USA))

[P2-14-06] Comparative Evaluation of Gate Driving Schemes for Paralleled 2.3 kV SiC MOSFET Power Modules

*Nianzun Qi¹, Gao Liu¹, Hongbo Zhao¹, Asger Bjørn Jørgensen¹, Stig Munk-Nielsen¹ (1. Aalborg University (Denmark))

[P2-14-07] Monolithic GaN Gate Driver with Adaptive Gate Driving Control

*Ching-Yu Ou Yang¹, Ching-Jan Chen¹, Yen-Ming Chen¹ (1. National Taiwan University (Taiwan))

[P2-14-08] Self-Driven Active Gate Driver Employing Gate–Drain Capacitive Coupling for Overshoot Reduction in SiC MOSFETs

*Niklas Falkenberg¹, Martin Pfof¹ (1. TU Dortmund Univ. (Germany))

[P2-14-09] Trade-off between Avalanche and Short Circuit Ruggedness in Different SiC MOSFET Technologies

Layi Alatise¹, Arkadeep Deb², Heaklig Ayala¹, Jose Ortiz Gonzalez¹, Abdul-Haleem Malik¹, *Saeed Jahdi³ (1. University of Warwick (UK), 2. GE Vernova, Stafford, UK, ST17 4FL (UK), 3. University of Bristol (UK))

[P2-14-10] Modeling GaN HEMT Devices: Physical Insights into Intrinsic and Extrinsic Circuit Components of the SPICE model

*Pengpeng Sun¹, Torbjörn Thiringer², Adamantia Logotheti¹ (1. Volvo Cars (Sweden), 2. Chalmers Univ. (Sweden))

[P2-14-11] Reconstruction of Output Characteristics of Wide-Bandgap Devices Based on Double-Pulse Tests

*Tianxu Cao¹, Christos Leontaris¹, Gean Maia de Sousa¹, Marcelo Lobo Heldwein¹ (1. Technical University of Munich (Germany))

[P2-14-12] Double-Pulse Characterization of GaN Monolithic Bidirectional Switches in Single-Stage OBC

*Guanjiang Liu¹, Qishan Pan¹, Xinxu Cui¹, Haoyu Wang^{1,2} (1. School of Information Science and Technology, ShanghaiTech University (China), 2. Shanghai Engineering Research Center of Energy Efficient and Custom AI IC (China))

[P2-14-13] Comprehensive Modeling and Evaluation of Cascode GaN HEMT Power Modules

*Ruijie Song¹, Fang Zhuo¹, Feng Wang¹, Hao Yi¹, Jiachen Tian¹, Ruru Zheng² (1. Xi'an Jiaotong University (China), 2. Yandangshan Institute of Electrical Technology (China))

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