ISEF 2019
Nancy, France

19th International Symposium on Electromagnetic Fields in Mechatronics, Electrical and Electronic Engineering

Prouvé Congress Center – Nancy - France

29-31 August 2019

Conference Booklet

Local organizer:

Groupe de Recherche en Energie Electrique de Nancy

G.R.E.E.N.

This booklet is prepared by
Latifa Zoua & Nelson Lemercier

19th International Symposium on Electromagnetic Fields in Mechatronics, Electrical and Electronic Engineering

29-31 August 2019, Nancy - FRANCE

Conference Booklet

This booklet contains informations about the organization of the symposium, conference partners, conference technical program and social events.

The conference is co-organized by:

Univerité de Lorraine – Groupe de Recherche en Energie Electrique de Nancy, France

Lodz University of Technology, Institute of Mechatronics and Information Systems, Poland

Tele & Radio Research Institute Warsaw, Poland

And sponsored by: IEEE France Section

Dear Participants, Colleagues and Friends

On behalf of the International Steering Committee and Organizing Committee, we would like to welcome you all for the 19th edition of International Symposium on Electromagnetic Fields in Mechatronics, Electrical and Electronic Engineering ISEF'2019 in Nancy, the city of King Stanislas Leszczynski. Université de Lorraine is honored and pleased to host this prestigious conference which began more than 40 years ago. A long history is behind us: it has been 45 years since the first ISEF edition was held in the castle of Uniejow, just near Lodz, Poland, which is the founding country of the Symposium. Thanks to its ever growing reputation, ISEF soon became a prestigious conference and gained a prominent position in the electrical and electronic engineering, and in particular, in the electromagnetic community. Last edition of ISEF'2017 came back to Poland and was successfully organized by Lodz University of Technology.

The ISEF conferences provide a unique opportunity for scientists, researchers and engineers from all around the world, to discuss the state of the art and new developments in computational electromagnetics with applications in numerous scientific areas. The topics of ISEF conference have been continuously extended during its history and now cover a wide spectrum of subjects in electromagnetic field problems, modelling, simulation, and application of electromagnetic field, optimization problems of electrical machines, transformers and special electromagnetic devices, electromagnetic components of mechatronics and microelectromechanical systems, coupled problems, testing and measurements.

Key numbers: 273 papers have been submitted to the conference secretariat. Thanks to the activity of the Editorial Board, we have finally accepted **236** high-quality papers from **34** countries, which are scheduled in 15 oral sessions and 12 poster sessions. The total number of authors associated with the accepted papers is approximately **578.** All accepted papers are available in the **e-Proceedings on USB**, delivered to all participants at the registration desk of the conference.

We are pleased to announce the post-conference publication of a number of selected papers **in peer-reviewed international journals**. A selected number of papers presented at the conference and accepted after a peer review process will be published **in prestigious journals**. A selected number of digests relevant to papers presented at the conference will undergo the online publication in the **IEEE Xplore Digital Library**. Detailed informations are given on the conference website.

ISEF Steering committee encourages PhD students and young researchers who are the future of our community by offering advantageous registration conditions. In Addition, best paper awards will be conferred to young researchers **based on the proposal of the award committee.**

The ISEF'2019 organizing committee wishes you a very successful and pleasant conference in which you will certainly attend interesting technical sessions, meet new friends and colleagues, and return back home with new ideas from this **exciting technical field of applied electromagnetics.**

Hoping you will keep a great souvenir of your stay in Nancy and discover its charms, history and culture.

With Our Best Wishes

S. Wiak - Lodz University of Technology, Poland, Chairman of the steering committee
N. Takorabet - Université de Lorraine, France, Chairman of the organizing committee
P. Di Barba - University of Pavia, Italy, Chairman of the editorial board

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ISEF'2019 is supported by many public institutions listed below:

Université de Lorraine often abbreviated in **UL**, is a "grand établissement" created on 1 January 2012 by the merge of Henri Poincaré, Nancy 2 and Paul Verlaine Universities, and the National Polytechnic Institute of Lorraine (INPL). It aimed to unify the main colleges of the Lorraine region. The University of Lorraine has over 60,000 students and offers 101 accredited research centers organized in 9 research areas and 8 doctoral colleges. (www.univ-lorraine.fr)

GREEN (Groupe de Recherche en Énergie Électrique de Nancy) is a research center of the University of Lorraine. As such, GREEN is the reference research Center in Electrical Energy at the University of Lorraine. It is part of the scientific pole EMPP "Energy, Materials, Processes, Products". Around the main topic of electrical energy, GREEN carries out research activities in electromagnetism, electrical energy conversion chains as well as superconductor applications. (www.green.univ-lorraine.fr)

ENSEM (Ecole Nationale Supérieure d'Electricité et de Mécanique), a graduate engineering school founded in 1900 by Ernest Bichat belong to Université de Lorraine. ENSEM trains engineers in electrical engineering, mechanics and Information technology to meet the challenges of Energy and Digital transitions. (www.ensem.univ-lorraine.fr)

Grand Est is an administrative region in eastern France. It superseded three former administrative regions: Alsace, Champagne-Ardenne, and Lorraine on 1 January 2016, as a result of territorial reform which was passed by the French legislature in 2014. Grand-Est Region supports high education and research activities in the universities and high schools of the region.

Grand Nancy: Since July 1, 2016, Grand-Nancy has been part of the metropolitan area network in France. National recognition and the culmination of more than half a century of inter-municipal practice. With an urban area of some 500,000 residents, Grand-Nancy metropolis is located 1h30 from Paris by TGV and at the heart of the European cross-border area.

The logistic and administrative support is performed by:

PROGEPI, An interface betwwen research laboratories and companies seeking technological solutions. PROGEPI offers companies research services in the field of Processes and the Environment. PROGEPI's EVENTS division is dedicated to logistics and financial management services for the organization of scientific events.

Exhibitors and Sponsors

ALTAIR ENGINEERING France
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Venue

The 19th edition of International Symposium on Electromagnetic Fields in Mechatronics, Electrical and Electronic Engineering will be held at "**Prouvé Congress Center**" of Nancy. Located in the city center, 1 min walk from Nancy TGV station and the public transport platform and 10 mn walk from Stanislas Square. It is a last generation equipment with exhibition halls, 2 auditoriums, 13 meeting rooms, a panoramic receptive area. It is the ideal setting for the organization and reception of all types of events.

All the facilities of Nancy can be reached by walking. In addition transportation facilities with bus and Tram are avialable to get all the the city key-Points.

NANCY CITY PASS

The Nancy Tourist Office, belonged to **Destination Nancy**, offers to ISEF'2019 participants the **Nancy City Pass** to enjoy the city, its museums and facilities. A 1-day City Pass is the best deal for a short stay in Nancy. It gives you :

- Free entrance to the museums and monuments of the Greater Nancy area.
- A free guided tour of the city and a free audioguide.
- Special offers and discounts in numerous shops and restaurants and for certain activities.

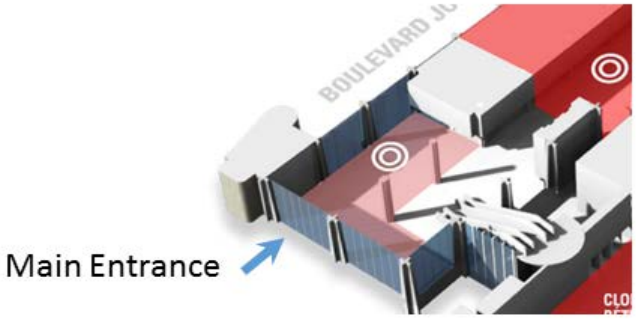
A special desk will be set-up for all participants to retrieve this City Pass.

DESTINATION NANCY

The Prouvé Congress Center

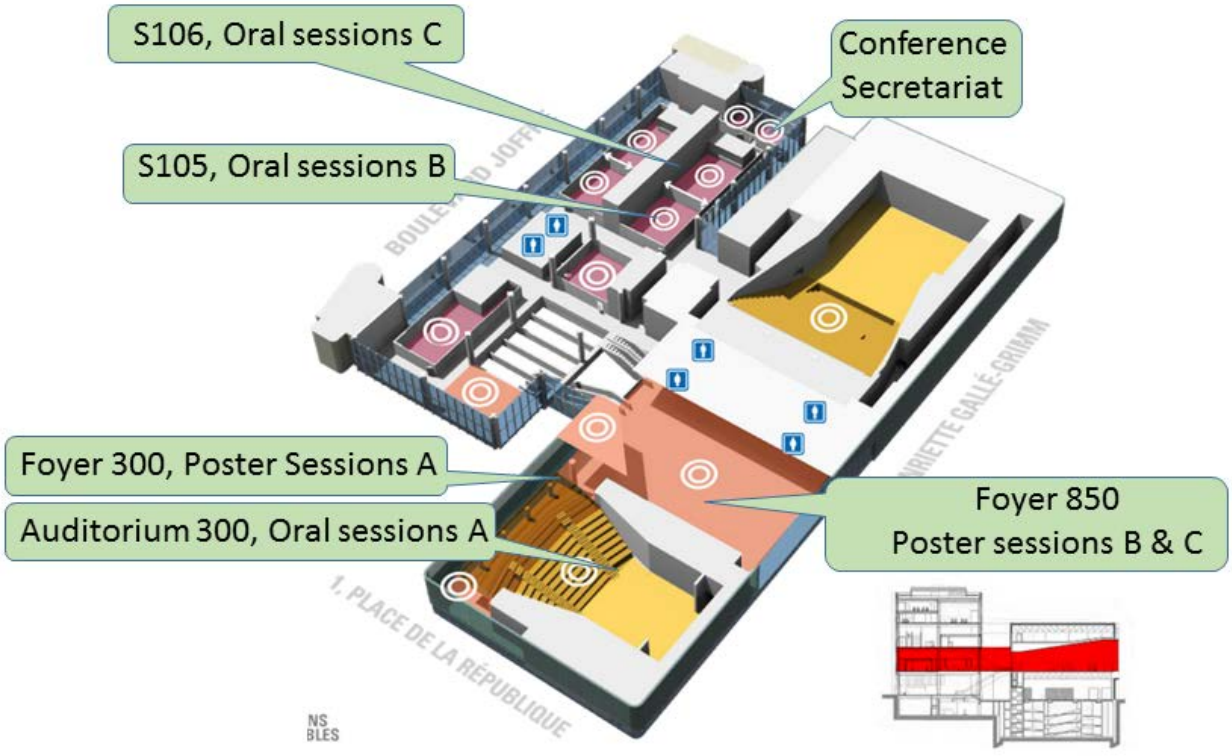
Reception:

Reception, Cloakroom and luggage service are available of the first floor.



Technical sessions:

All technical sessions, coffee breaks and lunch will be held on the second floor of Prouvé Center.
Opening and closing ceremonies, Plenery sessions, oral sessions (Ox-A) will be held in Auditorium 300.
Oral sessions (Ox-B), (Ox-C) will be held in rooms S105 and S106 respectively.
Poster Sessions, coffee breaks and lunch will be host in Foyer 850 and Foyer 300.



Welcome Reception

A welcome reception is scheduled on Thursday August 29th at the OPERA de Nancy located in Stanislas square (10 mn walk from Prouvé Congress Center).
Schedule: from 19:30 to 21:30. All participants are kindly invited to have a drink inside this prestigious building.

Opéra national de Lorraine: The company's original theatre was constructed during the reign of the King of Poland and Duke of Lorraine, Stanislas Leszczyński in 1758. This theatre, located behind the Museum of Fine Arts, was destroyed by fire in October 1905 and a new opera house was constructed in its present location on the Place Stanislas by Joseph Hornecker and was inaugurated in 1919.

You are kindly invited to attend *Rendez-Vous de la place Stanislas* light show in Stanislas square just after the welcome reception (22:00).

Gala Dinner

The Gala Dinner is scheduled on Friday 30th at the panoramic receptive area of Prouvé Congress Center located on the 4th floor.
Schedule : from 20:00 to 23:00. Gala Dinner invitations are required.

City Tour

The organizing committe in collaboration with Nancy Tourist Office offers a free a city tour with professional guides on **Thursday** and **Friday** afternoon just after the last poster sessions.
Contact Conference desk to register,
Scheduel; see the conference program.

WIFI

Free wifi is available inside Prouvé Congress Center,no specific password is required.

Instructions for Authors

Technical programm is available in this booklet and on the conference e-Proceeding USB with interactive links. Please follow the instructions given below to make the organisation successful:

Oral Sessions:

- Oral presentations duration is 15 mn + 5 mn for discussions.
- The presenters have to provide their presentations in ppt, pptx or PDF format to the session chair in order to gather all the presentations on the same laptop and test them **15mn before** starting the session.
- The organizing committee provides a laptop and videoprojector in each session room. Please avoid the use of your personal laptop.

Poster Sessions:

- Poster sessions duration is 1h15 mn.
- The poster format is A0 (84,1 cm X 118.9). Template is provided on the conference website.
- Poster printing service is provided until August 20th. Authors of pre-printed posters have to ask the conference desk to get their printed posters.
- Kits are provided to install the posters on the boards.
- Participants are asked to install their posters 15 mn before the beginning of the session and remove them after the session ends.

Guided Poster tour:

The guided poster tour is a new way to chair poster sessions:

- Each tour will be moderated by a chair composed of a chair person and two co-chairs
- The tour will start with the poster listed first in the poster list for each session.
- Presenting authors must be present at their poster for the duration of the poster session. During the tour, each presenting author will have **two minutes (sharp) of presentation** to give an overview of his/her contribution, followed by **three minutes (sharp) of discussion**.
- The presenting author is supposed to focus on the **major results**, and on what is **new and original**.
- The presentation and discussion will also be evaluated by the chairpersons for the best paper award.
- All attendees are encouraged to interact with the presenter and the chairpersons.

Young Researcher Best Paper Awards

The International steering committee and local organizing committee encourage young researchers and provide three awards for students who present their papers. Both oral and Poster Session are eligible for Best Paper award. The awards are offered by partners of the conference during the closing ceremony.

Instructions for Session Chairs

The sessions chairs (oral and poster) are asked to manage the organization of the session. The organizing commitee will provide them a printed and pdf versions of all the papers of the session. They have to give an evaluation of the presentation on the evaluation form provided by the organizing committee.

Oral Sessions:

- 15 mn before the session begining, collect the presentations on the session Laptop (ppt, pptx or pdf) and test them on video projector
- Oral presentations duration is 15 mn + 5 mn for discussions.
- Please respect the time and ask the presenter to conclude 1 minute before. The whole time should not exceed 20 mn (presentation + discussion).
- Chairs and participants are encouraged to interact with the presenter in the limit of the scheduled time (5 mn).
- If the presenter is a student, give some remarks and fill the evluation form that helps the ”Best Paper award committee” in their selection

Poster Sessions:

- Poster sessions duration is 1h15 mn.
- Kits are provided to install the posters on the boards.
- Use the evaluation form provided by the conference organizer and have an exchange with the presenter after its short presentation.
- If the presenter is a student, give some remarks and fill the evluation form that helps the ”Best Paper award committee” in their selection.

Contact Person:

For the management of sessions in terms of evaluation documents, … please contact Prof. Babak Nahidmobarakeh (babak.nahid@univ-lorraine.fr)

Conference Program

	Thursday 29 August			Friday 30 August			Saturday 31 August		
08:00 - 08:15	08:00 - 18:00 On-site Registration			08:00 - 18:00 On-site Registration					
08:15 - 08:30									
08:30 - 08:45				08:30 - 9:45 Poster (P2-A) Foyer 300	08:30 - 09:45 Poster (P2-B) Foyer 850	08:30 - 09:45 Poster (P2-C) Foyer 850			
08:45 - 09:00									
09:00 - 09:15	09:00 - 09:45 Opening Ceremony - Audit 300						09:00 - 10:15 Poster (P4-A) Foyer 300	09:00 - 10:15 Poster (P4-B) Foyer 850	09:00 - 10:15 Poster (P4-C) Foyer 850
09:15 - 09:30									
09:30 - 09:45									
09:45 - 10:00	09:45 - 10:15 Invited lecture (IL1) Audit 300			09:45 - 10:45 Pannel Session Audit 300					
10:00 - 10:15									
10:15 - 10:30	10:15 - 10:45 Invited lecture (IL2) Audit 300						10:15 - 10:45 Invited lecture (IL3) Audit 300		
10:30 - 10:45									
10:45 - 11:00	10:45 - 11:15 Coffee Break			10:45 - 11:15 Coffee Break			10:45 - 11:15 Coffee Break		
11:00 - 11:15									
11:15 - 11:30	11:15 - 13:00 ORAL (O1-A) Audit 300	11:15 - 13:00 ORAL (O1-B) S105	11:15 - 13:00 ORAL (O1-C) S106	11:15 - 13:00 ORAL (O3-A) Audit 300	11:15 - 13:00 ORAL (O3-B) S105	11:15 - 13:00 ORAL (O3-C) S106	11:15 - 13:00 ORAL (O5-A) Audit 300	11:15 - 13:00 ORAL (O5-B) S105	11:15 - 13:00 ORAL (O5-C) S106
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16:15 - 16:30	16:15 - 16:45 Coffee Break			16:15 - 16:45 Coffee Break					
16:30 - 16:45									
16:45 - 17:00	16:45 - 18:00 Poster (P1-A1) Foyer 300	16:45 - 18:00 Poster (P1-B) Foyer 850	16:45 - 18:00 Poster (P1-C) Foyer 850	16:45 - 17:15 Software provider Audit 300	16:45 - 17:15 Software provider S105	16:45 - 17:15 Software provider S106			
17:00 - 17:15									
17:15 - 17:30				17:15 - 18:30 Poster (P3-A) Foyer 300	17:15 - 18:30 Poster (P3-B) Foyer 850	17:15 - 18:30 Poster (P3-C) Foyer 850			
17:30 - 17:45	16:45 - 18:00 Poster (P1-A2) Foyer 300								
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ISEF 2019 Technical program

Thursday 29 August 2019

09:45 — 10:15 Invited Lecture: Corona resistant enameled wires as solution for electrical motor winding systems supplied by high du/dt inverter voltage: An insulation life-time estimation

Room: Auditorium 300

Session chairs:
Krawczyk Andrzej (Polish Society of Applied Electromagnetism; Poland)
Wiak Slawomir (Lodz University of Technology, Lodz, Poland)

IL1 ***"Corona resistant enameled wires as solution for electrical motor winding systems supplied by high du/dt inverter voltage: An insulation life-time estimation"***

Hameyer Kay[1], Pauli Florian[1], Driendl Niklas[1], Yang Liguo[1]
1 - Aachen University, RWTH, Germany

Abstract:

High slew rate inverters and an increasing DC-link voltage move electrical ageing of Insulation systems of low voltage traction drives into the focus. While state of the art machines are designed to be partial discharge (PD) free, corona resistant materials can withstand partial discharge significantly longer than standard materials. This makes tolerating PD during operation a future option in low voltage drives. While the effects of electrical ageing are well known for high voltage machines, there is no experience with PD in the insulation systems of low voltage

drives. Therefore, lifetime tests which characterize the electrical ageing of corona resistant wires in different operating points need to be performed.
Lower losses and a better overcurrent capability of SiC-MOSFETs compared to Si-IGBTs lead to increasing voltage slew rates (du/dt) of the inverter. At the same time the DC-link voltages in electric vehicles are increasing to achieve a faster charging process. Both of these aspects lead to a higher electric stress in the insulation system.
One option to meet the higher demands is to employ thicker insulation layers. However, this leads to reduction of the copper
fill factor. In a parametrization of the Paschen-curve for polyamide imide is given, which can be used alongside with the geometry of the insulation system to calculate the minimum voltage at which PD can occur. The calculated partial discharge
inception voltages (PDIV) largely depend on the permittivity and the thickness of the insulation.
Therefore, another option is to decrease the permittivity of the materials which are employed. However, there are only a few
low permittivity materials which offer the same thermal and mechanical properties of polyamide imide. A third way is to develop an insulation system which can withstand partial discharge significantly longer than standard materials. While insulation materials degrade – depending on the load point – within 10 minutes to 4 hours when PD is present, manufacturer data suggests, that corona resistant wires can last more than 100 times longer. PD-endurance tests of polyimide films with and without inorganic nanoparticles show an increased lifetime by approximately the same factor. However, these tests have
been conducted at fixed operating points, while the insulation system of electric vehicles is subjected to a large range of operating points.
As a result, it can be stated that by increasing the insulation thickness and decreasing the permittivity of the insulation material only yield a little increase of PDIV in the insulation system of low voltage drives. Employing PD-resistant materials offers the possibility of using higher DC-link voltages even while PDs are present. First measurements show that the lifetime of such insulating materials is increased significantly when compared to standard materials. Further measurements have to be performed for a more detailed understanding of the lifetime behavior of PD-resistant enameled wires.

10:15 — 10:45 Invited Lecture: MEMS: Field Models and Optimal Design

Room: Auditorium 300

Session chairs:
Krawczyk Andrzej (Polish Society of Applied Electromagnetism - Poland)
Wiak Slawomir (Lodz University of Technology, Lodz, Poland)

IL2 ***"MEMS: Field Models and Optimal Design"***

Di Barba Paolo[1], Wiak Slawomir[2]
1 - University of Pavia, Italy, 2 - Lodz University of Technology, Lodz, Poland

Abstract:

The invited lecture presents the same-title monograph in press by Springer, which covers a broad overview of methods of both analysis and synthesis of Micro Electro Mechanical Systems (MEMS) and devices. In particular, the MEMS devices the various case studies are focused on, are analyzed by means of distributed models (i.e. field models) which allow to represent the physical layer i.e. the internal reality which takes place within materials forming the device. In contrast, the traditional approach to analysis is based on lumped-parameter models (i.e. circuit models), which rely on the assumption of disregarding space effects. This twofold approach and its implications at the computing level is described. Following the field model approach, an overview of electrostatics, magnetostatics and steady-state conduction is presented, respectively.
Methods to simulate the mechanical effects, which take place in the field, i.e. forces and torques of electromagnetic origin acting on a structure, are accordingly illustrated. In turn, an introduction to multiphysics problems is developed as well. On the other hand, the lumped parameter approach is also exploited: the integral parameters characterizing a MEMS device (e.g. the equivalent capacitance), can be reliably computed just starting from field analyses; accordingly, the field-circuit approach is proven and discussed. If simulating a device by solving an analysis problem gives a fundamental information about its behavior, the design of MEMS is the main computational challenge which arises nowadays, in particular, the automated design optimization. In fact, the industrial designers are more and more involved in solving synthesis problems based on procedures of automated optimal design which are, in turn, based on analysis problems. This is the rationale behind Chapter 10 and Chapter 11: in the former, definitions and properties of synthesis (or inverse) problems are summarized and a few regularization methods are presented, while in the latter methods for the automated optimal design are presented and discussed. Because numerical methods have to follow the ongoing technological trend, which is more and more oriented towards Nano Electro Mechanical Systems (NEMS), a selection of NEMS devices is presented; accordingly, it is shown how they can

be still modelled by means of numerical methods used for MEMS. A categorization commonly accepted of MEMS devices is based on the inherent actuation principle. In fact, there are many principles of actuation, among the others electrical, magnetic, thermal, fluidic and chemical actuation. Each kind of actuation presents advantages and drawbacks; MEMS devices characterized by electrical, thermal and magnetic actuation are treated. Electrical actuation is the most common and the oldest one. In fact, capacitive transduction, coupled with the electrostatic actuation, is used for many applications like e.g. pressure sensors, micromotors, accelerometers, gyroscopes and energy harvesters. In particular, pressure sensors became the first mass-produced MEMS device around 1995. On the other hand, electrostatic micromotors were the first devices to be designed and prototyped, exploiting the Silicon integrated technology as early as the late eighties of last century. In the lecture the thermal actuation is presented as coupled with the electrical actuation, i.e. the conduction current heats a structural component of the device thanks to the Joule effect; then, the gradient of temperature gives rise to a strain and, finally, to a displacement. This kind of electro-thermo-elastic device is significant from the point of view of complex models, because of the three coupled fields. Finally, magnetic actuation is considered due to its many advantages. Among the others, low voltages are needed for power supply and, hence, the power consumption is low; moreover, they are simple to control because of their linear response to the input signal. Even if they appear not to be used very extensively, they fill some important niches in mechatronics e.g. for those applications that need large force densities and broad strokes. Following the three actuation types, examples of MEMS devices like micromotors, accelerometers, micromirrors and actuators of various shapes are analyzed by means of field models. In turn, the same devices are considered from the viewpoint of automated optimal design and solved by means of recently proposed optimization algorithms.

10:45 – 11:15 Coffee Break

Notes:

11:15 — 13:00 Oral Session O1-A: Field theory and advanced computation in electromagnetism

Room: Auditorium 300

Session chairs:
Clénet Stéphane (Laboratoire d'Electrotechnique et d'Electronique de Puissance - France)
Sykulski Jan (University Southmapton - UK)

O1-A-1 *"Unstructured - PEEC Method with the use of Surface Impedance Condition"*
Meunier Gérard[1], Phan Quang Anh[1], Chadebec Olivier[1], Guichon Jean Michel[1], Bannwarth Bertrand[1]
1 - Université de Grenoble Alpes, G2ELab, France

O1-A-2 *"Wideband Performance Analysis of the C-FDTD Approach in the Discretization Impoverishment of a Dielectric Curved Surface"*
Fortes Lucas[1], Gonçalves Sandro[1]
1 - Federal Center of Technological Education, Minas Gerais, Brazil

O1-A-3 *"Peculiarities of Calculating the Dynamics of High-Speed Electromagnets Using Tunable Elastic Meshes"*
Yevgen Bajda[1], Klymenko Borys[1], Pantelyat Michael[1], Yelanskyi Yurii[2], Trichet Didier[3], Wasselynck Guillaume[3]
1 - National Technical University, Department for Electrical Apparatus, Kharkiv Polytechnic Institute, Ukraine, 2 - Yuzhnoe State Design Office, Dnipro, Ukraine, 3 - Université de Nantes, IREENA, France

O1-A-4 *"Introduction of the Bicomplex Analysis in the Finite Element Method Applied to Electromagnetic Far-Field Calculations"*
Reum Thomas[1], Toepfer Hannes[1]
1 - Technische Universität Ilmenau, Germany

O1-A-5 *"Comparison of Methods for Thread Parallelization in 3-D Hybrid Parallel Finite Element Method"*
Yamaguchi Tadashi[1], Kawase Yoshihiro[1], Nagase Atsuyoshi[1]
1 - Gifu University, Japan

Notes:

11:15 — 13:00 Oral Session O1-B: Permanent magnet motors - calculation and design

Room: S105

Session chairs:

Barakat Georges (Université du Havre, GREAH, France)
Aimeng Wang (North China Electric Power University, China)

O1-B-1 *"3D Magnetic Field Model of a Permanent Magnet Ironless Axial Flux Motor with Additively Manufactured Non-Active Parts"*

Bonnet Maxime[1], Lefèvre Yvan[1], Llibre Jean-François[1], Harribey Dominique[1], Defay François2, Sadowski Nelson3
1 - INPT, LAPLACE-CNRS, Toulouse, France, 2 - Université Fédérale Toulouse Midi-Pyrénées, ISAE, France, 3 - Federal University of Santa Catarina, Brazil

O1-B-2 *"Design of a Very High Speed, High Power PM-Synchronous Motor"*

Girard Nicolas[1], Olmedo Luis Eric[2], Schiffmann Jürg[2], Chevailler Samuel[1]
1 - Institute of Systems Engineering University of Applied Sciences and Art Sion, Switzerland, 2 - Ecole Polytechnique Federale de Lausanne, Neuchâtel, Switzerland

O1-B-3 *"Design Aspects for Fractional-Slot PMBLDC Motor"*

Petkovska Lidija[1], Cvetkovski Goga[1]
1 - Ss. Cyril and Methodius University, Faculty of Electrical Engineering and Information Technologies, Skopje, Macedonia

O1-B-4 *"Comparison of losses and efficiency between a Permanent Magnet Generator and a Pseudo Direct Drive"*

Da Costa Neves Carlos Guilherme[1], Ferreira Flores Filho Ály[2]
1 - Federal University of Pelotas, Brazil, 2 - Federal University of Rio Grande do Sul, Brazil

O1-B-5 *"Degrees of Freedom in the Design of PM Synchronous Machines"*

Amara Yacine[1], Hlioui Sami[2]
1 - Université du Havre, GREAH, France, 2 - Université de Paris Saclay, SATIE, France

Notes:

11:15 — 13:00 Oral Session O1-C: Electromagnetism in materials

Room: S106

Session chairs:
Pichon Lionel (Université Paris Sud - Geeps - France)
Hinaje Melika (Université de Lorraine - GREEN - France)

O1-C-1 *"Tunable Flat MRI Lens"*
Hausman Slawomir[1], Jopek Lukasz[1]
1 - Lodz University of Technology, Lodz, Poland

O1-C-2 *"Comparison of experimental and computational analysis of superconducting stack demagnetization in an electrical motor"*
Smara Anis[1], Climente-Alarcon Vicente[1], Glowacki Bartek[2,1], Reis Thomas[3]
1 - University of Cambridge, Department of Materials Science and Metallurgy, Cambridge, United Kingdom, 2 - Institute of Power Engineering, Warsaw, Poland, 3 - Oswald Elektromotoren GmbH, Miltenberg, Germany

O1-C-3 *"Vector hysteresis models in comparison to the anhysteretic magnetization model"*
Xiao Xiao[1], Müller Fabian[1], Bavendiek Gregor[1]
1 - Aachen University, RWTH, Germany

O1-C-4 *"Modelling Dynamic Behavior of Laminated Steels Using a Fourier-Based Approach"*
Zeinali Reza[1], Krop Dave[1], Lomonova Elena[1]
1 - Eindhoven University of Technology, Eindhoven, Netherlands

O1-C-5 *"Coupled Statistical and Dynamic Loss Prediction of High-Permeability Grain-Oriented Electrical Steel"*
Daniels Bram[1], Overboom Timo[1], Lomonova Elena[1]
1 - Eindhoven University of Technology, Eindhoven, Netherlands

Notes:

13:00 - 14:30 Lunch

14:30 — 16:15 Oral Session O2-A: Field theory and advanced computation in electromagnetism

Room: Auditorium 300

Session chairs:
Geuzaine Christophe (Université de Liège - Belgium)
Fontchastagner Julien (Université de Lorraine, GREEN, France)

O2-A-1 *"Model Order Reduction Techniques applied to Magnetodynamic Scalar Potential Formulation"*
Müller Fabian[1], Crampen Lucas[1], Henneron Thomas[2], Clenet Stéphane[2], Hameyer Kay[1]
1 - Aachen University, RWTH, Germany, 2 - Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France

O2-A-2 *"3D FEM-BEM coupling for electromagnetic field computation in thin shells"*
Menana Hocine[1]
1 - Université de Lorraine, GREEN, France

O2-A-3 *"A Novel Impedance Matrix Localization For The Fast Modelling of 2D Electromagnetic Scattering Using The Localized Green's Function"*
Kutluay Deniz[1], Oguzer Taner[1]
1 - Dokuz Eylul University, Turkey

O2-A-4 *"Improved Numerical Method for Skin Effect Computing of Conductors Having Rectangular Cross Sections"*
Raicevic Nebojsa[1], Butrylo Boguslaw[2], Slavoljub Aleksic[1], Barukcic Marinko[3]
1 - University of Nis, Faculty of Electronic Engineering, Serbia, 2 - University of Technology, Bialystok, Poland, 3 - University of Osijek, Croatia

O2-A-5 *"Inductances of an Eccentric Induction Machine via Conformal Mapping and the Convolution Theorem"*
Pineda-Sanchez Manuel[1]
1 - Polytechnic University of Valencia, Spain

Notes:

14:30 — 16:15 Oral Session O2-B: Optimization and Computer-Aided Design

Room: S105

Session chairs:
Gillon Frédéric (Laboratoire d'Electrotechnique et d'Electronique de Puissance - France)
Ferreira Flores Filho Ály (Universidade Federal do Rio Grande do Sul, Brazil)

O2-B-1 *"Efficiency Improvement of Permanent Magnet Synchronous Motor Based on Cuckoo Search Approach"*
Cvetkovski Goga[1], Petkovska Lidija[1]
1 - Ss. Cyril and Methodius University, Faculty of Electrical Engineering and Information Technologies, Skopje, Macedonia

O2-B-2 *"Design of Slotless Permanent Magnet Machines by Developing a Semi-Infinite Global Optimization Method"*
Amrouchi Zahia[1], Messine Frédéric[2], Nadal Clément[2], Ouanes Mohand[1]
1 - Université Mouloud Mammeri, Tizi Ouzou, Algeria, 2 - INPT, LAPLACE-CNRS, Toulouse, France

O2-B-3 *"FEM-Based Transformer Design Optimization Technique with Evolutionary Algorithms and Geometric Programming"*
Orosz Tamás[1], Karban Pavel[1], Pánek David[1], Dolezel Ivo[1]
1 - University of West Bohemia, Pilsen, Czech Republic

O2-B-4 *"A Method for Solving Many-Objective Optimization Problems in Magnetics"*
Di Barba Paolo[1], Mognaschi Maria Evelina[1], Wiak Slawomir[2]
1 - University of Pavia, Italy, 2 - Lodz University of Technology, Lodz, Poland

O2-B-5 *"A Multi-Objective Design Optimization Method for PMVM Based on Subdomain Analysis"*
Ma Yiming[1], Zhou Libing[1], Wang Jin[1], Xiao Yang[2], Zheng Yinzhao[1], Zhao Junchen[1]
1 - State Key Laboratory of Advanced Electromagnetic Engineering and Technology, School of Electrical and Electronic Engineering, Huazhong University of Science and Technology, China, 2 - University of Sheffield, Sheffield, United Kingdom

Notes:

14:30 — 16:15 Oral Session O2-C: SS. Noise and vibrations in electrical machines and transformers

Room: S106

Session chairs:
Witczak Pawel (Lodz University of Technology - Poland)
Lecointe Jean-Philippe (Université d'Artois - LSEE - France)

O2-C-1 *"Vibration Investigation of a 24/20 Switched Reluctance Motor Focusing on the Driving Methods"*
Niguchi Noboru[1], Hirata Katsuhiro[1], Suzuki Hironori[1]
1 - Osaka University, Osaka, Japan

O2-C-2 *"e-NVH Response Synthesis of Electric Motors Based on Stator Teeth FRF Measurements"*
Pile Raphaël[1,2], Le Besnerais Jean[1], Devillers Emile[1], Degrendele Karine[1]
1 - Eomys Engineering, Lille, France, 2 - Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France

O2-C-3 *"Structural Analysis of a High Speed Double-Sided Axial Flux Permanent Magnet Motor Vertically Suspended by Magnetic Bearings"*
Guney Omer Faruk[1], Celik Ahmet[1], Bozkurt Ahmet Fevzi[1], Erkan Kadir[1]
1 - Yildiz Technical University, Turkey

O2-C-4 *"Analytical tool for the electromagnetic air gap pressure study and vibro-acoustic performance Permanent Magnet Synchronous Machine (PMSM)"*
La Delfa Patricio[1], Hecquet Michel[1], Gillon Frédéric[1]
1 - Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France

O2-C-5 *"Numerical and experimental vibration analysis of BLDC motor"*
Podhajecki Jerzy[1], Rawicki Stanislaw[1]
1 - The Jacob of Paradies University, Poland

Notes:

16:15 – 16:45 Coffee Break

16:45 — 18:00 Poster Session P1-A1: Bioelectromagnetism and electromagnetic hazards

Room: Foyer 300

Session chairs:
Iatcheva Ilona (Technical University of Sofia - Bulgaria)
Sikora Jan (University of Economics and Innovation, Lublin, Poland)

P1-A1-1 *"Evaluation of plant tissue structures subjected to the pulsed electric field using optical coherence tomography"*
Korzeniewska Ewa[1], Sekulska-Nalewajko Joanna[1], Goclawski Jaroslaw[1], Drózdz Tomasz[2], Kielbasa Pawel[2]
1 - Lodz University of Technology, Lodz, Poland, 2 - University of Agriculture, Faculty of Production and Power Engineering, Krakow, Poland

P1-A1-2 *"E-textile technology in electroceuticals for electrostimulation of fingertips"*
Krawczyk Andrzej[1], Korzeniewska Ewa[2], Mróz Józef[3], Wisniewska Sylwia[3]
1 - University of Economics and Innovations, Lublin, Poland, 2 - Lodz University of Technology, Lodz, Poland, 3 - Military Institute of Medicine, Warsaw, Poland

P1-A1-3 *"The system for activating the transport of ions in biological structures using a magnetic field"*
Chudorlinski Jerzy[1], Ksiazek Leszek[1], Prystupiuk Piotr[1]
1 - Tele and Radio Research Institute, Poland

P1-A1-4 *"Inverse Problem for Identifying Parameters Describing Data Field in Ultrasonographic Transmission Tomography"*
Rymarczyk Tomasz[1], Kania Konrad[1], Sikora Jan[1], Adamkiewicz Przemyslaw[1], Maj Michal[1], Golabek Michal[1]
1 - University of Economics and Innovations, Lublin, Poland

P1-A1-5 *"Innovative Methods of Tomographic Image Reconstruction Based on Machine Learning to Improve Monitoring and Optimization in Industrial Processes"*
Rymarczyk Tomasz[1], Klosowski Grzegorz[2], Kozlowski Edward[2]
1 - University of Economics and Innovations, Lublin, Poland, 2 - Lodz University of Technology, Lodz, Poland

P1-A1-6 *"Using Electrical Tomography for Remote Monitoring Cardiopulmonary State of Patients by Complementary Investigation Techniques"*
Rymarczyk Tomasz[1], Nita Pawel[1], Vejar Andres[1], Stefaniak Barbara[1], Wos Michal[1], Oleszek Michal[1]
1 - University of Economics and Innovations, Lublin, Poland

P1-A1-7 *"Experimental Study of Electromagnetic Field Strength Measurements in MRI Room"*
Mutlu Mustafa[1], Kurnaz Cetin[2]
1 - Ordu University, Turkey, 2 - Ondokuz Mayis University, Turkey

P1-A1-8 *"Effects of static magnetic fields on the germination and early growth of durum wheat seeds"*
Minucci Simone[1], Calabrò Giuseppe[1], Astolfi Stefania[1], Campiglia Enio[1]
1 - University of Tuscia, Italy

16:45 — 18:00 Poster Session P1-A2: Electromagnetism Modelling

Room: Foyer 300

Session chairs:
Komeza Krzysztof (Lodz University of Technology - Poland)
Dems Maria (Lodz University of Technology - Poland)

P1-A2-1 *"Experimental study of electromagnetic coupling between two transmission lines"*
Halima Slimani[1], Bendaoud Abdelbar[1], Reguig Abdeljalil[1], Omar Dafif[2]
1 - Université Djillali LIABES de Sidi Bel-Abbès, APELEC, Algeria, 2 - Institut XLIM, Laboratoire du département OSA, Université de Limoges, France

P1-A2-2 *"Reduced Order Model to Control Induction Brazing Process of Aluminum Pipes"*
Orosz Tamás[1], Pánek David[1], Karban Pavel[1], Kropík Petr[1], Dolezel Ivo[1]
1 - University of West Bohemia, Pilsen, Czech Republic

P1-A2-3 *"Modelling of Vertical Ground Electrode under Lightning Transient"*
Messaoudi Hossam Eddine[1], Kherif Omar[1], Chiheb Sofiane[1], Teguar Madjid[1], Mekhaldi Abdelouahab[1]
1 - Ecole Nationale Polytechnique d'Alger, LDCCP, Algeria

P1-A2-4 *"Towards a Generic Framework for Lumped Parameters Modelling"*
Yang Shuo[1], Amara Yacine[2], Hua Wei[1], Barakat Georges[2]
1 - School of Electrical Engineering, Southeast University, Nanjing, China, 2 - Université du Havre, GREAH, France

P1-A2-5 *"Hybrid method for crosstalk analysis of multiconductor transmission lines"*
Gheddar Hemza[1], Mohamed Melit[1], Nekhoul Bachir[1]
1 - Université de Jijel, L2EI, Algeria

P1-A2-6 *"A Novel Generalized Analytic Expression of Power Transformer Equivalent RLC Model"*
Hamza Houassine[1], Chaouche Moustafa Sahnoune[2], Moulahoum Samir[2], Bensaid Samir[1], Trichet Didier[3]
1 - Université de Bouira, Polytechnic School of Constantine, Algeria, 2 - Université de Medea, LREA, Algeria, 3 - Université de Nantes, IREENA, France

Notes:

16:45 — 18:00 Poster Session P1-B: Electric machines - Transformers - Actuators & Micro machines

Room: Foyer 850

Session chairs:

Panek David (University of West Bohemia - Czech Republic)
Nobuyuki Naoe (International College of Technology - Japan)

P1-B-1 *"The Distribution of the Magnetic Field in the Air Gap of the Superconducting Linear Motor"*
Habelok Krzysztof[1], Lasek Pawel[1], Stepien Mariusz[1]
1 - Silesian University of Technology, Poland

P1-B-2 *"FE Modeling and Simulation of a Synchronous Reluctance Motor Based on COMSOL Multiphysics"*
Khelifa Hocine[1], Bentounsi Ammar[1], Rebahi Fares[1]
1 - Université de Bouira, Polytechnic School of Constantine, Algeria

P1-B-3 *"Dual Stator Brushless Wound-Rotor Synchronous Machine for Variable Speed Applications"*
Hussain Asif[1], Ayub Muhammad[2], Sirewal Ghulam Jawad[2], Yazdan Tanveer[3], Shoaib Muhammad[1]
1 - University of Management and Technology, Lahore, Pakistan, 2 - Hanyang University, Ansan, South Korea

P1-B-4 *"Axial claw pole motor: harmonic torque estimation"*
Giraud Dominique[1,2], Ristagno Baptiste[1,2], Netter Denis[2], Fontchastagner Julien[2], Labbe Nicolas[1], Lanfranchi Vincent[3]
1 - Valeo Equipements Electriques, France, 2 - Université de Lorraine, GREEN, France, 3 - Université de Technologie de Compiègne, LEC, France

P1-B-5 *"High temperature induction motor preliminary sizing"*
Guezmil Amal[1], Iosif Vadim[1], Velu Gabriel[1], Roger Daniel[1]
1 - Université d'Artois, LSEE, France

P1-B-6 *"Optimal design of highly efficient LSPM motor based on magnetic equivalent parameters"*
Waheed Abdul[1], Cho Yun Hyun[1]
1 - Dong-A University, South Korea

P1-B-7 *"Impact of Flux Barriers Shape in Synchronous Reluctance Machine Optimization"*
De Gréef Christophe[1], Kluyskens Virginie[1], Henrotte Francois[1,2], Dehez Bruno[1], Geuzaine Christophe[2]
1 - Université catholique de Louvain, iMMC, Belgium, 2 - Université de Liège, Belgium

P1-B-8 *"Estimation of Localized Heat Transfer Coefficient in Induction Heating Apparatus by Thermal Fluid Analysis Based on HSMAC Method"*
Iino Tomoya[1], Namiki Satoshi[1], Okamoto Yoshifumi[1]
1 - Hosei University, Japan

P1-B-9 *"Fuzzy Fault Tolerant Control combined to an adaptive Super twisting observer: application IM"*
Kari Mohammed Zakaria[1], Guenoune Brahim[1], Mechernene Abdelkader[1], Meliani Sidi Mohammed[1]
1 - Université de Tlemcen, Algeria

P1-B-10 *"Computation of Oscillating Electrical Machines under Nonlinear Properties of Magnetic Circuit"*

Kudarauskas Sigitas[1]
1 - S. Kudarauskas personal enterprise, Klaipeda, Lithuania

P1-B-11 *"Modeling of a Slip-Ring Induction Motor"*

Wcislik Miroslaw[1], Suchenia Karol[1], Cyganik Andrzej[2]
1 - University of Technology, Kielce, Poland, 2 - Siemens Sp. z o.o., Poland

P1-B-12 *"Analysis of Shaft Voltage of Large Turbo-generators for rotor defect detection purposes"*

Darques Kévin[1], Tounzi Abdelmounaïm[1], Le Menach Yvonnick[1], Beddek Karim[2]
1 - Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France, 2 - Electricité De France Labs, France

P1-B-13 *"Induction machines closed-slot reactances: A novel approach"*

Tavares Alvacir[1], Ferreira Flores Filho Ály[1]
1 - Federal University of Rio Grande do Sul, Brazil

Notes:

16:45 — 18:00 Poster Session P1-C: Nondestructive testing – Wave propagation

Room: Foyer 850

Session chairs:
Menana Hocine (Université de Lorraine - GREEN - France)
Slusarek Barbara (Tele and Radio Research Institut, Warsaw, Poland)

P1-C-1 *"Cracks Characterization of Non-Ferromagnetic Material using EMAT Transducer and PLSR technique"*
Boughedda Houssem[1], Tarik Hacib[1], Smail Mostapha Kamel[2], Sadou Hakim[1], Le Bihan Yann[3], Acikgoz Hulusi[4]
1 - Université de Jijel, L2EI, Algeria, 2 - Institut Polytechnique des Sciences Avancées, Ivry sur Seine, France, 3 - CentraleSupélec, Université Paris Sud, GEEPS, France, 4 - Karatay University, Engineering Faculty, Konya, Turkey

P1-C-2 *"LS-SVM Datasets Optimization for Crack Estimation by Eddy Current Testing"*
Chelabi Mohamed[1], Tarik Hacib[1], Le Bihan Yann[2]
1 - Université de Jijel, L2EI, Algeria, 2 - CentraleSupélec, Université Paris Sud, GEEPS, France

P1-C-3 *"Fault Diagnosis Method for Cascaded H-bridge Multilevel Inverters under Switching Device Failure"*
Kherif Omar[1], Benmahamed Youcef[1], Maadjoudj Djamal[1], Teguar Madjid[1], Bounabi Moussaab[1], Larbes Cherif[1]
1 - Ecole Nationale Polytechnique d'Alger, LDCCP, Algeria

P1-C-4 *"Automatic detection of anomalies using hall sensor and eddy current non desrtuctive testing"*
Berkache Azouaou[1], Oudni Zehor[1], Mehaddene Hamid[1], Mohellebi Hassane[1], Lee Jinyi[2], Taib Brahimi Abdelhalim[3]
1 - Université Mouloud Mammeri, Tizi Ouzou, Algeria, 2 - Research Center for IT-based Real Time for Nano-Damage Tolerance, Chosun University, Gwangju, South Korea, 3 - Université des Sciences et Technologies Mohamed Boudiaf, Oran, Algeria

P1-C-5 *"SAW wireless sensor and scale-based methods in fault diagnosis of rotating machinery"*
Scipioni Angel[1,2], Rischette Pascal[2], Santori Agnès[2]
1 - Université de Lorraine, GREEN, France, 2 - CREA, Ecole de l'air, France

P1-C-6 *"2D Eddy current Non-destructive Testing and Evaluation in Ferromagnetic Steel"*
Mehaddene Hamid[1], Berkache Azouaou[1], Mohellebi Hassane[1]
1 - Université Mouloud Mammeri, Tizi Ouzou, Algeria

P1-C-7 *"2D Eddy Currents Imaging & Fuzzy Similarities for Assessing the Integrity of Steel Plates"*
Versaci Mario[1], Angiulli Giovanni[1], Di Barba Paolo[2], Morabito Carlo[1]
1 -Universita Mediterranea of Reggio Calabria, Reggio Calabria, Italy, 2 - University of Pavia, Italy

P1-C-8 *"Stochastic evaluation of defects in eddy currents non-destructive testing system"*
Oudni Zehor[1], Mohellebi Hassane[1]
1 - Université Mouloud Mammeri, Tizi Ouzou, Algeria

P1-C-9 *"Optimal Synthesis of Wearable Antenna Array for Interference Reduction in 700 MHz Band"*

Januszkiewicz Lukasz[1], Di Barba Paolo[2], Hausman Slawomir[1]
1 - Lodz University of Technology, Lodz, Poland, 2 - University of Pavia, Italy

P1-C-10 *"Analysis of High-efficiency Rectenna models at 2.45 GHz using Meandered Printed Dipole Antenna"*

Mendes Rakelane[1], Gonçalves Sandro[1], Silva Raphaella[1], Rego Cassio[2], Ramos Glaucio[3]
1 - Federal Center of Technological Education, Minas Gerais, Brazil, 2 - Department of Electronic Engineering, Brazil, 3 - Antennas and Propagation Research Group, Brazil

P1-C-11 *"Uncertainty Quantification in the Shielding Effectiveness Evaluation of Planar Sheets"*

Pichon Lionel[1], Krauth Van-Lang[1]
1 – CentraleSupélec, Université Paris Sud, GEEPS, France

Notes:

18:15 – 19:15 City Tour

19:30 — 21:30 Welcome Reception Opéra de Nancy

08:30 — 09:45 Poster Session P2-A: Electromagnism in Materials

Room: Foyer 300

Session chairs:

Bouazabia Slimane (USTHB - Algeria)

Costamagna Eugenio (University of Pavia - Italy)

P2-A-1 *"Modeling and Analyzing Bouc-Wen Hysteresis Model"*

Aboura Faouzi[1]

1 - Université des Sciences et Technologies Houari Boumediene, Bab Ezzouar, Algeria

P2-A-2 *"Influence of laser modification of textile on resistance of textronic structures"*

Korzeniewska Ewa[1], Walczak Maria[1]

1 - Lodz University of Technology, Lodz, Poland

P2-A-3 *"Quantification of iron losses for eddy current loss estimation in clamp plate"*

Darques Kévin[1], Tounzi Abdelmounaïm[1], Korecki Julien[1], Laloy Daniel[2], Boughamni Walid[2]

1 - Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France, 2 - Jeumont Electric, Jeumont, France

P2-A-4 *"Study on magnetic properties of silicon steel sheets at different temperatures"*

Zhang Yvyong[1]

1 - University of Technology, Shenyang, China

P2-A-5 *"Analysis of Magnetization Characteristic Based B-H curve fitting according to the Operation Conditions for traction motor"*

Kim Young Hyun[1], Yu Daehee[1], Lee Jung Ho[1]

1 - Hanbat National University, South Korea

P2-A-6 *"Magnet Eddy Current Loss Reduction in Permanent Magnet Machines"*

Belli Zoubida[1]

1 - Université de Jijel, L2EI, Algeria

P2-A-7 *"Microwave response of Carbon-fiber reinforced composite thin plate using the multidimensional Kirchhoff paradigm"*

Rezgui Slimane[1]

1 - Université Mouloud Mammeri, Tizi Ouzou, Algeria

P2-A-8 *"Microcontroller system for carbon nanotubes synthesis reactor"*

Szymanski Lukasz[1], Raniszewski Grzegorz[1], Lefik Marcin[1]

1 - Lodz University of Technology, Lodz, Poland

P2-A-9 *"Electrical Conductivity Computation of Stratified Material Using Homogenization Technique Based on Inverse Problem Study"*

Yousfi Ghania1, Mohellebi Hassane[1]

1 - Université Mouloud Mammeri, Tizi Ouzou, Algeria

P2-A-10 *"Numerical Model of Additive Manufacturing of Metal Bodies and its Experimental Verification"*

Kotlan Václav[1], Hamar Roman[1], Slobodník Karel[1], Dolezel Ivo[1]

1 - University of West Bohemia, Pilsen, Czech Republic

P2-A-11 *"3D semi-analytical modelling of magnetic forces between HTS coils"*

Statra Yazid[1], Menana Hocine[1], Douine Bruno[1]

1 - Université de Lorraine, GREEN, France

08:30 — 09:45 Poster Session P2-B: Electrical machines - Transformers - Actuators – Micro machines

Room: Foyer 850

Session chairs:
Ferreira Flores Filho Ály (Universidade Federal do Rio Grande do Sul - Brazil)
Lopez-Fernandez Xose (Universidade de Vigo – Spain)

P2-B-1 *"Improved Interleaved Layer Distribution for High-Frequency High-Power Planar Transformer"*
Poveda-Lerma Antonio[1], Pineda-Sanchez Manuel[1], Martinez-La-Osa P.[1], Rodriguez-Manez E.[1], Puche-Panadero R.[1]
1 - Polytechnic University of Valencia, Spain

P2-B-2 *"Design of a 2 stages compressor for mobility applications, using compact and efficient MICATM Moving Iron Controllable Actuators"*
Hugi Sandrine[1], Meneroud Patrick[1]
1 - Cedrat Technologies, France

P2-B-3 *"Fractional Order Direct Torque Control of Variable Relectance Motor Drives"*
Hachelfi Walid[1], Rahem Djamel[1], Djouambi Abdelbaki[1]
1 - Université d'Oum El bouaghi, LGEA, Algeria

P2-B-4 *"Concentrated Winding Brushless Wound Rotor Synchronous Machine Utilizing Sabharmonic Components"*
Hussain Asif[1], Ayub Muhammad[2], Sirewal Ghulam Jawad[2], Shoaib Muhammad[1], Raza Rafiq Muhammad[1]
1 - University of Management and Technology, Lahore, Pakistan, 2 - Hanyang University, Ansan, South Korea

P2-B-5 *"A configurable reluctance network model for the study of large power and distribution transformers"*
Mohammed Naïdjate[1], Bracikowski Nicolas[1], Hecquet Michel[2], Mircea Fratila[3], Martinez Duro Manuel[3], Ducreux Jean-Pierre[3]
1 - Université de Nantes, IREENA, France, 2 - Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France, 3 - R&D EDF, centre de recherche Electricité de France, Paris-Saclay, France

P2-B-6 *"Transient Performance Analysis for the Hysteresis Motor with Overexcitation Using Play Model"*
Kurihara Kazumi[1], Kurihara Naoki[1], Tomotsugu Kubota[1]
1 - Ibaraki University, Hitachi, Japan

P2-B-7 *"HF model of High Temperature machine coils"*
Elmadah Hamed[1], Roger Daniel[2], Takorabet Noureddine[1]
1 - Université de Lorraine, GREEN, France, 2 - Université d'Artois, LSEE, France

P2-B-8 *"Analysis of a Novel Permanent Magnet Electromagnetic Valve Actuator with FEM"*
Waindok Andrzej[1], Tomczuk Bronislaw[1], Koteras Dariusz[1]
1 - University of Technology, Opole, Poland

P2-B-9 *"Design and Analysis of Torque Superimposition Magnetic-Geared Motor"*
Ukaji Hajime[1], Hirata Katsuhiro[1], Niguchi Noboru[1], Noritaka Aso[2]
1 - Osaka University, Osaka, Japan, 2 - Panasonic Corporation, Japan

P2-B-10 *"Efficient Coupled Electromagnetic-Thermal Induction Machine Model using scaled FESolutions"*

Nell Martin[1], Groschup Benedikt[1], Hameyer Kay[1]
1 - Aachen University, RWTH, Germany

P2-B-11 *"Detection of early-stage inter-turn short-circuits in an induction machine based on CWT of phase currents by means of deep neural network"*

Górny Konrad[1], Pietrowski Wojciech[1]
1 - Poznan University of Technology, Poznan, Poland

P2-B-12 *"Fast calculation of the airgap flux density distribution based on subdomain and permeance magnetomotive force models of electrical machines."*

Devillers Emile[1], Le Besnerais Jean[1]
1 - Eomys Engineering, Lille, France

P2-B-13 *"Numerical Modeling of Brushless Synchronous Generator for Rectifier Fault detection"*

Rahnama Mehdi[1], Vahedi Abolfazl[1], Mohammad Alikhani Arta[1]
1 - University of Science and Technology, Tehran, Iran

P2-B-14 *"Starting Characteristics Analysis of Induction Motor with Broken Rotor Bars"*

Kawase Yoshihiro[1], Yamaguchi Tadashi[1], Ozawa Ryosuke[1], Kawano Hiroshi[2], Watanabe Masashi[2]
1 - Gifu University, Japan, 2 - Toyota industries corporation, Japan

P2-B-15 *"Increase the power-to-weight ratio of induction machines by increasing their operating temperature"*

Laidoudi Aïcha[1], Duchesne Stéphane[1], Mgaizar Mohamed[2], Takorabet Noureddine[2]
1 - Université d'Artois, LSEE, France, 2 - Université de Lorraine, GREEN, France

Notes:

08:30 — 09:45 Poster Session P2-C: Permanent magnet motors - calculation and design

Room: Foyer 850

Session chairs:

Sigitas Kudarauskas (Klaipeda, Lithuania)

Amara Yacine (Université du Havre, GREAH, France)

P2-C-1 *"Computational analysis of a brushless direct current motor"*

Ciurys Marek[1], Zalas Pawel[1]

1 - University of Science and Technology, Wroclaw, Poland

P2-C-2 *"Design optimization and performance comparaison of toothed outer rotor doubly salient permanent magnet machine"*

Guerroudj Cherif[1,2], Lemnouer Bekhouche[2], Ramli Aziz[2]

1 - Université des Sciences et Technologies Houari Boumediene, Bab Ezzouar, Algeria, 2 - Université de Béjaïa, Algeria

P2-C-3 *"Torque ripple minimization by current harmonic injection in permanent magnet synchronous machine"*

Jedryczka Cezary[1], Szelag Wojciech[1], Danielczyk Dawid[1], Krystkowiak Michal[1]

1 - Poznan University of Technology, Poznan, Poland

P2-C-4 *"Comparison of Spoke-Type Motor with Classical and Advanced Ferrite Magnets"*

Zhu Shan[1], Schaefer Uwe[1]

1 - Electrical Drives, TU Berlin, Germany

P2-C-5 *"Cogging Torque Minimization of Surface-Mounted Permanent Magnet Synchronous Machines Using Halbach Magnetization"*

Rabahi Redha[1], Boutora Youcef[1], Takorabet Noureddine[2]

1 - Université Mouloud Mammeri, Tizi Ouzou, Algeria, 2 - Université de Lorraine, GREEN, France

P2-C-6 *"Effect of the Load Angle on Radial Forces and Torque Ripple of a PMSM with Trapezoidal Supply"*

Uygun Emre[1,2], Hecquet Michel[1], Tounzi Abdelmounaïm[1], Depernet Daniel[3], Lanfranchi Vincent[4], Bruno Serge[2], Tollance Thierry[1,2]

1 -Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France, 2 - Somfy, Cluses, France, 3 - Université de Franche Comté, FEMTO-ST, France, 4 - Université de Technologie de Compiègne, Laboratoire Roberval, France

P2-C-7 *"Electric-Mechanical Performance Analysis of High Speed Non-contact Coaxial Magnetic Gear"*

Hong Do-Kwan[1,2], Jung-Hwan Chang[3]

1 - University of Science and Technology, South Korea, 2 - Korea Electrotechnology Research Institute, South Korea, 3 - Dong-A University, South Korea

P2-C-8 *"Dual Mode Operation of PM-assisted Brushless Wound Rotor Synchronous Machine for Electric Vehicle Applications"*

Hussain Asif[1], Fraz Muhammad Ali[1], Adnan Muhammad[1], Saleem Muhammad Rehan[1], Ayub Muhammad[2], Sirewal Ghulam Jawad[3]

1 - University of Management and Technology, Lahore, Pakistan, 2 - The Balochistan University of Information Technology, Quetta, Balochistan, Pakistan, 3 - Hanyang University, Ansan, South Korea

P2-C-9 *"Structural Optimization of BLDC Machine and its Control"*

Blohmann Miroslav[1], Karban Pavel[1], Dolezel Ivo[1]

1 - University of West Bohemia, Pilsen, Czech Republic

P2-C-10 *"Intrinsic Localized Mode Using Nonlinear Magnetic Springs"*

Lee Sanggook[1], Katsuhiro Hirata[1], Yusuke Doi[1], Noboru Niguchi[1], Masayuki Kato[1]
1 - Department of Adactive Machine Systems, Graduate School of Engineering, Osaka University, Japan

P2-C-11 *"Design optimisation of IPM machines considering the constant power range"*

Bruckschlögl Jonas[1], Germishuizen Johannes[2], Kremser Andreas[1]
1 - Technische Hochschule Nürnberg Georg Simon Ohm, Germany, 2 - Siemens Mobility GmbH, Germany

P2-C-12 *"A Method for Improving Torque Density in Fractional-slot Concentrated Winding PM Machines"*

Aimeng Wang[1], Yi Tian[1]
1 - North China Electric Power University, Baoding, China

P2-C-13 *"Impacts of Using Wide Bandgap Transistors on Electronics and Motors"*

Gerber Mathieu[1,2], Callerant Guillaume[3], Espanet Christophe[3], Meibody-Tabar Farid[4], Takorabet Noureddine[2]
1 - Moving Magnet Technologies, Besançon, France, 2 - Université de Lorraine, GREEN, France, 3 - Université de Franche Comté, FEMTO-ST, France, 4 - Université de Lorraine, LEMTA, France

P2-C-14 *"Assessement of viability of a low cost Three-level Boost Rectifier in harmonic mitigation"*

Ramos Gabriel[1], Luiz Alex-Sander[1], Stopa Marcelo[1]
1 - Federal University of São João del-Rei, Minas Gerais, Brazil

Notes:

09:45 — 10:45 Pannel Session: Optimal design – Metamaterials - 3D printing

Room: Auditorium 300

Session chair:
Di Barba Paolo (University of Pavia - Italy)

Abstract

Long-lasting developments in automated optimal design have made it possible to synthesize innovative devices; however, design uncertainties and fabrication tolerances dictated by old technologies might severely limit practical realizations. Recently, new technologies linked with additive printing put the ground for synthesizing new materials and prototyping tolerant-free samples.

Moving from this idea, the panel will address the main advances in the area of automated optimal design and will discuss new possibilities offered by 3D printing and additive manufacturing technology as well as various technologies for the fabrication of conductive layers in low and high frequency applications. The panel aims to provide a short overview and to stimulate a broad discussion by the audience.

Specifically, the format allows for short discussion by each panelist, followed by question/answer time from the audience.

Notes:

10:45 – 11:15 Coffee Break

11:15 — 13:00 Oral Session O3-A: Permanent Magnet Motors, Calculation and design

Room: Auditorium 300

Session chairs:
Kawase Yoshihiro (Gifu University - Japan)
Kazumi Kurihara (Ibaraki University - Japan)

O3-A-1 *"High Winding Factor Model of a Motor with Two Controllable Rotors"*
Suzuki Hironori[1], Hirata Katsuhiro[1], Niguchi Noboru[1], Kohara Akira[1]
1 - Osaka University, Osaka, Japan

O3-A-2 *"Electromagnetic study of segmented Permanent Magnet Synchronous Machines for Rim-Driven applications"*
Fleurot Eulalie[1], Charpentier Jean-Frédéric[1], Sculler Franck[1]
1 - Ecole navale, IRENav, France

O3-A-3 *"Optimal Sizing of Permanent Magnets with Non-Conventional Geometries in Synchronous Machines"*
Nobahari Amin[1], Vahedi Abolfazl[1], Takorabet Noureddine[2]
1 – Iran University of Science and Technology, Tehran, Iran, 2 - Université de Lorraine, GREEN, France

O3-A-4 *"Multi-Objectives Optimal Design of Ultra-Large Concentrated Flux Permanent Magnet Synchronous Generator for Direct-Drive Wind Turbine"*
Bensalah Amina[1], Barakat Georges[1], Amara Yacine[1], Benhamida Mohamed Ali[1], Al-Asmar Abed Al Kader[1]
1 - Université du Havre, GREAH, France

O3-A-5 *"Load Testing of Two Separate Rotor Axial Flux Permanent Magnet Motor"*
Siamak Omrani[1], Mizani Hamidreza[1]
1 - Shahrood University of Technology, Shahrood, Iran

Notes:

11:15 — 13:00 Oral Session O3-B: Optimization and Computer-Aided Design

Room: S105

Session chairs:
Messine Frédéric (INPT - LAPLACE - France)
Petkovska Lidija (Ss. Cyril and Methodius University, Macedonia)

O3-B-1 *"Investigation of Dimension Reduction Methods by Multi-Objective Optimization for Electromagnetic Device with GP"*
Sugimoto Ryoya[1], Kitagawa Wataru[1], Takeshita Takaharu[1]
1 - Nagoya Institute of Technology, Aichi, Japan

O3-B-2 *"Application of the Grey Wolf Algorithm for Optimization of PM Synchronous Motor"*
Knypinski Lukasz[1], Nowak Lech[1]
1 - Poznan University of Technology, Poznan, Poland

O3-B-3 *"WPT System Coupling Inductors: Exploring Pareto Optimal Solutions"*
Di Barba Paolo[1], Mognaschi Maria Evelina[1], Bertoluzzo Manuele[2], Forzan Michele[2], Sieni Elisabetta[3]
1 - University of Pavia, Italy, 2 - University of Padova, Italy, 3 - University of Insubria, Italy

O3-B-4 *"Metamaterial Unit Cell Characterization by Using a Multi-fidelity Surrogate Modelling Approach"*
Versaci Mario[1], Calcagno Salvatore[1], Angiulli Giovanni[1], Di Barba Paolo[2]
1 - Universita Mediterranea of Reggio Calabria, Reggio Calabria, Italy, 2 - University of Pavia, Italy

O3-B-5 *"Application of FPA to Identify Model and Parameters of DC-servo Motor"*
Kumpanya Danupon[1]
1 - Rajamangala University of Technology, Department of Electrical Engineering, Suvarnabhumi, Thailand

Notes:

11:15 — 13:00 Oral Session O3-C: SS. Electromagnetism in medicine and bioengineering

Room: S106

Session chairs:
Krawczyk Andrzej (Polish Society of Applied Electromagnetism - Poland)
Evelina Mognaschi Maria (University of Pavia, Italy)

O3-C-1 *"Applications of smart textiles in electromedicine"*
Krawczyk Andrzej[1], Korzeniewska Ewa[2]
1 - University of Economics and Innovations, Lublin, Poland, 2 - Lodz University of Technology, Lodz, Poland

O3-C-2 *"Importance of examinations with the use of MRI in the proper neurological diagnosis - case study"*
Gniadek-Olejniczak Katarzyna[1], Mróz Józef[1], Tomczykiewicz Kazimierz[2], Patoka Zofia[3], Kujaczynski Marian[4]
1 - Rehabilitation Clinic with Neurological Branch, Military Institute of Medicine, Warsaw, Poland, 2 - Józef Pilsudski University of Physical Education, Warsaw, Poland, 3 - Vistula University, Faculty of International Relations, Warsaw, Poland, 4 - University of Warsaw, Poland

O3-C-3 *"Numerical models for designing ECT applications"*
Di Barba Paolo[1], Mognaschi Maria Evelina[1], Forzan Michele[2], Sgarbossa Paolo[2], Sieni Elisabetta[3]
1 - University of Pavia, Italy, 2 - University of Padova, Italy, 3 - University of Insubria, Italy

O3-C-4 *"Noninvasive Blood Flow Velocity Determination"*
Mateev Valentin[1], Marinova Iliana[1]
1 - Technical University of Sofia, Bulgaria

O3-C-5 *"FEM Modelling of Heat Effects in Cellular Materials under the Application of Electric Fields"*
Iatcheva Ilona[1], Saykova Ilonka[1]
1 - Technical University of Sofia, Bulgaria

Notes:

13:00 - 14:30 Lunch

14:30 — 16:15 Oral Session O4-A: Field theory and advanced computation in electromagnetism

Room: Auditorium 300

Session chairs:
Meunier Gérard (Université Grenoble Alpes - G2ELab - France)
Kawase Yoshihiro (Gifu University, Japan)

O4-A-1 *"3D Finite Element Model using SIBC to Accelerate Electromagnetic Thermal Simulation of Induction Thermography Technique"*
Ba Abdoulaye[1], Bui Huu Kien[1], Berthiau Gerard[1], Trichet Didier[1], Wasselynck Guillaume[1]
1 - Université de Nantes, IREENA, France

O4-A-2 *"Two-way coupling of Thin Shell Finite Element Magnetic Models via an Iterative Subproblem Method"*
Dang Quoc Vuong[1], Geuzaine Christophe[2]
1 - University of Science and Technology, Hanoï, Vietnam, 2 - Université de Liège, Belgium

O4-A-3 *"Electric Field Model at Interfaces in High Voltage Cable Systems"*
Jörgens Christoph[1], Clemens Markus[1]
1 - University of Wuppertal, Germany

O4-A-4 *"Modeling and calculation of the electrical discharge fractal dimension in the presence of a vertical rod"*
Bouazabia Slimane[1], Djazia Khelil[1]
1 - Université des Sciences et Technologies Houari Boumediene, Bab Ezzouar, Algeria

O4-A-5 *"Inhomogeneous dielectrics: alternative models involving the Hilbert transform"*
Costamagna Eugenio[1], Costa Stefano[1]
1 - University of Pavia, Italy

Notes:

14:30 — 16:15 Oral Session O4-B: Sensors - Actuators - MEMS – Modelling and design optimization

Room: S105

Session chairs:
Hameyer Kay (RWTH Aachen University - Germany)
Tounzi Abdelmounaïm (Laboratoire d'Electrotechnique et d'Electronique de Puissance - France)

O4-B-1 *"Design of a Test Station for Magnetoelectric Sensor Development"*
Maximilian Krey[1], Toepfer Hannes[1], Paris Roman[2], Froehlich Thomas[1]
1 - Technische Universität Ilmenau, Germany, 2 - IMMS GmbH, Ilmenau, Germany

O4-B-2 *"Design and Analysis of Serial/Parallel Type of Electromagnetic Actuator"*
Takei Kenta[1], Kitagawa Wataru[1], Takeshita Takaharu[1], Yoshio Fujimura[2]
1 - Nagoya Institute of Technology, Aichi, Japan, 2 - Wako engineering corporation LTD, Gifu, Japan

O4-B-3 *"Model of Self-Sensing Microactuator with Embedded Sensor and its Control"*
Petrásová Iveta[1], Karban Pavel[1], Pánek David[1], Dolezel Ivo[1]
1 - University of West Bohemia, Pilsen, Czech Republic

O4-B-4 *"Magnetic Elastomer Sensor for Dynamic Torque"*
Mateev Valentin[1], Marinova Iliana[1]
1 - Technical University of Sofia, Bulgaria

O4-B-5 *"Experimental Verification of Three-Degree-of-Freedom Electromagnetic Actuator for Image Stabilization"*
Heya Akira[1], Hirata Katsuhiro[1]
1 - Osaka University, Osaka, Japan

Notes:

14:30 — 16:15 Oral Session O4-C: SS. Noise and Vibration in Electrical Machines and Transformers

Room: S106

Session chairs:
Lecointe Jean-Philippe (Université d'Artois - LSEE - France)
Witczak Pawel (Lodz University of Technology - Poland)

O4-C-1 *"Vibrations reduction of PMSM through physical and geometrical parameters combination"*
Ferkha Nassira[1], Ferkha Ahsene[1], Tarik Hacib[1], Djerdir Abdesslem[2], Mekideche Mohamed Rachid[1]
1 - Université de Jijel, L2EI, Algeria, 2 - Université de Technologie de Belfort-Montbéliard, SET, France

O4-C-2 *"Magneto-vibro-acoustic Design of PWM-fed Induction Machines"*
Zidat Farid[1], Bauw Grégory[2], Cassoret Bertrand[2], Guffroy Thomas[1]
1 - Altair Engineering, France, 2 - Université d'Artois, LSEE, France

O4-C-3 *"Attenuation of vibro-acoustic noise in a multi-phase machine"*
Mohamodhosen Bilquis[1], Despret Ghislain[1], Hecquet Michel[1]
1 - Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France

O4-C-4 *"Magnetizing core design of permanent magnet for pole order noise reduction of BLDC motor"*
Waheed Abdul[1], Hwang Taeseok[2], Cho Yun Hyun[1]
1 - Dong-A University, South Korea, 2 - Hyoseong Electric corporation LTD, South Korea

O4-C-5 *"Vibration of small induction motor used in household appliances"*
Witczak Pawel[1]
1 - Lodz University of Technology, Lodz, Poland

Notes:

16:15 – 16:45 Coffee Break

16:45 — 17:15 Software Provider SP1: ALTAIR Engineering France

Room: Auditorium 300

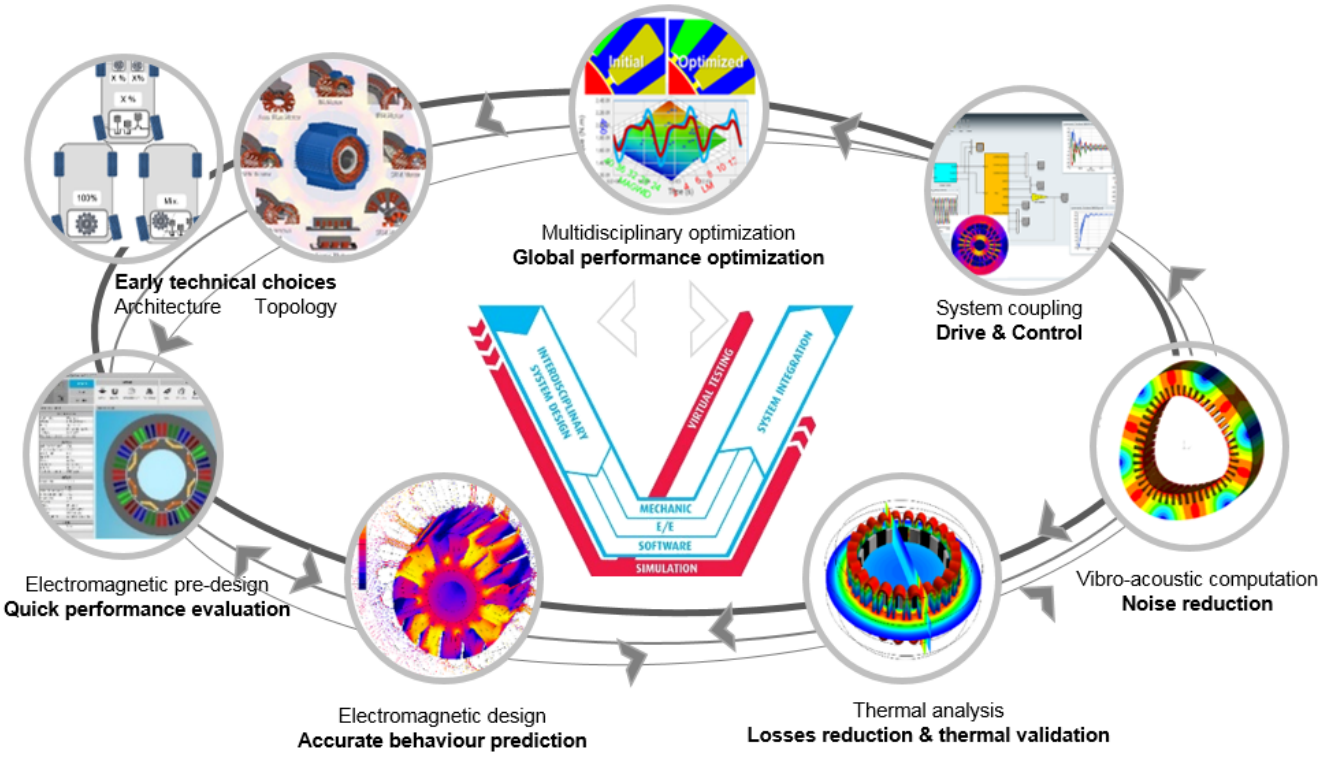
Session chairs
Netter Denis (Université de Lorraine - GREEN - France)

SP-1 " Simulation Driven Design of Electrical Rotating Machines"

Phd – Ing. Farid ZIDAT [1]
1 – Senior Application Engineer – ALTAIR Engineering France

Abstract

Electrification, e-mobility and energy efficiency bring new challenges for the design of electric machines. New methodologies are then proposed to make relevant choices in the early stage of the design, based on numerical simulation and optimization techniques. In the concept phase, fast evaluations are used to be able to look at several configurations. A machine topology is then selected and its performance is evaluated and maximized. Another key point is to get an accurate evaluation of the losses in the various parts of the motor. A more detailed analysis is then performed in order to optimize the machine and look at thermal and mechanical constraints in the meantime.



16:45 — 17:15 Software Provider SP2: BROCKHAUS Measurements

Room: S105

Session chairs
Babak Nahidmobarakeh (Université de Lorraine - GREEN - France)

SP-2 *" Measurement Technologies for Advanced Characterization of Magnetic Materials Used in Electric Drives and Automotive Applications"*

Lukasz Mierczak[1]
1 - Brockhaus Messtechnik GmbH & Co. KG, Lüdenscheid, Germany

Abstract

Due to the high complexity of the magnetization in electrical machines and influence of the manufacturing processes on the magnetic properties of their components, the assessment and prediction of power losses has remained a challenge. In the design stage of electric motors and generators the power losses of stators and rotors are calculated based on the material supplier's data from standard magnetic measurements. This type of data does not include the additional loss from non-sinusoidal multi-harmonic motor excitation, rotational magnetization nor the detrimental effects of residual stress remaining in the motor laminations after manufacturing processes, such as punching, housing shrink fitting and winding. Moreover, in production a considerable attention is given to the measurements of mechanical dimensions of stator and rotor cores, whereas verification of their magnetic properties is typically neglected, which can lead to inconsistent efficiency of assembled motors. Therefore, to enable a comprehensive characterization of motor materials and components, Brockhaus Measurements developed a range of in-line and offline measurement technologies for testing their magnetic properties under actual motor operating conditions. In this presentation, the experimental data obtained from case studies on the influence residual stress and arbitrary magnetization on the magnetic properties of stators and samples made of different grades of non-oriented steel will be discussed.

16:45 — 17:15 Software Provider SP3 EOMYS Engineering

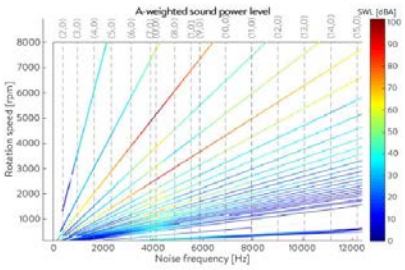
Room: S106

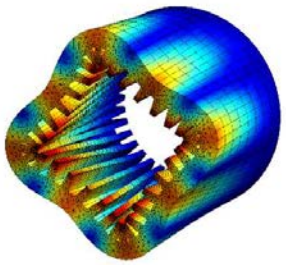
Session chairs
Lubin Thierry (Université de Lorraine - GREEN - France)

SP-3 " EOMYS Engineering, Noise, Vibration, Harshness (NVH) expertise of electrical systems"
Le Besnerais Jean [1]
1 – EOMYS Engineering, Lille, France

EOMYS ENGINEERING

Noise, Vibration, Harshness (NVH) expertise of electrical systems





17:15 — 18:30 Poster Session P3-A: Electromagnetism - Modelling - Simulation – Visualization

Room: Foyer 300

Session chairs:
Komeza Krzysztof (Lodz University of Technology - Poland)
Roger Daniel (Université d'Artois - LSEE - France)

P3-A-1 *"Effect of selected parameters of numerical model on calculation magnetostriction deformation in BLDC motor"*
Podhajecki Jerzy[1], Rawicki Stanislaw[1]
1 - The Jacob of Paradies University, Poland

P3-A-2 *"Numerical treatment of electrostatic contour value problem in heterogeneous media using local differential quadrature method"*
Peixoto De Faria José Geraldo[1], Márcio Matias Afonso[1], Rogério Da Silva João[2]
1 - Federal University of São João del-Rei, Minas Gerais, Brazil, 2 – Federal University of Acre, Rio Branco, Brazil

P3-A-3 *"Coupled Systems and Finite Element Analysis: A Novel Direct Resolution Method"*
Boutora Youcef[1], Takorabet Noureddine[2]
1 - Université Mouloud Mammeri, Tizi Ouzou, Algeria, 2 - Université de Lorraine, GREEN, France

P3-A-4 *"Experimental set up for magneto mechanical measurements with a close flux path sample"*
El Youssef Mohamad[1,2], Van Gorp Adrien[1], Clenet Stéphane[2], Benabou Abdelkader[2], Mipo Jean-Claude[3], Faverolle Pierre[3]
1 - Arts & Metiers ParisTech, Lille, France, 2 - Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France, 3 - Valeo Equipements Electriques, France

P3-A-5 *"Improved 3D Electromagnetic Analytical Model for Translational Motion Induction Heater with Consideration of Finite Length Effects"*
Hadjout Larbi[1], Messadi Mohammed[1], Ouazir Youcef[1], Bensaidane Hakim[1], Takorabet Noureddine[2], Lubin Thierry[2], Mezani Smaïl[2]
1 - Université des Sciences et Technologies Houari Boumediene, Bab Ezzouar, Algeria, 2 - Université de Lorraine, GREEN, France

P3-A-6 *"Lightning Over-voltages in Nuclear Power Plants"*
Gurbuz Ismet Tuna[1], Lehtonen Matti[1], Belahcen Anouar[1]
1 - Aalto University, Finland

P3-A-7 *"FEM using projection of physical properties suitable for movement modeling and optimization processes."*
Ristagno Baptiste[1,2], Giraud Dominique[1,2], Fontchastagner Julien[2], Netter Denis[2], Takorabet Noureddine[2], Devornique Geoffrey[1], Labbe Nicolas[1]
1 - Valeo Equipements Electriques, France, 2 - Université de Lorraine, GREEN, France

P3-A-8 *"Machine Learning in Magnetic Field Calculations"*
Mateev Valentin[1], Marinova Iliana[1]
1 - Technical University of Sofia, Bulgaria

P3-A-9 *"Analysis and Monitoring of Flood Embankments Through Image Reconstruction Based on Electrical Impedance Tomography"*

Rymarczyk Tomasz[1], Tchórzewski Pawel[1], Sikora Jan[1], Adamkiewicz Przemyslaw[1], Niderla Konrad[1]
1 - University of Economics and Innovations, Lublin, Poland

P3-A-10 *"Meshless Local Radial Point Interpolation Method for Electromagnetic Devices Modeling"*

Coppoli Eduardo Henrique[1], Ramdane Brahim[2], Marechal Yves[2], Márcio Matias Afonso[1]
1 - Federal University of São João del-Rei, Minas Gerais, Brazil, 2 - Université de Grenoble Alpes, G2ELab, France

P3-A-11 *"Development of Virtual Mechatronics Laboratory"*

Kaminska Dorota[1], Firych-Nowacka Anna[1], Lefik Marcin[1], Zwolinski Grzegorz[1], Wiak Slawomir[1], Petkovska Lidija[2], Cvetkovski Goga[2], Di Barba Paolo[3], Mognaschi Maria Evelina[3], Anbarjafari Gholamreza[4]
1 - Lodz University of Technology, Lodz, Poland, 2 - Ss. Cyril and Methodius University, Faculty of Electrical Engineering and Information Technologies, Skopje, Macedonia, 3 - University of Pavia, Italy, 4 - Tartu Ulikool, Tartu, Estonia

P3-A-12 *"3-D Adaptive Finite Element Analysis with Weighted Node Density Technique"*

Yamaguchi Tadashi[1], Kawase Yoshihiro[1], Ishimura Shota[1]
1 - Gifu University, Japan

P3-A-13 *"The Effect of Inductive Gain Peaking on a Photodetector's Bandwidth"*

Pereira Jorge[1]
1 - Institute of telecomunications, Lisbon, Portugal

P3-A-14 *"BEM-FEM formulation based on magnetic vector and scalar potentials for eddy current problems"*

Phan Quang Anh[1], Meunier Gérard[1], Chadebec Olivier[1], Guichon Jean Michel[1], Bannwarth Bertrand[1]
1 - Université de Grenoble Alpes, G2ELab, France

Notes:

17:15 — 18:30 Poster Session P3-B: Induction machines – Sensors - Actuators

Room: Foyer 850

Session chairs:
Kurihara Kazumi (Ibaraki University - Japan)
Netter Denis (Université de Lorraine – France)

P3-B-1 *"Core losses of the induction motor operating in a wide frequency range supplied from the inverter"*
Dems Maria[1], Komeza Krzysztof[1], Majer Krzysztof[1]
1 - Lodz University of Technology, Lodz, Poland

P3-B-2 *"Investigation of high frequency loss in electrical machine lamination considering skin effect and hysteresis"*
Komeza Krzysztof[1], Dems Maria[1], Lecointe Jean-Philippe[2]
1 - Lodz University of Technology, Lodz, Poland, 2 - Université d'Artois, LSEE, France

P3-B-3 *"Performance characteristics of single-phase self excited induction generators with an iron core of various non-grain oriented electrical sheets"*
Makowski Krzysztof[1], Leicht Aleksander[1]
1 - University of Science and Technology, Wroclaw, Poland

P3-B-4 *"Thermal investigation of Three-Phase Induction Motors with an Integrated Open-Phase Fault Operation Using a Lumped Parameter Thermal Network (LPTN)"*
Bouheraoua Mustapha[1], Atig Mahdi[1], Khaldi Rabah[1]
1 - Université Mouloud Mammeri, Tizi Ouzou, Algeria

P3-B-5 *"Contribution of new electrical materials to the design of large induction motors"*
Balavoine François[1], Demian Cristian[1], Cassoret Bertrand[1], Romary Raphaël[1], Debendere Christophe[2]
1 - Université d'Artois, LSEE, France, 2 - Flipo Richir, Seclin, France

P3-B-6 *"Comparison of two passive solutions for noise reduction of PWM-fed induction machines"*
Balavoine François[1], Bauw Grégory[1], Romary Raphaël[1], Cassoret Bertrand[1]
1 - Université d'Artois, LSEE, France

P3-B-7 *"A Magnetic Field Imaging System for Switching Arc diagnosis of Low-Voltage Switchgear"*
Reil Christian[1], Meier Matthias[1], Schmidt Hans-Peter[1]
1 - Technical University of applied sciences, OTH Regensburg, Germany

P3-B-8 *"A Novel Multi Axis Inductive Displacement Sensor"*
Tomruk Yunus Emre[1], Guney Omer Faruk[1], Erkan Kadir[1]
1 - Yildiz Technical University, Turkey

P3-B-9 *"Optimal Shape Design of Microchannel H-Cell"*
Mociran Bogdan[1], Topa Vasile[1], Oglejan Raluca[1]
1 - Technical University of Cluj-Napoca, Romania

P3-B-10 *"Robotic notation approach to energy harvesting system from tidal energy"*
Bijak Joanna[1], Trawinski Tomasz[1], Szczygiel Marcin[1]
1 - Silesian University of Technology, Poland

P3-B-11 *"Motion Control of Two Degree of Freedom Linear Resonant Actuator without Mechanical Spring"*

Kim Gyunam[1], Hirata Katsuhiro[1]
1 - Osaka University, Osaka, Japan

P3-B-12 *"Solid Rotor Construction Optimization"*

Kruchinina Irina[1], Boguslavskiy Ilya[1], Khozikov Yuvenaliy[1], Lyubimtzev Alexandr[1]
1 - Institute of Silicate Chemistry of the Russian Academy of Sciences, St. Petersburg, Russia

P3-B-13 *"Operation of air core current transducers in the presence of strong interfering magnetic fields"*

Lisowiec Aleksander[1], Nowakowski Andrzej[1], Kowalski Grzegorz[1]
1 - Tele and Radio Research Institute, Poland

P3-B-14 *"Design of a Solenoid Based Prototype Injector for Evaluation of Electromagnetic Parameters"*

Yagci Ayhan[1], Qureshi Muhammad Sarmad[1], Küntüz Mehmet Polat[1], Bebek Özkan[1]
1 - Özyegin University, Department of Mechanical Engineering, Istanbul, Turkey

P3-B-15 *"Electromagnetically excited torsional vibration to rock drilling support"*

Trawinski Tomasz[1], Szczygiel Marcin[1], Arkadiusz Tomas[1]
1 - Silesian University of Technology, Poland

Notes:

17:15 — 18:30 Poster Session P3-C: Design and computation of specific electromagnetic devices

Room: Foyer 850

Session chairs:
Lefèvre Yvan (LAPLACE CNRS, France)
Cvetkovski Goga (Ss. Cyril and Methodius University, Macedonia)

P3-C-1 *"Multiphysics Analysis of a Hybrid Suspension System for Middle-Low-Speed Maglev Trains"*
Guoqing Liu[1], Song Xiao[1], Yang Rao[1], Jingchi Wu[1], Yuanpei Luo[1], Can Zhang[1], Sykulski Jan[2]
1 - Southwest Jiaotong University, China, 2 - University of Southampton, United Kingdom

P3-C-2 *"Realizing and Experimentally Testing a Reluctance-Based Magnetic Lead Screw"*
Cirolini Mateus[1], Ferreira Flores Filho Ály[1], Dalla Corte Franchi Lucas[1], Eckert Paulo Roberto[1]
1 - Federal University of Rio Grande do Sul, Brazil

P3-C-3 *"Fundamental Study on Eddy Current Brake of Using A Three Phase AC Excitation Method"*
Sato Norihiro[1], Kikuchi Yoshimi[1], Sumi Taichiro[1], Wakiwaka Hiroyuki[1], Sonehara Makoto[1], Sato Toshiro[1]
1 - Shinshu University, Nagano, Japan

P3-C-4 *"Study on Fluid Density and Particle Size in Multi-Disc Magnetorheological Fluid Brakes for Medium Size Aircraft"*
Sumi Taichiro[1], Kikuchi Yoshimi[1], Sato Norihiro[1], Wakiwaka Hiroyuki[1], Sonehara Makoto[1], Toshiro Sato[1]
1 - Shinshu University, Nagano, Japan

P3-C-5 *"Calculation of Voltage and Current for FDTD Method in Cylindrical Geometries with Cubic Cells"*
Castro Jean Cesar[1], Gonçalves Sandro[1], Menezes Gustavo[1]
1 - Federal Center of Technological Education, Minas Gerais, Brazil

P3-C-6 *"Magnetic characteristisation method of high temperature bulk superconductors"*
Douine Bruno[1]
1 - Université de Lorraine, GREEN, France

P3-C-7 *"Influence of PWM drive grounding connections on voltage stresses endured by the motor insulation"*
Npaieralska Ewa[1], Roger Daniel[1]
1 - Université d'Artois, LSEE, France

P3-C-8 *"Modelling of Hybrid System with Magnetic Flux Modulation with Different Input Coils"*
Balabozov Iosko[1], Yatchev Ivan[1], Hadzhiev Ivan[1]
1 - Technical University of Sofia, Bulgaria

P3-C-9 *"Study the Impact of Superconducting Fault Current Limiter in Multi-terminal DC Grid"*
Ayachi Amor Yacine[1], Didier Gaetan[2], Hamoudi Farid[1]
1 - Université de Béjaïa, Algeria, 2 - Université de Lorraine, GREEN, France

P3-C-10 *"Railgun module of the hybrid electromagnetic launcher - determination of a rails deformation"*
Domin Jaroslaw[1]
1 - Silesian University of Technology, Poland

P3-C-11 *"Thermal measurements of the drive with a switched reluctance motor with a magnetic circuit made of soft magnetic composites"*

Przybylski Marek[1], Slusarek Barbara[1], Di Barba Paolo[2], Mognaschi Maria Evelina[2], Wiak Slawomir[3]
1 - Tele and Radio Research Institute, Poland, 2 - University of Pavia, Italy, 3 - Lodz University of Technology, Lodz, Poland

P3-C-12 *"Analysis of Eddy Current Effect on Attraction Force of Magnetic Bearings and High Speed Rotor"*

Guney Omer Faruk[1], Erkan Kadir[1]
1 - Yildiz Technical University, Turkey

P3-C-13 *"A Tunable Negative Stiffness Actuator for High-Static-Low-Dynamic Stiffness Isolator"*

Insung Choi[1], Katsuhiro Hirata[1], Noboru Niguchi[1]
1 - Department of Adactive Machine Systems, Graduate School of Engineering, Osaka University, Japan

P3-C-14 *"Numerical Analysis and Experimental Study of the Thermal Field in a Power Distribution Block"*

Hadzhiev Ivan[1], Malamov Dian[1], Balabozov Iosko[1], Yatchev Ivan[1]
1 - Technical University of Sofia, Bulgaria

18:45 – 19:45 City Tour

20:00 — 23:00 Gala Dinner
Prouvé Congress Center – Receptive Area (4th Floor)

09:00 — 10:15 Poster Session P4-A: Optimization and Computer-Aided Design

Room: Foyer 300

Session chairs:
Hecquet Michel (Laboratoire d'Electrotechnique et d'Electronique de Puissance - France)
Fontchastagner Julien (Université de Lorraine – France)

P4-A-1 *"Optimization of Rotor Structure for Synchronous Reluctance Motor Using Coupled Topology Optimization Based on Electromagnetic Field Analysis and Structural Mechanics"*
Sawada Hiroyuki[1], Suzuki Reiya[1], Okamoto Yoshifumi[1], Wakao Shinji[2]
1 - Hosei University, Japan, 2 - Waseda University, Japan

P4-A-2 *"Design Optimization of Magnetic Material Distribution by Using Encoder-Decoder with Additive Mixing for Design Conditions"*
Kawamata Rytoa[1], Wakao Shinji[1], Murata Noboru[1], Okamoto Yoshifumi[2]
1 - Waseda University, Japan, 2 - Hosei University, Japan

P4-A-3 *"Topology Optimization to Design a Hall-effect Thruster and Optimize its Energy Consumption"*
Youness Rtimi[1], Messine Frédéric[1]
1 - INPT, LAPLACE-CNRS, Toulouse, France

P4-A-4 *"Application of selected optimization algorithms for determining the shortest path for mobile robot"*
Kielan Pawel[1], Miroslaw Wieczerek[1]
1 - Silesian University of Technology, Poland

P4-A-5 *"Winding Design Method by Optimization of MMF harmonic content"*
Marault Jérôme[1], Gillon Frédéric[1], Hecquet Michel[1], Tounzi Abdelmounaïm[1]
1 - Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France

P4-A-6 *"Topology Optimisation of a Salient Pole Synchronous Generator"*
Tounzi Abdelmounaïm[1], Mohamodhosen Bilquis[1], Gillon Frédéric[1]
1 - Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France

P4-A-7 *"Optimum Design Evaluation and Experiment of PMA-SynRM for Power Improvement"*
Young Hyun Kim[1], Qian Yan[1], Jung Ho Lee[1]
1 - Hanbat National University, South Korea

P4-A-8 *"Application of Meta-Heuristic Algorithms for Optimal Design of Switched Reluctance Motor"*
Belli Zoubida[1]
1 - Université de Jijel, L2EI, Algeria

P4-A-9 *"Original optimization procedure of Halbach Permanent Magnet Segmented Array"*
Touhami Sarah[1], Lefèvre Yvan[1], Llibre Jean-François[1]
1 - INPT, LAPLACE-CNRS, Toulouse, France

P4-A-10 *"Shape collector optimization for electrospinning process by analysis electrostatic fields"*

Smólka Krzysztof[1], Firych-Nowacka Anna[1]
1 - Lodz University of Technology, Lodz, Poland

P4-A-11 *"New Arrangements of Overhead Power Line Phase Conductors Achieved by Multiobjective Non Dominated Sorting Evolutionary Method"*

Paganotti André Luiz[1], Márcio Matias Afonso[1], Ribeiro Gustavo Ciro[1], Schroeder Marco Aurélio De Oliveira[1], Saldanha Rodney Rezende[1]
1 - Federal University of São João del-Rei, Minas Gerais, Brazil

P4-A-12 *"Decision Making in Transmission Line Multiobjective Optimization with SMARTS"*

Resende Paula[1], Márcio Matias Afonso[1], Schroeder Marco Aurélio De Oliveira[1]
1 - Federal University of São João del-Rei, Minas Gerais, Brazil

P4-A-13 *"A Neural Network and NSGA-II Based Multi-objective Optimization Design Method for Permanent Magnet Synchronous Machine"*

Zheng Yinzhao[1], Ma Yiming[1], Zhou Libing[1], Wang Jin[1]
1 - State Key Laboratory of Advanced Electromagnetic Engineering and Technology, School of Electrical and Electronic Engineering, Huazhong University of Science and Technology, China

Notes:

09:00 — 10:15 Poster Session P4-B: Permanent magnet motors - Calculation and design

Room: Foyer 850

Session chairs:

Yamaguchi Tadashi (Gifu University - Japan)

Barakat Georges (Université du Havre, GREAH, France)

P4-B-1 *"Analysis and Study on the Performance of Unequal Tooth Width for Outer Rotor Permanent Magnet Machine"*

Aimeng Wang[1], Mengyuan Li[1]

1 - North China Electric Power University, Baoding, China

P4-B-2 *"Design of Radially-Differential Type Magnetic Harmonic Geared Motor"*

Takahara Kazuaki[1], Hirata Katsuhiro[1], Niguchi Noboru[1], Suzuki Hironori[1], Kamigaki Tsubasa[1], Ukaji Hajime[2]

1 - Osaka University, Osaka, Japan, 2 - Panasonic Corporation, Japan

P4-B-3 *"Design and Construction of IPM Synchronous Motor with Magnetic and Mechanical Stress Analysis"*

Chaithongsuk Sisuda[1], Takorabet Noureddine[2], Rahouadj Rachid[3]

1 - Rajamangala University of Technology, Department of Electrical Engineering, Suvarnabhumi, Thailand, 2 - Université de Lorraine, GREEN, France, 3 - Université de Lorraine, LEM3, France

P4-B-4 *"Demagnetization Modelling of RWAFPM Motor using Magnetic Equivalent Circuit"*

Mahmouditabar Farshid[1], Vahedi Abolfazl[1], Ojaghlu Pourya[1], Takorabet Noureddine[2], Nobahari Amin[1]

1 - University of Science and Technology, Tehran, Iran, 2 - Université de Lorraine, GREEN, France

P4-B-5 *"The Effect of Asymmetric Rotor Pole Shape for the Reduction of Torque Ripple"*

Krueger Robin[1], Werner Quentin[1]

1 - Daimler AG, Stuttgart, Germany

P4-B-6 *"Stator core shape design for low core loss and high power density of a small SPM motor"*

Soda Naoya[1], Enokizono Masato[2]

1 - Ibaraki University, Hitachi, Japan, 2 - Vector Magnetic Characteristic Technical Laboratory, Oita, Japan

P4-B-7 *"A Three-Phase PM Generator with Double Rotors for Low-Head Hydropower"*

Naoe Nobuyuki[1], Imazawa Akio[1]

1 - International College of Technology, Kanazawa, Japan

P4-B-8 *"Wind Power Forecasting Using a New and Robust Hybrid Metaheuristic Approach: A Case Study Considering Different Locations"*

Kerem Alper[1], Saygin Ali[1], Rahmani Rasoul[2]

1 - Gazi University, Turkey, 2 - Swinburne University of Technology, Australia

P4-B-9 *"A New Predictive Torque Control Approach Using Space Vector Modulation for PMSM Drive"*

Aberkane Hesna[1], Sakri Djamel[1], Rahem Djamel[1]

1 - Université d'Oum El bouaghi, LGEA, Algeria

P4-B-10 *"Improved Sliding Mode Control of FSCW PM Machine for Electric Vehicle Application"*

Aimeng Wang[1], Shengjun Wei[1]

1 - North China Electric Power University, Baoding, China

P4-B-11 *"Characterization of rotor losses in High Speed Permanent Magnet Synchronous Machines"*

Caunes Antomne[1], Chaithongsuk Sisuda[2], Takorabet Noureddine[1], Duranton Laurent[3]
1 - Université de Lorraine, GREEN, France, 2 - Rajamangala University of Technology, Department of Electrical Engineering, Suvarnabhumi, Thailand, 3 – Artus, Meggitt Group, Avrillé, France

P4-B-12 *"Comparison Between Analytic and Finite Element Method for Double Star Permanent Magnet Synchronous Machine Under IGBT Short-Circuit"*

Al-Asmar Abed Al Kader[1], Barakat Georges[1], Chabour Ferhat[1], Amara Yacine[1], Bensalah Amina[1]
1 – Université du Havre, GREAH, France

P4-B-13 *"Contribution on AC bar windings losses reduction for a high frequency and high performance machine for aeronautical application"*

Piscini Lorenzo[1], Matt Daniel[2], Anthony Gimeno[1], Nadhem Boubaker[3]
1 - Safran Tech, Institut d'Electronique et des Systèmes, Paris Saclay, France, 2 - Institute of Electronics and Systems, University of Montpellier, France, 3 - Safran Electrical & Power UK, Pitstone Green, United-Kingdom

Notes:

09:00 — 10:15 Poster Session P4-C: Design and computation of specific electromagnetic devices

Room: Foyer 850

Session chairs:
Yatchev Ivan (Technical University of Sofia, Bulgaria)
Ferreira Flores Filho Ály (Universidade Federal do Rio Grande do Sul, Brazil)

P4-C-1 *"Analysis of electromagnetic transducers by means of multi-branch equivalent circuit"*
Kurzawa Milena[1], Wojciechowski Rafal M.[1], Jedryczka Cezary[1]
1 - Poznan University of Technology, Poznan, Poland

P4-C-2 *"Single-Phase Induced Pole Line Start Permanent Magnet Synchronous Motor"*
Gwozdziewicz Maciej[1]
1 - University of Science and Technology, Wroclaw, Poland

P4-C-3 *"Maximum Torque Control of Magnetic-Geared Motors"*
Suzuki Hironori[1], Hirata Katsuhiro[1], Niguchi Noboru[1], Kohara Akira[1], Takahara Kazuaki[1]
1 - Osaka University, Osaka, Japan

P4-C-4 *"Application of Cross-Recurrence plot on the diagnostic of high voltage insulator"*
Maadjoudj Djamal[1], Mekhaldi Abdelouahab[1], Teguar Madjid[1], Benmahamed Youcef[1]
1 - Ecole Nationale Polytechnique d'Alger, LDCCP, Algeria

P4-C-5 *"Analytical modeling of a coil in a ferromagnetic circuit including a superconductor pellet"*
Elbaa Mohamed[1,2], Berger Kevin[1], Douine Bruno[1], Halit Mohamed[3], Elhadj Ailam[2]
1 - Université de Lorraine, GREEN, France, 2 - Université de Khemis Miliana, LESI, Algeria, 3 - Université de Laghouat, LPM, Algeria

P4-C-6 *"Proposal of 3-Degree-of-Freedom Spherical Actuator with Auxiliary Poles"*
Takahara Kazuaki[1], Hirata Katsuhiro[1], Niguchi Noboru[1], Amazutsumi Tomoya[1]
1 - Osaka University, Osaka, Japan

P4-C-7 *"Comparison of Dynamic Properties of Selected Railgun Constructions"*
Waindok Andrzej[1], Piekielny Pawel[1]
1 - University of Technology, Opole, Poland

P4-C-8 *"A Dynamic Simulation Model of a Hybrid Magnetic Bearing"*
Wajnert Dawid[1], Sykulski Jan[2], Tomczuk Bronislaw[1]
1 - University of Technology, Opole, Poland, 2 - University of Southampton, United Kingdom

P4-C-9 *"Edge Effect of Multi-degree-of-freedom Oscillatory Actuator Driven by Vector Control"*
Kato Masayuki[1], Hirata Katsuhiro[1], Mototsuji Tomoaki[1], Heya Akira[1]
1 - Osaka University, Osaka, Japan

P4-C-10 *"Investigation of Influence of Caulking on Various Characteristics of High-speed Motor"*
Kawase Yoshihiro[1], Yamaguchi Tadashi[1], Ito Ryo[1]
1 - Gifu University, Japan

P4-C-11 *"Nonlinear transient finite element analysis of grounding systems"*
Trlep Mladen[1], Jesenik Marko[1], Bekovic Milos[1], Hamler Anton[1]
1 - University of Maribor, Faculty of Electrical Engineering and Computer Science, Slovenia

P4-C-12 *"Evaluation of voltage transformer operation during supply of distorted voltage based on 3-D field analysis"*

Lesniewska Elzbieta[1], Kaczmarek Michal[1], Stano Ernest[1]
1 - Lodz University of Technology, Lodz, Poland

P4-C-13 *"Optimal Energy Control applied to an Hybrid Stepper Motor"*

Bêkir Wissem[1,2], El Amraoui Lilia[2], Gillon Frédéric[1]
1 - Laboratoire d'électrotechnique et d'électronique de puissance, Lille, France, 2 - Université de Carthage, Research Laboratory Smart Electricity & ICT, Tunis, Tunisia

P4-C-14 *"Multiphysics Analysis of a Novel Circular Pantograph Catenary System for High-speed Trains"*

Xiao Song[1], Rao Yang[1], Luo Yuanpei[1], Zhang Can[1], Wu Jingchi[1], Sykulski Jan[2]
1 - Southwest Jiaotong University, China, 2 - University of Southampton, United Kingdom

Notes:

10:15 — 10:45 Invited Lecture: Gmsh: Past - Present and Future

Room: Auditorium 300

Session chairs:
Wiak Slawomir (Lodz University of Technology - Poland)

IL3 ***"Gmsh: Past - Present and Future"***

Geuzaine Christophe[1]
1 - Université de Liège, Belgium

Abstract:

Gmsh is an open source finite element mesh generator with built-in pre- and post-processing facilities. Under continuous development for the last two decades, it has become the de facto standard for open source finite element mesh generation, with a large user community in both academia and industry.
In this talk, I will present an overview of Gmsh, and highlight recent developments including the support for constructive solid geometry, new robust and parallel meshing algorithms, flexible solver integration and a new multi-language Application Programming Interface. Time permitting I will also present an overview of current research directions for meshing based on the solution of partial differential equations: from surface remeshing to frame-based hex-meshing.

10:45 – 11:15 Coffee Break

11:15 — 13:00 Oral Session O5-A: Design and computation of special machines

Room: Auditorium 300

Session chairs:
Di Barba Paolo (University of Pavia, Italy)
Sykulski Jan (University Southmapton - UK)

O5-A-1 *"Design considerations of superconducting armature winding in PM-excited AC machines"*
Lasek Pawel[1], Habelok Krzysztof[1], Stepien Mariusz[1]
1 - Silesian University of Technology, Poland

O5-A-2 *"Design of a Superconducting System for Aeronautics"*
Colle Alexandre[1,2], Ayat Sabrina[2], Gosselin Olivier[2], Lévêque Jean[1], Lubin Thierry[1]
1 - Université de Lorraine, GREEN, France, 2 - Safran Tech, Institut d'Electronique et des Systèmes, Paris Saclay, France

O5-A-3 *"Torque Study of a Fully HTS Synchronous Reluctance Motor Design"*
Bouchekhou Hocine[1], Mekideche Mohamed Rachid[1], Lévêque Jean[2], Belli Zoubida[1]
1 - Université de Jijel, L2EI, Algeria, 2 - Université de Lorraine, GREEN, France

O5-A-4 *"Dynamic behaviour of a Magnetically Geared Induction Machine"*
Bidouche Badr-El-Boudour[1], Lubin Thierry[1], Mezani Smaïl[1]
1 - Université de Lorraine, GREEN, France

O5-A-5 *"Viscose Ferrofluid in Low Speed Magnetic Gears"*
Mateev Valentin[1], Marinova Iliana[1]
1 - Technical University of Sofia, Bulgaria

Notes:

11:15 — 13:00 Oral Session O5-B: Transformers modeling

Room: S105

Session chairs:
Bronislaw Tomczuk (Opole University of Technology - Poland)
Schaefer Uwe (TU -Berlin - Germany)

O5-B-1 *"The Effects of AC losses on Back-iron Extension Thermal Benefits"*
Bardalai Anuvav[1], Zhang Fengyu[1], Gerada Chris[2], Xu Zeyuan[2], Gerada David[2]
1 - University of Nottingham, Ningbo, China, 2 - University of Nottingham, Nottingham, United Kingdom

O5-B-2 *"3D Magneto-Thermal Evaluation on a Transformer Structural Parts Due to Zero-Sequence"*
Lopez-Fernandez Xose M.[1], Alvarez-Gomez Luis A.[1]
1 - University of Vigo, Department of Electrical Engineering, Spain

O5-B-3 *"Impact of Windings Stacking of Three-phase to Multi-phase Transformer on the Output Voltage Balance"*
Djebli Abdelmalik[1], Khelafi Abdelhakim[1], Touhami Omar[1], Ibtiouen Rachid[1]
1 - Ecole Nationale Polytechnique d'Alger, LDCCP, Algeria

O5-B-4 *"Virtual air gap and non-conventional magnetic circuits"*
Brudny Jean-François[1], Demian Cristian[1], Roger Daniel[1], Cambier Jérome[2]
1 - Université d'Artois, LSEE, France, 2 - Securelec, Courrières, France

O5-B-5 *"Design of a High-Frequency Wireless Power Transfer System for a Rotating Application"*
Bastiaens Koen[1], Krop Dave[1], Curti Mitrofan[1], Jumayev Sultan[1], Lomonova Elena[1]
1 - Eindhoven University of Technology, Eindhoven, Netherlands

Notes:

11:15 — 13:00 Oral Session O5-C: SS. Induction Heating

Room: S106

Session chairs:
Barglik Jerzy (Silesian University of Technology - Poland)
Nacke Bernard (Leibniz University of Hannover - Germany)

O5-C-1 *"Optimization Inspired Design of Induction Heating Coils: a Technology Adapted Solution"*
Dughiero Fabrizio[1], Forzan Michele[1], Lupi Sergio[1], Di Barba Paolo[2], Mognaschi Maria Evelina[2], Sieni Elisabetta[3]
1 - University of Padova, Italy, 2 - University of Pavia, Italy, 3 - University of Insubria, Italy

O5-C-2 *"Focusing of Electromagnetic Field for Induction Welding of Composite Materials"*
Kane Banda[1], Wasselynck Guillaume[1], Bui Huu Kien[1], Trichet Didier[1], Berthiau Gerard[1]
1 - Université de Nantes, IREENA, France

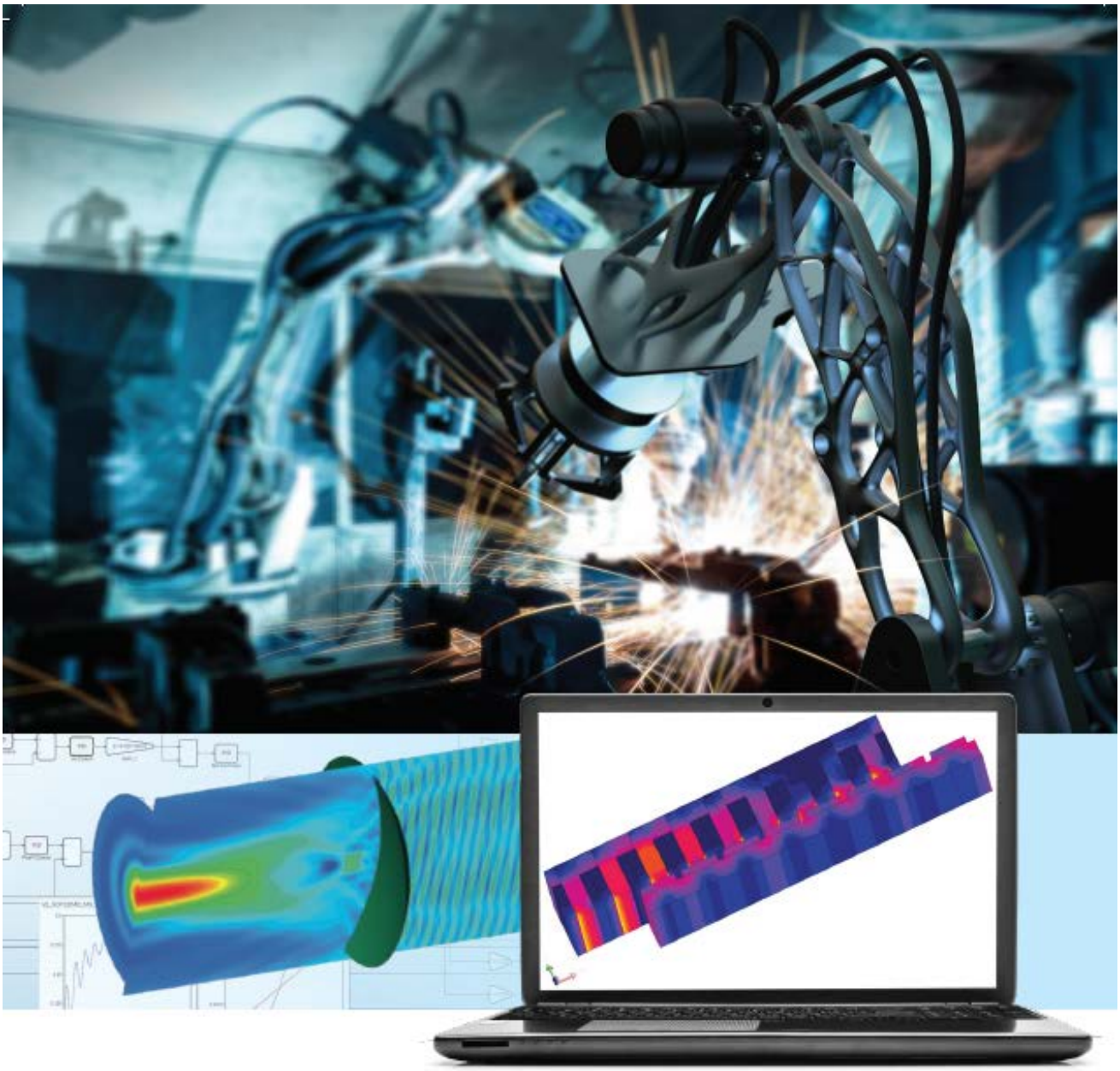
O5-C-3 *"Quasi-3D Magneto-Thermal Transient Analytical Solution in PM Induction Heating Device"*
Barakat Georges[1], Abdi Ammar[2], Ouazir Youcef[2], Amara Yacine[1]
1 - Université du Havre, GREAH, France, 2 - Université des Sciences et Technologies Houari Boumediene, Bab Ezzouar, Algeria

O5-C-4 *"Induction heating of small gear wheels in the contour hardening process"*
Barglik Jerzy[1]
1 - Silesian University of Technology, Poland

O5-C-5 *"Design of Transverse Flux Induction Coils by using a Successive Optimization Strategy"*
Nacke Bernard[1], Schulze Martin[1], Nikanorov Alexander[1]
1 - University Hannover, Institute of Electrotechnology, Leibniz, Germany

13:00 — 13:45 Closing Ceremony

13:00 - 14:30 Lunch



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