TECHNICAL PROGRAM

IEEE-SDEMPED 2023

14th IEEE International Symposium on Diagnostics for Electrical Machines, Power Electronics & Drives

Chania (Greece)
August 28 – 31, 2023

WELCOME TO THE 14ᵗʰ IEEE SDEMPED 2023

On behalf of the SDEMPED 2023 Organizing Committee, we would like to welcome you to 14ᵗʰ edition of the IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives 2023.

This is the 25ᵗʰ year since the first SDEMPED was established as the only international symposium entirely devoted to the diagnostics of electrical machines, power electronics and drives. SDEMPED is now a regular biennial event. Since it was created in 1997, very successful editions have been held during the past 10 years in Cargèse (France) in 2009, Bologna (Italy) in 2011, Valencia (Spain) in 2013, Guarda (Portugal) in 2015, Tinos (Greece) in 2017, and Toulouse (France) in 2019. The IEEE SDEMPED 2021 was run in an atypical form due to the COVID-19 pandemic (virtual event).

The IEEE SDEMPED 2023 is held in Chania on the beautiful island of Crete (Greece). The SDEMPED 2023 Organizing Committee wishes you a very successful, pleasant and outstanding symposium. Let's make this an enjoyable and rewarding event!

Dr. Konstantinos Gyftakis, IEEE SDEMPED 2023 - General Chair

SDEMPED 2023 will be a four-day symposium that will provide a forum for presentation and discussion of the state-of-the-art of diagnostics and monitoring for electrical machines, power electronics, adjustable speed drives and related areas.

The technical program of SDEMPED 2023 will include **2** Keynote presentations, **2** Tutorial Sessions, **11** Regular and **5** Special Sessions where **92** papers from **33** different countries will be presented. All the submitted and finally accepted papers have been reviewed by at least three independent reviewers.

The symposium will start on August 28, which will be devoted to the tutorials that will deal with different topics of great interest for the area: the first one will be focused on hands-on processing of transient signals for electrical machines fault diagnosis (Dr. Morinigo-Sotelo and Dr. Fernandez-Cavero), while the second will deal with software-defined power electronics (Prof. Preindl). Moreover, the first Keynote entitled: "Faulty trends, common misdiagnosis and tough troubleshooting cases on an electric machine using vibration analysis" will be presented by Mr. Fawzal.

The opening ceremony will take place on August 29 and will be followed by the Keynote entitled: "Challenges in Monitoring the Insulation Condition of Windings Supplied by Voltage Source Invertors" by Dr. Stone. The end of the last keynote will be the starting point of three days of intense activity, in which parallel morning and afternoon sessions will be held. These sessions will cover a wide range of topics within the electrical machines, power electronics and drives condition monitoring, fault diagnosis and prognosis. The technical activities of the conference will finish on the morning of the last day (August 31) at the closing ceremony.

The Proceedings of the Symposium will become available in the IEEE Xplore Digital Library. Part of the presented papers can be further submitted for review to IEEE Transactions on Industry Applications, as well as to the Transactions of Power Electronics and Industrial Electronics.

The Diagnostic Achievement Award will be awarded at the Symposium, and three selected papers will be recognized with the SDEMPED Prize Paper Award.

We wish you an enjoyable stay in Crete and a very successful Symposium!

Prof. Antonio J. Marques Cardoso
Prof. Thomas Wolbank
Prof. Jose A. Antonino-Daviu

MESSAGE FROM THE TECHNICAL PROGRAM CO-CHAIRS

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COMMITTEES

IEEE SDEMPED 2023
14th Edition of the IEEE International Symposium on Diagnostics for
Electric Machines, Power Electronics and Drives
28-31 August 2023, Chania, Greece

Tutorial on:

"Hands-on processing of transient signals for electrical machines fault diagnosis"

Instructors

Dr. Daniel Morinigo-Sotelo

Research Group ADIRE-HSPdigital, Institute of Advanced Production Technologies, Universidad de Valladolid, Spain

Dr. Vanesa Fernandez-Cavero

Department on Electrical Engineering, Universidad de Valladolid, Spain

Tutorial Scope and Learning Outcomes:

Fault detection in electrical machines relies on signal analysis. The standard tools used to process such signals are based on the assumption of "stationarity" (machines operating at a steady state). But "non-stationarities" (i.e., operation of wind generators or traction motors) are not exceptional and carry valuable information. Therefore, it is necessary to develop approaches beyond Fourier-type methods. Time-frequency signal processing has emerged as a useful alternative. This is pretended to be a hands-on tutorial. MATLAB/Octave scripts and signals will be shared in advance so that participants can bring their computers and practice during the session. This tutorial's learning outcomes are as follows:

- Basics of time-frequency analysis.
- Time-frequency analysis of synthetic and real signals.
- Code your own Short-Time Fourier or MUSIC Transform.
- Code your own Time-Frequency Atom Transforms.

Bios:

Daniel Morinigo-Sotelo (M'04) received the B.S. and Ph.D. degrees in electrical engineering from the University of Valladolid (UVa), Spain, in 1999 and 2006, respectively. He was a research collaborator on Electromagnetic Processing of Materials with the Light Alloys Division of CIDAUT Foundation since 2000 until 2015. He is currently with the research group on Analysis and Diagnostics of Electrical Grids and Installations (ADIRE), that belongs to the ITAP Institute (UVa), and with the HSPdigital Research Group, Mexico. His current research interests include fault detection and diagnostics of induction machines, power quality, and smart grids.

Vanesa Fernandez-Cavero received the B.S. degree in Industrial Organization Engineering and Electrical Engineering from the ICAI, Comillas Pontifical University (UPCO), Madrid, Spain, in 2005. She received the Ph.D. degrees in electrical engineering from the University of Valladolid (UVA), Spain, in 2018. She is currently a Researcher with the University of Valladolid. Her current research interests are monitoring of induction machines, detection and diagnosis of faults in inverter-fed IM in transient regimes.

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Tutorial on:

"Software-Defined Power Electronics: Theory and Study Cases"

Instructor

Prof. Matthias Preindl

Columbia University in the City of New York, USA

Tutorial Scope and Learning Outcomes:

This tutorial focuses on a novel family of software-defined power converters that aggregate atomic power electronic converter modules by a dedicated software stack. This tutorial discusses the design and implementation of the atomic power electronic converter modules for high efficiency power conversion with competitive power density and cost. The atomic modules leverage soft-switching and solve key power electronic challenges locally such as filtering, electromagnetic compatibility (EMC), and component protection.

Software defined power electronics aggregates atomic modules to form power converters and the higher levels define the converter operation. Special attention is given to how the software stack can be leveraged to increasing flexibility and enable reprogrammability resulting in reconfigurable converters with partial redundancy and self-healing properties.

The merits and challenges of software defined power electronics are illustrated using two real-world applications: a transformerless battery charger and a motor drive inverter for electric drivetrains. The converters achieve more than 99% efficiency at a competitive power density and cost. Reconfigurability and fault tolerance is shown by aggregation and operation with a varying number of atomic modules. High level converter controls are illustrated on the example of bidirectional battery charging while providing vehicle to grid services and motor drive controls.

Bio:

Matthias Preindl received the PhD degree in Energy Engineering from the Doctoral School of Industrial Engineering at University of Padua, Italy (2014), the MSc degree in Electrical Engineering and Information Technology from ETH Zurich, Switzerland (2010), and the BSc degree in Electrical Engineering (summa cum laude) from University of Padua, Italy (2008).

Dr. Preindl is Associate Professor of Power Electronic Systems at Columbia University in the City of New York since 2020. He joined the Department of Electrical Engineering as Assistant Professor in 2016 and is the principal investigator of the Motor Drives and Power Electronics Laboratory (MPLab) and a founding member of the Columbia Electrochemical Energy Center (CEEC). Before joining Columbia University, he was a Sessional Professor in the Department of Electrical and Computer Engineering (2015) and a Post Doctoral Research Associate at the McMaster Institute for Automotive Research and Technology (2014-2015), both at McMaster University, Canada. He was a visiting scholar at University of California, Berkeley, USA (2013), a visiting student at Aalborg University, Denmark (2009), and a trainee at the National Research Council (CNR), Italy (2008). Also, he worked in wind power industry as an R&D engineer at Leitwind AG, Italy (2010-2012).

Dr. Preindl serves as Area Editor (Co-EiC) of IEEE Transactions on Vehicular Technology, Associate EiC or Springer Nature/China SAE Automotive Innovation, and he was the general chair of 2022 IEEE/AIAA ITEC+EATS. He is a Fellow of IET and Senior Member of IEEE. He obtained several honors including the FUTURA Award (2016), NSF Career Award (2017), the Masao Horiba Awards honorable mention (2019), Fast Company's World Changing Ideas Awards honorable mention (2022) and he is the co-recipient of best paper and presentation awards including the IEEE Transactions on Industrial Electronics best paper award (2019) and the MIT A+B best paper award (2022). His primary research interests are the design and control of power electronic systems with specific focus on energy storage and motor drive systems for electrified transportation, renewable-energy, and smart grid applications.

SPEAKER

IEEE SDEMPED 2023

14th Edition of the IEEE International Symposium on Diagnostics for Electric Machines, Power Electronics and Drives

28-31 August 2023, Chania, Greece

Keynote Title: "Challenges in Monitoring the Insulation Condition of Windings Supplied by Voltage Source Invertors"

Presenter

Dr. Greg Stone

Stone Dielectrics Toronto, Canada

Abstract:

When voltage source invertors (VSI) using IGBTs were first introduced in the late 1980s to control industrial motor speed, even low voltage motors were found to fail due to partial discharges (PD). This led to improved insulation systems for random wound motors rated <1000 V, and the development of PD sensors and instruments capable of measuring PD during the short switching impulses such drives create. Since then, VSI's have been applied to machines up to several hundred MW, and wide bandgap switching devices have been developed which create voltage impulses of 20 ns and less. These developments have made assessing the insulation condition before winding failure even more difficult. This paper will describe the progress that has been made in applying off-line and on-line PD measurement to such applications, and the prospect for inexpensive, reliable winding continuous monitoring for applications such as electric vehicle and aircraft motors.

Bio:

Dr. Greg Stone was one of the developers of on-line partial discharge test methods to evaluate the condition of the high voltage insulation in stator windings. From 1975 to 1990 he was a Dielectrics Engineer with Ontario Hydro, a large Canadian power generation company. From 1990 to 2021 he was employed at Iris Power L.P. in Toronto Canada, a motor and generator condition monitoring company he helped to form. He is now with Stone Dielectrics. He has published two books on motor and generator winding maintenance, a book on practical partial discharge measurement and authored >200 papers concerned with rotating machine windings. Since 1980 he has also been active in creating and updating many IEEE and IEC standards. Greg Stone has a PhD in Electrical Engineering, is a Fellow of the IEEE and a past-president of the IEEE Dielectrics and Electrical Insulation Society.

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Keynote Title: "Faulty trends, common misdiagnosis and tough troubleshooting cases on an electric machine using vibration analysis"

Presenter

Nu'man Fawzal
AF Condition Monitoring (M) Sdn Bhd
Kuala Lumpur, Malaysia

Abstract:

The advantage of robustness, compactness, ease of maintenance, and high-power generation make the electric machine the prime mover for most industrial rotating machinery. In order to extend this machine's life, several maintenance techniques have been applied. This includes the Condition-Based Maintenance (CBM) technique, which monitors the machine's performance and identifies any faulty symptoms without the machine's operational intervention. Combining with other classical maintenance philosophies such as corrective, preventing, and risk-based maintenance), CBM improves machine reliability, lowers the likelihood of serious faults, decreases maintenance expenses, and possibly lessens the chances of operational disruption. In this session, we will share our experience in performing CBM specifically utilizing vibration analysis throughout various industries such as power generation, paper mill, marine, oil and gas on its faulty trends, common misdiagnosis cases, and also cases that is tough to troubleshoot using the current approach. We wish that other CBM practitioners and academicians can aware of these industrial scenarios and help in marching the advancement of this machine diagnostic technology.

Bio:

Nu'man Fawzal is currently the Operation Manager of AF Conditioning Monitoring Sdn. Bhd. (AFCM), Malaysia, and holds a Category IV Certified Vibration Specialist from Mobius Institute, Australia. Nu'man first started his career in Condition-Based Maintenance (CBM) as Junior Technician in 2003 before continuing his study at Universiti Teknologi Mara (UiTM) in 2006 and a Master's Degree at Swansea University, United Kingdom (2009). Since 2010, he has been working with AFCM as Certified Vibration Specialist and the Team Leader in Machinery Condition Monitoring.

On daily basis, he applied numerous machine diagnostic methods such as time-waveform analysis, phase analysis, Operational Deflection Shape (ODS), Experimental Modal Analysis (EMA), and Advance Turbomachinery Analysis. In 2014, Nu'man took the role of Head of Mechanical Department and lead a group of engineers in performing troubleshooting on-site on incipient or re-occurring failure machine covers offshore/onshore. One of his biggest achievements was successfully leading the CBM program for PETRONAS oil and gas platforms and terminal plants (Sabah cluster) for 3 years. Apart from managing the operation of the mechanical department, he also delivers CBM courses and trains analysts for CAT. I-III Vibration Certification and Ultrasound Category I with examinations through Mobius Institute Board of Certification (MIBOC). So far, he has trained more than 200 students.

PROGRAM AT A GLANCE

Monday, 28 August 2023	14:00	Registration open
	14:30- 15:45	Tutorial 1 Hands-on processing of transient signals for electrical machines fault diagnosis
	15:45-16:15	Coffee break
	16:15-17:30	Keynote 1 Faulty trends, common misdiagnosis and tough troubleshooting cases on an electric machine using vibration analysis
	17:30-18:00	Coffee break
	18:00-19:15	Tutorial 2 Software-Defined Power Electronics: Theory and Study Cases
	19:30	Welcome reception

Tuesday, 29 August 2023	8:00	Registration open
	08:30-09:30	Opening Ceremony
	09:30-10:30	Keynote 2 Challenges in Monitoring the Insulation Condition of Windings Supplied by Voltage Source Invertors
	10:30-11:00	Coffee break
	11:00-13:00	TT1 – Condition Monitoring of Induction Machines (A) TT5 – Signal Processing and Data Analysis
	13:00-14:00	Lunch
	14:00-16:00	TT2 – Condition Monitoring of Synchronous machines (A) SS3 – Fault Diagnostics and Fault Tolerance in Multiphase Motor Drives
	16:00-16:30	Coffee break
	16:30-18:30	SS1 – Machine AI and statistical learning methods for fault detection in electrical machines (A) SS4 – Thermal Issues in Electric Machines, Power Electronics and Drives: Diagnostics and Fault Tolerance
	18:30	Attendees free evening
	19:30	International Steering Committee meeting

Wednesday, 30 August 2023	8:00	Registration open
	08:30-10:30	TT1 – Condition Monitoring of Induction Machines (B)
		TT4 – Condition Monitoring of Power Electronics (A)
	10:30-11:00	Coffee break
	11:00-13:00	TT3 – Performance, Degradation and Ageing of Materials (A)
		TT7 – Demagnetization Faults of Permanent Magnet Machines
	13:00-14:00	Lunch
	14:00-16:00	TT6 – Vibrations, bearings and mechanical issues
		SS2 – Challenges in fault detection for inverter-fed electrical machines operating in transient regimes and different control types
	16:00-16:30	Coffee break
	16:30-18:30	TT2 – Condition Monitoring of Synchronous Machines (B)
		SS1 – Machine AI and statistical learning methods for fault detection in electrical machines (B)
	20:00	Gala Dinner

Thursday, 31 August 2023	8:00	Registration open
	08:30-10:10	TT3 – Performance, Degradation and Ageing of Materials (B)
		TT4 – Condition Monitoring of Power Electronics (B)
	10:10-10:30	Coffee break
	10:30-11:00	Closing ceremony
	11:15-11:45	Travel by bus from the conference venue to the Archaeological Museum of Chania
	12:00-14:00	Guided tour of the Archaeological Museum of Chania
	14:00-15:15	Free time for lunch
	15:15	Return to the conference venue or transportation to the airport by bus

TECHNICAL PROGRAM

29 August (11:00-13:00)		
TT1 – Condition Monitoring of Induction Machines (A)		
Chairs: Konstantinos N. Gyftakis & Alessandro Goedtel		
11:00-11:20	SDEMPED23-000033	**Speed and Torque Estimation in Induction Motor through the Analysis of Stray Flux Signals** (Geovanni Diaz-Saldaña, Israel Zamudio-Ramírez, Oscar Ugalde-Ugalde, Roque A. Osornio-Rios, Jose A. Antonino-Daviu)
11:20-11:40	SDEMPED23-000034	**Implementation of Likelihood of Failure (LoF) Methodology for HV Motors in Industry** (Melissa Shamani Ganason, Nur Saleha Binti Jayiddin, M Tarmidzi Bin Iskandar, M Faizal Bin Hamdan, Salmey Bin A Halim)
11:40-12:00	SDEMPED23-000042	**Estimation of Torque Sharing for Industrial Dual Induction Motor Drives under Special Current Sensor Configuration** (Eduardo Rodriguez Montero, Markus Vogelsberger, Thomas Wolbank)
12:00-12:20	SDEMPED23-000067	**Motor Eccentricity Fault Detection: Physics-Based and Data-Driven Approaches** (Bingnan Wang, Hiroshi Inoue, Makoto Kanemaru)
12:20-12:40	SDEMPED23-000070	**Broken rotor bar fault detection using odd triplets harmonics in delta-connected induction motors** (Ruhan Pontes Policarpo de Souza, Daniel Morinigo-Sotelo, Vanesa Fernandez-Cavero, Óscar Duque-Perez, Cristiano Marcos Agulhari, Alessandro Goedtel)
12:40-13:00	SDEMPED23-000029	**A Novel Approach for Early Detection of Inter-turn Faults in Induction Motors during Start-up** (Jorge Bonet-Jara, Joan Pons-Llinares, Daniel Morinigo-Sotelo, Konstantinos N. Gyftakis)

29 August (11:00-13:00)		
TT5 – Signal Processing and Data Analysis		
Chairs: Daniel Morinigo-Sotelo & Michal Orkisz		
11:00-11:20	SDEMPED23-000059	**A review of lithium-ion battery diagnostic methods for space applications** (Lorenzo Chapel, Antoine Picot, Fabien Lacressonniere, Pascal Maussion)
11:20-11:40	SDEMPED23-000068	**Detection of Harmonics by using Parallel-Connected Nonlinear Limit Cycle Oscillators** (Erick Vazquez, Javier Roldan-Perez, Milan Prodanovic)
11:40-12:00	SDEMPED23-000093	**Search Coil Based Detection of the Inter-turn Fault in Aircraft Permanent Magnet Synchronous Machine by Signal Frequency Extraction** (Johannes Mühlthaler, Panagiotis A. Panagiotou, Bastian Lehner, Andreas Reeh, Hans-Georg Herzog, Konstantinos N. Gyftakis)

12:00-12:20	SDEMPED23-000083	**Mechanical Fault Detection in Induction Motors Using a Data-Driven Kalman Filter** (Maryam Vazifehdan, Hamid Toshani, Salman Abdi)
12:20-12:40	SDEMPED23-000035	**Motor Current Signal Analysis for the Diagnostics of Localized Bearing Defects** (Praneet Amitabh, Dimitar Bozalakov, Frederik De Belie)
12:40-13:00	SDEMPED23-000041	**Detection of Shaft Misalignment of a PMSM using Zoom-FFT** (Konstantinos Koutrakos, Epameinondas Mitronikas)

29 August (14.00-16.00) TT2 – Condition Monitoring of Synchronous machines (A) Chairs: Sang Bin Lee & Carlos A. Platero Gaona		
14:00-14:20	SDEMPED23-000016	**Detection of Shorted Turns in the Field Winding of Turbo Generators during Turning Gear Mode** (Namhyuk Byun, Muhamad Faizan Shaikh, Sang Bin Lee, Kyeongyul Kim, Taesik Kong, Baekkyung Ko, Kyunghoon Kim, Carlos A. Platero)
14:20-14:40	SDEMPED23-000020	**Online system identification and excitation for thermal monitoring of electric machines using machine learning and model predictive control** (Emebet Gebeyehu Gedlu, Oliver Wallscheid, Joachim Böcker, Oliver Nelles)
14:40-15:00	SDEMPED23-000023	**Auto-Adaptive Stator Ground Fault Protection for Synchronous Generators in Diesel-Electric Locomotives** (Kumar Mahtani, José M. Guerrero, Luis F. Beites, Carlos A. Platero)
15:00-15:20	SDEMPED23-000052	**Identification of sensitive feature in the stray magnetic field to detect rotor short-circuit fault in synchronous generators** (Raphael Romary, Remus Pusca, Thierry Jacq)
15:20-15:40	SDEMPED23-000060	**Particular Winding Configuration in Permanent Magnet Traction Motors enabling Voltage Weakening under Overspeed and Fault Tolerance** (Eleftherios K. Karamanis, Antonios G. Kladas)
15:40-16:00	SDEMPED23-000069	**An Investigation of the Rotor Position Influence on the Broadband Phase Impedance - Application to SFRA Diagnosis** (Jose E. Ruiz-Sarrio, Jose A. Antonino-Daviu, Claudia Martis)

29 August (14.00-16.00) SS3 – Fault Diagnostics and Fault Tolerance in Multiphase Motor Drives Chairs: Davide S. B. Fonseca & Hugo R. P. Antunes		
14:00-14:20	SDEMPED23-000008	**Detection of Multiple Open Faults in Variable Phase-Pole Machines based on Harmonic Plane Decomposition** (Yixuan Wu, Luca Peretti)
14:20-14:40	SDEMPED23-000024	**Fault-Tolerant Analysis of Kalman Filter Sensor Fusion for Sensorless Control of a Multiphase Machine** (Giuseppe Galati, Luigi Alberti, Ludovico Ortombina)
14:40-15:00	SDEMPED23-000076	**Fault Tolerance Analysis of Multiphase Ironless PMSM for Flywheel Batteries** (Elena Macrelli, Alberto Bellini, Claudio Bianchini, Ambra Torreggiani)

Time	Paper ID	Title
15:00-15:20	SDEMPED23-000104	**Online Stator Fault Diagnostics and Performance Comparison of Stator Winding Configurations in Symmetrical Six-Phase Induction Motors** (Khaled Laadjal, João Serra, Hugo R. P. Antunes, Acácio M. R. Amaral, Antonio J. Marques Cardoso)
15:20-15:40	SDEMPED23-000105	**Alpha-Beta Plane Current Modulus Slot Harmonics in Symmetrical Six-phase Induction Motors Fed by Unbalanced Voltages and Under Stator Faults** (Hugo R. P. Antunes, D. S. B. Fonseca, Antonio J. Marques Cardoso)
15:40-16:00	SDEMPED23-000111	**Stator Imbalance in Asymmetrical Six-Phase SMPM Synchronous Motor Drives: High-Resistance Connections and Mismanufactured Winding** (Antonio Femia, Giacomo Sala, Michele Mengoni, Luca Vancini, Gabriele Rizzoli, Luca Zarri, Angelo Tani)

29 August (16.30-18.30) **SS1 – Machine AI and statistical learning methods for fault detection in electrical machines (A)** **Chairs: Jose A. Antonino-Daviu & Miguel Iglesias Martinez**		
16:30-16:50	SDEMPED23-000018	**Stray Flux Signal Analysis for Faults Detection in Induction Motors During Startup Transient by Means of Statistical Indicators** (Israel Zamudio-Ramirez, Jose M. Mendoza-Ortiz, Roque A. Osornio-Rios, Jose A. Antonino-Daviu)
16:50-17:10	SDEMPED23-000048	**A Projection-Based Support Vector Machine Algorithm for Induction Motors' Bearing Fault Detection** (Narges Khadem, Hamid Toshani, Salman Abdi)
17:10-17:30	SDEMPED23-000053	**Bearing fault detection in IM using the Rate Of Change Of Frequency and KNN** (Gerardo Avalos-Almazan, Sarahi Aguayo-Tapia, Jose Rangel-Magdaleno, Mario R.A. Paternina)
17:30-17:50	SDEMPED23-000054	**Broken bar detection on IM using ROCOF and decision tree** (Sarahi Aguayo-Tapia, Gerardo Avalos-Almazan, Jose Rangel-Magdaleno, Juan Manuel Ramirez-Cortes, Mario R.A. Paternina)
17:50-18:10	SDEMPED23-000057	**Artificial intelligence (AI)-based optimization of power electronic converters for improved power system stability and performance** (Ioana-Cornelia Gros, Xiaoshu Lü, Claudiu Oprea, Tao Lu, Lucian Pintilie)
18:10-18:30	SDEMPED23-000055	**A Domain Adaptation Method Based on Deep Coral for Rolling Bearing Fault Diagnosis IO** (Zexiao Wang, Xinguo Ming)

29 August (16.30-18.30)		
SS4 – Thermal Issues in Electric Machines, Power Electronics and Drives: Diagnostics and Fault Tolerance **Chairs: Antonio J. Marques Cardoso and Payam Shams Ghahfarokhi**		
16:30-16:50	SDEMPED23-000005	**Inspecting Static Frequency Converter Station with Thermography** (Michal Orkisz)
16:50-17:10	SDEMPED23-000015	**Comparative Study of Permanent-Magnet Synchronous Motor Drives: Two-level GaN-Based and Three-level Silicon-Based Voltage Source Inverters** (Saeed Rezaee, Jalal Amini, Mehrdad Moallem, Jason Wang)
17:10-17:30	SDEMPED23-000022	**Exciter Field Winding Temperature-Based Condition Monitoring Method for Brushless Synchronous Machines** (Kumar Mahtani, Javier Muñoz-Antón, Sang Bin Lee, Carlos A. Platero)
17:30-17:50	SDEMPED23-000032	**Experimental Investigation of High Viscosity on Oil Spray Cooling System with Hairpin Winding** (Payam Shams Ghahfarokhi, Ants Kallaste, Andrejs Podgornovs, Antonio J. Marques Cardoso, Toomas Vaimann, Martin Sarap, Viktor Rjabtšikov)
17:50-18:10	SDEMPED23-000051	**The effect of heat sink thermal capacitance and resistance on predicted lifetime of switching devices in photovoltaic applications** (Leander Van Cappellen, Omid Alavi, Michael Daenen)
18:10-18:30	SDEMPED23-000101	**Real Time Core Loss Estimation for the Wound Rotor Synchronous Machine** (Bernard Steyaert, Ethan Swint, W. Wesley Pennington, Matthias Preindl)

30 August (08.30-10.30)		
TT1 – Condition Monitoring of Induction Machines (B) **Chairs: Panagiotis A. Panagiotou & Taner Goktas**		
08:30-08:50	SDEMPED23-000092	**Diagnostics of a double cage induction motor in steady state with rotor asymmetry** (Jarosław Tulicki, Tadeusz J. Sobczyk, Maciej Sułowicz)
08:50-09:10	SDEMPED23-000109	**Insights on diagnostic signals in single-phase and three-phase induction motors in single-phasing fault** (Marcello Minervini, Lucia Frosini, Alberto Meloni, Riccardo De Tullio, Lorenzo Mantione)
09:10-09:30	SDEMPED23-000030	**A Novel Method for Rotor Fault Diagnostics in Induction Motors using Harmonic Isolation** (Panagiotis A. Panagiotou, Jonathan C. Mayo-Maldonado, Ioannis Arvanitakis, Gerardo Escobar, Jose A. Antonino-Daviu, Konstantinos N. Gyftakis)
09:30-09:50	SDEMPED23-000064	**Static, Dynamic and Mixed Eccentricity Fault Detection Using MCSA and Stray Flux Monitoring via Finite Element Analysis** (Dimitrios Karampasoglou, Jorge Bonet-Jara, Konstantinos Gyftakis)
09:50-10:10	SDEMPED23-000106	**The Use of The Line Impedance Symmetrical Components for Stator Faults Detection and Location in Symmetrical Six-Phase Induction Motors** (Hugo R. P. Antunes, D. S. B. Fonseca, Antonio J. Marques Cardoso)

10:10-10:30	SDEMPED23-000077	**IoT based Multi-Environmental Sensing System: Monitoring of Rotor Fault in Induction Motors** (Taner Goktas, Rıdvan Er, Fatih Altunel, Muslum Arkan)

30 August (08.30-10.30) TT4 – Condition Monitoring of Power Electronics (A) Chairs: Christos Mademlis & Jonathan C. Mayo-Maldonado		
08:30-08:50	SDEMPED23-000006	**Detection of Lithium Plating in Li-ion Batteries for Electric Vehicle Applications** (Evangelos Tsioumas, Nikolaos Jabbour, Dimitrios Papagiannis, Markos Koseoglou, Christos Mademlis)
08:50-09:10	SDEMPED23-000010	**A Ground Fault Location Method for Modular Multilevel Converters** (José M. Guerrero, Miguel Jiménez Carrizosa, Kumar Mahtani, Carlos A. Platero)
09:10-09:30	SDEMPED23-000011	**Variable Speed Drives AC Ground Fault Location by Voltages Components Analysis** (José M. Guerrero, Daniel Serrano-Jiménez, Vanesa Valiño, Carlos A. Platero)
09:30-09:50	SDEMPED23-000012	**A Ground Fault Detection Method for Double Fed Induction Machines** (José M. Guerrero, Itxaso Aranzabal Santamaría, Julen Gómez-Cornejo Barrena, Victor Valverde, Carlos A. Platero)
09:50-10:10	SDEMPED23-000013	**Performance of Machine-Learning-Based Algorithms for Anomaly Detection in Variable Frequency Drives Using Temperature Signals** (Artur D. Surówka, Ruomu Tan, Alireza Nemat Saberi, Marcin Firla)

30 August (11.00-13.00) TT3 – Performance, Degradation and Ageing of Materials Chairs: Michael Galea & Lucia Frosini		
11:00-11:20	SDEMPED23-000009	**Determination of Dominant Influencing Factors on Partial Discharge Inception Voltage** (Yatai Ji, Paolo Giangrande, Weiduo Zhao, Vincenzo Madonna, He Zhang, Michael Galea)
11:20-11:40	SDEMPED23-000043	**Comparison of high frequency winding modeling for stator health monitoring** (Najla Haje Obeid, Thierry Boileau, Babak Nahid-Mobarakeh)
11:40-12:00	SDEMPED23-000046	**Study of thermo-oxidative ageing applied to an epoxy resin using a microstrip ring resonator structure** (Steven COUTIN, Anca PETRE, Veronika GAVRILENKO, Ioav RAMOS, Jean-Marc DIENOT, Robert RUSCASSIE)
12:00-12:20	SDEMPED23-000061	**Bayesian Experiment Design for the Development of an Epoxy Resin Degradation Model** (Jan Leffler, Jan Kaska, Pavel Trnka, Vaclav Smidl)
12:20-12:40	SDEMPED23-000063	**Two-winding procedure for the measurement of the anhysteretic curve points of ferromagnetic materials** (Emir Pošković, Fausto Franchini, Luca Ferraris)

	30 August (11.00-13.00) TT7 – Demagnetization Faults of Permanent Magnet Machines Chairs: Elias Strangas & Michele Mengoni	
11:00-11:20	SDEMPED23-000007	**FEM Analysis of Demagnetization Risk of Flux-Switching Machine Under Short Circuit Condition Considering Machine Temperature** (Lucas Steinacker, Christian Kreischer)
11:20-11:40	SDEMPED23-000026	**The Stator Current Spectrum as Fault Identification Mean for Combined Faults in an AFPM Synchronous Generator** (Alexandra C. Barmpatza, Constantinos Condaxakis, Dimitris Christakis)
11:40-12:00	SDEMPED23-000028	**Analysis and Minimization Scheme for Torque Ripple of Single-Pole Demagnetized PMSM** (Hyung-June Cho, Hwigon Kim, Seung-Ki Sul)
12:00-12:20	SDEMPED23-000087	**Modelling and Analysis of PM Demagnetization and its Effect on Vibration in SPM Machines** (Supratap Sengupta, Naveen Endla, Amarkumar Kushwaha, B. G. Fernandes)
12:20-12:40	SDEMPED23-000044	**Comparison of Demagnetisation Behavior of Radial and Halbach Array PMs in Fault-Tolerant Synchronous Machines Operating with Open Phases** (Vitaliy Sizonenko, Ondrej Vitek, Petr Hutak)
12:40-13:00	SDEMPED23-000085	**Detection of Trailing-Edge Demagnetization for Six-Phase Permanent Magnet Motors** (Luca Vancini, Michele Mengoni, Gabriele Rizzoli, Luca Zarri, Angelo Tani)

	30 August (14.00-16.00) TT6 – Vibrations, bearings and mechanical issues Chairs: Anouar Belahcen & Toomas Vaimann	
14:00-14:20	SDEMPED23-000019	**Outer Bearing Race Diagnosis by Means of Stray Flux Signals and Shannon Entropy** (Jonathan Cureno-Osornio, Israel Zamudio-Ramirez, Juan Jose Saucedo-Dorantes, Roque A. Osornio-Rios, Jose A. Antonino-Daviu)
14:20-14:40	SDEMPED23-000045	**Radial Lumped-parameter Model of a Ball Bearing for Simulated Fault Signatures** (Nada El Bouharrouti, Floran Martin, Annouar Belahcen)
14:40-15:00	SDEMPED23-000050	**Digital and wireless Operating Deflection Shape (ODS) for assets condition monitoring** (Marcus Vinícius Pinter Maciel, Lucas Henrique dos Santos Tavares, Thiago da Silva, Fabiana Seidel, Marco Aurélio Sciepiet, Vinicius Sell Goncalves, Crystian Luciano Jordan, Hugo Gustavo Gomez Mello)
15:00-15:20	SDEMPED23-000097	**The Effects of Bearing Lubrication on Vibration, Acoustic and Stray Flux Signals in Induction Motors** (Rıdvan Er, Fatih Altunel, Mert Can, Taner Goktas)
15:20-15:40	SDEMPED23-000025	**Investigation of Empirical Start-Up Strategy for Industrial Generator Through Vibration Monitoring** (Zafeirios Kolidakis, Georgios Falekas, Athanasios Karlis, Jose Alfonso Antonino-Daviu, Konstantinos N. Gyftakis)
15:40-16:00	SDEMPED23-000073	**Preliminary Analysis of Mechanical Bearing Faults for Predictive Maintenance of Electrical Machines** (Karolina Kudelina, Hadi

		Ashraf Raja, Siarhei Autsou, Muhammad Usman Naseer, Toomas Vaimann, Ants Kallaste, Raimondas Pomarnacki, Van Khang Hyunh)

30 August (14.00-16.00) SS2 – Challenges in fault detection for inverter-fed electrical machines operating in transient regimes and different control types. Chairs: Lucia Frosini & Vanesa Fernandez-Cavero		
14:00-14:20	SDEMPED23-000017	**Diagnosis of Passing over Railway Joints and Reducing the Effects in Modern Traction Systems** (Mihaela Popescu, Alexandru Bitoleanu, Constantin Vlad Suru)
14:20-14:40	SDEMPED23-000021	**Fault Harmonics Current Detection in Closed-loop Controlled Induction Motors** (Gabriele De Boni, Vanesa Fernandez-Cavero, Lucia Frosini, Oscar Duque-Perez, Daniel Morinigo-Sotelo)
14:40-15:00	SDEMPED23-000036	**A Time-Frequency Analysis for Broken Rotor Bar Detection in Closed Loop Inverter Fed Induction Motor at Imposed Speed** (Lorenzo Mantione, Vanesa Fernandez-Cavero, Daniel Morinigo-Sotelo, Lucia Frosini)
15:00-15:20	SDEMPED23-000094	**Experimental Investigation of High-Fidelity Interior Permanent-Magnet Machine Transient Model with Arbitrary Stator Turn Fault** (Stjepan Stipetić, Marinko Kovačić, Damir Žarko)
15:20-15:40	SDEMPED23-000084	**Fault-Tolerant and Voltage Balancing Control for Five-Phase Three-Level T-type Inverters under Open-Switch Fault** (Luca Vancini, Michele Mengoni, Gabriele Rizzoli, Luca Zarri, Angelo Tani)
15:40-16:00	SDEMPED23-000065	**Automatic detection of corrosion in ball bearings of soft-started induction motors, obtaining the persistence spectrum of the stray-flux signals** (Vicente Biot-Monterde, Angela Navarro-Navarro, Israel Zamudio-Ramirez, Jose Antonino-Daviu, Roque A. Osornio-Rios, Jose E. Ruiz-Sarrió)

30 August (16.30-18.30) TT2 – Condition Monitoring of Synchronous Machines (B) Chairs: Raphael Romary & Carlos A. Platero Gaona		
16:30-16:50	SDEMPED23-000078	**Thermal management of electrically excited synchronous motor with integrated thermal network in automotive drive system** (Eryang Wang, Christoph Schmülling, Claas Kürten, Philip Grabherr, Martin Doppelbauer)
16:50-17:10	SDEMPED23-000079	**Drying-Out of a 11 kV-4900 kVA Synchronous Machine through Different Methods** (Kumar Mahtani, Víctor Lozano, David Talavera, Sang Bin Lee, Carlos A. Platero)
17:10-17:30	SDEMPED23-000086	**Detection of External Rotor PMSM Inter-Turn Short Circuit Fault using Extended Kalman Filter** (Ahmed Belkhadir, Remus Pusca, Raphael Romary, Driss Belkhayat, Youssef Zidani)

17:30-17:50	SDEMPED23-000100	**Parameter Identification for Inter turn Fault Detection in Permanent-Magnet Synchronous Motors Using Stator Flux Linkage DC Offset Monitoring** (Akanksha Upadhyay, Avo Reinap)
17:50-18:10	SDEMPED23-000108	**Reviewing Standards and Guidelines for High-Energy Efficient Line-Start Permanent Magnet Synchronous Machines with Explosion-Proof Capability in Explosive Atmospheres: A Comprehensive Analysis** (Nijan Yogal, Christian Lehrmann, Markus Henke)
18:10-18:30	SDEMPED23-000114	**Influence of Rotational Speed on the Frequency Response Analysis of the Field Winding of Large Hydrogenerators** (Unai Albizuri-Txurruka, José M. GuerreroKumar Mahtani, Carlos A. Platero)

30 August (16.30-18.30) SS1 – Machine AI and statistical learning methods for fault detection in electrical machines (B) Chairs: Jose A. Antonino-Daviu & Jose Enrique Ruiz-Sarrió		
16:30-16:50	SDEMPED23-000062	**Development of a universal diagnostic system for stator winding faults of induction motor and PMSM based on transfer learning** (Maciej Skowron)
16:50-17:10	SDEMPED23-000066	**Spectral Entropy and Frequency Cepstral Coefficients of Stray Flux Signals for Sparking Detection in DC Motors** (Miguel E. Iglesias Martínez, Jose Guerra Carmenate, Jose A. Antonino-Daviu, Larisa Dunai, Pedro Fernandez de Cordoba, Pablo M Velasco-Pla, J. Alberto Conejero)
17:10-17:30	SDEMPED23-000071	**Detection of Corrosion in Ball Bearings in Synchronous Reluctance Motors through the Computation of Statistical Indicators of Current Signals** (Angela Navarro-Navarro, Vicente Biot-Monterde, Jose E. Ruiz-Sarrió, Jose Antonino-Daviu, Roque A. Osornio-Rios, Israel Zamudio-Ramirez)
17:30-17:50	SDEMPED23-000072	**Perspectives of Transfer Learning on the Diagnosis of Faults in Electrical Machines, Power Electronics, and Drives** (Panagiotis A. Traganitis and Elias G. Strangas)
17:50-18:10	SDEMPED23-000074	**Optimal Feature Selection via Bayesian Optimization for Acoustic Condition Monitoring** (Yu Zhang, Miguel Martínez García, Jiafu Wan)
18:10-18:30	SDEMPED23-000110	**Data Generation Method for Domain Adaptation in Fault Diagnosis Using Motor Current Signals** (Tenta Komatsu, Yuya Sugasawa)

31 August (08.30-10.10) TT3 – Performance, Degradation and Ageing of Materials (B) Chairs: Pascal Maussion & Thomas Wolbank		
08:30-08:50	SDEMPED23-000098	**Thermal Degradation Profile of Concentrated Stator Winding Insulation by Impedance Spectroscopy** (Panagiotis A. Panagiotou, Edward J.W. Stone, Johannes Mühlthaler, Andreas Reeh, Alexis Lambourne, Geraint W. Jewell)
08:50-09:10	SDEMPED23-000107	**Investigation of Changes in Partial Discharge Properties of Insulation Material over Lifetime under Accelerated Aging Conditions** (Ali Qerkini, Markus Vogelsberger, Werner Grubelnik, Edgar Moser, Thomas Wolbank)
09:10-09:30	SDEMPED23-000049	**Classification of Bearing Faults in Induction Motors with the Hilbert-Huang Transform and Feature Selection** (Yuri P. Bórnea, Avyner L. O. Vitor, Marcelo F. Castoldi, Alessandro Goedtel, Wesley A. Souza)
09:30-09:50	SDEMPED23-000037	**Broadband Technique Analysis for Insulation Fault Detection and Condition Monitoring in Rotating Electrical Machines** (Jose E. Ruiz-Sarrio, Jose A. Antonino-Daviu, Angela Navarro-Navarro, Vicente Biot-Monterde)
09:50-10:10	SDEMPED23-000004	**Getting the Most Out of the Pole Drop Test for Detecting Rotor Faults in Salient Pole Synchronous Machines** (Sang Bin Lee, Muhamad Faizan Shaikh, Thotahage Sumadhurie Hansika, Byambasuren Battulga, Han-ju Kim, Carlos A. Platero)

31 August (08.30-10.10) TT4 – Condition Monitoring of Power Electronics (B) Chairs: Jonathan C. Mayo-Maldonado & Georgios Orfanoudakis		
08:30-08:50	SDEMPED23-000040	**Inline solution for characterization of chip-substrate connections by Laser Speckle Photometry** (Lennard Surner, Lili Chen, Beatrice Bendjus, Ulana Cikalova, Stefan Muench)
08:50-09:10	SDEMPED23-000058	**Influence of Battery Aging on Converter Switching Device Degradation** (Martijn Deckers, Silvia Colnago, Johan Driesen, Luigi Piegari)
09:10-09:30	SDEMPED23-000075	**Influence of DC Link Capacitor Ageing on Performance of Single-Phase Power Factor Correction Rectifiers** (Sergei Kolesnik, Yegal Darhovsky, Alon Kuperman)
09:30-09:50	SDEMPED23-000088	**Optimized Online Multi-Sine Battery Electrochemical Impedance Spectroscopy using a Three-Phase Neutral Point Clamped Converter** (Kai-Ping Liu, Georgios Orfanoudakis, Suleiman M. Sharkh, Andrew Cruden)
09:50-10:10	SDEMPED23-000102	**Transformerless Fault-Tolerant Wind Energy System Based on a Series Double NPC Multilevel Rectifier and a Six-Phase Asymmetrical PMSG** (Jonathan C. Mayo-Maldonado, Panagiotis A. Panagiotou, Mahmoud I. Masoud, Alexis Lambourne, Jesus E. Valdez-Resendiz, Julio C. Rosas-Caro)

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