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(Compumag 2013)

**Budapest, Hungary
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Volume 1 of 2

Editors:

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Compumag 2013 – Technical Program

Date: Sunday, 30/Jun/2013	
3:00pm - 7:30pm	Registration
7:30pm - 9:00pm	Welcome Reception

Date: Monday, 01/Jul/2013	
8:30am - 9:10am Ballroom	Opening Session Chair: József Pávó
	On the Shoulders of Giants % <u>Bill Trowbridge</u> ¹ , Jan Sykulski ² ¹ D’Arcy’s Field’s, Frilford, Oxford; ² School of ECS, University of Southampton, United Kingdom
9:10am - 10:10am Ballroom	OA1: Numerical Techniques 1 Session Chairs: Bill Trowbridge, József Pávó
	OA1-1 Computational Performances of Natural Element and Finite Element Methods % <u>Yves Marechal</u> , Brahim Ramdane, Diego Pereira Botelho G2Elab, Grenoble Electrical Engineering lab, France
	OA1-2 A Time-Domain Discontinuous Galerkin Trefftz Method % <u>Fritz Kretzschmar</u> ¹ , Sascha M. Schnepf ² , Igor Tsukerman ³ , Thomas Weiland ⁴ ¹ Graduate School of Computational Engineering, Technische Universitaet Darmstadt, Germany; ² Laboratory for Electromagnetic Fields and Microwave Electronics, ETH Zurich, Switzerland; ³ The Univ of Akron, United States of America; ⁴ Institut fuer Theorie Elektromagnetischer Felder, Technische Universität Darmstadt, Germany
	OA1-3 Trefftz-discontinuous Galerkin and Finite Element Multi-solver Technique for Modeling Time-harmonic EM Problems with High-conductivity Regions %+ <u>Zsolt Badics</u> Tensor Research LLC, United States of America
10:10am - 10:35am	Coffee Break

10:35am - 12:15pm Ballroom Foyer	PA1: Coupled Problems 1 Session Chairs: Bernhard Auchmann, Nelson Sadowski
	<p>PA1-1 Optimum Design of Transformer for Wind-Turbine Generator Considering Temperature Behavior ***- <u>Yeon-Ho Oh</u>¹, Do-Kwan Hong¹, Ki-Dong Song¹, Man Sig Lee², Sung Chin Hahn³ ¹KERI, Republic of Korea (South Korea); ²Korea Institute of Industrial Technology; ³Department of Electrical Engineering, Dong-A University</p> <p>PA1-2 A General Arc-Segment Element for Three-Dimensional Thermal Modelling ***% Nick Simpson, <u>Rafal Wrobel</u>, Phil H. Mellor University of Bristol, United Kingdom</p> <p>PA1-3 Mixing of Liquids with a Rotating Current Density ***% <u>Gerard Vinsard</u>, Stephane Dufour, Esteban Saadtjian LEMTA, France</p> <p>PA1-4 Validation of Numerical Approaches for Simulating the Heat Transfer in Stator Ducts with Measurements ***% <u>Maximilian Schrittwieser</u>¹, Oszkár Bíró¹, Ernst Farnleitner², Gebhard Kastner² ¹IGTE, Graz University of Technology, Austria; ²ANDRITZ Hydro GmbH, Austria</p> <p>PA1-5 An Iterative Magnetomechanical Deflection Model for a Magnetic Gear ***% Kiran Uppalapati, <u>Jonathan Bird</u> University of North Carolina at Charlotte, United States of America</p> <p>PA1-6 Finite Element Modeling of Heat Transfer in a Nanofluid Filled Transformer ***% <u>Weimin Guan</u>¹, M Jin¹, Y Fan², J Chen¹, P Xin¹, Y Li³, K Dai¹, J Ruan¹ ¹Wuhan University, People's Republic of China; ²Wuhan NARI Co. Ltd., State Grid Electric Power Research Institute, People's Republic of China; ³CEET PingGao Group Co. Ltd., Pingdingshan, People's Republic of China</p> <p>PA1-7 An Accurate Mesh Based Equivalent Circuit Approach to Thermal Modelling ***%& <u>Nick Simpson</u>, Rafal Wrobel, Phil Mellor University of Bristol, United Kingdom</p> <p>PA1-8 A Three-Dimensional Multispecies Fluid Model of Coupled Multi-physics Simulations in Electromagnetic Devices with Moving Parts ***& <u>Yujiao Zhang</u>¹, Xiongfeng Huang¹, Tao Huang², Jiangjun Ruan² ¹China Three Gorges University, People's Republic of China; ²Wuhan University, People's Republic of China</p>

PA1-9

Magneto-Thermal Modeling of the Structural Components in a Single Phase Transformer

Luiz Henrique Jovelli¹, Alexandre Magno Milagre¹, Mauricio Valencia Ferreira da Luz²,
Glaucio de Melo Cangane³

¹ENGBRAS Software e Projetos, Brazil; ²Federal University of Santa Catarina, Brazil;

³Siemens Ltda/TUSA Transformers, Brazil

PA1-10

The Optimal Design of HTS Devices

Rajceev Das¹, Fernando Oliverira², Frederico Guimaraes², David Lowther¹

¹McGill University, Canada; ²Federal University of Minas Gerais, Brazil

PA1-11

Flow and Electric Field in Electrostatic Precipitator Using Multiphase Continuum Flow and Charge Simulation Method

André Abelardo Tavares

SATC, Brazil

PA1-12

3D Simulation of Electrically-induced Nano-Patterning on Polymer Films

Qingzhen Yang^{1,2}, Ben Q. Li², Yucheng Ding¹

¹Xi'an Jiaotong University, China; ²University of Michigan-Dearborn, United States of America

PA1-13

Numerical and Experimental Validation of Discharge Current with Generalized Energy Method and Integral Ohm's Law in Dielectric Liquid Media

Ho-Young Lee¹, Jae-Seung Jung¹, Hong-Kyu Kim², Il-Han Park³, Se-Hee Lee¹

¹Kyungpook National University, Republic of Korea (South Korea); ²Korea

Electrotechnology Research Institute; ³Sungkyunkwan University

PA1-14

3D Anisotropic Model for the Numerical Computation of Nonlinear Magnetostriction

Adrian Volk¹, Manfred Kaltenbacher², Alexander Sutor¹, Michael Ertl³, Reinhard Lerch¹

¹Chair of Sensor Technology, University of Erlangen-Nuremberg, Erlangen, Germany;

²Institute of Mechanics and Mechatronics, Vienna University of Technology, Wien, Austria;

³Siemens Energy Sector, Nuremberg, Germany

PA1-15

Contact Temperature Prediction in Three-phase Gas Insulated Bus Bars with the Finite-element Method

Xiaowen Wu, Naiqiu Shu, Hongtao Li, Ling Li

Wuhan University, People's Republic of China

PA1-16

FEM-BEM Analysis of Radio Frequency Drying of a Moving Wood Piece

Teodor Leuca¹, Livia Bandici¹, Gabriel Cheregi¹, Oana Drosu², Marcela Ioana Laza¹

¹University of Oradea, Romania; ²Politechnica University of Bucharest

	<p>PA1-17 Numerical Analysis and Experiment for Micro Particle Collector Using Dielectrophoretic Force (%) <u>Myung Ki Baek</u>¹, Gwang Jun Yu², Il Han Park¹ ¹Sungkyunkwan University, Republic of Korea (South Korea); ²Samsung Electronics Co., LTD, Republic of Korea (South Korea)</p>
<p>10:35am - 12:15pm Corvina</p>	<p>PA2: Static & Quasi-static Fields 1 Session Chairs: Zsolt Badiacs, André Buchau</p>
	<p>PA2-1 Fast and Robust Method for Mutual Inductance Calculation of Coaxial Circular Coils with Rectangular Cross Section (%) <u>Tomislav Župan</u>, Željko Štih, Bojan Trkulja Faculty of Electrical Engineering and Computing, Croatia</p> <p>PA2-2 2D Magnetostatic Finite Element Simulation for Devices With Radial Symmetry (%) <u>Dries Vanoost</u>², Herbert De Gerssem², Joan Peuteman¹, Georges Gielen², Davy Pissoot¹ ¹Katholieke Hogeschool Brugge Oostende, Belgium; ²KU Leuven, Belgium</p> <p>PA2-3 Analytical Calculation of Copper Losses in Litz-Wire Windings of Gapped Inductors (%) <u>Alexander Stadler</u>, Raoul Huber, Tobias Stolzke, Christof Gulden STS Spezial-Transformatoren-Stockach GmbH & Co. KG, Germany</p> <p>PA2-4 Analysis of the Shielding Effect of Wire Mesh to Ion Flow Field from HVDC Transmission Lines (%) Xiangxian Zhou, <u>Tiebing Lu</u>, Xiang Cui North China Electric Power University, People's Republic of China</p> <p>PA2-5 Particulate Model for Magnetic Field and Force Computation (%) Zoltán László, <u>János Füzi</u> Wigner RCP, Hungary</p> <p>PA2-6 A Hybrid Boundary Element Method-Reluctance Network Method for Open Boundary 3D Non Linear Problems (%) <u>Douglas Martins Araujo</u>^{1,2}, Jean-Louis Coulomb², Olivier Chadebec² ¹Schneider Electric Industries SAS; ²G2ELAB - Université de Grenoble, Grenoble, France</p> <p>PA2-7 Rigorous Capacitance-Extraction Method for Metamaterial Resonator Equivalent Circuits (%) Thodosios Karamanos, Alexandros Dimitriadis, <u>Nikolaos Kantartzis</u>, Theodoros Tsiboukis Department of Electrical and Computer Engineering, Aristotle University of Thessaloniki, Greece</p>

PA2-8
Equations of 3-D Electromagnetic Field with Direct Calculation of Flux and Eddy Current Densities **) +

Witold Mazgaj
Cracow University of Technology, Poland

PA2-9
Three-dimensional Computation of Magnetic Fields in Hysteretic Media with Time-periodic Sources **) -

Massimiliano d'Aquino¹, Guglielmo Rubinacci², Antonello Tamburrino^{3,4}, Salvatore Ventre³

¹Università di Napoli "Parthenope"; ²Università di Napoli Federico II; ³University of Cassino, Italy; ⁴Michigan State University, United States of America

PA2-10
Choice of Electrical Field Calculation Method According to the Dielectric Design Criteria ***) %

Kosjenka Capuder¹, Željko Štih², Goran Plišić¹

¹Končar Power Transformers Ltd., Croatia; ²Faculty of Electrical Engineering and Computing, Croatia

PA2-11
Modeling and Finite Element Simulation of the Wilson–Wilson Experiment ***)'

Holger Heumann², Stefan Kurz¹

¹Tampere University of Technology, Finland; ²Université de Nice - Sophia Antipolis, France

PA2-12
Fast Calculation of Magnetic Fields Produced by Rectangular Cross Section, Arc-Shaped Conductors ***)

Alessio Capelluto¹, Mario Nervi², Paolo Molfino²

¹ASG-Superconductors, Italy; ²Departement of Electrical, Electronic, Telecommunications Engineering and Naval Architecture, University of Genoa, Italy

PA2-13
Nonlinear Computational Homogenization Method for the Evaluation of Eddy Currents in Soft Magnetic Composites ***) +

Innocent Niyonzima¹, Ruth V. Sabariego¹, Patrick Dular^{1,2}, Christophe Geuzaine¹

¹University of Liège, Belgium; ²Fonds de la Recherche Scientifique, F.R.S.–FNRS, Belgium

PA2-14
Analysis of the Motion of Conducting Sheets in Magnetic Fields ***) -

Mihai Maricaru¹, Ioan R. Ciric², Horia Gavrilă¹, George-Marian Vasilescu¹, Florea I. Hantila¹

¹Department of Electrical Engineering, Politehnica University of Bucharest, Romania; ²Department of Electrical and Computer Engineering, The University of Manitoba, Canada

PA2-15
Hierarchical Block Wavelet Compression of 3-D Eddy Current Problems ***) + %

Remus Banucu, Christian Scheiblich, Jan Albert, Veronika Reinauer, Wolfgang Rucker
University of Stuttgart, Germany

PA2-16**A New Neural Predictor for ELF Magnetic Field Strength**Salvatore Coco¹, Antonino Laudani², Francesco Riganti Fulginei², Alessandro Salvini²¹University of Catania, Italy; ²University of RomaTre, Italy**PA2-17****Calculation of 3D Magnetic Fields Produced by MHD Active Control Systems in Fusion Devices**Paolo Bettini¹, Ruben Specogna²¹Università di Padova, Italy; ²Università di Udine, Italy**PA2-18****Dual Formulations for Accurate Thin Shell Models in a Finite Element Subproblem Method**Vuong Dang Quoc¹, Patrick Dular^{1,2}, Ruth V. Sabariego¹, Laurent Krähenbühl³, Christophe Geuzaine¹¹University of Liege, Belgium; ²Fonds de la Recherche Scientifique; ³Université de Lyon, France**PA2-19****Research on Corona Characteristics of Fittings in Valve Hall of UHVDC Converter Station**Zhiye Du, Jiangjun Ruan, Ting Zhan, Shuo Jin, Longfei Hu, Guodong Huang
School of Electrical Engineering, Wuhan University, Wuhan, China**PA2-20****Modeling ECAP in Cochlear Implants using Finite Element Method and Equivalent Circuits**Charles T. M. Choi, Shao-Po Wang

National Chiao Tung University, Taiwan, ROC

PA2-21**Numerical Modelling of Axissymmetrical Ferrite-Core Probes over Planar Specimens Using a Coupled FIT/Semi-Analytical Formulation**Audrey Vigneron, Anastassios Skarlatos, Christophe Reboud
CEA, LIST, France**PA2-22****Analysis of Electromagnetic Inspection Method of Opposite Side Carburizing Depth in Steel Plate Taking Account of Minor Loop**Yuji Gotoh¹, Hidekazu Tanaka², Norio Takahashi³¹Oita University, Japan; ²Oita University, Japan; ³Okayama University, Japan**PA2-23****Computing Eddy Currents in Thin Shells of Arbitrary Topology by Mesh Analysis**Federico Moro, Piergiorgio Alotto, Massimo Guarnieri, Andrea Stella
Università di Padova, Italy

10:35am - 12:15pm Corvina	PA3: Electrical Machines & Drives 1 Session Chairs: Anouar Belahcen, Andrzej Demenko
	<p>PA3-1 Electromagnetic Design of a New Dual-magnet Magnetic-gear Machine Using Parallelogram Hysteresis Model ; - Chunhua Liu, K.T. Chau, <u>Mu Chen</u> The University of Hong Kong, Hong Kong S.A.R. (China)</p> <p>PA3-2 Static Characteristic Analysis and Force Optimization of a Short-stroke DC Planar Motor with Three Degree of Freedom ; - % <u>He Zhang</u>, Baoquan Kou, Hailin Zhang, Yinxi Jin Harbin Institute of Technology, People's Republic of China</p> <p>PA3-3 Analysis of Eddy-Current Brakes (ECB) for High Speed Railway Using Meshless Method ; - ' Yang Zou¹, Yanbin Li², Bin Wang¹, K.R. Shao¹, Gang Lei³, <u>Jianguo Zhu</u>³ ¹State Key Laboratory of Advanced Electromagnetic Engineering and Technology, Huazhong University of Science and Technology, Wuhan, 430074, China; ²Zhong Yuan Institute of Technology, Zhengzhou, China; ³Faculty of Engineering and Information Technology, University of Technology, Sydney, Australia</p> <p>PA3-4 A Design Method for Cage Induction Motors With Non-Skewed Rotor Bars ; -) <u>Haisen Zhao</u>, Xiangyu Wang, Qing Wang, Xiaofang Liu, Yingli Luo North China Electric Power University, People's Republic of China</p> <p>PA3-5 Performance Analysis of an Integrated Rotary-linear Machine with Coupled Magnetic Paths ; - + J.F. Pan¹, <u>Norbert Cheung</u>², Yu Zou¹ ¹School of Mechatronics and Control Engineering, Shenzhen University, People's Republic of China; ²Department of Electrical Engineering, Hong Kong Polytechnic University, People's Republic of China</p> <p>PA3-6 Finite-Element Modelling of Magnetic Material Degradation Profiles due to Punching ; - - Madeleine Bali¹, <u>Herbert De Gersem</u>², Annette Muetze¹ ¹Graz University of Technology; ²KU Leuven, Belgium</p> <p>PA3-7 Starting Torque Optimization of High-speed Switched Reluctance Motor Based on Level Set Method ; - %% Haijun Zhang, Weijie Xu, <u>Shuhong Wang</u>, Youpeng HuangFu, Guolin Wang, Jianguo Zhu Xi'an Jiaotong University, People's Republic of China</p>

PA3-8**Thermal Optimization of a High Speed Permanent Magnet Motor**

Jianning Dong^{1,2}, Yunkai Huang^{1,2}, Long Jin^{1,2}, Heyun Lin^{1,2}, Hui Yang^{1,2}

¹School of Electrical Engineering, Southeast University, People's Republic of China;

²Engineering Research Center for Motion Control of Ministry of Education, Southeast University, People's Republic of China

PA3-9**Damper Windings Performance Evaluation in Large Hydro Electrical Generators**

Arezki Merkhouf

Research Institut of Hydro-Québec, IREQ, Canada

PA3-10**Characteristics of a Rotor Vibration in an IPM Motor by Using Magnetic and Structural Analyses**

Doyeon Kim, Jeongyong Song, Gunhee Jang

Hanyang University, Republic of Korea (South Korea)

PA3-11**High-Torque Low-Speed Machines for In-Wheel Application: Comparative Study of Radial, Axial, and Transverse Flux Machines**

Daesuk Joo, Ji-Young Lee, Do-Kwan Hong, Byung-Chul Woo, Dae-Hyun Koo

Korea Electrotechnology Research Institute, Republic of Korea (South Korea)

PA3-12**Representation of Electrical Machine Windings using T^0 Formulation**

Rafal Wojciechowski, Cezary Jedryczka

Poznan University of Technology, Poland

PA3-13**A Novel Electrical Continuously Variable Transmission System and its Numerical Model**

Yulong Liu, Siu-lau Ho, Weinong Fu

The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)

PA3-14**Design Improvement for Cogging Torque Reduction in Axial-Flux Permanent-Magnet Machines Using Schwarz-Christoffel Transformation**

Aliakbar Alipour, Mehdi Moallem

Isfahan University of Technology, Islamic Republic of Iran

PA3-15**Design of Dual Rotors Switched Reluctance Motor**

Hao Chen, Tong Xu, Xiao Liu

China University of Mining & Technology, People's Republic of China

PA3-16**Stator-Teeth Design of Direct-Drive Large-Torque Transverse Flux-Type Motor with High Power Factor for Electric Ship Propulsion**

Yuta Yamamoto¹, Qi Zhao¹, Yasuhiro Takada¹, Takafumi Koseki¹, Yasuaki Aoyama²

¹The University of Tokyo, Japan; ²Hitachi Research Laboratory, Japan

	<p>PA3-17 PM Magnetization Characteristics Analysis of a Post-Assembly Line Start Permanent Magnet Motor Using Coupled Preisach Modeling and Finite Element Method Young Hyun Kim, <u>Won Gee Byen</u>, Jung Ho Lee Hanbat National University, Republic of Korea (South Korea)</p> <p>PA3-18 Effect of Pole and Slot Combination on Noise and Vibration in Induction Motor Su-Jin Lee, Jae-Han Sim, Jae-Woo Jung, Hyeon-Jin Park, <u>Jung-Pyo Hong</u> Hanyang University, Republic of Korea (South Korea)</p> <p>PA3-19 Magnetic Vibration Analysis of a New DC-Excited Multitoothed Switched Reluctance Machine Chunhua Liu, K.T. Chau, <u>Christopher H.T. Lee</u>, Mu Chen The University of Hong Kong, Hong Kong S.A.R. (China)</p> <p>PA3-20 Numerical Analysis and Experimental Evaluation of IPMSM Considering Time Harmonics of Switching Frequency Subong Jang¹, Yong-Jae Kim², <u>Sang-Yong Jung</u>¹ ¹Sungkyunkwan university, Republic of Korea (South Korea); ²Chosun University, Republic of Korea (South Korea)</p>
12:15pm - 1:45pm	Lunch
1:45pm - 3:25pm Ballroom Foyer	PA4: Optimization & Design 1 Session Chairs: Piergiorgio Alotto, David Lowther
	<p>PA4-1 EM-FL-PSO Design Optimization of WAD N. Al-Aawar, R. Al-Khatib, <u>A. A. Arkadan</u> Rafik Hariri University, Lebanon (Lebanese Republic)</p> <p>PA4-2 Benefits of Waveform Relaxation Method and Space Mapping for the Optimization of Multirate System Antoine Pierquin¹, <u>Stephane Brisset</u>¹, Thomas Henneron², Stephane Clenet³ ¹EC Lille, L2EP, France; ²Université de Lille, L2EP, France; ³Arts et Métiers ParisTech, L2EP, France</p> <p>PA4-3 Use of an Artificial Neural Network-based Metamodel in the Optimization by Particle Swarm Optimization Method Sheila Santisi Travessa, <u>Walter Pereira Carpes Jr</u>, Marcelo A. Nunes Filho Federal University of Santa Catarina, Brazil</p> <p>PA4-4 Fast Shape Optimization of Microwave Devices Based on Parametric Reduced Order Models <u>Stefan Burgard</u>, Ortwin Farle, Philipp Loew, Romanus Dyczij-Edlinger Saarland University, Germany</p>

PA4-5**Optimal Design of Brushless DC Motor for Reducing Cogging Torque**

Young-Un Park¹, Ji-young So¹, Dong-Hwa Chung¹, Ju-Hee Cho², Kyung-il Woo³, Yong-Min You⁴, Dae-kyong Kim¹

¹Sunchon National University, Republic of Korea (South Korea); ²Korean Electronics Technology Institute (KETI), Republic of Korea (South Korea); ³Pukyong National University; ⁴LG Electronics, Republic of Korea (South Korea);

PA4-6**Design Optimization of a Loudspeaker Utilizing Sampling-based Sensitivity Information of a Hyper-spherical Local Window**

Nak-Sun Choi¹, Dong-Wook Kim¹, K. K. Choi², Dong-Hun Kim¹

¹Kyungpook National University, Republic of Korea (South Korea); ²Mech. and Ind. Eng., Univ. of Iowa, Iowa City, United States of America

PA4-7**A Novel Evolution Strategy and its Application to Inverse Scattering in Microwave Imaging**

Lin Yang¹, Shiyong Yang², S.L. Ho¹, Weinong Fu¹, Lei Liu¹

¹The Hong Kong Polytechnic University, Hong Kong S.A.R. (China); ²College of Electrical Engineering, Zhejiang University, People's Republic of China

PA4-8**Global Sensitivity Analysis of Magneto-electric Sensor Model Parameters**

Thu Trang Nguyen^{1,3}, Stéphane Clenet², Laurent Daniel^{3,4}, Xavier Mininger³, Frédéric Bouillault³

¹L2EP, Univ. Lille 1, France; ²L2EP, Arts et Métiers ParisTech, France; ³LGEP, CNRS UMR8507; SUPELEC; UPMC Univ Paris 06; Univ Paris-Sud, France.; ⁴School of Materials, University of Manchester, United Kingdom

PA4-9**Optimization of Rotor Topology in PM Synchronous Motors by Genetic Algorithm Considering Cluster of Materials and Cleaning Procedure**

Takeo Ishikawa, Kyoichi Nakayama, Nobuyuki Kurita
Gunma University, Japan

PA4-10**Transformer Design Based on Diversity-Guided Extremal Optimization**

Leandro dos Santos Coelho^{1,2}, Viviana C. Mariani^{2,3}, Helon V. H. Ayala⁴, Mauricio V. F. Luz⁵, Jean Vianei Leite⁵

¹Industrial and Systems Engineering Grad. Program, Pontifical Catholic University of Parana, Brazil; ²Department of Electrical Engineering, Federal University of Parana, Brazil; ³Mechanical Engineering Graduate Program, Pontifical Catholic University of Parana, Brazil; ⁴LACTEC - Institute of Technology for Development, Electrical Systems Division (DVSE), Brazil; ⁵GRUCAD/EEL/UFSC, Brazil

PA4-11**Optimal Antenna Design with QPSO-QN Optimization Strategy**

J. B. Liu^{1,2}, Zhongxiang Shen¹, Y. L. Lu¹

¹Nanyang Technological University, Singapore; ²National University of Defense Technology, People's Republic of China

PA4-12

A Multi-objective Repository-based Genetic Algorithm for Ultra-wideband Antenna Optimization

Cláudio Silva, Sinara Martins

Federal University of Rio Grande do Norte (UFRN), Brazil

PA4-13

Statistical Moment-based Robust Design Optimization for Nonlinear Electromagnetic Devices

Su-gil Cho, Junyong Jang, Tae Hee Lee

Hanyang University, Republic of Korea (South Korea)

PA4-14

Meaning of the Rational Solution Obtained by Game Theory

Tomoyuki Miyamoto¹, Shinya Matsutomo², Fumiaki Nobuyama¹, So Noguchi¹

¹Hokkaido University, Japan; ²Niihama National College of Technology, Japan

PA4-15

Optimal Rotor Structure of Surface-mounted Permanent Magnet Motor for Vibration Reduction

Sunghoon Lim, Seungjae Min, Jung-Pyo Hong

Hanyang University, Republic of Korea (South Korea)

PA4-16

A Parallel Version of the Self-Adaptive Low-High Evaluation Evolutionary-Algorithm for Electromagnetic Device Optimization

Emanuele Dilettoso, Santi Agatino Rizzo, Nunzio Salerno

DIEEI - Università di Catania, Italy

PA4-17

Embedded Multilevel Optimization for Nonlinear Time Stepping Mesh based Reluctance Network

Maya Hage Hassan, Guillaume Krebs, Ghislain Remy, Claude Marchand

Laboratoire de génie électrique de Paris, France

PA4-18

Low Cogging Torque Design of Permanent-Magnet Machine using Modified Multi-level Set Method with Total Variation Regularization

Piotr Putek¹, Piotr Paplicki², Ryszard Palka²

¹Ghent University, Belgium; ²West Pomeranian University of Technology, Poland

PA4-19

A Numerically Efficient Reliability-Based Robust Optimal Design Algorithm: Application to TEAM 22

Ziyan Ren, Chanhyuk Park, C.S. Koh

Chungbuk National University, Republic of Korea (South Korea)

<p>1:45pm - 3:25pm Corvina</p>	<p>PA5: Static & Quasi-static Fields 2 + Non-destructive Electromagnetic Inspection and Applications Session Chairs: Ioan R Ciric, Antonello Tamburrino</p>
	<p>PA5-1 Improvement of Unified Boundary Integral Equation Method in Magnetostatic Shielding Analysis *%+ Kazuhisa Ishibashi^{1,3}, <u>Takuya Yoshioka</u>², Shinji Wakao², Yashuhito Takatashi⁴, Zoran Andjelic³, Koji Fujiwara⁴ ¹Japan; ²Waseda University, Japan; ³POLOPT Technologies GmbH, Switzerland; ⁴Doshisha University, Japan</p> <p>PA5-2 Time Domain Analysis of Transient Currents in Conductors Involving Non-Homogeneous Media *%*- <u>Thiago Antonio Grandi de Tolosa</u>, Ricardo Caranicola Caleffo Mauá Institute of Technology, Brazil</p> <p>PA5-3 Inclusion of the Model of Rotational Magnetization into Equations of Magnetic Field Distribution *%-% <u>Witold Mazgaj</u>, Tadeusz Sobczyk, Adam Warzecha Cracow University of Technology, Poland</p> <p>PA5-4 Eddy Currents Computation by an Integral Equation Method Using Facet Elements <u>Alexander Kalimov</u>, Dmitry Lysenko *%' St.Petersburg State Polytechnic University, Russian Federation</p> <p>PA5-5 A Shimming Scheme for Active Shielding *%*) <u>Andrea Gaetano Chiariello</u>, Alessandro Formisano, Raffaele Martone Seconda Università di Napoli, Italy</p> <p>PA5-6 Linear Representation of Saturation Characteristics Associated with Eddy Currents in Ferromagnetic Materials *%+ Jian Wang, Heyun Lin, Shuhua Fang, Yunkai Huang, Jianning Dong, <u>Hui Yang</u> Southeast University, People's Republic of China</p> <p>PA5-7 Improved Calculation method of Electric Field and Power loss of EHV AC Bundled Conductors *%*- Shuo Jin, Jiangjun Ruan, <u>Zhiye Du</u>, Guodong Huang School of Electrical Engineering, Wuhan University, Wuhan, People's Republic of China</p> <p>PA5-8 Dual Finite Integral Technique in Ion Flow Field Calculation *%-% <u>Yongsheng Xu</u>, Jinliang He, Bo Zhang Tsinghua University, People's Republic of China</p> <p>PA5-9 Imaging of Current Density within a Planar Specimen *%' <u>Patrick A. Hölzl</u>, Bernhard G. Zagar Johannes Kepler University of Linz, Austria</p>

PA5-10**Fast Technique for Lorentz Force Calculations in Nondestructive Testing Applications**

Mladen Zec, Robert P. Uhlig, Marek Ziolkowski, Hartmut Brauer

Ilmenau University of Technology, Department of Advanced Electromagnetics, Germany

PA5-11**Diagnosis of Real Cracks from Eddy Current Testing Signals using Parallel Computation**

Mihai Iulian Rebican¹, Ladislav Janousek², Milan Smetana², Tatiana Strapacova²

¹Faculty of Electrical Engineering, University Politehnica of Bucharest, Romania; ²Faculty of Electrical Engineering, University of Zilina, Slovakia

PA5-12**Nonlinear Integral Formulation and Neural Networks based Solution for Reconstruction of Deep Defects with Pulse Eddy Currents**

Gabriel Preda, Florea Ioan Hantila

Politehnica University of Bucharest, Romania

PA5-13**Numerical Simulation of Crack Detection in High-Temperature Superconducting Film by Using Contactless Methods**

Atsushi Kamitani¹, Teruou Takayama¹, Soichiro Ikuno²

¹Yamagata University, Japan; ²Tokyo University of Technology, Japan

PA5-14**New Methods Based on Matched Coordinates for the Computation of Quasi-static Fields Induced in a Layered Conductor with a Rough Surface and a Continuous Depth Profile of Conductivity**

François Caire¹, Denis Prémel¹, Gérard Granet²

¹CEA LIST, France; ²Clermont Universités, Université Blaise Pascal, Institut Pascal, UMR 6602, France

PA5-15**FEM Technique for Modelling Eddy Current Testing of Ferromagnetic Media with Low Skin Depth**

Houda Zaidi^{1,2}, Laurent Santandrea¹, Guillaume Krebs¹, Yann Le Bihan¹, Edouard Demaldent²

¹Laboratoire de Génie Electrique de Paris, France; ²Laboratoire d'Intégration des Systèmes et des Technologies, France

PA5-16**A Modeling Approach for the Characterization of Stress in Magnetic Materials using Eddy Current Non-Destructive Evaluation**

Abla Dahia¹, Eric Berthelot¹, Yann Le Bihan¹, Laurent Daniel^{1,2}

¹LGEF, France; ²School of Materials, United Kingdom

PA5-17

Magnetic NDE for Material Deterioration and Sub-mm Size Defect in Steel

Hiroaki Kikuchi¹, Isamu Shimizu¹, Kaito Sato¹, Keiji Iwata²

¹Iwate University, Japan; ²Nippon Steel & Smitomo Metal, Japan

PA5-18

Surface Integral Equations for Electromagnetic Testing: The Low-frequency and High-contrast Case

Audrey Vigneron¹, Edouard Demaldent¹, Marc Bonnet²

¹CEA, LIST, France; ²POEMS (UMR 7231 CNRS-INRIA-ENSTA), France

PA5-19

An Efficient Numerical Scheme for Sizing of Cavity Defect in Metallic Foam from Signals of DC Potential Drop Method

Xiaojuan Wang, Shejuan Xie, Jing Zhang, Zhenmao Chen

State Key Laboratory for Strength and Vibration of Mechanical Structures, Xi'an Jiaotong University, People's Republic of China

PA5-20

Stress Zone Imaging in Steel Plates using Multi Coil Array Sensors

Markus Neumayer¹, Daniel Watzenig¹, Bernhard Brandstätter²

¹Graz University of Technology, Austria; ²Elin Motoren GmbH, Austria

PA5-21

A Study on the Estimation of the Shapes of Axially Oriented Cracks in CMFL type NDT System

Hui Min Kim, Gwan Soo Park

Pusan National University, Republic of Korea (South Korea)

PA5-22

Dynamic Modeling of an Electrodynamical Maglev Vehicle

Subhra Paul, Walter Bomela, Jonathan Bird

University of North Carolina at Charlotte, United States of America

PA5-23

A Novel Tool for Breakdown Probability Predictions on Multi-electrode Multi-voltage Systems

Paolo Bettini^{1,2}, Nicola Pilan², Ruben Specogna³

¹Università di Padova, Italy; ²Consorzio RFX, Padova, Italy; ³Università di Udine, Italy

PA5-24

Accurate Post-Processing of Magnetic Field Gradients from Low-Order Finite-Element Solutions

Herbert De Gerssem, Bert Masschaele, Toon Roggen, Ewald Janssens

KU Leuven, Belgium

1:45pm - 3:25pm
Corvina

PA6: Devices & Applications 1
Session Chairs: Zsolt Szabó, Jasmin Smajic

PA6-1

Proposal of Concept of Theoretical Formula for Equivalent Resistances for Zone-Control Induction Heating System and Theoretical and Numerical Examination

Teruyoshi Sasayama¹, Yusuke Yanamoto¹, Norio Takahashi¹, Naoki Uchida², Takahiro Ao², Keiji Kawanaka², Nobuyasu Matsunaka²

¹Okayama University, Japan; ²Mitsui Engineering & Shipbuilding Co. Ltd., Japan

PA6-2

A UWB Antenna Design with Adjustable Second Rejection Band using a SIR

Hyung-Seok Choi, Hee-Yong Hwang, Kyung Choi

Kangwon National University, Republic of Korea (South Korea)

PA6-3

Iron Losses in a Medium-Frequency Transformer Operated in a High-Power DC-DC Converter

Nils Soltau¹, Daniel Eggers², Kay Hameyer², Rik De Doncker¹

¹RWTH Aachen University, E.ON Energy Research Center, Institute for Power Generation and Storage Systems, Germany; ²RWTH Aachen University, Institute for Electrical Machines, Germany

PA6-4

Electromagnetic Model of Plasma Breakdown in the JET Tokamak

Francesco Maviglia¹, Raffaele Albanese¹, Peter J. Lomas², Fernanda G. Rimini², Adrianus C.C. Sips^{3,4}, Peter C. De Vries⁵

¹Assoc. EURATOM-ENEA-CREATE, Univ. di Napoli Federico II, Italy; ²Assoc. EURATOM-CCFE Fusion Association, Culham Science Centre, United Kingdom; ³JET-EFDA, Culham Science Centre, United Kingdom; ⁴European Commission, Belgium; ⁵FOM Institute DIFFER, Association EURATOM-FOM, The Netherlands

PA6-5

3D Multi-strands Inductor Modeling: Influence of Complex Geometrical Arrangements

Raphaël Scapolan, Annie Gagnoud, Yves Du Terrail

SIMaP, Grenoble INP, UJF, CNRS, France

PA6-6

3D Magnetostatic Moment Method Dedicated to Arc Interruption Process Modeling

Loic Rondot¹, Olivier Chadebec², Gerard Meunier²

¹Schneider Electric, France; ²G2Elab, France

PA6-7

Modal Analysis of Currents Induced by Magnetic Resonance Imaging Gradient Coils

Hector Sanchez¹, Michael Poole³, Adnan Trakic¹, Fabio Freschi², Maurizio Repetto², Stuart Crozier¹

¹The University of Queensland, Australia; ²Department of Energy Politecnico di Torino Corso Duca Degli Abruzzi, Torino, Italy; ³Institute of Neuroscience and Medicine –Julich, Germany

PA6-8
Simplified Position Estimation Using Back-EMF for Two-DoF Linear Resonant Actuator

Takamichi Yoshimoto¹, Yasuyoshi Asai¹, Katsuhiro Hirata¹, Tomohiro Ota²
¹Osaka University, Japan; ²Panasonic Corporation, Japan

PA6-9
A Paretian Approach to Optimal Design with Uncertainties: Application in Induction Heating

Paolo Di Barba¹, Fabrizio Dughiero², Michele Forzan², Elisabetta Sieni²
¹University of Pavia, Italy; ²University of Padova, Italy

PA6-10
Evaluation of Electromagnetic Measuring Technique of Tip Position of Nasogastric Tube using Evolution Strategy

Yuji Gotoh¹, Atsushi Nakamura², Yoshitaka Miyazaki³, Norio Takahashi⁴
¹Oita University, Japan; ²Oita University, Japan; ³Yufuin Kouseinenkin Hospital, Japan; ⁴Okayama University, Japan

PA6-11
Numerical Determination of the Effective Magnetic Path Length of a Single Sheet Tester

Markus Hofmann¹, Deniz Kahraman², Hans-Georg Herzog³, Michael J. Hoffmann²
¹Daimler AG, Stuttgart, Germany; ²Institute for Applied Materials, Karlsruhe Institute of Technology, Karlsruhe, Germany; ³Institute of Energy Conversion Technology, Technical University of Munich, Munich, Germany

PA6-12
Analysis of a High Speed Induction Machine used for the Propulsion of an Electric Vehicle

Dan-Cristian Popa, Daniel Fodorean
Technical University of Cluj-Napoca, Romania

PA6-13
Heat Transfer Coefficients Determination of Numerical Model by Using Particle Swarm Optimization

Peter Kitak, Arnel Glotic, Igor Tigar
University of Maribor, Slovenia

PA6-14
Self-consistent Simulation of Bented Channel DG MOSFETs

Andras Reichardt¹, Gabor Varga²
¹Dept. of Broadband Infocomm. and Electromagnetic Theory, BUTE, Hungary; ²Dept. of Physics, BUTE, Hungary

PA6-15
Modeling of Mechanical Effects of Short-Circuit Currents in Power Transformers

Fernando Torres Pereira da Silva¹, Mauricio Valencia Ferreira da Luz², Glauco de Melo Cangane¹
¹Siemens Ltda/TUSA Transformers, Brazil; ²Federal University of Santa Catarina, Brazil

PA6-16**Examination on Equivalent Resistance and Coupling Coefficient of Zone-Control Induction Heating by Finite Element Method**

Yusuke Yanamoto¹, Teruyoshi Sasayama¹, Norio Takahashi¹, Naoki Uchida², Takahiro Ao², Keiji Kawanaka², Nobuyasu Matsunaka²

¹Okayama University, Japan; ²Mitsui Engineering & Shipbuilding Co., LTD., Japan

PA6-17**An Efficient Numerical Investigation for Short-Circuit Force Prediction of Power Transformer Considering 3-D Effects**

Hyun-Mo Ahn¹, Joong-Kyoung Kim², Jung-Woo Ha², Yeon-Ho Oh³, Ki-Dong Song³, Sung-Chin Hahn¹

¹Dong-A Univ., Republic of Korea (South Korea); ²HYOSUNG Co., Republic of Korea (South Korea); ³KERI, Republic of Korea (South Korea)

PA6-18**An Integral Model for the Computation of the Magnetic Field Emission of MV/LV oil Transformer**

Davide Bavastro, Aldo Canova, Luca Giaccone, Michele Manca
Politecnico di Torino, Italy

PA6-19**Cascaded Frequency Selective Surfaces Using Dürer's Pentagon Pre-Fractals Patch Elements for Licensed 2.5 GHz and 3.5 GHz Bands**

Jose Idifranse Trindade¹, Adaildo Gomes Dassuncao², Paulo Henrique Silva³

¹Federal University of Rio Grande do Norte, Brazil; ²Federal University of Rio Grande do Norte, Brazil; ³Instituto Federal de Educação, Ciência e Tecnologia da Paraíba, Brazil

PA6-20**Analysis and Performance Evaluation of the Solenoid as an Injector for 2-Liter Diesel Vehicle**

Daohan Wang¹, Xiuhe Wang¹, Sung-Jun Kwon², Sang-Yong Jung²

¹School of Electrical Engineering, Shandong University, China; ²School of Electronic and Electrical Engineering, Sungkyunkwan University, Korea

PA6-21**Electrical Loss Analysis of A.C. Electromagnet Using Parallel Computing**

Tadashi Yamaguchi¹, Yoshihiro Kawase¹, Tomohito Nakano¹, Tatsuya Asano¹, Ryosuke Kawai¹, Takanori Takemoto²

¹Gifu University, Japan; ²Fuji Electric FA Components & Systems Co., Ltd., Japan

PA6-22**Study of a High Speed Motorization with Improved Performances Dedicated for an Electric Vehicle**

Daniel Fodorean

Technical University of Cluj-Napoca, Romania

PA6-23**Analysis on Methods to obtain Lumped Parameters for an Inductive Coupling Device**

Daniela Wolter Ferreira¹, Moisés Ferber², Luiz Lebensztajn¹, Renan B. Müller¹, Laurent Krähenbühl², Florent Morel², Christian Vollaire²

¹Escola Politécnica da Universidade de São Paulo, Brazil; ²cole Centrale de Lyon

3:25pm - 3:50pm	Coffee Break
3:50pm - 5:30pm Ballroom	OA2: Wave Propagation 1 Session Chairs: Irina Munteanu, Istvan Bardi
	<p>OA2-1 Wide-band Electromagnetic Time Reversal: Selecting the Instant of Focus for Scatterer Localization ***&% <u>Mehdi Benhamouche</u>^{1,2}, Laurent Bernard¹, Mohamed Serhir², Lionel Pichon¹, Dominique Lesselier² ¹LGEP, France; ²LSS, France</p> <p>OA2-2 A 3-D Interlayer-Based FDTD/NS-FDTD Connection Technique Combined with a Stable Subgrid Model for Low-Cost Simulations ***&' Tadao Ohtani¹, <u>Yasushi Kanai</u>², Nikolaos Kantartzis³ ¹Asahikawa City, Japan; ²Niigata Institute of Technology, Japan; ³Aristotle University of Thessaloniki, Greece</p> <p>OA2-3 Time Domain Absorbing Boundary Terminations for Waveguide Ports based on State Space Models ***&) <u>Thomas Flisgen</u>, Johann Heller, Ursula van Rienen University of Rostock, Germany</p> <p>OA2-4 High-frequency Multi-winding Magnetic Components: From Numerical Simulation to Equivalent Circuits with Frequency-independent RL Parameters ***&+ <u>Zacharie De Greve</u>¹, Olivier Deblecker¹, Jacques Lobry¹, Jean-Pierre Kéradec² ¹Department of Power Electrical Engineering, University of Mons, Belgium; ²Grenoble Electrical Engineering Laboratory (G2ELab), Université Joseph Fourier de Grenoble, France</p> <p>OA2-5 Fast Frequency-Domain Modeling of Return Stroke including Influence of Lossy Ground ***&- Lei Liu, Shiyu Yang, <u>Guangzheng Ni</u> Zhejiang University, People's Republic of China</p>
8:30pm - 9:30pm Dominican Courtyard	Concert

Date: Tuesday, 02/Jul/2013

**8:30am - 10:10am
Ballroom**

OB1: Static & Quasi-static Fields 3
Session Chairs: Kay Hameyer, Raffaele Martone

OB1-1
Multilevel Preconditioning for Time-harmonic Eddy Current Problems Solved with Hierarchical Finite Elements
Ali Aghabarati, Jon P. Webb
McGill University, Canada

OB1-2
Model Order Reduction of Non Linear Magneto-static Problems based on POD and DEI Methods
Thomas Henneron¹, Stephane Clenet²
¹Université Lille 1, France; ²L2EP/Arts et Métiers ParisTech

OB1-3
Dual Discrete Geometric Methods in Terms of Scalar Potential on Unstructured Mesh in Electrostatics
Zhuoxiang Ren^{1,2}, Xiaoyu Xu²
¹University of Pierre & Marie Curie, L2E, France; ²Institute of Microelectronics, Chinese Academy of Sciences, China

OB1-4
Perfect Conductor and Impedance Boundary Condition Corrections via a Finite Element Subproblem Method
Patrick Dular¹, Victor Péron², Ronan Perrussel³, Laurent Krähenbühl⁴, Christophe Geuzaine¹
¹University of Liège, ACE, Belgium; ²Université de Pau et des Pays de l'Adour, MAGIQUE3D, France; ³Université de Toulouse, LAPLACE, France; ⁴Université de Lyon, Ampère, France

OB1-5
Robust Transmission Conditions of High Order for Thin Conducting Sheets in Two Dimensions
Kersten Schmidt¹, Alexey Chernov²
¹Technische Universität Berlin, Germany; ²Universität Bonn, Germany

**10:10am - 10:20am
Front of the Hotel**

Conference Photo

10:20am - 10:45am

Coffee Break

10:45am - 12:25pm
Corvina

PB1: Wave Propagation 2 + Nano-Electromagnetic Computation and Applications
Session Chairs: Mauro Feliziani, Nathan Ida

PB1-1

Approximation of Grunwald-Letnikov Fractional Derivative for FDTD Modeling of Cole-Cole Media

Ioannis T. Rekanos, [Traianos V. Yioultsis](#)
Aristotle University of Thessaloniki, Greece

PB1-2

Consistent Study of Graphene Structures Through the Direct Incorporation of Surface Conductivity

Georgios Bouzianas, [Nikolaos Kantartzis](#), Traianos Yioultsis, Theodoros Tsiboukis
Department of Electrical and Computer Engineering, Aristotle University of Thessaloniki, Greece

PB1-3

Modeling of Frequency Selective Surfaces using Impedance Type Boundary Condition

[Tamás Gombor](#), József Pávó
Budapest University of Technology and Economics, Hungary

PB1-4

Reduction of Unphysical Wave Reflection Arising from Space-Time Finite Integration Method

[Tetsuji Matsuo](#), Takeshi Mifune
Kyoto University, Japan

PB1-5

Attenuation Properties of Electrically Large Periodic Structures Applying FEM

[Werner Renhart](#), Christian Tuerk, Thomas Bauernfeind, Christian A. Magele
Graz University of Technology, IGTE, Austria

PB1-6

The FEM-SRBCI Method for the Solution of Scalar Scattering Problems

Salvatore Alfonzetti¹, Giuseppe Borzi², [Nunzio Salerno](#)¹
¹University of Catania, Italy; ²University of Messina, Italy

PB1-7

Analysis of Microstrip Patch Antennas on Nanostructured Ceramic Substrate by an Iterative Method Based on Transversal Wave Concept

Valdemir Praxedes Silva Neto¹, Joemia Leilane Medeiros², [Adaildo Gomes Dassuncao](#)³,
Laercio Martins Mendonca⁴, Joao Bosco Oliveira⁵
¹Federal University of Rio Grande do Norte, Brazil; ²Federal University of Rio Grande do Norte, Brazil; ³Federal University of Rio Grande do Norte, Brazil; ⁴Federal University of Rio Grande do Norte, Brazil; ⁵Federal University of Rio Grande do Norte, Brazil

PB1-8

An Exponential Time Differencing Algorithm for the FDTD-PML Analysis of Nonlinear PBG Structures

Xu Zhuansun, Xikui Ma, [Qi Liu](#)
Xi'an Jiaotong University, People's Republic of China

PB1-9**On Proper Orthogonal Decomposition for Electromagnetic Wave Problems**

Yuki Sato, Hajime Igarashi
Hokkaido University, Japan

PB1-10**Analysis of Multilayer Amplifier Structure by an Efficient Iterative Technique**

Alexandre Serres¹, Georgina de Freitas Serres¹, Glauco Fontgalland¹, Raimundo Freire¹,
Henri Baudrand²

¹UFCG, Brazil; ²INPT, France

PB1-11**Cutoff Wavenumbers of Circular Metallic Waveguides with Eccentricity**

Aristides D. Kotsis, John A. Roumeliotis

National Technical University of Athens, Greece

PB1-12**Theoretical Calculation of Optical Transfer Functions in SiC Superlens Imaging System**

Seunghwa Baek, Kyoungsik Kim

Yonsei University, Republic of Korea (South Korea)

PB1-13**Enhanced Analysis of Multiconductor Nanostructured Devices via a Compact Block FDTD/VFETD Method**

Nikolaos V. Kantartzis¹, Theodoros Zygiridis², Theodoros Tsiboukis¹

¹Department of Electrical and Computer Engineering, Aristotle University of Thessaloniki, Greece; ²Department of Informatics and Telecommunications Engineering, University of Western Macedonia, Kozani, Greece

PB1-14**Temperature and Electromagnetic Field Distributions of Heat-Assisted Magnetic Recording for Bit-Patterned Media at Areal Density beyond 6 Tb/in²**

Arkorn Kaewrawang¹, Kotchakorn Pituso¹, Puttaphon Buatong¹, Apirat Siritaratiwat¹,
Anan Kruesubthaworn²

¹Khon Kaen University, Khon Kaen, Thailand; ²Khon Kaen University, Nong Khai Campus, Thailand

PB1-15**Optical Properties of Modified Nanorod Particles for Biomedical Sensing**

Renato Iovine, Luigi La Spada, Lucio Vegni

University of Roma Tre, Italy

PB1-16**Geometry of the 3D Schrodinger Problem and Comparison with Finite Elements Discretization**

Ruben Specogna, Francesco Trevisan

Università di Udine, Italy

PB1-17**Symmetry Breaking in Magnetic Vortex Formation near Shaped Boundary of Ferromagnetic Film**

Vladimir A. Skidanov, Petr M. Vetoshko, Fedor P. Vetosko, Alexander L. Stempkovskiy
Institute for Design Problems in Microelectronics RAS, Russian Federation

	<p>PB1-18 Homogenization of Periodic Structures Using the Finite Element Method *** & % <u>Istvan Bardi</u>, Jeffrey Tharp, Rickard Petersson ANSYS Inc., United States of America</p> <p>PB1-19 Unconventional Photolithography with Self-Assembled Plasmonic Nanostructures Anna Vermes, <u>Zsolt Szabó</u> % Department of Broadband Infocommunications and Electromagnetic Theory, Budapest University of Technology and Economics, Hungary</p> <p>PB1-20 3D FEM Quasimodal Analysis of the Haroche QED Cavity *** % Benjamin Vial, Guillaume Demesy, Frederic Zolla, <u>Andre Nicolet</u> Institut Fresnel, Aix-Marseille Université, France</p>
10:45am - 12:25pm Ballroom Foyer	PB2: Material Modeling 1 Session Chairs: Youguang Guo, Patrick Dular
	<p>PB2-1 Temperature Dependent Vector Hysteresis Model for Permanent Magnets *** & % <u>Anders Johan Bergqvist</u>¹, Dingsheng Lin², Ping Zhou² ¹ANSYS Inc, Sweden; ²ANSYS Inc, United States of America</p> <p>PB2-2 Influence of Skin Effect on Homogenization of Composite Materials: Application to Shielding Effectiveness *** & <u>Valentin Pr�eault</u>¹, Romain Corcolle¹, Laurent Daniel^{1,2}, Lionel Pichon¹ ¹Laboratoire de G�nie �lectrique de Paris, CNRS (UMR 8507)/SUPELEC/UPMC/Univ Paris-Sud, France; ²School of Materials, University of Manchester, M1 7HS, Manchester, United Kingdom</p> <p>PB2-3 A Differential Permeability 3D Formulation for Anisotropic Vector Hysteresis Analysis *** & <u>Joao Pedro Assumpcao Bastos</u>¹, Nelson Sadowski¹, Jean Vianei Leite¹, Nelson Jhoe Batistela¹, Gerard Meunier², Olivier Chadebec² ¹GRUCAD/EEL/UFSC, Brazil; ²G2Elab (UMR CNRS 5269, Grenoble INP, Universit� Joseph Fourier), Grenoble, France</p> <p>PB2-4 A FIT Formulation of Bianisotropic Materials over Polyhedral Grids *** & Piergiorgio Alotto¹, <u>Lorenzo Codecasa</u>² ¹Universit� di Padova, Italy; ²Politecnico di Milano, Italy</p> <p>PB2-5 Calculation of Basic Domain Width Considering Lancet Domains in (110)[001]Fe₃Si *** & <u>Keiji Iwata</u>^{1,2}, Satoshi Arai¹, Kazushi Ishiyama² ¹Nippon Steel & Sumitomo Metal Corporation, Japan; ²Research Institute of Electrical Communication, Tohoku University, Japan</p>

PB2-6**Improved Vector Play Model and Parameter Identification for Magnetic Hysteresis Materials**

Dingsheng Lin¹, Ping Zhou¹, Anders Johan Bergqvist²

¹Ansys Inc., United States of America; ²Ansys Inc., Sweden

PB2-7**Measurement and Modeling of Anisotropic Magnetostriction Characteristic of Grain-Oriented Silicon Steel Sheet under DC Bias**

Yanli Zhang, Jiayin Wang, Xiaoguang Sun, Baodong Bai, Dexin Xie
Shenyang University of Technology, People's Republic of China

PB2-8**Effect of Variation of DC Bias on Loss and Flux inside GO Electrical Steel Lamination**

Zhigang Zhao¹, Zhiguang Cheng², Norio Takahashi³, Behzad Forghani⁴, Fugui Liu¹,
Yongjian Li¹, Lanrong Liu², Junjie Zhang², Weili Yan¹

¹Joint Key Laboratory of EFEAR, Hebei University of Technology, People's Republic of China; ²R & D Center, Baoding Tianwei Group Co., Ltd, People's Republic of China; ³Dept. of E.E., Okayama University, Okayama, Japan; ⁴Infolytica Corporation, Canada

PB2-9**A New Algorithm to Consider the Effects of Core Losses on 3D Transient Magnetic Fields**

Ping Zhou, Dingsheng Lin, Chuan Lu, Ningning Chen, Marius Rosu
ANSYS, United States of America

PB2-10**Minor Hysteresis Loop Analysis for Magnetic Granular Systems with Local Distribution**

Kenichi Terashima¹, Kenji Suzuki¹, Katsuhiko Yamaguchi¹, Tetsuya Uchimoto²,
Toshiyuki Takagi²

¹Fukushima University, Japan; ²Tohoku University, Japan

PB2-11**Vector Jiles-Atherton Hysteresis Model and Its Application to Magnetizing Analysis for an Anisotropic Bonded NdFeB Magnet**

Dianhai Zhang, Ziyang Ren, C.S. Koh
Chungbuk National University, Republic of Korea (South Korea)

PB2-12**Comparison of Two Nonlinear Finite-Element Homogenization Methods for Laminated Iron Cores**

Ruth V. Sabariego¹, Innocent Niyonzima¹, Johan Gyselinck², Christophe Geuzaine¹

¹Dept. of Electrical Engineering and Computer Science (ACE), University of Liège, Belgium; ²BEAMS Department, Université Libre de Bruxelles (ULB), Belgium

PB2-13**Determination of the Magnetic Properties of Composites based on Reluctance Model** ()

Julio Carlos Teixeira¹, Élio Périgo², Fabio Henrique Pereira³, José Roberto Pascon⁴, Sílvia Ikuyo Nabeta⁴

¹UFABC, Brazil; ²Instituto de Pesquisas Tecnológicas, Brazil; ³Universidade Nove de Julho, Brazil; ⁴Escola Politécnica da USP, Brazil

PB2-14**Assesment Of 3 MA Technique Potentiality for Non Destructive Evaluation of Dual-Phase Steel Using 2D Non Linear FEM and Taking Hysteretic Behavior into Account** (+

Yasmine Gabi¹, Afef Kedous-Lebouc², Gerard Meunier², Bernd Wolter¹, Olivier Geoffroy², Philip Meilland³, Patrice Labie², Christophe Guerin⁴

¹IZFP Fraunhofer institute, Germany; ²G2elab, electrical engineering laboratory; ³ArcelorMittal, Maizières les metz; ⁴Cedrat group

PB2-15**A Study on the Deperming of Isotropic Ferromagnetic Material Using Vector M-B Preisach Model** (-

Hyuk Won¹, Hye Sun Ju², Gwan Soo Park²

¹Korea Marine Equipment Research Institute, Republic of Korea (South Korea); ²School of Electrical Engineering, Pusan National University, Republic of Korea (South Korea)

PB2-16**A Jiles-Atherton based Hysteresis Model for Magnetic Materials under Complex Magneto-mechanical Loadings** () %

Laurent Bernard, Xavier Mininger, Laurent Daniel, Jean Viane Leite, Nelson Sadowski, Nelson Jhoe Batistela
LGEP, France

PB2-17**Measurement and Modeling of Anhysteretic Curves** ()'

Seyed Ali Mousavi, Andreas Krings, Göran Engdahl, Ara Bissal
Royal Institute of Technology (KTH), Sweden

PB2-18**Vector Generalization of Uniaxial Models for Magnetomechanical Hysteresis and Magnetostriction** ())

Paavo Rasilo¹, Deepak Singh¹, Reijo Kouhia², Anouar Belahcen¹, Antero Arkkio¹

¹Aalto University, Finland; ²Tampere University of Technology, Finland

10:45am - 12:25pm
Corvina

PB3: Electrical Machines & Drives 2
Session Chairs: Markus Clemens, Johan Gyselinck

PB3-1

Characteristic Analysis Method of Irreversible Demagnetization in Single-phase LSPM Motor *) +

Byeong-Hwa Lee, Jae-Woo Jung, Kyu-Sub Kim, Jung-Pyo Hong
Hanyang University, Republic of Korea (South Korea)

PB3-2

Development of Electric Machine for Robot Eyes by Using Analytical Electromagnetic Field Computation Method *) -

Dongwoo Kang¹, Sunghong Won², Ho-Joon Lee¹, Ju Lee¹

¹Hanyang University, Republic of Korea (South Korea); ²Dong Yang Mirae University, Republic of Korea (South Korea)

PB3-3

Optimum Design of a Switched Reluctance Motor Fed by Asymmetric Bridge Converter Using Experimental Design Method *) *%

Takeo Ishikawa, Yoshinori Hashimoto, Nobuyuki Kurita
Gunma University, Japan

PB3-4

A Novel Stator and Rotor Dual Permanent Magnet Vernier Motor with Space Vector Pulse Width Modulation *) *'

Shuangxia Niu, S. L. Ho, W. N. Fu

The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)

PB3-5

Design and Analysis of Electric Controlled Permanent Magnet Excited Synchronous Machine *) *

Ryszard Palka, Piotr Paplicki, Marcin Wardach

West Pomeranian University of Technology, Poland

PB3-6

A Noble Method for Minimization of Cogging Torque and Torque Ripple for Interior Permanent Magnet Synchronous Motor *) *+

Ki-Chan Kim

Hanbat National University, Republic of Korea (South Korea)

PB3-7

Characteristic Analysis for Concentrated Multiple-layer Winding Machine with Optimum Turn Ratio *) *-

Hae-Joong Kim¹, Do-Jin Kim², Joong-Pyo Hong³

¹Hanyang University, Republic of Korea (South Korea); ²Hanyang University, Republic of Korea (South Korea); ³Hanyang University, Republic of Korea (South Korea)

PB3-8

Air-gap Magnetic Field Analysis of Wind Generator with PM Embedded Salient Poles by Analytical and Finite Element Combination Technique *) +%

Yujing Guo, Heyun Lin, Yunkai Huang, Shuhua Fang, Hui Yang, Kang Wang
Engineering Research Center for Motion Control of Ministry of Education, Southeast University, Nanjin, People's Republic of China

PB3-9**Magnet Flux Focusing Design of Double Stator Permanent Magnet Vernier Machine**

Fei Zhao¹, Thomas A. Lipo², Byung-il Kwon¹

¹Hanyang University, Republic of Korea (South Korea); ²University of Wisconsin-Madison, Madison, United States of America

PB3-10**Calculation of Core Loss of a Transverse Flux Motor with SMC Stator Core and Mild Steel Rotor Yoke**

Youguang Guo, Jianguo Zhu, Haiyan Lu

University of Technology Sydney, Australia

PB3-11**Comparison of Halbach and Dual-Side Vernier Permanent Magnet Machines**

Dawei Li, Ronghai Qu, Zhe Zhu

Huazhong University of Science and Technology, People's Republic of China

PB3-12**Optimal Rotor Design of an 150kW-Class IPMSM through the 3D Voltage-Inductance Map Analysis Method**

Tae-Chul Jeong, Mi-Jung Kim, Ki-Deok Lee, Jung-Ho Han, Hyun-Jong Park, Ju Lee
Hanyang University, Republic of Korea (South Korea)

PB3-13**Design and Characteristic Analysis of Novel Hybrid Transverse Flux Type Switched Reluctance Generator for Wind Turbine**

Sun-il Kang, Jin-hee Lee, Byung-il Kwon

Hanyang Univ., Republic of Korea (South Korea)

PB3-14**Core Loss Analysis for the Planar Switched Reluctance Motor**

J.F. Pan¹, F. J. Meng¹, Norbert Cheung²

¹School of Mechatronics and Control Engineering, Shenzhen University, P.R.C.;

²Department of Electrical Engineering, Hong Kong Polytechnic University, P.R.C.

PB3-15**Zero Torque Pulsation of Surface Permanent Magnet Synchronous Motor for Ship Gyro Stabilizer by Pole/Slot Number and Air-gap Designs**

Sun Kwon Lee^{1,2}, Gyu Hong Kang¹, Jin Hur², Byoung Woo Kim²

¹Korea Marine Equipment Research Institute, Republic of Korea (South Korea);

²University of Ulsan

PB3-16**Current Harmonics Loss Analysis of a 150kW-Class Traction Interior Permanent Magnet Synchronous Motor Through Co-analysis of d-q Axis Current Control and Finite Element Method**

Tae-Chul Jeong, Mi-Jung Kim, Jae-Jun Lee, Se-Young Oh, Ju Lee

Hanyang University, Republic of Korea (South Korea)

PB3-17**A New Quasi-3D Analytical Model of Axial Flux Permanent Magnets Machines**

Huguette Tiegna, Yacine Amara, Georges Barakat

University of Le Havre, France

PB3-18**Research on the Radial Electromagnetic Forces of an Inverter-Fed Induction Machine on Different Load Conditions Using FEM**

Tao Huang¹, Hailong Liu², Jiangjun Ruan¹, Yujiao Zhang³, Sichao Yi¹, Hengyu Ding¹, Yuanchao Hu¹

¹School of Electrical Engineering, Wuhan University, People's Republic of China; ²Wuhan Institute of Marine Electric Propulsion, CSIC, People's Republic of China; ³School of Electrical Engineering and Renewable Energy, China Three Gorges University, People's Republic of China

PB3-19**Fast Simulations of 3D Axial Switched Reluctance Motor Drives**

Konstantin Frank Porzig¹, Marek Ziolkowski¹, Hartmut Brauer¹, Tobias Kellerer¹, Sandro Purfürst²

¹TU Ilmenau, Germany; ²driveXpert, Germany

PB3-20**The Iron Loss Error Comparison of IPMSM according to Fitting Function**

Yong-Tae Kim, Gyu-Won Cho, Gyu-Tak Kim

changwon National University, Republic of Korea (South Korea)

PB3-21**A Fast Diagnosis Technique of Inter-Turn Fault in BLDC Motor Using Impedance Algorithm**

Chae-Lim Jeong, Jin Hur

University of Ulsan, Republic of Korea (South Korea)

PB3-22**Loss & Efficiency Comparisons of PMA-, CW-, Normal SynRMs by Coupled Preisach Models & FEM and Experiment**

Young Hyun Kim, Pil Won Lee, Jung Ho Lee

Hanbat National University, Republic of Korea (South Korea)

PB3-23**Design and Analysis of a Magnetless Dual-Mode DC-Excited Multitoothed Switched Reluctance Machine**

Christopher H.T. Lee, K.T. Chau, Chunhua Liu, Mu Chen

The University of Hong Kong, Hong Kong S.A.R. (China)

PB3-24**Permanent Magnet Motor Design for Turret Applications with Large Diameter**

Ji-Young Lee, Dae-Suk Joo, Do-Kwan Hong, Shi-Uk Chung, Byung-Chul Woo

Korea Electrotechnology Research Institute, Republic of Korea (South Korea)

PB3-25**Numerical Design Compatibility of Induction Motor with respect to Voltage and Current Source**

Jihyun Ahn¹, Cheol-Gyun Lee², Yong-Jae Kim³, Hyun-kyo Jung⁴, Sang-Yong Jung¹

¹Sungkyunkwan University, Republic of Korea (South Korea); ²Department of Electrical Engineering, Dong-Eui University, Republic of Korea (South Korea); ³Dept.of Electrical Engineering College of Engineering, Chosun University, Republic of Korea (South Korea); ⁴Seoul National University, Republic of Korea (South Korea)

<p>1:45pm - 3:25pm Corvina</p>	<p>PB4: Electromagnetic Compatibility + Nano-Electromagnetic Computation and Applications Session Chairs: Andre Nicolet, Werner Renhart</p>
	<p>PB4-1 Calculation of Current Distribution in the Lightning Protective System of a Residential House (S+) Ping Wang¹, <u>Lin Li</u>¹, Vladimir A. Rakov² ¹) State Key Laboratory of Alternate Electrical Power System with Renewable Energy Sources(North China Electric Power University), People's Republic of China; ²Department of ECE, University of Florida, United States of America</p> <p>PB4-2 Resultant Electric Field Reduction with Shielding Wires under Bipolar HVDC Transmission Lines (S) Feng Tian¹, Rong Zeng¹, Zhanqing Yu¹, <u>Han Yin</u>¹, Bo Zhang¹, Lei Liu², Min Li², Ruihai Li², Jinliang He¹ ¹Department of Electrical Engineering, Tsinghua University, People's Republic of China; ²Electric Power Research Institute, China Southern Power Grid, People's Republic of China</p> <p>PB4-3 Estimating Far-field Emissions from Simulated Near-field Data Using Neural Networks (M) Luciana Firmino¹, Adroaldo Raizer¹, <u>Yves Marechal</u>² ¹UFSC - PGEEL, Brazil; ²G2Elab, Grenoble Electrical Engineering Laboratory, France</p> <p>PB4-4 Electromagnetic Signature Study of a Power Inverter Connected to an Electric Motor Drive (M) Mohammadreza Barzegaran¹, Arash Nejadpak², <u>Osama Mohammed</u>³ ¹Florida International University, United States of America; ²Florida International University, United States of America; ³Florida International University, United States of America</p> <p>PB4-5 Modeling Approach for the Assessment of Field Distribution and Uniformity in Anechoic Chambers (M) <u>Irina Munteanu</u>^{1,2}, Ralf Kakerow³ ¹CST AG, Germany; ²Graduate School of Computational Engineering, TU Darmstadt, Germany; ³Continental Automotive GmbH, Germany</p> <p>PB4-6 Computational Analysis of Shielding Problems for System in Package using VEMC System (M) Boyuan Zhu¹, <u>Junwei Lu</u>¹, Ling Sun², Haiyan Sun², Lingling Yang², Mingcheng Zhu³ ¹Griffith University, Australia; ²Nantong University, China; ³Shenzhen University, People's Republic of China</p> <p>PB4-7 Reduction of EMI Effects in Motor Drives and Complex Power Electronic Systems <u>Matthew McDonough</u>, Pourya Shamsi, Babak Fahimi (M) The University of Texas at Dallas, United States of America</p>

PB4-8**A Methodology for Modeling a Power Cable in Frequency Domain**

Ahmed Hassan, Moawia Al-Hamid, Ralf Vick
Otto-von-Guericke University Magdeburg, Germany

PB4-9**Absorbing Surfaces using EBG Structures**

Stylios D. Assimonis, Theofano M. Kollatou, Traianos V. Yioultsis, Christos S. Antonopoulos
Aristotle University of Thessaloniki, Greece

PB4-10**Calculation of the Lightning Electromagnetic Fields Using Non-uniform FDTD Mesh with Soil Ionization**

Taobin Jin, Boyuan Zhang, Yuelong Jia, Jun Zou, Jiansheng Yuan
Tsinghua University, People's Republic of China

PB4-11**Ground Effects on Electrical Fields around Power Line Carrier Channels**

Francisco Rodrigues Sabino Jr., Gabriel Gonçalves Machado, Marcos Tavares de Melo, Luiz Henrique Alves de Medeiros
UFPE, Brazil

PB4-12**A Kind of Tortuosity Lightning Channel Model and Calculation of Its Radiated Fields**

Yan Zhang, Youhua Wang, Fugui Liu, Rongmei Liu, Yongjian Li
Province-Ministry Joint Key Lab of Electromagnetic Field and Electrical Apparatus Reliability Hebei University of Technology, People's Republic of China

PB4-13**Near-infrared Invisibility Cloak Engineered with Two-phase Metal-dielectric Composites**

Koppány István Körmöczi, Zsolt Szabó
Budapest University of Technology and Economics, Hungary

PB4-14**Computation of Effective Surface and Bulk Parameters of Electromagnetic Metamaterials**

Xiaoyan Y.Z. Xiong¹, Li Jun Jiang¹, Vadim A. Markel², Igor Tsukerman³
¹Department of Electrical and Electronic Engineering, The University of Hong Kong;
²Departments of Radiology and Bioengineering, University of Pennsylvania; ³The Univ. of Akron, United States of America

PB4-15**Dirichlet-to-Neumann Transparent Boundary Conditions for Photonic Crystal Wave-guides**

Dirk Klindworth, Kersten Schmidt
Technische Universität Berlin, Germany

PB4-16**Statistical Study of high-Q Photonic Crystal Resonators**

Bastian Bandlow, Rolf Schuhmann
TU Berlin, Germany

	<p>PB4-17 Parallel Finite Difference Time Domain Codes for Electromagnetic Metamaterial Calculations (((' - <u>Zsolt Szabó</u>, Arnold Kalvach Department of Broadband Infocommunications and Electromagnetic Theory, Budapest University of Technology, Hungary</p> <p>PB4-18 Efficient Implementation of the CFS-PML on a Curved Two-Dimensional Domain <u>Alex Sander Moura</u>¹, Rodney Rezende Saldanha², Élson José Silva²,((% Adriano Chaves Lisboa³, Werley Gomes Facco⁴ ¹UFJF, Brazil; ²UFMG, Brazil; ³ENACOM, Brazil; ⁴IFES, Brazil</p> <p>PB4-19 Optimization of a Thin Film Solar Cell with Metallic Nanoparticles ((('(Giovanni Aiello¹, Salvatore Alfonzetti¹, Giuseppe Borzi², Viviana Chiarello¹, <u>Nunzio Salerno</u>¹ ¹DIEEI - University of Catania, Italy; ²DIC - University of Messina, Italy</p> <p>PB4-20 Computation of Transient Electromagnetic Fields Surrounding Grounding Systems <u>Moussa Lefouili</u>¹, Ilhem Hafsaoui¹, Kamal Kerroum², Khalil Elkhamlichi Drissi².....((¹LAMEL Laboratory, Jijel University, Algeria; ²Institut Pascal, Blaise Pascal Université, France</p>
<p>1:45pm - 3:25pm Corvina</p>	<p>PB5: Numerical Techniques 2 + Software Methodology Session Chairs: Ruth V. Sabariego, Tetsuji Matsuo</p>
	<p>PB5-1 Lazy Cohomology Generators: A Breakthrough in (Co)Homology Computations for CEM (((+ Pawel Dlotko², <u>Ruben Specogna</u>¹ ¹Università di Udine, Italy; ²Jagiellonian University in Krakow, Poland</p> <p>PB5-2 Finite Element Analysis of Three-Phase Three-Limb Power Transformers under DC Bias (((- <u>Oszkár Bíró</u>¹, Gergely Koczka², Gerald Leber², Kurt Preis¹, Bernhard Wagner² ¹IGTE/TU Graz, Austria; ²Siemens AG Austria - Transformers Weiz</p> <p>PB5-3 Adaptive Discontinuous Galerkin Method for Transient Analysis of Eddy Current Fields in High-speed Rotating Solid Rotors ((()%) <u>S. L. Ho</u>, Yanpu Zhao, W. N. Fu The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)</p> <p>PB5-4 A Split Step Precise Integration Time Domain Method and its Numerical Dispersion ((()' <u>Qi Liu</u>, Xikui Ma, Xu Zhuansun Xi'an Jiaotong University, People's Republic of China</p>

PB5-5
Parallel Multigrid Acceleration for the Finite Element Gaussian Belief Propagation Algorithm (*)

Yousef El-Kurdi, Warren Gross, Dennis Giannacopoulos
McGill University, Canada

PB5-6
Stochastic Finite Integration Technique Formulation for Electrokinetics (*)

Lorenzo Codecasa, Luca Di Rienzo
Politecnico di Milano, Italy

PB5-7
Computed Basis Functions and the Nonconforming Voxel Finite Element Method

Moein Nazari, Jon P. Webb (*)
McGill University, Canada

PB5-8
Initial Value Problem Formulation of 3D Time Domain Boundary Element Method

Hideki Kawaguchi¹, Seiya Itasaka¹, Thomas Weiland² (*)

¹Muroran Institute of Technology, Japan; ²Technische Universitaet Darmstadt, Germany

PB5-9
Fast Multipole Method Accelerated Meshfree Post-Processing in 3D Boundary Element Methods (*)

André Buchau, Wolfgang M. Rucker

Universität Stuttgart, Institut für Theorie der Elektrotechnik, Germany

PB5-10
Efficient Numerical Integration for Post-processing and Matrix Assembly of Finite Element Subdomains (*)

Ryan Galagusz, Steve McFee

McGill University, Canada

PB5-11
Energetic Galerkin Projection of Electromagnetic Fields between Different Meshes

Zifu Wang¹, Zuqi Tang², Thomas Henneron², Francis Piriou², Jean-Claude Mipo¹ (*)

¹Valeo, France; ²L2EP, University of Lille 1, France

PB5-12
Temporal Length for Sub-Domain Models in Multi-Physics and System Analysis (*)

Aron Antal Szucs

ABB OY, Motors and Generators, Finland

PB5-13
A Novel Hybrid Method Combining DGTD and TDIE for Wire Antenna-Dielectric Interaction (*)

S. P. Gao^{1,2}, Y. L. Lu¹, Q. S. Cao²

¹Nanyang Technological University, Singapore; ²Nanjing University of Aeronautics and Astronautics, China

PB5-14
Spherical Harmonics Coefficients of All Magnetic Field Components Generated by Iron Piece (*)

So Noguchi¹, SeokBeom Kim²

¹Hokkaido University, Japan; ²Okayama University, Japan

<p>PB5-15 Modeling of Inductors Printed on Flexible Substrates Including the Edge Effect“(+)” <u>Nikola Jeranč</u> Faculty of Technical Sciences Novi Sad, Serbia</p>
<p>PB5-16 Galerkin Finite Element Method for Calculating 3D Ion Flow Field“(++)” Yongzan Zhen, Xiang Cui, <u>Tiebing Lu</u>, Xuebao Li, Xiangxian Zhou North China Electric Power University, People’s Republic of China</p>
<p>PB5-17 A Distributed Parallel Approach using the Conjugate Gradient Method and the N-Scheme on FEM cases“(+)” Juliana Eyng¹, <u>João Pedro Assumpção Bastos</u>¹, Mário Antônio Ribeiro Dantas¹, Maginot Júnior¹, Marcos Fischborn² ¹Universidade Federal de Santa Catarina, Brazil; ²Universidade Tecnológica Federal do Paraná, Brazil</p>
<p>PB5-18 Homogenization Techniques of Conductive and Non-magnetic Components Taking Account of Eddy Currents in Magnetic Field Analysis“(, %)” Lin Cheng, <u>Kenji Ikenaga</u>, Yanhui Gao, Hiroshi Dozono, Kazuhiro Muramatsu Saga University, Japan</p>
<p>PB5-19 A Finite-Resistance-Network Based Method to Determine the Equivalent DC Resistance of a Conducting Region“(, ')” Marco Arjona, <u>Roberto B.B. Ovando-Martinez</u>, Coni Hernandez Instituto Tecnológico de la Laguna, Mexico</p>
<p>PB5-20 The Element Method Applied to Solve Electromagnetic Scattering Problem“(,)” Marcio Matias Afonso¹, <u>Brahim Ramdane</u>², Yves Marechal², Benoit Delinchant², Marco Aurélio de Oliveira Schroeder¹, Ursula do Carmo Resende¹ ¹CEFET-MG, Brazil; ²G2ELAB, France</p>
<p>PB5-21 Efficient Preconditioned Conjugate Gradient Parallelization on GPU“(, +)” <u>Ana Flávia Peixoto de Camargos</u>^{1,2}, Viviane C. Silva¹ ¹Escola Politécnica da Universidade de São Paulo, Brazil; ²Instituto Federal de Educação, Ciência e Tecnologia de Minas Gerais (IFMG) – Departamento de Engenharia</p>
<p>PB5-22 Computation Code of Software Component for the Design by Optimization of Electromagnetical Devices“(, -)” <u>Hoa Nguyen Xuan</u>, Laurent Gerbaud, Lauric Gabuio, Frédéric Wurtz Grenoble Electrical Engineering Laboratory (Grenoble INP-UJF, CNRS UMR 5529), France</p>
<p>PB5-23 Improving a Time Domain Spherical Multipole Near-to-far-field Transformation Algorithm“(, - %)” <u>Glaucio Lopes Ramos</u>¹, Cássio Gonçalves Rego², Alexandre Ramos Fonseca³ ¹UFSJ, Brazil; ²UFMG, Brazil; ³UFVJM, Brazil</p>

	<p>PB5-24 A New and Simple Technique for Vectorization of Finite Element Method in Electromagnetics (-' Carlos Henrique Veloso¹, Antonio Manoel Frasson², Kleber Zuza Nobrega¹ ¹Instituto Federal do Maranhao, Brazil; ²Universidade Federal do Espirito Santo</p>
<p>1:45pm - 3:25pm Ballroom Foyer</p>	<p>PB6: Devices & Applications 2 Session Chairs: Zhuoxiang Ren, Renato Mesquita</p>
	<p>PB6-1 Modeling Coreless Transformers with Relative Large Wire Gauge using an Optimization Method (-) Renan Bergonsi Muller, Daniela Wolter Ferreira, Luiz Lebensztajn Universidade de São Paulo, Brazil</p> <p>PB6-2 Simulation Based Design of HF-Resonators for Damping of Very Fast Transients in GIS (- + Jasmin Smajic, Abdolhamid Shoory, Simon Burow, Walter Holaus, Uwe Riechert, Stefan Tenbohlen University of Applied Sciences of Eastern Switzerland, Switzerland</p> <p>PB6-3 Aspect Independent Spherical Target Recognition Using Structural Features of Scattered Signals (- - Alper Selver¹, Yesim Zoral², Suat Dorak³ ¹Dokuz Eylul University, Turkey; ²Dokuz Eylul University, Turkey; ³Dokuz Eylul University, Turkey</p> <p>PB6-4 3D Finite Element Analysis of Conductive Coupling Problems in Transmission Line Rights of Way (%) S% Lucas Blattner Martinho¹, Viviane Cristine Silva¹, Mário Leite Pereira Filho², Marcelo Facio Palin³, Sérgio Luis Lopes Verardi³, José Roberto Cardoso¹ ¹Escola Politécnica da Universidade de São Paulo, Brazil; ²Instituto de Pesquisas Tecnológicas, Brazil; ³InSciTi Consultoria e Desenvolvimento de Software, Brazil</p> <p>PB6-5 Forward Model Computation of Quasi-static Magnetic Fields inside Electric Vehicles (%) S Olivier Pinaud¹, Olivier Chadebec¹, Laure Line Rouve¹, Jean Michel Guichon¹, Andrea Vassilev² ¹G2Elab, UMR CNRS, Grenoble INP, Université Joseph Fourier Grenoble, France; ²CEA-Leti MINATEC Grenoble, France</p> <p>PB6-6 Static Characteristics of Novel Air-cored Linear and Rotary Halbach Permanent Magnet Actuator (%) S Ping Jin Hohai University, People's Republic of China</p>

PB6-7**Design Analyses of a Hybrid Suspension System for Scooter Application **) \$**

Cheng-Tsung Liu¹, Wei-Ping Lin¹, Chang-Chou Hwang²

¹National Sun Yat-Sen University, Taiwan, Republic of China; ²Feng Chia University, Taiwan, Republic of China

PB6-8**Analysis and Performance Evaluation of a Novel High Reliability Linear Switch Reluctance Machine for Low Cost Conveyor Applications **) \$**

Daohan Wang¹, Xiuhe Wang¹, Sang-Yong Jung²

¹Shandong University, People's Republic of China; ²Sungkyunkwan University, Republic of Korea (South Korea)

PB6-9**Design of Wireless Power Transmission for a Charge while Driving System **) %**

Davide Bavastro, Aldo Canova, Vincenzo Cirimele, Fabio Freschi, Luca Giaccone, Paolo Guglielmi, Maurizio Repetto
Politecnico di Torino, Italy

PB6-10**FEM-Simulation of Magnetic Shape Memory Actuators **) %**

Thomas Schiepp¹, Manuel Maier¹, Emmanouel Pagounis¹, Andreas Schlüter², Markus Laufenberg¹

¹ETO MAGNATIC GmbH, Germany; ²University of Applied Sciences Munich

PB6-11**A Study on Novel Slotless Design of Variable Reluctance Resolver **) %**

Ki-Chan Kim

Hanbat National University, Republic of Korea (South Korea)

PB6-12**A Design Proposal for Optimal Transcutaneous Energy Transmitters **) %**

Daniela Wolter Ferreira¹, Luiz Lebensztajn¹, Laurent Krähenbühl², Florent Morel², Christian Vollaire²

¹Escola Politécnica da Universidade de São Paulo, Brazil; ²École Centrale de Lyon, France

PB6-13**An Optimal Design of Compact Ring-slot type Rectenna with Numerical Manipulation **) %**

Koon-Tae Kim², Hyeong-Seok Kim², Kyung Choi¹

¹Kangwon National University, Republic of Korea (South Korea); ²Chung-Ang University, Republic of Korea (South Korea)

PB6-14**A 3D Electromagnetic Analysis and Circuit Modeling for Wireless Charging of Electrical Vehicles **) %**

Mohammad Fawwaz Ibrahim, Lionel Pichon, Laurent Bernard, Adel Razek
Laboratory of Electrical Engineering of Paris (LGEP), France

PB6-15**Design Cycle of Electromechanical Actuator Based on VHDL-AMS Modeling **) &**

Abir Rezgui¹, Benoit Delinchant¹, Laurent Gerbaud¹, Julien Henri-Rousseau², Roger Franchino²

¹G2ELAB, Grenoble Electrical Engineering lab, Grenoble University, France; ²Schneider Electric, France

	<p>PB6-16 Modeling and Simulation of Medium Voltage Cable in Time Domain Using Fitting Method & <u>Ming Tang</u>¹, Jianyang Sun², Jianzhao Guo², Hong-Jie Li¹, Wei Zhang¹, Deliang Liang¹ ¹State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering Xian JiaoTong University, People's Republic of China; ²Quanzhou Power Supply Ltd., People's Republic of China</p>
3:25pm - 3:50pm	Coffee Break
3:50pm - 5:30pm Ballroom	<p>OB2: Optimization & Design 2 Session Chairs: Stéphane Clénet, C.S. Koh</p>
	<p>OB2-1 Novel Topology Optimization Based on On-Off Method and Level Set Approach & <u>Yuki Hidaka</u>, Takahiro Sato, Hajime Igarashi Graduate School of Information Science and Technology, Japan</p> <p>OB2-2 A Multiobjective Approach of Differential Evolution Optimization Applied to Electromagnetic Problems & Luiz Lebensztajn, <u>Gustavo Caravaggi Tenaglia</u> Escola Politécnica da Universidade de São Paulo, Brazil</p> <p>OB2-3 An Architecture for Embedding Knowledge in the Design of Electromagnetic Devices <u>David Lowther</u>, Ernest Freeman, Jon Webb Infolytica Corporation, Canada</p> <p>OB2-4 Axial-Flux Generator Robust Design Aided by Numerical Electromagnetic Field Computation <u>Claret Laurente Sabioni</u>, Selênio Rocha Silva, João Antônio Vasconcelos Federal University of Minas Gerais, Brazil</p> <p>OB2-5 Bouc-Wen Hysteresis Model Identification by the Metric-Topological-Evolutionary Optimization Antonino Laudani, <u>Francesco Riganti Fulginei</u>, Alessandro Salvini University of RomaTre, Italy</p>
5:40pm - 7:00pm	<p>TEAM: Benchmarking Session Chair: Oszkár Bíró</p>
	<p>TEAM-1 A Benchmark Problem for Eddy Current Nondestructive Evaluation + Theodoros Theodoulidis¹, John Martinos¹, Nikolaos Poulakis², <u>Antonello Tamburrino</u>³ ¹University of Western Macedonia, Greece; ²Technological Education Institute of Western Macedonia, Greece; ³University of Cassino, Italy</p> <p>TEAM-2 A Benchmark CAD Mobile Phone Model for Specific Absorption Rate Calculations - <u>Vikass Monebhurrn</u>¹, Yannis Braux², Harald Devos³, Mikhail Kozlov⁴, Winfried Simon⁵, Tilmann Wittig⁶ ¹SUPELEC, France; ²CST, France; ³Agilent, Belgium; ⁴Max Planck Institute, Germany; ⁵IMST, Germany; ⁶CST, Germany</p> <p>TEAM-3 A Benchmark Problem of Vector Magnetic Hysteresis for Numerical Models (% Ermanno Cardelli, <u>Antonio Faba</u> Department of Industrial Engineering, University of Perugia, Perugia, Italy</p>

Date: Wednesday, 03/Jul/2013	
8:30am - 10:10am Ballroom	OC1: Material Modeling 2 (dedicated to the memory of Norio Takahashi) Session Chairs: Osama Mohammed, Hajime Igarashi
	<p>OC1-1 Iron Loss Calculation in Steel Laminations at High Frequencies (') (' <u>Francois Henrotte</u>¹, Simon Steentjes², Christophe Geuzaine³, Kay Hameyer² ¹UCL, Belgium; ²IEM RWTH-Aachen, Germany; ³ACE, ULg</p> <p>OC1-2 Convolution-Free Modelling of Dispersive Media in the Time-Domain Finite-Element Solution of the Vector Wave Equation (') () <u>Ali Akbarzadeh Sharbaf</u>, Dennis D. Giannacopoulos McGill University, Canada</p> <p>OC1-3 Numerical Modeling of Hysteresis in Si-Fe Steels (') (+ Ermanno Cardelli¹, Edward Della Torre², <u>Antonio Faba</u>¹ ¹Department of Industrial Engineering, University of Perugia, Perugia, Italy; ²The George Washington University, United States of America</p> <p>OC1-4 Complex-Variable Vector Magnetic Characteristic Analysis considering Residual Stress Effect (') (- Shingo Zeze, Yuichiro Kai, <u>Takashi Todaka</u>, Masato Enokizono Oita University, Faculty of Engineering, Japan</p>
10:10am - 10:35am	Coffee Break
10:35am - 12:15pm Ballroom Foyer	PC1: Bio-Electromagnetic Computation and Applications + Education Session Chairs: Hartmut Brauer, Maurizio Repetto
	<p>PC1-1 A Novel Inversion Technique for Imaging Thrombus Volume in Microchannels Fusing Optical and Impedance Data (') (') % Antonio Affanni¹, Giovanni Chiorboli², Lorenzo Codecasa³, Maria Rita Cozzi⁴, Luigi De Marco⁴, Mario Mazzucato⁴, Carlo Morandi², <u>Ruben Specogna</u>¹, Marco Tartagni⁵, Francesco Trevisan¹ ¹Università di Udine, Italy; ²Università di Parma, Italy; ³Politecnico di Milano, Italy; ⁴National Cancer Institute CRO-IRCCS, Aviano (PN), Italy; ⁵Università di Bologna, Italy</p> <p>PC1-2 Electromagnetic Actuation System using Helmholtz Pairs for Micro-robot Locomotion (') (')' <u>Chan Park</u>¹, Jeonghoon Yoo², Jinsoo Kim³, Seung-Jong Kim⁴ ¹Graduate School of Mechanical Engineering, Yonsei University, Republic of Korea (South Korea); ²School of Mechanical Engineering, Yonsei University, Republic of Korea (South Korea); ³Center for Bionics, Korea Institute of Science and Technology, Republic of Korea (South Korea); ⁴Center for Bionics, Korea Institute of Science and Technology, Republic of Korea (South Korea)</p>

PC1-3**Induced Current Calculation in Detailed 3D Adult and Child Model for the WPT Frequency Range**

Hye-Jin Song¹, Hansu Shin¹, Hyang-Beom Lee¹, Jae-Hun Yoon², Jin-Kyu Byun¹

¹Soongsil University, Republic of Korea (South Korea); ²Electronics and Telecommunications Research Institute, Republic of Korea (South Korea)

PC1-4**A Strategy for the Combined Estimation of Tissues Properties and Brain Sources in EEG-MEG Analysis**

Fabrizio Ferraioli, Alessandro Formisano, Raffaele Martone
Seconda Università di Napoli, Italy

PC1-5**Comparison between Electric Field Analysis Methods Induced in Human Body by ELF Magnetic Field**

Yasuhito Takahashi¹, Akira Ahagon², Koji Fujiwara¹, Takeshi Iwashita³, Hiroshi Nakashima³

¹Doshisha University, Japan; ²Science Solutions International Laboratory, Inc., Japan; ³Kyoto University, Japan

PC1-6**Deep Brain Stimulation Models Incorporating Electrode-Tissue Interfaces**

Charles T. M. Choi, Yi-Lin Tsou

National Chiao Tung University, Taiwan, China

PC1-7**Analysis of Magnetic Disturbance due to Paramagnetic Metallic Implant in Magnetic Resonance Imaging**

Yanhui Gao¹, Yui Esaki¹, Hiroshi Dozono¹, Kazuhiro Muramatsu¹, Toru Yamamoto²

¹Saga University, Japan; ²Hokkaido University, Japan

PC1-8**A Numerical Computation Model of Electrical Impedance Tomography Forward Problem Based on Generalized Finite Element Method**

Xueying Zhang, Guizhi Xu, Shuai Zhang, Youhua Wang, Weili Yan, Yongjian Li, Yonguang Guo

Hebei University of Technology, People's Republic of China

PC1-9**Electromagnetic Field Computation in Human Body Exposed to Wireless Inductive Charging System**

Ping-Ping Ding, Lionel Pichon, Laurent Bernard, Adel Razek

Laboratoire de Génie Electrique de Paris (LGEPE), UMR8507 CNRS/SUPELEC/Univ. Paris Sud/Univ. Pierre et Marie Curie, France

PC1-10**Error Estimation in the Computation of Induced Current of Human Body in the Case of Low Frequency Magnetic Field Excitation**

Thomas Lelong¹, Zuqi Tang², Riccardo Scorretti³, Pierre Thomas¹, Yvonnick Le Menach², Emmanuel Creusé⁴, Francis Piriou², Noel Burais³, Cécile Miry¹, Isabelle Magne¹

¹EDR R&D, France; ²L2EP, Université Lille 1, France; ³Ampère-Lab UMR 5005 CNRS, Université Lyon 1, France; ⁴LPP UMR 8524 and INRIA Lille Nord Europe, France

PC1-11**Evaluation of Electromagnetic Phenomena Induced by Transcranial Magnetic Stimulation** **) +%

Oriano Bottauscio¹, Mario Champi², Luca Zilberti¹, Mauro Zucca¹

¹Istituto Nazionale di Ricerca Metrologica, Italy; ²Dip. Energia, Politecnico di Torino, Italy

PC1-12**Massively Parallelized Boundary Element Simulation of Voxel-based Human Models Exposed to MRI fields** **) +'

Oriano Bottauscio¹, Mario Chiampi², Luca Zilberti¹

¹Istituto Nazionale di Ricerca Metrologica, Torino, Italy; ²Politecnico di Torino, Italy

PC1-13**A Note on Faraday Paradoxes** **) +)

Bernhard Auchmann¹, Stefan Kurz², Stephan Russenschuck¹

¹CERN, Switzerland; ²TUT, Finland

PC1-14**Approximate and Proper Electromagnetic Modeling in Moving Conductors** **) ++

Sándor Bilicz, Szabolcs Gyimóthy

Budapest University of Technology and Economics, Hungary

PC1-15**A New 3-D Visualization System of Magnetic Field with Augmented Reality Technology for Education** **) +

Shinya Matsutomo¹, Kenta Mitsufuji¹, Yuta Hiasa¹, Fumiaki Nobuyama², So Noguchi²

¹Niihama National College of Technology, Japan; ²Graduate School of Information Science and Technology, Hokkaido University, Japan

PC1-16**Combined Use of Measurements, Simulation and Numerical Computation of Magnetic Fields for Power Electronics Teaching** **) , %

Rosa Ana Salas, Jorge Pleite

Universidad Carlos III de Madrid, Spain

PC1-17**Large-scale Analyses of Electromagnetic Fields Using Numerical Human Body Models** **) , '

Amane Takei¹, Kouhei Murotani², Shin-ichiro Sugimoto², Masao Ogino³, Shinobu Yoshimura²

¹Tomakomai National College of Technology, Japan; ²The University of Tokyo; ³Nagoya University

10:35am - 12:15pm Corvina	PC2: Numerical Techniques 3 Session Chairs: Kurt Preis, Hideki Kawaguchi
	<p>PC2-1 Acceleration of Dynamic Bubble Mesh Generation for Large-Scale Model ()),) <u>Fumiaki Nobuyama</u>, So Noguchi, Hajime Igarashi Hokkaido University, Japan</p> <p>PC2-2 Adaptive Cross Approximation Technique for Volume Integral Method Applied to Nonlinear Magnetostatic Problems ()), + Bertrand Bannwarth¹, Anthony Carpentier¹, Vinh Le-Van¹, <u>Olivier Chadebec</u>^{1,2}, Gérard Meunier¹, Jean-Michel Guichon¹ ¹G2ELAB, Grenoble, France; ²GRUCAD/EEL/CTC/UFSC, Florianópolis, Brazil</p> <p>PC2-3 Modeling of Trichel Pulses in the Negative Corona on a Line-to-plane Geometry ()), - <u>Han Yin</u>, Bo Zhang, Jinliang He, Chijie Zhuang Tsinghua University, People's Republic of China</p> <p>PC2-4 A Posteriori Error Bounds for Krylov-based Fast Frequency Sweeps of Finite Element Systems (")) - % Yves Konkel, <u>Ortwin Farle</u>, Romanus Dyczij-Edlinger Chair for Electromagnetic Theory, Saarland University, Germany</p> <p>PC2-5 A Fast Frequency-domain Parameter Extraction Method Using Time-domain Finite-element Method (")) - ' <u>W. N. Fu</u>, Xiu Zhang, S. L. Ho The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)</p> <p>PC2-6 GPU-Accelerated Efficient Implementation of FDTD Methods with Optimum Time-Step Selection (")) -) <u>Theodoros Zygiridis</u>¹, Nikolaos Kantartzis², Theodoros Tsiboukis² ¹Univ. of Western Macedonia, Greece; ²Aristotle Univ. of Thessaloniki, Greece</p> <p>PC2-7 Extended Finite Element Method for Electric Field Analysis (")) - + Nana Duan¹, Guolin Wang¹, Weijie Xu¹, <u>Shuhong Wang</u>¹, Jie Qiu¹, Jian Guo Zhu² ¹Xi'an Jiaotong University, People's Republic of China; ²University of Technology, Sydney, NSW 2007, Australia</p> <p>PC2-8 Isogeometric Finite Elements with Surface Impedance Boundary Conditions (")) - - Rafael Vazquez¹, Annalisa Buffa¹, <u>Luca Di Rienzo</u>², Dongwei Li³ ¹Istituto di Matematica Applicata e Tecnologie Informatiche del CNR; ²Politecnico di Milano, Italy; ³Ohio State University, United States of America</p> <p>PC2-9 Circuit-Oriented Solution of Drude Dispersion Relation by the FD2TD (")) * \$% Silvano Cruciani¹, Valerio De Santis², Francesca Maradei³, <u>Mauro Feliziani</u>¹ ¹University of L'Aquila, Italy; ²IT²IS Foundation; ³Sapienza University of Rome, Italy</p>

PC2-10**Compatible h-p Adaptive Refinement Strategies for Finite Element Electromagnetic Analysis in High Performance Parallel Computing Environments ***\$**Steve McFee, [Dennis Giannacopoulos](#)
McGill University, Canada**PC2-11****Comparison of Non-Overlapping Domain Decomposition Methods for the Parallel Solution of Magnetic Field Problems ***\$**[Dániel Marcsa](#), Miklós Kuczmann
Széchenyi István University, Hungary**PC2-12****To Smooth Vertices in Field Analysis Problems, or Not to Smooth ***\$+**[Eugenio Costamagna](#)
University of Pavia, Department of Industrial and Information Engineering (Retired), Italy**PC2-13****Efficient Numerical Algorithms on Large Scale Magnetic Field Problems Using an Iterative Domain Decomposition Method ***\$**[Daisuke Tagami](#)
Kyushu University, Japan**PC2-14****Using AMG to Accelerate Finite Differences by GPUs in Electromagnetic/Thermal Field Simulations ***%**[Christian Richter](#)¹, Sebastian Schöps², Markus Clemens¹
¹Bergische Universität Wuppertal, Germany; ²Technische Universität Darmstadt, Germany**PC2-15****Acceleration Technique for Extended Boundary Node Method ***%**[Ayumu Saitoh](#)¹, Taku Itoh², Nobuyuki Matsui¹, Atsushi Kamitani³
¹University of Hyogo, Japan; ²Tokyo University of Technology, Japan; ³Yamagata University, Japan**PC2-16****Asymptotic Boundary Element Methods for Thin Conducting Sheets in Two Dimensions ***%**[Kersten Schmidt](#)¹, Ralf Hiptmair²
¹Technische Universität Berlin, Germany; ²ETH Zurich, Switzerland**PC2-17****Multiply Connected 3D Transient Problem with Rigid Motion Associated with T- Ω Formulation ***%**Chuan Lu, Ping Zhou, Dingsheng Lin, Bo He, [Dinkow Sun](#)
Ansys Inc., United States of America**PC2-18****An Iterative Algorithm for the Fast Analysis of Anisotropic Magnetic Shields ***%**[Luca Giaccone](#), Carlo Ragusa
Politecnico di Torino, Italy**PC2-19****Reducing the Cost of Mesh-to-mesh Data Transfer ***&%**[Antoine Journeaux](#)¹, Frederic Bouillault¹, Jean-Yves Roger²
¹Laboratoire de Genie Electrique de Paris, France; ²EDF R&D, Clamart France

	<p>PC2-20 Evaluation of Singular Integral Equation in MoM Analysis of Arbitrary Wire Structures ***& Maicon Vaz Moreira, <u>Ursula do Carmo Resende</u>, Marcio Matias Afonso Federal Center for Technological Education of Minas Gerais, Brazil</p> <p>PC2-21 A Novel Approach to Deal with Rotationally Symmetrical Conditions for 3D Eddy Current Field Problems ***& S. L. Ho¹, <u>Shiyu Yang</u>² ¹The Hong Kong Polytechnic University, Hong Kong; ²Zhejiang University, People's Republic of China</p> <p>PC2-22 Domain Decomposition Method used in Reducing Error near Boundaries Based on Combined RBF Collocation ***& Yang Zou¹, K. R. Shao¹, Xiaoming Chen¹, Gang Lei², <u>Youguang Guo</u>², Jianguo Zhu² ¹College of Electrical and Electronic Engineering, Huazhong University of Science and Technology, China; ²Faculty of Engineering and information technology, University of Technology, Australia</p>
10:35am - 12:15pm Corvina	PC3: Electrical Machines & Drives 3 Session Chairs: Karl Hollaus, Stanislaw Gratkowski
	<p>PC3-1 Design of Saliency-based Sensorless Controlled IPMSM with Concentrated Winding for EV Traction ***& Myung Seop Lim¹, Seung Hee Chai¹, Byeong Hwa Lee¹, <u>Jung Pyo Hong</u>¹, Jung Ik Ha² ¹Hanyang university, Republic of Korea (South Korea); ²Seoul National univeristy, Republic of Korea (South Korea)</p> <p>PC3-2 A Novel Calculation Method on the Current Information of Vector Inverter for Interior Permanent Magnet Synchronous Motor for Electric Vehicle ***' % <u>Ki-Chan Kim</u> Hanbat National University, Republic of Korea (South Korea)</p> <p>PC3-3 Improvement of Convergence Behavior for Steady-State Analysis of Permanent Magnet Synchronous Motor ***' ' <u>Hirokatsu Katagiri</u>, Yoshihiro Kawase, Tadashi Yamaguchi Gifu University, Japan</p> <p>PC3-4 Airgap Reluctance Identification for the Magnetic Equivalent Circuit Modelling of Induction Machines ***') <u>Johan Gyselinck</u>¹, Ruth V. Sabariego² ¹Université Libre de Bruxelles (ULB), Belgium; ²Université de Liège (ULg), Belgium</p> <p>PC3-5 Pole-Changing of DC-Excited Dual-Memory Machines ***' + Fuhua Li, K.T. Chau, Chunhua Liu, <u>Christopher H.T. Lee</u>, Mu Chen The University of Hong Kong, Hong Kong S.A.R. (China)</p>

PC3-6**Dynamic Modeling of the Demagnetization in Halbach Array Permanent Magnet Machine** ***' -

Ants Kallaste¹, Anouar Belahcen^{1,2}, Toomas Vaimann¹

¹Tallinn University of Technology, Estonia; ²Aalto University, Finland

PC3-7**Research on Shape Design to reduce Torque Ripple in IPMSM for High-voltage Electric Oil Pump based on Numerical Analysis** ***(%

Youngmin Kim¹, Sung-Jun Kwon¹, Cheol-Gyun Lee², Jong-Wook Kim³, Sang-Yong Jung¹

¹Sungkyunkwan University, Republic of Korea (South Korea); ²Dong-Eui University, Republic of Korea (South Korea); ³Dong-A University, Republic of Korea (South Korea)

PC3-8**Finite Element Based Circuit Model Approach for Skewed Electrical Machines** ***('

Martin Mohr¹, Oszkár Bíró¹, Andrej Stermecki¹, Franz Diwoky²

¹Christian Doppler Laboratory for Multiphysical Simulation, Analysis and Design of Electrical Machines, Institute for Fundamentals and Theory in Electrical Engineering, Austria; ²AVL List GmbH, Austria

PC3-9**Design and Control of a Novel Axial Flux Permanent Magnet In-Wheel Machine for HEVs** ***()

S. L. Ho, Shuangxia Niu, W. N. Fu

The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)

PC3-10**Calculation of Iron Loss in Solid Rotor Induction Machine using FEM** ***(+

Mircea Fratila¹, Abdelkader Benabou¹, Abdelmounaïm Tounzi¹, Maxime Dessoude²

¹L2EP-Lamel, Université Lille1, France; ²EDF R&D, France

PC3-11**A Novel FEA Algorithm for SRM Simulations** ***(-

Tanvir Rahman, Derek Dyck, David Lowther

INFOLYTICA Corporation, Canada

PC3-12**Eddy Current Losses in Permanent Magnets of Permanent Magnet Synchronous Machines - Comparison between Finite Element and Analytical Calculation Methods** ***)%

Erich Schmidt, Manfred Kaltenbacher, Anton Wolfschluckner

Vienna University of Technology, Austria

PC3-13**Steady-State Time-Stepping Analysis of a Single-Phase PMSG with Capacitors for Voltage Regulation** ***)'

Adolfo Gonzalez, Coni Hernandez, Marco Arjona

Instituto Tecnológico de la Laguna, Mexico

PC3-14

Analysis of Environmental Effect on Temperature Distribution of Power Converter for Switched Reluctance Motor Drive (*)**

Hao Chen, Yang Xu, Zhentao Hu

China University of Mining & Technology, People's Republic of China

PC3-15

Computation and Analysis of Iron Loss in Permanent Magnet-Inductor Hybrid Excitation Synchronous Generator (*) +**

Xinghe Fu, Xiangjun Li, Da Xu, Mingyao Lin

Southeast University, People's Republic of China

PC3-16

Design of IPMSM Rotor Shape for Magnet Eddy-Current Loss (*) -**

Se-Young Oh, Ho-Jun Lee, Kwang-Hyung Ryu, Ju Lee

Hanyang University, Republic of Korea (South Korea)

PC3-17

Equivalent Circuit Parameters Calculation of Induction Motor by Finite Element Analysis (*)%**

Zaixun Ling, Libing Zhou, Siyuan Guo, Yi Zhang

Huazhong University of Science and Technology, People's Republic of China

PC3-18

A Self-tuning Regulator for the Voice Coil Motor (*)¹**

J.F. Pan¹, B.B. Yang¹, Norbert Cheung²

¹School of Mechatronics and Control Engineering, Shenzhen University; ²Department of Electrical Engineering, Hong Kong Polytechnic University.

PC3-19

Optimum LIM Interval Selection of Vector Controlled Moving Secondary Plate Conveyor System Using FEM & SUMT for Constant Speed Control (*)**

Young Hyun Kim, Young Gak Rha, Jung Ho Lee

Hanbat National University, Republic of Korea (South Korea)

PC3-20

Study of Cogging Torque in Axial Flux Permanent-Magnet Machines Using an Analytical Model (*)+**

Huguette Tiegna, Yacine Amara, Georges Barakat

University of Le Havre (France), France

PC3-21

Detection of the Fault Type under Eccentricity and Inter-Turn Fault using Fault Frequency of Stator Input Current in IPM-type BLDC motor (*)-**

Jun-Kyu Park, Il-Man Seo, Jin Hur

University of Ulsan, Republic of Korea (South Korea)

PC3-22

Comparison of Two Different Rotor Topologies for 44Pole-48Slot Fractional Slot Concentrated Winding Permanent Magnet Synchronous Machine (*)+%**

Shi-Uk Chung, Yon-Do Chun, Byung-Chul Woo, Do-Kwan Hong, Ji-Young Lee

KERI, Republic of Korea (South Korea)

	<p>PC3-23 Numerical Simulation of the Interactions between Low Voltage Network, Miniature Circuit Breaker and Mounting Technique ***+' <u>Liviu Neamt</u>, Dumitru Pop, Olivian Chiver, Cristian Barz Technical University of Cluj-Napoca, Romania</p> <p>PC3-24 Harmonics reduction with Pulse Width Modulation Method for Flux Concentration Interior PM Motors ***+) <u>Sisuda Chaithongsuk</u>¹, Pramuk Unahalekhaka¹, Nouredine Takorabet², Babak Nahid-Mobarakeh², Farid Meibody-Tabar² ¹Rajamangala University of Technology Suvarnabhumi, Thailand; ²University of Lorraine, Green, France</p> <p>PC3-25 Analysis of a Novel Switched-Flux Memory Motor Employing Time-Divisional Magnetization Strategy ***++ <u>Hui Yang</u>, Heyun Lin, Jianning Dong, Jianhu Yan, Yunkai Huang, Shuhua Fang Southeast University, Nanjing, Jiangsu Province, People's Republic of China</p> <p>PC3-26 Cost-Effectiveness Comparison of Coaxial Magnetic Gears with Different Magnet Materials ***+ <u>Mu Chen</u>, K.T. Chau, Wenlong Li, Chunhua Liu The University of Hong Kong, Hong Kong S.A.R. (China)</p>
12:15pm - 1:45pm	Lunch
1:45pm - 3:25pm Ballroom Foyer	PC4: Optimization & Design 3 Session Chairs: Alice Reinbacher-Köstinger, Stephan Russenschuck
	<p>PC4-1 Multiobjective Topology Optimization with Ant Colony Systems in Applied Electromagnetics *** , % João B. Q. Zuliani¹, Lucas S. Batista¹, <u>Frederico G. Guimarães</u>¹, Miri W. Cohen², Min Li³, David A. Lowther³ ¹Universidade Federal de Minas Gerais, Belo Horizonte, Brazil; ²ORT Braude College of Engineering, Karmiel, Israel; ³McGill University, Montreal, Canada</p> <p>PC4-2 Enhanced Invasive Weed Optimization Algorithm Applied to Electromagnetic Optimization *** , ' Leandro Dos Santos Coelho², Viviana Mariani³, Helon Ayala², <u>Piergiorgio Alotto</u>¹ ¹Università di Padova, Italy; ²Pontifical Catholic University of Parana, Curitiba, Brazil; ³Federal University of Parana, Curitiba, Brazil</p> <p>PC4-3 Composite First-Order Reliability Method for Efficient Reliability-based Optimization of Electromagnetic Design Problems *** ,) Dong-Wook Kim, Nak-Sun Choi, Gi-Woo Jeung, <u>Dong-Hun Kim</u> Kyungpook National University, Republic of Korea (South Korea)</p>

PC4-4

An Automated Robust Optimization Approach Based on Robust Constraints and Objective Function ***, +

Laura Picheral¹, Issam Mazhoud², Khaled Hadj-Hamou¹, Jean Bignon¹, Patrice Joyeux²

¹G-SCOP - CNRS, Grenoble-INP-UJF, France; ²Hager Electro SAS, France

PC4-5

Non Linear Multiphysics Analysis and Multiobjective Optimization in Electro-Heating Applications ***, -

Paolo Di Barba^{1,2}, Ivo Dolezel³, Maria Evelina Mognaschi¹, Antonio Savini¹, Pavel

Karban⁴

¹University of Pavia, Italy; ²University of Padua, Italy; ³Academy of Sciences of the Czech Republic, Czech Republic; ⁴University of West Bohemia

PC4-6

Robust Global Optimization of Electromagnetic Designs Utilizing Gradient Indices and Kriging ***, - %

Song Xiao, Mihai Rotaru, Jan Sykulski

University of Southampton, United Kingdom

PC4-7

Worst Case Scenario Robust Optimization Utilizing Dynamic Kriging and Differential Evolution Algorithm ***, -'

Ziyan Ren, Bin Xia, Nyambayar Baatar, Chang-Seop Koh

Chungbuk National University, Republic of Korea (South Korea)

PC4-8

Multi-objective Evolutionary Optimization of a Surface Mounted PM Actuator for Aerospace Applications ***, -)

Minos E. Beniakar, Athanasios G. Sarigiannidis, Evangelos M. Tsampouris,

Antonios G. Kladas

National Technical University of Athens, Greece

PC4-9

Characteristics Analysis & Optimum Design of Axially Lamianated Anisotropic Rotor Synchronous Reluctance Motor Using Coupled Finite Element Method & Response Surface Methodology ***, - +

Young Hyun Kim, Won Gee Byen, Jung Ho Lee

Hanbat National University, Republic of Korea (South Korea)

PC4-10

Multilevel Design and Optimization of a FSPMM Drive System by Using Sequential Subspace Optimization Method ***, - -

Gang Lei, Wei Xu, Jianguo Zhu, Youguang Guo

University of Technology, Sydney, Australia

PC4-11
Multiobjective Optimization of Transformer Design using a Chaotic Evolutionary Approach

Leandro dos Santos Coelho^{1,2}, Viviana C. Mariani^{2,3}, Fabio A. Guerra⁴, Mauricio V. F. Luz⁵, Jean Vianei Leite⁵

¹Industrial and Systems Engineering Graduate Program, Pontifical Catholic University of Parana, Curitiba, Brazil; ²Department of Electrical Engineering, Federal University of Parana, Curitiba, Brazil; ³Mechanical Engineering Graduate Program, Pontifical Catholic University of Parana, Curitiba, Brazil; ⁴LACTEC - Institute of Technology for Development, Electrical Systems Division (DVSE), Curitiba, Brazil; ⁵GRUCAD/EEL/UFSC, Brazil

PC4-12
Shape Optimal Design of a Powder-Aligning-Fixture of Four-pole Anisotropic Bonded NdFeB Ring Magnet

Dianhai Zhang¹, Hyojun Kim², C.S. Koh¹

¹Chungbuk National University, Republic of Korea (South Korea); ²R&D Center of Jahwa Electronics Co. Ltd., Republic of Korea (South Korea)

PC4-13
Utilizing Kriging Surrogate Models for Multi-objective Robust Optimization of Electromagnetic Devices

Bin Xia, Kwang-Young Jeong, C.S. Koh

Chungbuk National University, Republic of Korea (South Korea)

PC4-14
Topology Optimization Using Material Density Based on Sigmoid Function by Means of Sequential Linear Programming

Yoshifumi Okamoto¹, Yusuke Tominaga¹, Shinji Wakao², Shuji Sato¹

¹Utsunomiya University, Japan; ²Waseda University, Japan

PC4-15
NE-Map Based Design of IPM Synchronous Motor for Traction of EV

Won-Ho Kim¹, Mi-Jung Kim², Ki-Doek Lee², Jae-Jun Lee², Ju Lee², Hyun-Jong Park²

¹Material & Device Research Center, Samsung Advanced Institute of Technology, Republic of Korea (South Korea); ²Department of Electrical Engineering, Hanyang University, Republic of Korea (South Korea)

PC4-16
HEV - AI Based Real Time Control Strategy

N Al-Aawar, A. A. Arkadan

Rafik Hariri University, Lebanon (Lebanese Republic)

PC4-17
A Robust Metaheuristic Based on Clonal Colony Optimization and Population Based Incremental Learning Methods

S. L. Ho¹, Shiyong Yang², Yanan Bai²

¹The Hong Kong Polytechnic University, Hong Kong; ²Zhejiang University, People's Republic of China

PC4-18
Optimization of a Contactless Displacement Sensor Using Finite-element Analysis

Christoph Weissinger, Stefan Lohmeyer, Peter Huck, Hans-Georg Herzog
Technische Universität München, Germany

1:45pm - 3:25pm Corvina	PC5: Numerical Techniques 4 Session Chairs: Dennis D. Giannacopoulos, Stefan Kurz
	<p>PC5-1 Accurate Determination of Thousands of Eigenvalues for Large-Scale Eigenvalue Problems</p> <p><u>Tomodorka Banova</u>^{1,2}, Wolfgang Ackermann², Thomas Weiland² ¹Graduate School of Computational Engineering, TU Darmstadt, Germany; ²Institut für Theorie Elektromagnetischer Felder (TEMF), TU Darmstadt, Germany</p> <p>PC5-2 Influence of Measurement Errors on Transformer Inrush Currents Using Different Material Models</p> <p><u>Timo Hülsmann</u>¹, Andreas Bartel¹, Jan Kühn¹, Roland Pulch¹, Sebastian Schöps² ¹Bergische Universität Wuppertal, Chair of Applied Mathematics and Numerical Analysis, Germany; ²Technische Universität Darmstadt, Graduate School Computational Engineering, Germany</p> <p>PC5-3 Fast Halo Currents Computation in Fusion Reactors by Electrokinetic Complementary Formulations</p> <p><u>Paolo Bettini</u>¹, Ruben Specogna² ¹Consorzio RFX, EURATOM-ENEA Association, Italy; ²Università di Udine, Italy</p> <p>PC5-4 Convergence of a Stabilized Subpixel Smoothing Scheme for the Finite Integration Technique</p> <p><u>Rolf Schuhmann</u> Technische Universität Berlin, Germany</p> <p>PC5-5 Hybrid Parallel Meshless Algorithm for Electromagnetic Applications</p> <p><u>Eduardo Henrique da Rocha Coppoli</u>¹, Ursula do Carmo Resende¹, Márcio Matias Affonso¹, Renato Cardoso Mesquita², João Paulo Gervásio¹, Biharck M. Araújo¹ ¹Centro Federal de Educação Tecnológica de Minas Gerais, Brazil; ²Universidade Federal de Minas Gerais, Brazil</p> <p>PC5-6 A Modified Meshless Local Petrov-Galerkin Applied to Electromagnetic Axisymmetric Problems</p> <p>Ramon Dornelas Soares¹, <u>Fernando José da Silva Moreira</u>¹, Renato Cardoso Mesquita¹, David Alister Lowther², Naïsses Zoia Lima¹ ¹Federal University of Minas Gerais, Brazil; ²McGill University, Canada</p> <p>PC5-7 3D Modeling of Thin Resistive Sheets in the Discontinuous Galerkin Method for Transient Scattering Analysis</p> <p>Mohamed Boubekeur¹, <u>Abelin Kamení</u>¹, Laurent Bernard¹, Axel Modave², Lionel Pichon¹ ¹Laboratoire de Genie Electrique de Paris, France; ²Montefiore Institute, Belgium</p>

PC5-8**The Transmission Line Modeling Method to Represent the Soil Ionization Phenomenon in Grounding Systems**Daniel da Silva Gazzana¹, Arturo Suman Bretas¹, Guilherme A. D. Dias¹, Marcos Telló²¹Federal University of Rio Grande do Sul - UFRGS, Brazil; ²State Company of Electrical Energy CEEE-D**PC5-9****An Alternative Way to Impose Essential Boundary Conditions in EFG Method**Ursula do Carmo Resende, Eduardo Henrique da Rocha Coppoli, Tadeu de Brito Oliveira Porto, Marcio Matias Afonso

Federal Center for Technological Education of Minas Gerais, Brazil

PC5-10**A Singularity Expansion Method for Analysis of Wireless Power Transfer System**Lei Liu, S.L. Ho, W.N. Fu

The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)

PC5-11**An Efficient Interpolation for Calculation of the Response of Composite Layered Material and its Implementation in MUSIC Imaging**Giacomo Rodeghiero¹, Yu Zhong², Dominique Lesselier¹, Marc Lambert¹, Xudong Chen²¹CNRS-SUPELEC-Université Paris Sud; ²National University of Singapore**PC5-12****Performance Improvement of Three-Dimensional Tiled FDTD Kernel Based on Automatic Parameter Tuning**Takeshi Minami, Motoharu Hibino, Tasuku Hiraishi, Takeshi Iwashita, Hiroshi Nakashima
Kyoto University, Japan**PC5-13****Force Calculation from the Finite Element Solution Avoiding Nonzero Local Forces in the Air Region**Takeshi Mifune

Kyoto University, Japan

PC5-14**Coupling of Different Dimensions in Finite Element Analysis for Solving Laplace and Poisson Equations**Tommi Sakari Peussa, Anouar Belahcen

Aalto University, Finland

PC5-15**Flexible BiCGStab to solve the Discretized EFIE in Scattering Computations**Giovanni Angiulli, Matteo Cacciola, Salvatore Calcagno, Domenico De Carlo, Francesco Carlo Morabito, Annalisa Sgrò, Mario Versaci

"Mediterranea" University of Reggio Calabria, Italy

PC5-16**Coupling of a Method of Moments Adapted to Planar Circuit and Volumic Methods**Caroline Girard^{1,2}, Stéphane Lanteri², Ronan Perrussel¹, Nathalie Raveu¹¹Université de Toulouse ; INPT, UPS ; CNRS ; LAPLACE ; ENSEEIHT, Toulouse, France;²NACHOS project-team, INRIA Sophia Antipolis-Méditerranée, Sophia Antipolis, France

	<p>PC5-17 Refoundation of the Cell Method by Means of Augmented Dual Grids **+(- <u>Lorenzo Codecasa</u> Politecnico di Milano, Italy</p> <p>PC5-18 A Multi-Layer Finite Element Method Algorithm for Three-Dimensional Magnetic Force Computation **+) % S. L. Ho, <u>Shuangxia Niu</u>, W. N. Fu The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)</p> <p>PC5-19 Application of the ACA Compression Technique for the Scattering of Periodic Surfaces **+) ' Benjamin Alzaix, <u>Ronan Perrussel</u>, Jean-René Poirier LAPLACE/GRE, France</p> <p>PC5-20 High Order Finite Elements in T-Ω Method Considering Multiply-Connected Regions **+)) <u>Bo He</u>, Ping Zhou, Dingsheng Lin, Chuan Lu Ansys, United States of America</p> <p>PC5-21 Comparison of Residual and Hierarchical Finite Element Error Estimators in Eddy Current Problems **+) + Zuqi Tang¹, Patrick Dular², Yvonnick Le Ménach³, Emmanuel Creusé¹, <u>Francis Piriou</u>³ ¹Université Lille 1, LPP, France; ²University of Liège, ACE, Belgium; ³Université Lille1, L2EP, France</p>
1:45pm - 3:25pm Corvina	PC6: Electrical Machines & Drives 4 Session Chairs: Luiz Lebensztajn, Laurent Krahenbuhl
	<p>PC6-1 Characteristic Analysis & Optimum Design Standard Evaluation of Permanent Magnet Assisted Synchronous Reluctance Motor for Power Improvement **+) - Young Hyun Kim, Jung Woo Kim, <u>Jung Ho Lee</u> Hanbat National University, Republic of Korea (South Korea)</p> <p>PC6-2 Iron Loss Analysis of Turbo Generators Considering Eddy Currents in Duct Spacers and End Plates **+*% <u>Katsumi Yamazaki</u>¹, Takuya Sekine¹, Yoko Furukawa² ¹Chiba Institute of Technology, Japan; ²Hitachi, Ltd., Japan</p> <p>PC6-3 Thermal Analysis of Permanent Magnet Motor with Water-Jacket Cooling for Electric Vehicles **+*' <u>Meng Hu</u>¹, Ben Q. Li^{2,3}, Changhong Liu¹ ¹Shanghai JiaoTong University/China, People's Republic of China; ²University of Michigan-Dearborn/Dearborn, United States of America; ³Xi'an Jiaotong University/Shaanxi, People's Republic of China</p>

PC6-4**Estimation of Acoustic Noise and Vibration in an Induction Machine considering Rotor Eccentricity ***+*)**

Do-Jin Kim, Hae-Joong Kim, Jung-Pyo Hong, Chul-Jun Park, Jin-Tai Chung
Hanyang University, Republic of Korea (South Korea)

PC6-5**Nonlinear Dynamic Characteristic Analysis of Linear Actuator for Compressor ***+*+**

Sung-An Kim, Sang-Geon Lee, Yun-Hyun Cho
Dong-A University, Republic of Korea (South Korea)

PC6-6**Design of Hybrid Hysteresis Motor Rotor by Means of FE Model and Decision Process ***+*-**

Mariusz Jagiela, Tomasz Garbiec, Marcin Kowol
Opole University of Technology, Poland

PC6-7**Brushless Doubly-Fed Reluctance Machine Optimization using Reluctance Networks ***+-%**

Tiago Staudt^{1,2}, Lisa Scanu^{1,2}, Frédéric Wurtz², Nelson Jhoe Batistela¹, Patrick Kuo-Peng¹, Nelson Sadowski¹

¹Federal University of Santa Catarina (GRUCAD-UFSC), Brazil; ²Grenoble INP-UJF, CNRS UMR 5529 (G2ELAB), France

PC6-8**Internally Consistent Nonlinear Behavioural Model of a PM Synchronous Machine for Hardware-in-the-Loop simulation ***+!**

Derek N. Dyck¹, Tanvir Rahman¹, Christian Dufour²

¹Infolytica Corp., Montreal; ²Opal-RT Technologies Inc., Montreal, Canada

PC6-9**Electromagnetic Performance Analysis of Axial Field Flux-Switching Permanent Magnet Machine Using Equivalent Magnetic Circuit Method ***+)**

Da Xu^{1,2}, Mingyao Lin^{1,2}, Xinghe Fu^{1,2}, Li Hao^{1,2}, Xuming Zhao³

¹School of Electrical Engineering, Southeast University, Nanjing, People's Republic of China; ²Engineering Research Center for Motion Control of MOE, Southeast University, Nanjing, People's Republic of China; ³Jiangsu Electric Power Maintenance Branch Company, Nanjing, People's Republic of China

PC6-10**Permanent Magnet Eddy Current Comparison of Surface Permanent Magnet Synchronous Motors with Different Permanent Magnet Shapes ***+++**

Sun Kwon Lee^{1,2}, Gyu Hong Kang¹, Jin Hur², Byoung Woo Kim²

¹Korea Marine Equipment Research Institute, Republic of Korea (South Korea); ²University of Ulsan, Republic of Korea (South Korea)

PC6-11**Torque-Slip Characteristic of Squirrel Cage Induction Motor by New FEA Technique ***++**

Olivian Chiver, Liviu Neamt, Cristian Barz, Dumitru Pop
Technical University of Cluj Napoca, Romania

PC6-12
Novel Rotor Design to Improve Dynamic Performance of Axial Flux Hysteresis Motors ***+, %

Mohammad Modarres, Byung-Il Kwon
Hanyang University, Republic of Korea (South Korea)

PC6-13
Cut Out Bars FEM Simulation of Large Hydro Generator ***+, '

Ana Beatriz Martins Aguiar^{1,2}, Arezki Merkhoul², Kamal Al-Haddad¹
¹Ecole de Technologie Supérieure, Canada; ²IREQ, Canada

PC6-14
On the Geometric Uncertainties of an Electrical Machine: Stochastic Modeling and Impact on the Performances ***+,)

Hung Mac¹, Stéphane Clénet¹, Shaoqu Zheng², Thierry Coorevits², Jean-Claude Mipo³
¹L2EP/Arts et Métiers ParisTech, France; ²LML/Arts et Métiers ParisTech, France; ³VALEO, France

PC6-15
Design Optimization of an Interior PMSM for Electric Vehicle Application ***+, +

Hussein Dogan, Hoa Nguyen-Xuan, Frederic Wurtz, Lauric Garbuio, Albert Foggia
INPG, France

PC6-16
Comparison between Cage-Rotor Induction Motor and Matrix-Rotor Induction Motor Using 3-D Finite Element Method ***+ S

Yoshihiro Kawase¹, Tadashi Yamaguchi¹, Masaki Otsubo¹, Naotaka Toida², Koichi Sato²
¹Gifu University, Japan; ²Toyota Industries Corporation, Japan

PC6-17
Design and Simulation of a Double Stator Type Axial Magnetically Levitated Motor

Nobuyuki Kurita¹, Takeo Ishikawa¹, Hiromu Takada¹, Toru Masuzawa²+ &
¹Gunma University, Japan; ²Ibaraki University, Japan

PC6-18
Efficient Approach for Angular Modelling of Electrical Machine by Reluctance Network ***+ (

Hoa Nguyen Xuan, Hussein Dogan, Laurent Gerbaud, Lauric Gabuio, Frédéric Wurtz
Grenoble Electrical Engineering Laboratory, France

PC6-19
Reduction of Eddy-Current Losses by Circumferential and Radial PM Segmentation in Axial Flux Permanent Magnet Machines with Fractional-Slot Winding ***+ *

Jian Li, Yun-Hyun Cho, Ronghai Qu
State Key Laboratory of Advanced Electromagnetic Engineering and Technology,
Huazhong University of Science and Technology, People's Republic of China

PC6-20
Design and Optimization of Neodymium Free Spoke Type Motor with Segmented Wing Shape PM ***+,

Mohammad Mizanoor Rahman, Kyung-Tae Kim, Jin Hur
University of Ulsan, Republic of Korea (South Korea)

	<p>PC6-21 End Edge Force Analysis in Stationary Discontinuous Armature concentrated-winding PMLSM with the shape of Novel Auxiliary Teeth ;, \$\$ Sung-Jin Kim¹, <u>Yong-Jae Kim</u>¹, Sang-Yong Jung² ¹Chosun University, Republic of Korea (South Korea); ²Sungkyunkwan University, Republic of Korea (South Korea)</p> <p>PC6-22 Micro-Analysis of Electromagnetic Force Distribution in a Simple Actuator ;, \$& Mohammad Adib Ghadamyari¹, Mehdi Moallem¹, Babak Fahimi², <u>Matthew McDonough</u>² ¹Isfahan University of Technology, Islamic Republic of Iran; ²University of Texas at Dallas, United States of America</p> <p>PC6-23 Design and Analysis of a New Double-stator Dual-magnet Linear Magnetic-gear Machine ;, \$ Chunhua Liu, K.T. Chau, <u>Mu Chen</u> The University of Hong Kong, Hong Kong S.A.R. (China)</p> <p>PC6-24 Numerical Analysis and Optimal Design of Double Squirrel Cage Induction Motor for Electric Vehicle ;, \$* Subong Jang¹, Kyung-Won Jeon¹, Yong-Jae Kim², <u>Sang-Yong Jung</u>¹ ¹Sungkyunkwan University, Republic of Korea (South Korea); ²Chosun University, Republic of Korea (South Korea)</p> <p>PC6-25 Field-circuit Modeling of the 12-pole Magnetic Bearing Characteristics ;, \$ <u>Bronislaw Tomczuk</u>, Jan Zimon, Dawid Wajnert Opole University of Technology, Poland</p>
3:25pm - 3:50pm	Coffee Break
3:50pm - 5:30pm Ballroom	OC2: Coupled Problems 2 Session Chairs: Arnulf Kost, Dexin Xie
	<p>OC2-1 Modeling of Magneto-Mechanical Coupling with Magnetic Volume Integral and Mechanical Finite Element Methods ;, %\$ Anthony Carpentier¹, Nicolas Galopin¹, <u>Olivier Chadebec</u>^{1,2}, Gérard Meunier¹ ¹G2elab, Grenoble, France; ²GRUCAD/EEL/CTC/UFSC, Florianopolis, Brazil</p> <p>OC2-2 On Forces in Magnetized Matter ;, %& <u>Alain Bossavit</u> LGEP, CNRS, France</p> <p>OC2-3 Magneto-mechanical Coupling: Applied to the Prediction of Deformation of a FeSi Based Transformers ;, % <u>Florent Ganet</u>^{1,2}, Olivier Hubert², Xavier Mininger¹, Frederic Bouillault¹, Laurent Bernard¹ ¹LGEP, France; ²LMT, France</p>

	<p>OC2-4 Nonlinear Evolution of Axisymmetric Fusion Plasmas with Three-dimensional Volumetric Conductors ^{*, %} <u>Fabio Villone</u>, Lucio Barbato, Stefano Mastrostefano, Salvatore Ventre Università di Cassino e del Lazio Meridionale, Italy</p> <p>OC2-5 Coupled Electromagnetic-Mechanical Dynamic Analysis of Generator Circuit Breakers ^{*, %} <u>Jasmin Smajic</u>, Cornelius Jäger, Severin Neubauer, Astrid Bauer, Daniel Jun Cheng, Markus Widenhorn University of Applied Sciences of Eastern Switzerland, Switzerland</p>
<p>7:00pm - 11:00pm Hungarian National Gallery</p>	<p>Conference Dinner</p>

Date: Thursday, 04/Jul/2013

8:30am - 10:10am Ballroom	OD1: Numerical Techniques 5 Session Chairs: Jan Sykulski, Zhenmao Chen
	OD1-1 Second Moment Perturbation Analysis of the Nonlinear Eddy Current Model with Material Uncertainties ; & <u>Ulrich Römer</u> , Sebastian Schöps, Thomas Weiland Technische Universität Darmstadt, Germany
	OD1-2 An Overlapping Non-matching Grid Mortar Element Method for Maxwell's Equations ; & <u>Alexandra Christophe</u> ¹ , Laurent Santandrea ¹ , Francesca Rapetti ² , Guillaume Krebs ¹ , Yann Le Bihan ¹ ¹ LGEP, France; ² Lab. J.-A Dieudonné, France
	OD1-3 GPU-optimized Parallel Preconditioners for the Element-by-element Finite Element Method ; & <u>Imre Kiss</u> ¹ , Zsolt Badics ² , Szabolcs Gyimóthy ¹ ¹ Budapest University of Technology and Economics, Hungary; ² Tensor Research LLC, Andover, MA, United States of America
	OD1-4 Linear Subspace Reduction for Quasistatic Field Simulations ; & Daniel Schmidhäusler ¹ , Sebastian Schöps ² , <u>Markus Clemens</u> ¹ ¹ Bergische Universität Wuppertal, Germany; ² Technische Universität Darmstadt, Germany
	OD1-5 Two-Scale Homogenization of the Nonlinear Eddy Current Problem with FEM ; & <u>Karl Hollaus</u> ¹ , Antti Hannukainen ² , Joachim Schöberl ¹ ¹ Vienna University of Technology, Austria; ² Aalto University, Finland
10:10am - 10:35am	Coffee Break
10:35am - 12:15pm Ballroom Foyer	PD1: Optimization & Design 4 Session Chairs: Abdul-Rahman Arkadan, Antonios G. Kladas
	PD1-1 Enhanced Identification of Hidden Conductive Objects with Deterministic and Stochastic Methods ; ' \$ <u>Alice Reinbacher-Köstinger</u> ¹ , Piergiorgio Alotto ² , Christian Magele ¹ , Werner Renhart ¹ ¹ Graz University of Technology, Austria; ² University of Padova, Italy
	PD1-2 Stochastic Methods for Parameter Estimation of Multiphysics Models of Fuel Cells ; ' & <u>Piergiorgio Alotto</u> , Massimo Guarnieri ; Università di Padova, Italy
	PD1-3 A Novel Superconducting MRI Magnet and Its Optimum Design Using Adaptive Optimization Strategy ; ' (<u>Yanli Zhang</u> Shenyang University of Technology, People's Republic of China

PD1-4
Topology Optimization Based on ON/OFF Method with Surface Smoothing ; ' *
Kota Watanabe¹, Hajime Igarashi²

¹Muroran Institute of Technology, Japan; ²Hokkaido University

PD1-5
A Modification of Artificial Bee Colony Algorithm Applied to Loudspeaker Design Problem ; ',

Xin Zhang², Xiu Zhang¹, S. L. Ho¹, W. N. Fu¹

¹The Hong Kong Polytechnic University, Hong Kong S.A.R. (China); ²City University of Hong Kong, Hong Kong S.A.R. (China)

PD1-6
Level Set-based Topology Optimization for Light Trapping Structures ; (S

Masaki Otomori¹, Takayuki Yamada¹, Kazuhiro Izui¹, Shinji Nishiwaki¹, Nozomu Kogiso²

¹Kyoto University, Japan; ²Osaka Prefecture University, Japan

PD1-7
Comparative Study of Reliability Evaluation Methods for Reliability-based Design Optimization of Electromagnetic Devices under Uncertainty ; (&

Ziyan Ren, Chang-Seop Koh

Chungbuk National University, Republic of Korea (South Korea)

PD1-8
Multi-objective Optimization Approach to Reliability-based Optimal Design of Electromagnetic Problems ; ((

Ziyan Ren, Dianhai Zhang, Chang-Seop Koh

Chungbuk National University, Republic of Korea (South Korea)

PD1-9
A Two-level Genetic Algorithm for Large Electromagnetic Optimization Problems

Fabio Henrique Pereira^{1,2}, Wonder Alexandre Luz Alves¹, Lucas Koleff², Silvio Ikuyo ; (*
Nabeta²

¹Nove de Julho University, Brazil; ²São Paulo University, Brazil

PD1-10
Reliability-Based Optimum Tolerance Design for Industrial Electromagnetic Devices ; (,

Su-gil Cho¹, Junyong Jang¹, Su-Jin Lee¹, Kyu-Seob Kim¹, Jung-Pyo Hong¹, Woo-Kyo Jang², Tae Hee Lee¹

¹Hanyang University, Republic of Korea (South Korea); ²Keyang Electric Machinery Co., Ltd., Republic of Korea (South Korea)

PD1-11
Evolutionary Algorithm-based Multi-criteria Optimization of Triboelectrostatic Separator ;) \$

Frantisek Mach¹, Lukas Adam¹, Pavel Kus¹, Pavel Karban¹, Ivo Dolezel²

¹University of West Bohemia, Faculty of Electrical Engineering, Czech Republic; ²Academy of Sciences of the Czech Republic, Institute of Thermomechanics, Czech Republic

PD1-12
Adaptive Parameter Controlling Non-dominated Ranking Differential Evolution for Multi-objective Optimization of Electromagnetic Problems ;) &

Nyambayar Baatar, Kwang-Young Jeong, C.S. Koh

Chungbuk National University, Republic of Korea (South Korea)

PD1-13**Waveguide Design at Infrared Wavelength with Asymmetric Dielectric Surface Gratings**Dongyeal Lim¹, Heeseung Lim¹, Jae Seok Choi², Jeonghoon Yoo³¹Graduate School of Mechanical Engineering, Yonsei University, Republic of Korea (South Korea); ²Samsung Electronics Co. Ltd.; ³School of Mechanical Engineering, Yonsei University, Republic of Korea (South Korea)**PD1-14****Topology Optimization of an IPM Motor Flux Barrier Based on Current Phase Angle Using a Multistep Evolutionary Algorithm**Yoshifumi Okamoto¹, Yusuke Tominaga¹, Shinji Wakao², Shuji Sato¹¹Utsunomiya University, Japan; ²Waseda University, Japan**PD1-15****Vector Design Optimizations using an Improved Cross-Entropy Method**Siguang An¹, Wei Wang¹, Shiyong Yang²¹China Jiliang University, China; ²Zhejiang University, People's Republic of China**PD1-16****Shape Optimization of Dielectric Material Using Continuum Sensitivity and Adaptive Level Set Method**Kang Hyouk Lee¹, Seung Geon Hong¹, Myung Ki Baek¹, Hong Soon Choi², Il Han Park¹¹Sungkyunkwan University, Republic of Korea (South Korea); ²Kyungpook National University, Republic of Korea (South Korea)**PD1-17****Magnetizer Design Based on a Quasi-Oppositional Gravitational Search Algorithm**Leandro Dos Santos Coelho², Viviana Mariani³, Nedim Tutkun⁴, Piergiorgio Alotto¹¹Università di Padova, Italy; ²Pontifical Catholic University of Parana, Curitiba, Brazil;³Federal University of Parana, Curitiba, Brazil; ⁴University of Zonguldak, Turkey**PD1-18****An Automatic Pareto Classifier for the Multiobjective Optimization of an Electrostimulative Acetabular Revision System**

Ulf Zimmermann, Ursula van Rienen

University of Rostock, Germany

PD1-19**A Novel Approach of Sensitivity Analysis in Finite Element Method and Its Application**

Lin Yang, S. L. Ho, W. N. Fu, Lei Liu

The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)

PD1-20**Multiobjective Design Optimization of PM-SMC Motors for Six Sigma Quality Manufacturing**

Gang Lei, Jianguo Zhu, Youguang Guo

University of Technology, Sydney, Australia

10:35am - 12:15pm Corvina	PD2: Numerical Techniques 6 Session Chairs: Yasuhito Takahashi, Fabio Villone
	<p>PD2-1 MPI Parallel Scheme of 3D Time Domain Boundary Element Method with CRS Matrix Compression ^{***, +S} Kazunori Maeda, Hiroshi Shibata, Hideki Kawaguchi, <u>Seiya Itasaka</u> Muroran Institute of Technology, Japan</p> <p>PD2-2 Time-Domain Simulation of Tower with Grounding Device under Lightning Strikes <u>Bo Zhang</u>, Jinpeng Wu, Jinliang He, Chijie Zhuang, Han Yin ^{****, +&} Tsinghua University, People's Republic of China</p> <p>PD2-3 Electromagnetic Wave Propagation Simulation in Complex Shaped Domain using Hybrid Method of FDTD and MTDM ^{***, +(} <u>Taku Itoh</u>, Yoshihisa Fujita, Soichiro Ikuno Tokyo University of Technology, Japan</p> <p>PD2-4 Computation of Magnetic Contact Forces ^{***, +*} Jangho Seo, <u>Hong Soon Choi</u> Kyungpook National University, Republic of Korea (South Korea)</p> <p>PD2-5 An Integral Formulation for the Computation of 3D Eddy Current Using Facet Elements ^{***, +,} <u>Thanh Trung Nguyen</u>, Gerard Meunier, Jean-Michel Guichon, Olivier Chadebec Grenoble Electrical Engineering Laboratory, France</p> <p>PD2-6 The Face-Based Gradient Smoothing Point Interpolation Method Applied to 3D Electromagnetics ^{***, , S} Naïsses Zoia Lima, <u>Renato Cardoso Mesquita</u> Federal University of Minas Gerais, Brazil</p> <p>PD2-7 Low-Frequency Time-Domain On-Surface Radiation Boundary Condition for Scattering Applications ^{***, , &} Subramaniya Hariharan, Jianyang Zeng, <u>Nathan Ida</u> The University of Akron, United States of America</p> <p>PD2-8 Non-Asymptotic Homogenization of Electromagnetic Metamaterials via Discrete Hodge Operators with Trefftz Calibration ^{***, , (} Ralf Hiptmair¹, <u>Igor Tsukerman</u>² ¹Seminar of Applied Mathematics, ETHZ Zuerich, Switzerland; ²The Univ of Akron, United States of America</p> <p>PD2-9 A Posteriori Error Estimation in Stochastic Static Problems ^{***, , *} <u>Duy Hung Mac</u>, Stéphane Clenet Arts et Métiers ParisTech Centre de Lille, France</p>

PD2-10

Reduced Basis Generation for Maxwell's Equations by Rigorous Error Estimation

Martin W. Hess, Peter Benner

MPI Magdeburg, Germany

PD2-11

A New Numerical Scheme for the Simulation of Corona Fields

Jacques Lobry

Université de Mons, Belgium

PD2-12

Parallel Implementation for Mortar Finite Element Method in Electrostatic Problems

Caibo Liao, Jiangjun Ruan, Zhiye Du, Dong Wang, Shoubao Liu, Chao Liu

Wuhan University, People's Republic of China

PD2-13

Convergence Characteristics of Preconditioned Linear Solvers Based on Minimum Residual for Complex Symmetric Linear Systems

Tomonori Tsuburaya¹, Yoshifumi Okamoto¹, Koji Fujiwara², Shuji Sato¹

¹Utsunomiya University, Japan; ²Doshisha University, Japan

PD2-14

Eddy Current Analysis of Large-scale Constructions in Railway System by Infinite Edge Elements

Shogo Yasukawa¹, Yoshihiro Tawada¹, Takuya Yoshioka¹, Shinji Wakao¹, Tamio Okutani²

¹Waseda University, Japan; ²Railway Engineering Co., Ltd., Japan

PD2-15

Asymptotic Boundary Conditions for Finite Element Analysis of 2D and 3D Electrical Field Problems

Stanislaw Gratkowski, Krzysztof Stawicki, Marcin Ziolkowski

West Pomeranian University of Technology, Szczecin, Poland

PD2-16

Thin Conducting Sheet (TCS) in Non-destructive Testing Simulations: Implementation in Code_Carmel3D and Validation

Toufic Abboud¹, François Béreux¹, Natacha Marie Béreux², Valentin Costan²

¹IMACS, France; ²EDF R&D, France

PD2-17

Solution of Large Complex BEM Systems Derived from High-Resolution Human Models

Giuseppe Borzi², Oriano Bottauscio³, Mario Chiampi¹, Luca Zilberti³

¹Politecnico di Torino, Italy; ²Università di Messina, Italy; ³Istituto Nazionale di Ricerca Metrologica, Torino, Italy

PD2-18

An Accurate Multi-layer Magnetic Force Computation Method by Using Adaptive Parameterized Mesh Technique

Yanpu Zhao, S. L. Ho, W. N. Fu

The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)

	<p>PD2-19 A New Basis Function for Fast Computation of Electromagnetic Fields in Meshless Frames - S*</p> <p><u>Arman Afsari</u>, Masoud Movahhedi Shahid Bahonar University of Kerman, Krman, Islamic Republic of Iran</p> <p>PD2-20 A Path Toward Stable Higher Order Discretization of Constitutive Equations in FIT - S</p> <p><u>Lorenzo Codecasa</u> - S Politecnico di Milano, Italy</p> <p>PD2-21 Shared Memory Parallelism and Low-rank Approximation Techniques Applied to Direct Solvers in FEM Simulation - %</p> <p>Patrick Amestoy¹, Alfredo Buttari², Guillaume Joslin⁴, Jean-Yves L'Excellent³, Mohamed Sid-Lakhdar⁵, Clement Weisbecker¹, Michele Forzan⁶, <u>Cristian Pozza</u>⁶, Remy Perrin⁷, Valene Pellissier⁷ ¹INPT-IRIT; ²CNRS-IRIT; ³INRIA-ENS Lyon; ⁴CERFACS; ⁵ENS Lyon; ⁶University of Padova; ⁷Cedrat Group</p>
10:35am - 12:15pm Corvina	PD3: Devices & Applications 3 Session Chairs: Theodoros Tsiboukis, Wolfgang Rucker
	<p>PD3-1 A Fast Method for the Design of Azimuth Radiation Characteristics of Shaped Beam Rectangular Waveguide Slot Antennas - %&</p> <p><u>Peter Tamas Benko</u>^{1,2}, Bela Ladanyi-Turoczy², Jozsef Pavo¹ ¹Budapest University of Technology and Economics, Hungary; ²GRANTE Antenna Development and Production Corporation, Hungary</p> <p>PD3-2 Temperature-dependent Demagnetisation of Segmented Halbach Arrays - %</p> <p><u>Oliver Winter</u>¹, Hannes Lacher¹, Christian Kral¹, Erich Schmidt² ¹AIT Austrian Institute of Technology, Austria; ²Vienna University of Technology, Institute of Energy Systems and Electrical Drives, Austria</p> <p>PD3-3 Three-dimensional Analysis with a Two-dimensional Source for Dielectric Characteristic in High Voltage Gas Circuit Breaker - %</p> <p><u>Yeon-Ho Oh</u>¹, Ki-Dong Song¹, Hong-Kyu Kim¹, Changho Yeo², Sung Chin Hahn³ ¹KERI, Republic of Korea (South Korea); ²Hyosung Corporation; ³Department of Electrical Engineering, Dong-A University</p> <p>PD3-4 Emulation Process Designs and Experimental Assessments of a Refined DC Magnetron Sputter - %</p> <p><u>Cheng-Tsung Liu</u>, Wei-Ping Lin, Chih-Wen Chang National Sun Yat-Sen University, Taiwan, Republic of China</p> <p>PD3-5 Characterization of Deformed Magnets from External Magnetic Measurements - &S</p> <p>Alessandro Bonito Oliva¹, Eva Boter¹, Alessandro Formisano², <u>Raffaele Martone</u>², Alfredo Portone¹, Pietro Testoni¹ ¹Seconda Università di Napoli, Italy; ²Fusion for Energy, Spain</p>

PD3-6**Modeling of Transformer Core Joints via a Subproblem FEM and a Homogenization Technique**

Mauricio Valencia Ferreira da Luz¹, Patrick Dular², Jean Viane Leite¹, Patrick Kuo-Peng¹

¹Federal University of Santa Catarina, Brazil; ²University of Liège, Dept. of Electrical Engineering and Computer Science, ACE, Belgium / FNRS, Belgium

PD3-7**3D Modeling of Integrated Magnetics in High Frequency LLC Resonant Converters**

Wayne Water, Junwei Lu

Griffith University, Australia

PD3-8**An Optimization Method for the Control of Efficiency in Two-ports Microwave Ovens**

Fernando Bressan¹, Marco Bullo¹, Paolo Di Barba², Fabrizio Dughiero¹

¹University of Padova, Italy; ²University of Pavia, Italy

PD3-9**Air Core Reactor Analysis Based on RNM Method**

Anderson Santos Nunes^{1,2}, Patrick Kuo-Peng², Marcelo Grafulha Vanti³

¹WEG T&I, Brazil; ²GRUCAD/EEL/UFSC, Brazil; ³DEET/FURB, Brazil

PD3-10**Homogenization Methods in Simulations of Transcutaneous Transmitters**

Daniela Wolter Ferreira¹, Ruth V. Sabariego², Luiz Lebensztajn¹, Laurent Krähenbühl³, Florent Morel³, Christian Vollaire³

¹Escola Politécnica da Universidade de São Paulo, Brazil; ²University of Liège; ³École Centrale de Lyon, France

PD3-11**Design and Analysis of Axial Hybrid Magnetic Bearing with Asymmetric Axial Air Gaps**

Kang Wang¹, Dong Wang², Heyun Lin¹, Xianbiao Zhang², Yi Feng¹, Hui Yang¹

¹Southeast University, People's Republic of China; ²China Navy University of Engineering, Wuhan, People's Republic of China

PD3-12**Simulation and Measurement of Lightning-impulse Voltage Distributions over Transformer Windings**

Jasmin Smajic, Martin Rüegg, Zeljko Tanasic, Roman Obrist, Jens Tepper, Benjamin Weber, Martin Carlen

University of Applied Sciences of Eastern Switzerland, Switzerland

PD3-13**A New Method to Evaluate Residual Flux Thanks to Leakage Flux. Application to a Transformer**

Didier Cavallera¹, Vinicius Oiring², Jean-Louis Coulomb¹, Olivier Chadebec¹, Bruno Caillault², François Zgainski²

¹G2ELab, France; ²EDF, France

	<p>PD3-14 The Numerical Calculation of Short Circuit Resistance of Transformers of Inverter Power Source Welding Machines -', <u>Liudmila Sakhno</u>, Olga Sakhno, Denis Likhachev, William Kashimu St.Petersburg State Polytechnic University, Russian Federation</p> <p>PD3-15 Current Induced Spin Transfer Noise in CPP-GMR Based Heusler Alloy - (S Pirat Khunkitti¹, Apirat Siritaratiwat¹, Arkom Kaewrawang¹, Chayada Surawanitkun¹, <u>Anan Kruesubthaworn</u>² ¹Department of Electrical Engineering, Khon Kaen University, Thailand; ²Faculty of Applied Science and Engineering, Khon Kaen University, Thailand</p> <p>PD3-16 VHDL-AMS Electromagnetic Automatic Modeling for System Simulation and Design - (& <u>Abir Rezgui</u>, Benoit Delinchant, Laurent Gerbaud G2ELAB, France</p> <p>PD3-17 Impedance Analysis of a Domestic Induction Appliance with Energy-Efficient Cookware - ((<u>Federico Moro</u>, Piergiorgio Alotto, Massimo Guarnieri, Andrea Stella Università di Padova, Italy</p>
12:15pm - 1:45pm	Lunch
1:45pm - 3:25pm Corvina	PD4: Coupled Problems 3 Session Chairs: Ruben Specogna, Francis Piriou
	<p>PD4-1 Finite Element Analysis of Thermal Problems in Gas Insulated Power Apparatus with Multiple Species Transport Technique - (* <u>Xiaowen Wu</u>, Naiqiu Shu, Hongtao Li, Hui Peng, Ling Li Wuhan University, People's Republic of China</p> <p>PD4-2 Harmonic Pressure Optimization on Numerical Electric Motor Model - (, <u>Jaafar Hallal</u>¹, Pierre Pellerey¹, Fabrice Marion², Frederic Druesne¹, Vincent Lanfranchi¹ ¹université de technologie de Compiègne, France; ²Cedrat, France</p> <p>PD4-3 Numerical Investigations of the Effects of a High Magnetic Field on a Diamagnetic Yield Stress Fluid Flow -- Opportunities of a Solid-gel Transition -) & <u>Laurent Heyrendt</u>, Denis Netter Groupe de Recherche en Électrotechnique et Électronique de Nancy - GREEN, Université de Lorraine, France</p> <p>PD4-4 Comparison of Mechanical Vibration in a Double-Stator Switched Reluctance Machine and a Conventional Switched Reluctance Machine -) (Arash Hassanpour Isfahani, Babak Fahimi, <u>Matthew McDonough</u> University of Texas at Dallas, United States of America</p>

PD4-5**Adaptive Mesh Morphing Method for Numerical Analysis of Electromagneto-mechanical Coupling using Lagrangian Approach** ***)*

Weixin Li, Zhensheng Yuan, Zhenmao Chen

State Key Laboratory for Strength and Vibration of Mechanical Structures, Xi'an Jiaotong University, People's Republic of China

PD4-6**3D Field Calculations of the Modular Transformer Heating under High Frequency Operation** ***),

Bronislaw Tomczuk, Dariusz Koterak, Andrzej Waindok

Opole University of Technology, Poland

PD4-7**Estimation Method for Heating Efficiency of Induction Heating Cooker by Finite Element Analysis** ***)*\$

Daigo Yonetsu, Yasushi Yamamoto

Kansai University, Japan

PD4-8**Model of Induction Heating of Rotating Nonmagnetic Billets and its Experimental Verification** ***)*&

Frantisek Mach¹, Pavel Karban¹, Ivo Dolezel¹, Petr Sima², Zdenek Jelinek²

¹University of West Bohemia, Faculty of Electrical Engineering, Czech Republic; ²ETD Transformatory, a.s., Czech Republic

PD4-9**A WENO Scheme for Streamer Discharge Simulations** ***)* (

Chijie Zhuang, Rong Zeng, Bo Zhang

Tsinghua University, People's Republic of China

PD4-10**Coupled Analysis of Vibration Energy Harvesters Based on Nonconforming Voxel FEM** ***)**

Takahiro Sato¹, Kota Watanabe², Hajime Igarashi¹

¹Hokkaido University, Japan; ²Muroran Institute of Technology

PD4-11**Simultaneous Design Approach to Transient Electromagnetic and Thermal Problems Based on a Black-Box Modeling Concept** ***)*,

Nak-Sun Choi¹, Dong-Wook Kim¹, Gi-Woo Jeung¹, K. K. Choi², Dong-Hun Kim¹

¹Kyungpook National University, Republic of Korea (South Korea); ²Mech. and Ind. Eng., Univ. of Iowa, Iowa City, United States of America

PD4-12**Modeling Acoustic Effects during Casting Nanocomposites under Electromagnetic Field** ***)+\$

Slawomir Golak, Roman Przulucki

Silesian University of Technology, Poland

PD4-13**A Method of Vibrations due to Electromagnetic Force in Electric Motor**Ik-Sang Jang¹, Sang-Hwan Ham², Chang-Sung Jin¹, Won-Ho Kim³, Se-Young Oh⁴, Ju Lee⁴¹Mechatronics Group, Defence Program R&D Center, Samsung Techwin Co., Republic of Korea (South Korea); ²Dept. of Electrical Control Engineering, Suncheon First College, Republic of Korea (South Korea); ³Material&Device Research Center, SAIT, Samsung Electronics Co., Republic of Korea (South Korea); ⁴Dept. of Electric Engineering, Hanyang University, Republic of Korea (South Korea)**PD4-14****Coupled Magneto-mechanical Analysis in Isotropic Materials under Multi-axial Stress**Hassan Ebrahimi, Yanhui Gao, Hiroshi Dozono, Kazuhiro Muramatsu
Saga University, Japan**PD4-15****A Fast and Accurate Multi-Physic Approach to Predict Acoustic Noise: Application to SRMs**Haïfa Mechmeche^{1,2}, Guillaume Fritz², Frédéric Gillon¹, Abdelmounaïm Tounzi¹, Michel Hecquet¹¹Laboratoire d'Electrotechnique et d'Electronique de Puissance, France; ²RENAULT, France**PD4-16****Scale Modeling on the Overheat Failure of Bus Contacts in Gas-Insulated Switchgears**Hongtao Li, Naiqiu Shu, Xiaowen Wu, Hui Peng, Zipin Li
Wuhan University, People's Republic of China**PD4-17****Multi-physics Analysis of a Magnetocaloric Cooling System**Amine Mira¹, Christophe Espanet¹, Thierry de Larochelambert¹, Stefan Giurgea², Philippe Nika¹¹University of Franche-Comté, France; ²University of Technology Belfort-Montbéliard, France**PD4-18****Turbo Generators End Windings Magneto-mechanical Analysis Using a Fully Analytic Magnetic Model**Antoine Journeaux¹, Frédéric Bouillault¹, Olivier Moreau²¹Laboratoire de Genie Electrique de Paris, France; ²EDF R&D Clamart, France**PD4-19****Modeling and Numerical Analysis for Motional Effects of Dielectric Barrier on Electric Discharge and Surface Charge Accumulation**Myung Ki Baek, Il Han Park
Sungkyunkwan University, Republic of Korea (South Korea)**PD4-20****On the Trajectory and Rotation of a Spherical Magnet Falling Inside a Conducting Pipe**Stephane Dufour, Gerard Vinsard, Esteban Saatdjian
LEMETA, France**PD4-21****An Experimentally Based Mortar Cell Model for Electrical Interconnects**Federico Moro, Piergiorgio Alotto, Massimo Guarnieri, Giovanni Meneghetti, Andrea Stella
Universtià di Padova, Italy

1:45pm - 3:25pm Ballroom Foyer	PD5: Material Modeling 3 Session Chairs: Janos Füzi, João Pedro Assumpção Bastos
	<p>PD5-1 Construction of Magnetic Hysteresis Loops from the Normal BH Curve and Intrinsic Coercivity --- - \$ <u>Dingsheng Lin</u>, Ping Zhou, Chuan Lu, Ningning Chen Ansys Inc., United States of America</p> <p>PD5-2 Hysteresis Losses Evaluation in Electromagnetic Devices under Non Sinusoidal Induction Waveforms --- - & Diego C. S. do Prado, Patrick Kuo-Peng, <u>Nelson Sadowski</u>, Nelson J. Batistela GRUCAD/EEL/CTC/UFSC, Brazil</p> <p>PD5-3 Thermal Behavior of Iron-Nickel-Chromium Alloys and Correlation with Magnetic and Physical Properties- Part A: Static Effects Modeling --- - (Oualid Messal¹, <u>Fabien Sixdenier</u>², Laurent Morel³, Noël Burais⁴ ¹Laboratoire AMPERE, Université Claude Bernard Lyon1, France; ²Laboratoire AMPERE, Université Claude Bernard Lyon1, France; ³Laboratoire AMPERE, Université Claude Bernard Lyon1, France; ⁴Laboratoire AMPERE, Université Claude Bernard Lyon1, France</p> <p>PD5-4 A Complex-Valued Rotating Magnetic Property Model and its Application to Iron Core Loss Calculation of Transformer Iron Core --- - * Yanli Zhang, <u>Dexin Xie</u> Shenyang University of Technology, People's Republic of China</p> <p>PD5-5 Nonlinear Magnetization Loss in Sintered NdFeB Magnet due to Eddy Current Heat Dissipation --- - , <u>Radu Fratila</u>^{1,2}, Abdelkader Benabou¹, Abdelmounaïm Tounzi¹, Jean-Claude Mipo² ¹L2EP/Université Lille1, France; ²Valeo Equipements Electriques Moteur, France</p> <p>PD5-6 On the Modeling of Dynamic Hysteresis Using JA and Field Separation Theories --- - %SS <u>Ajay P. Singh Baghel</u>, S. V. Kulkarni --- Indian Institute of Technology Bombay, India</p> <p>PD5-7 Development of Vector Hysteresis Model using a Magnetic Flip Model --- - %SS& <u>Atsushi Furuya</u>¹, Jun Fujisaki¹, Yuji Uehara¹, Koichi Shimizu¹, Hirotaka Oshima², Tetsuji Matsuo³ ¹Fujitsu, Japan; ²Fujitsu Laboratories Ltd.; ³Kyoto University</p> <p>PD5-8 Non Linear 2D Time Domain Eddy Current Calculation for Laminated Iron Cores --- - %S Wagane Faye^{1,2}, Gérard Meunier¹, Brahim Ramdane¹, <u>Christophe Guérin</u>², Marlène --- Faure², Delphine Dupuy², Patrice Labie¹ ¹G2ELAB (Grenoble Electrical Engineering Lab), France; ²Cedrat, France</p>

PD5-9

A 3D Semi Implicit Method for Computing Current Density in Bulk Superconductors

Abelin Kameni¹, Mohamed Boubekeur¹, Lotfi Alloui¹, Jonathan Lambrechts², Frederic Bouillault¹, Christophe Geuzaine³

¹Laboratoire de Génie Electrique de Paris, France; ²Centre for Systems Engineering and Applied Mechanics, Louvain-la-Neuve, Belgium; ³Dept of Electrical Engineering and Computer Science, Montefiore Institute, Liège, Belgium

PD5-10

Parameters for Expressing an Analytical Magnetization Curve Obtained Using a Genetic Algorithm

Marko Jesenik, Anton Hamler, Peter Kitak, Mladen Trlep
University of Maribor, Slovenia

PD5-11

Comparison between Modeling Methods of Two-Dimensional Magnetic Properties in Magnetic Field Analysis of Synchronous Machines

Shingo Higuchi¹, Yasuhito Takahashi¹, Tadashi Tokumasu², Koji Fujiwara¹

¹Department of Electrical Engineering, Doshisha University, Japan; ²Toshiba Mitsubishi-Electric Industrial Systems Corporation, Japan

PD5-12

Improvement and Application of the Viscous-Type Frequency-Dependent Preisach Model

Miklós Kuczmann

Szechenyi Istvan University, Hungary

PD5-13

Loss Calculation Method Considering Hysteretic Property with Play Model in Finite Element Magnetic Field Analysis

Junji Kitao¹, Yoshimi Takeda¹, Yasuhito Takahashi¹, Koji Fujiwara¹, Akira Ahagon², Tetsuji Matsuo³

¹Doshisha University, Japan; ²Science Solutions International Laboratory, Inc., Japan; ³Kyoto University, Japan

PD5-14

Comparison Between Different Approaches in Homogenization: Mean-field Approach vs Full-field Approaches

Romain Corcolle

Laboratoire de Génie Electrique de Paris (LGEP), France

PD5-15

Thermal Behavior of Iron-Nickel-Chromium Alloys and Correlation with Magnetic and Physical Properties-Part B: Dynamic Modeling

Oualid Messal, Fabien Sixdenier, Laurent Morel, Noël Burais

Laboratoire AMPERE, Université Claude Bernard Lyon1, France

PD5-16

Comparison of Iron Loss Prediction Formulae

Tanvir Rahman¹, Jemimah Akiror², Pragasen Pillay², David Lowther¹

¹Infolytica Corporation, Canada; ²Concordia University, Canada

	<p>PD5-17 Modelling of Several Concentric Layers of Superconducting Filaments *%&& <u>Thitipong Satiramatekul</u>¹, Frederic Bouillault² ¹Kasetsart University, Thailand; ²LGEP, France</p> <p>PD5-18 Homogenized Magnetostatic Analysis of Periodic Structure with Anisotropy *%&& <u>Yasuhisa Ito</u>, Hajime Igarashi Graduate School of Information Science and Technology, Hokkaido University, Japan</p> <p>PD5-19 Modeling of a Novel Three-Dimensional Magnetization Structure for Laminated Silicon Steel *%&& <u>Yongjian Li</u>¹, Qingxin Yang², Jianguo Zhu³, Zhigang Zhao¹, Xiaojing Liu¹, Changgeng Zhang¹ ¹Hebei University of Technology, People's Republic of China; ²Tianjin Polytechnic University, People's Republic of China; ³University of Technology, Sydney, Australia</p> <p>PD5-20 Prediction of Hysteresis Characteristics Using Stress-Dependent Preisach Model and FEM *%&& Jae-han Sim, Jae-woo Jung, Byeong-hwa Lee, Seung-hee Chai, <u>Jung-pyo Hong</u> Hanyang University, Republic of Korea (South Korea)</p>
1:45pm - 3:25pm Corvina	PD6: Electrical Machines & Drives 5 Session Chairs: Wolfgang Rucker, Oriano Bottauscio
	<p>PD6-1 Comparative Study of E-Core Axial Field Flux-Switching Permanent Magnet Machines *%& \$ Wei Zhang^{1,2}, Mingyao Lin¹, Li Hao¹, Jilong Zhao¹, <u>DA Xu</u>¹, Xinghe Fu¹ ¹School of Electrical Engineering, Southeast University, People's Republic of China; ²School of Electrical Engineering, Nantong University, People's Republic of China</p> <p>PD6-2 Commutation Analysis for High-Speed Universal Motors *%& & <u>Kazumi Kurihara</u>¹, Mamoru Kokubo¹, Takahiro Ito² ¹Ibaraki University, Japan; ²Hitachi Appliances, Inc., Japan</p> <p>PD6-3 Diagnosis Technique Using Detection Coil in BLDC Motor with Inter-Turn Fault *%& (*%& (& <u>Kyung-Tae Kim</u>, Seung-Tae Lee, Jin Hur *%& University of Ulsan, Republic of Korea (South Korea)</p> <p>PD6-4 Development of Axial Gap Generators for Mycro-hydro System Utilizing Magnetic Material Attached Magnetic Flux Concentrated Permanent Magnets *%& * Shiota Katsuyuki, <u>Takashi Todaka</u>, Masato Enokizono Oita University, Faculty of Engineering, Japan</p>

PD6-5**Transient Analysis of Single-Phase Induction Motor by Using Field-Circuit Coupled Finite Element Method**

Youpeng HuangFu, Shuhong Wang, Jie Qiu, Haijun Zhang, Guolin Wang, Jianguo Zhu
Xi'an Jiaotong University, People's Republic of China

PD6-6**Magnetic Force Comparison of Permanent Magnet Linear Synchronous Motor with Different Topology Structures**

Sang-Geon Lee, Sung-An Kim, Sang-In Byun, Yun-Hyun Cho
Dong-A University, Republic of Korea (South Korea)

PD6-7**Fast Computation of Torque - Load Angle Characteristics of Synchronous Machines Using Time-Domain Finite Element Method**

S. L. Ho, Xiu Zhang, W. N. Fu
The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)

PD6-8**An Improved Analytical Method for Calculation of PMEM Cogging Torque**

Gene Guo, Riming Shao, Liuchen Chang
University of New Brunswick, Canada

PD6-9**Research on Cogging Torque Calculation for Interior Permanent Magnet Machine based on Lumped-Circuit Parameters**

Jangho Seo, Hong Soon Choi
Kyungpook National University, Republic of Korea (South Korea)

PD6-10**A Permanent Magnet Synchronous Machine with Motor and Generator Functionalities in Single Stator Core**

Erkan Mese¹, Murat Ayaz², Murat Tezcan¹, Kadir Yilmaz², Engin Ozdemir²
¹Yildiz Technical University, Turkey; ²Kocaeli University, Turkey

PD6-11**Numerical Analysis and Design of Large Capacity Interior Permanent Magnet Synchronous Generator under Mechanical Stress**

Dongsu Lee¹, Cheol-Gyun Lee², Jong-Wook Kim³, Sang-Yong Jung⁴
¹Sungkyunkwan University, Republic of Korea (South Korea); ²Dong-Eui University, Republic of Korea (South Korea); ³Dong-A University, Republic of Korea (South Korea); ⁴Sungkyunkwan University, Republic of Korea (South Korea)

PD6-12**The Shape Design for Vibration Reduction of IPM Type BLDC Motor**

Tae-Seok Jeong, Gyu-Won Cho, Gyu-Tak Kim
changwon National University, Republic of Korea (South Korea)

PD6-13**Electromagnetic Analysis of a Novel Switched-Flux Memory Machine Employing a Parallelogram Hysteresis Model**

Hui Yang, Heyun Lin, Jianning Dong, Jianhu Yan, Yunkai Huang, Shuhua Fang
Southeast University, Nanjing, Jiangsu Province, People's Republic of China

	<p>PD6-14 Numerical and Experimental Design Validation for Optimal Efficiency Distribution Compatible to Frequent Operating Range of Interior PMSM, <u>Hochang Jung</u>¹, <u>Jihyun Ahn</u>², <u>Deokjin Kim</u>¹, <u>Sang-Yong Jung</u>² ¹Korea Automotive Technology Institute(KATECH), Republic of Korea (South Korea); ²Sungkyunkwan University, Republic of Korea (South Korea)</p> <p>PD6-15 Design of a BLDC Motor for Low Cost and Low Noise Application <u>Sangkla Kreuawan</u>¹, <u>Nattapon Chayopitak</u>¹, <u>Prasit Champa</u>¹, <u>Pakasit Somsiri</u>¹, <u>Sisuda Chaithongsuk</u>² ¹National Electronics and Computer Technology Center; ²Rajamangala University of Technology Suvarnabhumi</p> <p>PD6-16 Design of a Vernier Machine with Permanent Magnet on both sides of Rotor and Stator <u>Ho min Shin</u>, <u>Dae Kyu Jang</u>, <u>Jung Hwan Chang</u> Dong-A University, Republic of Korea (South Korea)</p> <p>PD6-17 Influences of Isotropic and Anisotropic Magnetostriction on Three-Phase Transformer with Highly Grain-Oriented Electrical Steel Sheet <u>Heesung Yoon</u>, <u>C.S. Koh</u> Chungbuk National University, Republic of Korea (South Korea)</p> <p>PD6-18 Finite-Element Analysis of Demagnetization of IPM-type BLDC Motor with Stator Turn Fault <u>Yoon-Seok Lee</u>, <u>Jin Hur</u> University of Ulsan, Republic of Korea (South Korea)</p> <p>PD6-19 A study on IPMSM Design for Sensorless Control with High-Frequency Voltage Signal Injection, <u>Seung-Hee Chai</u>¹, <u>Myung-Seop Lim</u>¹, <u>Jae-Woo Jung</u>¹, <u>Jung-Pyo Hong</u>¹, <u>Seung-Ki Sul</u>² ¹Hanyang University, Republic of Korea (South Korea); ²Seoul National University, Republic of Korea (South Korea)</p> <p>PD6-20 Analytical Model of Induction Motor for Performance Calculation <u>Ankit Dalal</u>, <u>Mohammed Nasir Ansari</u>, <u>Praveen Kumar</u> Indian Institute of Technology, Guwahati., India</p> <p>PD6-21 Analysis of Temperature Distribution on Power Switches Arrangements in Power Converter for Switched Reluctance Motor Drive <u>Hao Chen</u>, <u>Yang Xu</u> China University of Mining & Technology, People's Republic of China</p>
3:25pm - 3:50pm	Coffee Break

3:50pm - 5:30pm Ballroom	OD2: Electrical Machines & Drives 6 + Devices & Applications 4 Session Chairs: Herbert De Gersem, Yves Marechal
	<p>OD2-1 Frequency Domain Decomposition of 3-D Eddy Current Problems in Steel Laminations of Induction Machines * <u>Paul Handgruber</u>¹, Andrej Stermecki¹, Oszkar Biro¹, Georg Ofner² ¹IGTE, Graz University of Technology, Austria; ²ELIN Motoren GmbH, Austria</p> <p>OD2-2 Segregation of Iron Losses from Rotational Field Measurements and Application to Electrical Machine * <u>Anouar Belahcen</u>^{1,2}, Paavo Rasilo¹, Antero Arkkio¹ ¹Aalto University, Finland; ²Tallinn University of Technology, Estonia</p> <p>OD2-3 Iron Loss Analysis of Interior Permanent Magnet Synchronous Motors by Considering Mechanical Stress and Deformation of Stators and Rotors * <u>Katsumi Yamazaki</u>, Yusuke Kato Chiba Institute of Technology, Japan</p> <p>OD2-4 2D versus 3D Electromagnetic Field Modelling in Electromechanical Energy Converters * Andrzej Demenko², Jan Sykulski¹, <u>Rafal Wojciechowski</u>² ¹University of Southampton, United Kingdom; ²Poznań University of Technology, Poland</p> <p>OD2-5 A Parametrical Determination of the Influence Region of Holes in Electromagnetic Devices by the Compensation Theorem * Alessandro Formisano¹, Raffaele Fresca², <u>Raffaele Martone</u>¹ ¹Seconda Università di Napoli, Italy; ²Assoc. EURATOM/ENEA/CREATE; Univ. della Basilicata, Italy</p>
5:30pm - 5:50pm Ballroom	Closing Session