PROGRAM

IEEE SLED 2023, Seoul, Korea

Ryse Hotel, Seoul / August 16-18, 2023

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Wednesday, August 16

14:00 Technical Tour

17:00 Welcome Reception

Thursday, August 17

09:00 Opening

Plenary Speech 1

Thursday, August 17, 09:20 to 10:00

09:20 Hyundai Motor Group's Electrification System Technology Trend and Sensorless Control Status

Mr. Junghong Joo
Hyundai Motor Group, Korea

Plenary Speech 2

Thursday, August 17, 10:00 to 10:40

10:00 Current Status and Future Directions of Compressor and Motor Technology in DA Division of Samsung Electronics

Dr. Junpyo Lee
Samsung Electronics, Korea

10:40 Coffee Break

Session 1 – Signal Injection Sensor-less Drives

Thursday, August 17, 11:00 to 12:40
Chairman: Prof. Jung-Ik Ha

S1-1

11:00 Investigation of Pulsating Vector Excitation Saliency-based Rotor Position Estimation Method in Current-source Inverters

Renato Amorim Torres[1], Woongkul Lee[2]
[1]University of Wisconsin-Madison, [2]Michigan State University

S1-2

11:20 Analysis of Static Eccentricity on the Position Estimation of Zero-Sequence Voltage Based Sensorless Techniques

Carsten Klein[1], Niklas König[2], Marco Palmieri[1], Matthias Nienhaus[1], Emanuele Grasso[1]
[1]Saarland University, [2]Universität des Saarlandes niversity of Basilicata

S1-3

11:40 Zero Voltage Vector Based Initial Magnet Polarity Identification Strategy of PMSM Drives

Kairan Wang, Guoqiang Zhang, Rundong Li, Gaolin Wang, Dianguo Xu
Harbin Institute of Technology

S1-4

12:00 Comparison of Different Compensation Methods of the Mutual Inductance for Self-Sensing Control

Niklas Himker, Georg Lindemann, Axel Mertens
Leibniz University Hannover

S1-5

12:20 Sensorless Control of PMSM Based on Hybrid Extended State Observer

Van Nam Nguyen, Dong-Choon Lee
Yeungnam University

12:40 Lunch

Session 2 – PMSM Drives 1

Thursday, August 17, 13:40 to 15:40
Chairman: Prof. Seung-Ki Sul

S2-1

13:40 Restart Strategy for Sensorless PMSM Drive with Single Zero Voltage Vector in Railway Application

Fei Du[1], Jian Li[2], GuoFeng Li[1]
[1]Dalian University of Technology, [2]Huazhong University of Science and Technology

S2-2

14:00 Simple Rotor Polarity Reversal Recovery in EV Traction Motor Sensorless Control

Myeong-Won Kim, Jung-Wook Park
Yonsei University

S2-3

14:20 Sensorless Control of High-Speed Surface Permanent Magnet Synchronous Motors for Enhanced Dynamic Performance

Shun Lan, Jian Li
Huazhong University of Science and Technology

S2-4

14:40 Estimation of d-q Inductances and Initial Rotor Position Considering Voltage Distortions in High-Speed Motors for Air Compressors of Fuel-Cell Systems

Min seong Lee, Sang gyu Lee, Sungho Kang, Young-Doo Yoon
Hanyang University

S2-5

15:00 Self-Sensing Control of a PMSM used for an Automotive Application with a novel Rotor Position Estimator based on the Back-Electromotive Force

Viktor Willich, Axel Mertens
Leibniz University Hannover - Institute for Drive Systems and Power Electronics

S2-6

15:20 Hexa-Active Vector Pulsewidth Modulation in IPMSM Sensorless Drives Using Single DC-Link Current Sensor

Byung Ryang Park, Jung-Ik Ha
Seoul National University

15:40 Break

Session 3 – IM/SRM/Wound-Rotor SM Drives

Thursday, August 17, 16:00 to 18:00
Chairman: Prof. Marko Hinkkanen

S3-1

16:00 High-Efficiency Control Method of V/f Control for Switched Reluctance Motor

Hirotaka Kato, Junichi Itoh
Nagaoka University of Technology

S3-2

16:20 V/f control method for torque ripple reduction in a single phase induction motor

SEUNG CHEOL CHOI[1], Jung-Han Kim[1], Young-Doo Yoon[2], CHAN OOK HONG[1],
Cheol-Hyun Park[1], JOO HYUN CHO[1]
[1]LS Electric, [2]Hanyang University

S3-3

16:40 Flux Saturation Model using Arctangent and Logarithm Functions considering the Flux Characteristics of Synchronous Reluctance Machines

TAEGYEOM WOO, Hyun-Jun LEE, Young-Doo Yoon
Hanyang University

S3-4

17:00 Evaluation of an Induction Machine's Differential High-Frequency Inductance for Self-Sensing Control under Consideration of Iron Saturation

Constantin Schepe, Bernd Ponick
Leibniz University Hannover

S3-5

17:20 Speed-Adaptive Full-Order Observer Revisited: Closed-Form Design for Induction Motor Drives

Lauri Tiitinen[1], Marko Hinkkanen[1], Lennart Harnefors[2]
[1]Aalto University, [2]ABB Corporate Research

S3-6

17:40 Sensorless Drive for Wound Rotor Synchronous Generator with Brushless Excitation System in Maritime DC Microgrid

Jonghun Yun[1], Sanggi Ko[1], Seung-Ki Sul[1], Woojae Park[2], Sanghyun Kim[2]
[1]Seoul National University, [2]Korea Shipbuilding & Offshore Engineering Co., Ltd.

18:00 Banquet

Friday, August 18

Session 4 – Special Solutions

Friday, August 18, 09:00 to 10:40
Chairman: Prof. Junich Itoh

S4-1

09:00 **Multi-Channel Neural Network-Based Thermal Monitoring of Electric Motor**

Jaehoon Shim, Jonghun Choi, Sangwon Lee, Jung-Ik Ha
Seoul National University

S4-2

09:20 **Implementation of AC current-sensor-less control and high-frequency modulation of an all-SiC Current Source Inverter**

Yonghwa LEE, Alberto Castellazzi
Kyoto University of Advanced Science

S4-3

09:40 **Full-Speed Sensorless Control Scheme for Permanent Magnet Synchronous Motor Using Artificial Neural Network**

Hasan Al-kaf, Sadeq Mohammed, Kyo-Beum Lee
Ajou University

S4-4

10:00 **Sensorless Control of a Two-Phase Linear PMSM exploiting PWM-Induced Current Ripples**

Joshua Summa, Niklas König, Matthias Nienhaus, Emanuele Grasso
Saarland University

S4-5

10:20 **A Practical Position Sensorless Control of Long-Cable-Fed PMSM Drives with a Sine-wave Filter for Electrical Submersible Pumps**

Hanyoung Bu, Younghoon Cho
Konkuk University

10:40 Coffee Break

Session 5 – PMSM Drives 2

Friday, August 18, 11:00 to 12:40
Chairman: Prof. Dong-Choon Lee

S5-1

11:00 Improved Predictive Torque Control with Unidirectional Voltage Vector Selection of PMSM fed by Three-Level Neutral-Point-Clamped Inverter

Ibrahim ALSOFYANI[1], Kyo-Beum Lee[2]
[1]SEMI-TS, [2]Ajou University

S5-2

11:20 Zero-position Deviation Calibration of PMSM Based on I/f Control Strategy and Slide Mode Observer for Electric Power Steering System

Yingzhe Wu[1], Hui Li[2], Lisheng Wang[1], Shan Yin[2]
[1]Shanghai Gatek Automotive Electronics Co.,Ltd, [2]University of Electronic Science and Technology of China

S5-3

11:40 Improved Hybrid Current Regulation for Interior PMSM Drives Subjected to Internal/External Distortions

Sadeq Mohammed, Kyo-Beum Lee
Ajou University

S5-4

12:00 Modified Phase-Shift PWM for Common-Mode Voltage Reduction in PMSM Drives Fed by Five-Level HANPC Inverter

Samer Hakami, Kyo-Beum Lee
Ajou University

S5-5

12:20 Analysis of Pulse Width Modulation Methods for PMSM Sensorless Control Based on Current Derivative Measurement

Juwon Lee, Byung Ryang Park, Jung-Ik Ha
Seoul National University

12:40 Lunch

Session 6 – Modeling & Control Techniques

Friday, August 18, 13:40 to 15:40
Chairman: Dr. Ibrahim ALSOFYANI

S6-1

13:40 Static Friction Torque Estimation for Robot Manipulators Using a Data-Driven Approach

Jaehoon Shim[1], Sangwon Lee[1], Daesung Jeon[2], Jung-Ik Ha[1]
[1]Seoul National University, [2]Hyundai Robotics

S6-2

14:00 A Virtual Space Model based on Torque Gradient of IPMSMs with Non-linear Characteristics

Takumi Ohnuma
National Institute of Technology, Numazu College

S6-3

14:20 Efficient Fault Detection for Open Circuit Faults in HANPC Inverters Using Artificial Neural Network for Motor Drive Applications

Laith M. Halabi[1], Hasan Al-kaf [2], Kyo-Beum Lee[2]
[1]Nablus University for Vocational & Technical Education, [2]Ajou University

S6-4

14:40 Online Inductance Identification for PMSM Sensorless Control Immune to Position Error

Jiqing Xue, Qiwei Wang, Gaolin Wang, Guoqiang Zhang, Dianguo Xu
Harbin Institute of Technology

S6-5

15:00 DC Current Sensing Drive Scheme for Ultra-Low Inductance PMSMs with Enhanced Low-Speed Performance

Kahyun Lee[1], Hyeon-Gyu Choi[2]
[1]Ewha Womans University, [2]Incheon National University

S6-6

15:20 Torque Ripple Suppression Technique of High-Frequency Signal Injection-Based Sensorless Control

Hyun-Jun LEE, Je-Eok Joo, Young-Doo Yoon
Hanyang University

15:40 Break

16:00 Award & Closing

Plenary Speakers

Junghong Joo (Hyundai Motor Group, Korea)

- Head of Group / Electric Power Conversion Engineering Design Group

- "Hyundai Motor Group's Electrification System Technology Trend and Sensorless Control Status"

Global electrification of the vehicles is ongoing future. Under tightening emission regulations, many manufacturers including HMG (Hyundai Motor Group) are declaring their transition to EVs. To achieve carbon neutrality, HMG aims to sell more than 3 million EVs in 2030 and prepares competitive technical solutions. In this speech, we will introduce e-GMP (Electric – Global Modular Platform), which is the new backbone for HMG's next-generation EV-exclusive lineups. E-GMP includes PE system, Motor system, Battery system, 800V electrical architecture, multi-charging system, High efficiency propulsion drives, and so on. Also, we will discuss our PE modular strategy (IMA, Integrated Modular Architecture) and V2X development strategy in details. We will introduce several sensorless techniques applied in the e-GMP not only for fail-safe but also for enhancing performance. Overcomes, effects, and future works of the sensorless techniques especially for the EV will also be discussed.

Junpyo Lee (Samsung Electronics, Korea)

- Corporate VP / Digital Appliances Compressor & Motor Business Team

- "Current Status and Future Directions of Compressor and Motor Technology in DA Division of Samsung Electronics"

Due to the demand for convenience, various home appliances have been developed and released, and various compressors and motors have been developed accordingly. Energy and environmental regulations, which are becoming more and more stringent, are leading to the need for more advanced compressor and motor technologies, which require the development of driving technologies based on power electronics. In this speech, we will introduce the Compressor and Motor Business Team of Samsung DA Division and explain various types of compressor and motor technologies currently being developed. In addition, we will discuss the directionality of compressor and motor technology to be pursued in the future. The development of compressor and motor technologies along with the development of power electronics will not only contribute to convenience with home appliances, but will ultimately contribute to improving the quality of life of people along with the achievement of carbon neutrality

On-site Registration (Wed. 12:00~18:00, Thur. 08:30~18:00, Fri. 08:30~12:00, 5th Floor)

Help desk staff will be available during registration hours (Wed. 12:00~18:00, Thur. 08:30~18:00, Fri. 08:30~12:00) to assist with printing badges and providing materials at the help desk (5th floor, Ryse space). Please come to the desk to complete on-site registration.

Technical Tour (Wed. 14:00~17:00)

Guided technical tour to LG Electronics (LG Science Park) has been prepared for attendees of the SLED 2023 on Wed. Please get on the tour bus according to the guidance of staff. You will come back to the Ryse hotel by 17:00.

On-line Proceedings

All registered authors and attendees have on-line access to the SLED 2023.

1. Go to the proceedings download link: **http://me-qr.com/xucUlHFP**
   or Use this QR code to go to the proceedings download link.

2. Enter e-mail address that you use for the conference registration site.

Live Concert (Thur. 19:30~, All of Rock)

There is a live concert after banquet. You can walk for about 15 minutes according to the guidance of staff.
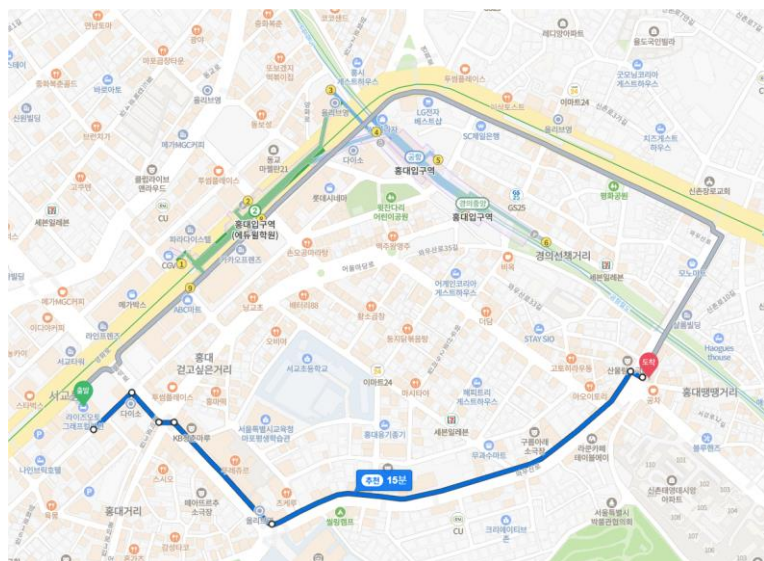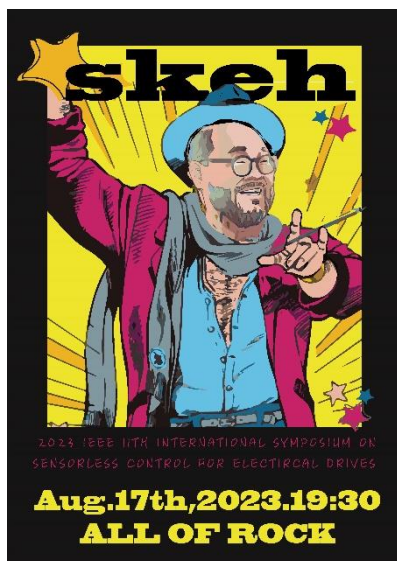
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Wednesday, August 16		Thursday, August 17		Friday, August 18	
12:00 18:00	Registration	08:30 18:00	Registration	08:30 12:00	Registration
14:00 17:00	Technical Tour	09:00 09:20	Opening	09:00 10:40	Section 4 - Special Solution Chair : Prof. Junich Itoh
17:00	Welcome Reception	09:20 10:00	Plenary Speech 1 Mr. Junghong Joo	10:40 11:00	Coffee Break
		10:00 10:40	Plenary Speech 2 Dr. Junpyo Lee	11:00 12:40	Section 5 - PMSM Drives 2 Chair : Prof. Dong-Choon Lee
		10:40 11:00	Coffee Break	12:40 13:40	Lunch
		11:00 12:40	Section 1 - Signal Injection Sensor-less Drives Chair : Prof. Jung-Ik Ha	13:40 15:40	Section 6 - Modeling & Control Techniques Chair : Dr. Ibrahim ALSOFYANI
		12:40 13:40	Lunch	15:40 16:00	Break
		13:40 15:40	Section 2 - PMSM Drive 1 Chair : Prof. Seung-Ki Sul	16:00 16:30	Award & Closing
		15:40 16:00	Break		
		16:00 18:00	Section 3 - IM/SRM/Wound-Rotor SM Drives Chair : Prof. Marko Hinkkanen		
		18:00 19:00	Banquet		