

21st International Conference on the Computation of Electromagnetic Fields (Compumag 2017)

Daejeon, South Korea
18 - 22 June 2017

ISBN: 978-1-5108-4638-8

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2017) by International Compumag Society
All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact International Compumag Society
at the address below.

International Compumag Society
Attn: Jan Sykulski
University of Southampton
Southampton SO17 1BJ UK

Phone: 44 238 059 3448
Fax: 44 238 059 3709

jks@soton.ac.uk

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Session Title	[OA1] Optimisation and Design 1
Date and Time	June 19 (Monday) / 10:00-10:40
Place	Grand Ballroom (2F, 201)
Session Chair	Jan Sykulski (Univ. of Southampton, UK)

OA1-1

10:00-10:20

Adjoint Technique for Sensitivity Analysis of Coupling Factors According to Geometric Variations 1

Schuhmacher, Sebastian (1); Klaedtke, Andreas (1); Keller, Christoph (1); Ackermann, Wolfgang (2); De Gersem, Herbert (2)

1: Robert Bosch GmbH - Corporate Research; 2: TU Darmstadt

OA1-2

10:20-10:40

Combined Deterministic Algorithm and Metaheuristic Technique for Fast and Accurate Resolution of Optimization Problems 3

Martin, Floran (1); Belahcen, Anouar (1,2)

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

Session Title	[OA2] Material Modelling
Date and Time	June 19 (Monday) / 16:20-18:00
Place	Grand Ballroom (2F, 201)
Session Chair	Tetsuji Matsuo (Kyoto Univ., Japan)

OA2-1	16:20-16:40
--------------	--------------------

Algebraic model for hysteresis and anisotropy of magnetic materials modeled by finite element method. 5

Glehn, Gregor; Steentjes, Simon; Hameyer, Kay
RWTH Aachen University, Institute of Electrical Machines, Aachen, Germany

OA2-2	16:40-17:00
--------------	--------------------

Magnetostrictive Characteristics in Grain-Oriented Laminated Cores Magnetized with a DC Biased Magnetic Field 7

Wang, Zhen (1); Zhang, Yanli (1); Ren, Ziyang (1); Zeng, Linsuo (1); Xie, Dexin (1); Koh, Chang-Seop (2)
1: Shenyang University of Technology, China; 2: Chungbuk National University, Korea, Republic of (South Korea)

OA2-3	17:00-17:20
--------------	--------------------

Analytical Hysteresis Model and Initial Conditions for Inrush Current Computations using FEM 9

Renhart, Werner (1); Biro, Oszkar (1); Magele, Christian (1); Preis, Kurt (1); Rabel, Alexander (2)
1: Graz University of Technology/IGTE, Austria; 2: Transformer Weiz, Siemens Inc. Austria Weiz, Austria

OA2-4	17:20-17:40
--------------	--------------------

Precise Modeling of Magnetically-Biased Graphene through a Recursive Convolution FDTD Method 11

Amanatiadis, Stamatios A. (1); Kantartzis, Nikolaos V. (1); Ohtani, Tadao (2); Kanai, Yasushi (3)
1: Aristotle University of Thessaloniki, Greece; 2: Omachi, Asahikawa, Japan; 3: Niigata Institute of Technology, Japan

OA2-5	17:40-18:00
--------------	--------------------

Magnetic Field Analysis of Window-shaped Core for Verifying Accuracy of Isotropic Vector Hysteresis Model 13

Minowa, Naoki; Takahashi, Yasuhito; Fujiwara, Koji
Doshisha University, Japan

Session Title [OB1] Mathematical Modelling & Formulations

Date and Time June 20 (Tuesday) / 09:00-10:40

Place Grand Ballroom (2F, 201)

Session Chair David Lowther (McGill Univ., Canada)

OB1-1

09:00-09:20

Equilibrated based A Posteriori Error Estimators for A and Ω Potential Formulations in Magnetostatic Problems 15

Tang, Zuqi
GeePs – Génie Electrique et Electronique de Paris, France

OB1-2

09:20-09:40

Solving nonlinear circuits with pulsed excitation by multirate partial differential equations 17

Pels, Andreas (1,2); Gyselinck, Johan (3); Sabariego, Ruth V. (4); Schöps, Sebastian (1,2)
1: Graduate School of Computational Engineering, Technische Universität Darmstadt, Germany; 2: Institut für Theorie Elektromagnetischer Felder, Technische Universität Darmstadt, Germany; 3: BEAMS Department, Université libre de Bruxelles, Belgium; 4: Department of Electrical Engineering, EnergyVille, KU Leuven, Belgium

OB1-3

09:40-10:00

A full-wave integral equation method including accurate wide-frequency-band wire models for WPT coils 19

Bilicz, Sandor (1); Badics, Zsolt (2); Gyimothy, Szabolcs (1); Pavo, Jozsef (1)
1: Budapest University of Technology and Economics, Hungary; 2: Tensor Research, LLC, Andover, MA, USA

OB1-4

10:00-10:20

The Study of VFTO Distribution in the IOCT Insulation System Considering the Moisture and Frequency Dependence of Materials 21

BAI, Baodong; WANG, Qingpeng; CHEN, Dezhi; HE, Xiaoyu
Shenyang University of Technology, China, People's Republic of

OB1-5

10:20-10:40

Study of Carbon-Based Transistors with Semi-Analytic and Full-Band Models 23

Zheng, Yi (1); Zanella, Fernando (2); Valerio, Guido (1); Ren, Zhuoxiang (1); Dartora, César Augusto (2)
1: Université Pierre et Marie Curie, France; 2: Federal University of Paraná, Brazil

Session Title	[OB2] Numerical Techniques
Date and Time	June 20 (Tuesday) / 16:20-18:00
Place	Grand Ballroom (2F, 201)
Session Chair	Oszkar Blro (TU Graz, Austria)

OB2-1	16:20-16:40
--------------	--------------------

Stability Analysis of Time Domain Discontinuous Galerkin H- Φ Method for Eddy Current Simulations 25

Smajic, Jasmin (1,2); Bucher, Matthias (1); Christen, Reto (1); Tanasic, Zeljko (1)
 1: University of Applied Sciences of Eastern Switzerland (HSR), Switzerland; 2: Swiss Federal Institute of Technology ETH

OB2-2	16:40-17:00
--------------	--------------------

Goal-oriented adaptivity in complementary geometric formulations for electrostatics 27

Bettini, Paolo (1,2); De Lorenzi, Antonio (2); Marconato, Nicolò (2); Pilan, Nicola (2); Specogna, Ruben (3)
 1: University of Padova, Department of Industrial Engineering (DII), 35131 Padova, Italy; 2: Consorzio RFX, 35127 Padova, Italy; 3: University of Udine, Polytechnic Department of Engineering and Architecture (DPIA), 33100 Udine, Italy

OB2-3	17:00-17:20
--------------	--------------------

Eddy-Current-Effect Homogenization of Windings in Harmonic-Balance Finite Element Models Coupled to Nonlinear Circuits 29

Sabariego, Ruth V. (1); Niyonmsatian, Korawich (1,2); Gyselinck, Johan (2)
 1: KU Leuven, Belgium; 2: Université Libre de Bruxelles (ULB), Belgium

OB2-4	17:20-17:40
--------------	--------------------

A Fast Reconstruction Approach for the Assessment of Magnetic Diagnostic Systems in Nuclear Fusion Devices 31

Chiariello, Andrea Gaetano; Formisano, Alessandro; Ledda, Francesco; Martone, Raffaele; Pizzo, Francesco
 Università della Campania "Luigi Vanvitelli", Italy

OB2-5	17:40-18:00
--------------	--------------------

MPP-Based Dimension Reduction Method for Accurate Prediction of the Probability of Failure of a Performance Function 33

Kim, Dong-Hun (1); Kang, Byungsu (1); Kim, Chang-Eob (2); Cho, Hyunkyoo (3); Choi, K. K. (3)
 1: Kyungpook National University, Korea, Republic of (South Korea); 2: Dept. of Electrical Eng., Hoseo Univ., Chungnam 336-795, Republic of Korea; 3: Dept. of Mechanical and Industrial Eng., Univ. of Iowa, Iowa City, IA 52242-1527, USA

Session Title [OC1] Static & Quasi-Static Fields / Wave propagation

Date and Time June 21 (Wednesday) / 09:00-10:40

Place Grand Ballroom (2F, 201)

Session Chair Osama Mohammed (Florida Int'l Univ., USA)

OC1-1 **09:00-09:20**

New Type of Second Order Tetrahedral Edge Elements by Reducing Edge Variables for Quasi-static Field Analysis 35

Ahagon, Akira (1); Kameari, Akihisa (1); Ebrahimi, Hassan (1); Fujiwara, Koji (2); Takahashi, Yasuhito (2)
 1: Science Solutions International Laboratory, Inc., Japan; 2: Doshisha University, Japan

OC1-2 **09:20-09:40**

Subproblem Finite Element Method for Current and Voltage Driven Magnetic Devices 37

Dular, Patrick (1); de Sousa Alves, Bruno (2); Kuo-Peng, Patrick (2)
 1: University of Liege, Belgium; 2: Universidade Federal de Santa Catarina, Brazil

OC1-3 **09:40-10:00**

GPU accelerated time domain DGA method for wave propagation problems on tetrahedral grids 39

Kapidani, Bernard (1); Cicuttin, Matteo (2); Codecasa, Lorenzo (3); Specogna, Ruben (1); Trevisan, Francesco (1)
 1: DPIA, University of Udine, Italy; 2: Cermics (ENPC), Université Paris-Est, France; 3: DEIB, Politecnico di Milano, Italy

OC1-4 **10:00-10:20**

Numerical modelling and material characterization for multilayer magnetically shielded room design 41

Canova, Aldo (1); Freschi, Fabio (1,2); Giaccone, Luca (2); Repetto, Maurizio (1,2)
 1: Politecnico di Torino, Dipartimento Energia, Corso Duca degli Abruzzi 24, 10129, Torino; 2: School of Information Technology and Electrical Engineering - The University of Queensland, Australia

OC1-5 **10:20-10:40**

Nonlinear Lamination Stacks Studied with Harmonic Balance FEM combined with Homogenization approach 43

Ziani, Smail; Henneron, Thomas; Le Menach, Yvonnick
 Laboratoire d'Electrotechnique et d'Electronique de Puissance de Lille (L2EP)

Session Title	[OC2] Optimisation and Design 2
Date and Time	June 21 (Wednesday) / 16:20-18:00
Place	Grand Ballroom (2F, 201)
Session Chair	Kay Hameyer (RWTH Aachen Univ., Germany)

OC2-1	16:20-16:40
--------------	--------------------

A benchmark TEAM problem for multiobjective Pareto optimization of electromagnetic devices 45

Di Barba, Paolo (1); Mognaschi, Maria Evelina (1); Xiao, Song (2); Lowther, David Alister (3); Sykulski, Jan K. (4)

1: University of Pavia, Pavia, Italy; 2: Southwest Jiaotong University, Chengdu, China; 3: McGill University, Montreal, Québec, Canada; 4: University of Southampton, Southampton, UK

OC2-2	16:40-17:00
--------------	--------------------

A SIMP based Methodology for Topology Optimization and its Application to Piezoelectric Energy Harvester Designs 47

Li, Yilun (1); Yang, Shiyu (1); Ren, Zhuoxiang (2)

1: Zhejiang University, China, People's Republic of; 2: Pierre and Marie Curie University, France

OC2-3	17:00-17:20
--------------	--------------------

Variance-based Robust Optimization of Permanent Magnet Synchronous Machine 49

Putek, Piotr (1); ter Maten, E. Jan W. (1); Günther, Michael (1); Sykulski, Jan K. (2)

1: University of Wuppertal; 2: University of Southampton

OC2-4	17:20-17:40
--------------	--------------------

Shape Optimization Procedure of Interior Permanent Magnet Motors Considering Carrier Harmonic Losses Caused by Inverters 51

Yamazaki, Katsumi; Togashi, Yusuke

Chiba Institute of Technology

OC2-5	17:40-18:00
--------------	--------------------

Design and analysis of an IE4 Class Line-Start Synchronous Reluctance Motor Considering Total Loss and Starting Performance 53

Liu, Huai cong; Lee, ju

Hanyang UNIV., Korea, Republic of (South Korea)

Session Title	[OD1] Novel Computational Methods for machines & Devices
Date and Time	June 22 (Thursday) / 09:00-10:40
Place	Grand Ballroom (2F, 201)
Session Chair	Hajime Igarashi (Hokkaido Univ., Japan)

OD1-1	09:00-09:20
--------------	--------------------

Proper Generalized Decomposition Applied on a Rotating Electrical Machine 55

Montier, Laurent (1,2); Henneron, Thomas (1); Clénet, Stéphane (1); Goursaud, Benjamin (2)
 1: Univ. Lille, Centrale Lille, Arts et Métiers Paris Tech, HEI, EA 2697, France; 2: EDF R&D, THEMIS, 7
 Boulevard Gaspard Monge, 91120 Palaiseau, France

OD1-2	09:20-09:40
--------------	--------------------

System Level Multi-objective Optimization Method for Electrical Drive Systems 57

Lei, Gang; Zhu, Jianguo; Guo, Youguang
 University of Technology Sydney, Australia

OD1-3	09:40-10:00
--------------	--------------------

The Role of Temperature-dependent Material Properties in Optimizing the Design of Permanent Magnet Motors 59

Ghorbanian, Vahid; Hussain, Sajid; Hamidzadeh, Sara; Chromik, Richard; Lowther, David
 McGill University, Canada

OD1-4	10:00-10:20
--------------	--------------------

Comparison of two forward solution approaches in Lorentz Force Evaluation 61

Dölker, Eva-Maria; Schmidt, Reinhard; Weise, Konstantin; Petković, Bojana; Ziolkowski, Marek; Brauer, Hartmut; Haueisen, Jens
 Technische Universität Ilmenau, Germany

OD1-5	10:20-10:40
--------------	--------------------

Iron-Loss Modelling based on a Loss-Separation Approach in Modelica 63

Kapeller, Hansjörg (1); Plaßnegger, Bernd (1); Gragger, J.V. (1); Müllner, Florian (2); Neudorfer, H. (2)
 1: AIT Austrian Institute of Technology GmbH, Austria; 2: TSA Traktionssysteme Austria GmbH

Session Title [OD2] Multi-physics and Coupled Problems

Date and Time June 22 (Thursday) / 16:20-18:00

Place Grand Ballroom (2F, 201)

Session Chair Herbert De Gersem (TU Darmstadt, Germany)

OD2-1

16:20-16:40

A 2-D Finite-element Model for Electro-thermal Transients in Accelerator Magnets 65

Bortot, Lorenzo (1); Auchmann, Bernhard (1); Maciejewski, Michał (1,2); Prioli, Marco (1); Schöps, Sebastian (3); Cortes Garcia, Idoia (3); Verweij, Arjan Peter (1); Navarro, Alejandro Manuel Fernandez (1)
 1: CERN, Geneva, Switzerland; 2: Łódź University of Technology, Łódź, Poland; 3: Technische Universität Darmstadt, Darmstadt, Germany

OD2-2

16:40-17:00

An Iterative Flux Tracing Method Without Deutsch Assumption for Ion-Flow Field of AC/DC Hybrid Transmission Lines N/A

Qiao, Ji; Zhang, Pengfei; Zou, Jun; Yuan, Jiansheng
 State Key Laboratory of Power System, Department of Electrical Engineering, Tsinghua University, Beijing, China, People's Republic of

OD2-3

17:00-17:20

Numerical Method for the Ferromagnetic Granules Utilizing DEM and MoM 67

Mitsufuji, Kenta; Nambu, Masahito; Hirata, Katsuhiro; Miyasaka, Fumikazu
 Osaka University, Japan

OD2-4

17:20-17:40

Characterization of Electrical Conductivity of Anisotropic CFRP Materials by means of Induction Thermography Technique 69

Bui, Huu Kien (1); Senghor, F. D. (1); Wasselynck, G. (1); Trichet, D. (1); Fouladgar, J. (1); Lee, K. (2); Berthiau, G. (1)
 1: IREENA, France; 2: Department of Physics, Sogang University, Seoul 121-742, Korea

OD2-5

17:40-18:00

Finite Element Analysis for Surface Discharge Due to Interfacial Polarization at the Oil-Nanocomposite Interface 71

Choi, Jin-Hyun (1); Kim, Su-Hun (1); Jang, Kyunghoon (2); Hikita, Masayuki (2); Lee, Se-Hee (1)
 1: Department of Electrical Engineering, Kyungpook National University, Daegu 41566, Republic of Korea; 2: Kyushu Institute of Technology Fukuoka, Japan

Session Title [PA-M1] Static and Quasi-Static Fields 1
Date and Time June 19 (Monday) / 11:00-12:50
Place Rm. 101 (1F)
Session Chair Ziyang Ren (Chungbuk Nat'l Univ., Korea)

PA-M1-1 **Digest ID: 1**

Calculation of the DC Ionized Field with the Presence of Dielectric Film by FEM and Divergence Theorem 73

Zou, Zhilong; Cui, Xiang; Lu, Tiebing
 North China Electric Power University, China, People's Republic of

PA-M1-2 **Digest ID: 52**

Cauer Ladder Network Representation of Eddy-Current Fields for Model Order Reduction Using Finite Element Method 75

Kameari, Akihisa (1); Ebrahimi, Hassan (1); Sugahara, Kengo (2); Shindo, Yuji (3); Matsuo, Tetsuji (4)
 1: Science Solutions International Laboratory, Inc.; 2: Faculty of Science and Engineering, Kindai University; 3: Kawasaki Heavy Industries, Ltd.; 4: Dept. Electrical Engineering, Kyoto University

PA-M1-3 **Digest ID: 56**

An efficient algorithm for accurate reduced models with the proper generalized decomposition for magneto quasistatic problems 77

Kruettgen, Christian; Hameyer, Kay
 RWTH Aachen University, Institute of Electrical Machines, Aachen, Germany

PA-M1-4 **Digest ID: 59**

Proposals for Inclusion of the Electrode Radius in Grounding Systems Analysis Using Interpolating Element-Free Galerkin Method 79

RESENDE, URSULA DO CARMO; ALÍPIO, RAFAEL SILVA; OLIVEIRA, MAISA LAILA DE FÁTIMA
 CEFET-MG, Brazil

PA-M1-5 **Withdrawn**

PA-M1-6 **Digest ID: 242**

Analysis of Eddy Currents in Litz Wire Using Homogenization-based FEM 81

Hiruma, Shingo; Igarashi, Hajime
 Hokkaido university, Japan

PA-M1-7 **Digest ID: 98**

Large Scale Simulation of Magnetization Process of HTS Undulator for X-ray FEL Based on T-method 83

Yi, Deri; Kawaguchi, Hideki
 Muroran Institute of Technology, Japan

PA-M1-8

Digest ID: 197

A Study on Comparison of Quasi 3D Modeling and 3D FEA of AFPMG for Large Scale Offshore Wind Turbine 85

Kim, Sung-An; Song, Ji-Hyo; Cho, Yun-Hyun
Dong A University, Korea, Republic of (South Korea)

PA-M1-9

Digest ID: 128

Lean cohomology computation for electromagnetic modeling 87

Dlotko, Pawel (1); Kapidani, Bernard (2); Specogna, Ruben (2)
1: DataShape, Inria, France; 2: DPIA, University of Udine, Italy

PA-M1-10

Digest ID: 293

Coupling volume and surface integral formulations for eddy current problems on general meshes 89

Bettini, Paolo (1); Specogna, Ruben (2); Passarotto, Mauro (2)
1: Department of Industrial Engineering (DII), University of Padova, Italy; 2: Polytechnic Department of Engineering and Architecture (DPIA), University of Udine, Italy

PA-M1-11

Digest ID: 158

A Fast Procedure to Assemble Interaction Matrices in Equivalent Magnetic Charges Methods 91

Chiariello, Andrea Gaetano; Formisano, Alessandro; Ledda, Francesco; Martone, Raffaele; Pizzo, Francesco
Università degli Studi della Campania "Luigi Vanvitelli"

PA-M1-12

Digest ID: 173

Solutions for the Ill-posed Problem of Inverse Calculating Three-phase Voltages of Overhead Transmission Lines by Using Power-frequency Electric Field Data 93

Xiao, Dongping; Xie, Yutong; Ma, Qichao; Liu, Huaitong; Zheng, Qi; Zhang, Zhanlong
Chongqing University, China, People's Republic of

PA-M1-13

Digest ID: 178

Presentation and 2-Dimensional Equivalent Magnetic Field Analysis of a Novel 2-DOF Spherical Hybrid Stepping Motor 95

Lu, Binglin; Xu, Yanliang
Shandong University, China, People's Republic of

PA-M1-14

Digest ID: 281

An Efficient Decomposed Method in Harmonic Domain For Solving Nonlinear Time-Periodic Magnetic Problems 97

Zhao, Xiaojun (1); Wang, Gang (1); Jin, Zhiming (1); Zhang, Honggang (1); Cheng, Zhiguang (2); Lu, Junwei (3)
1: North China Electric Power University, China, People's Republic of; 2: Institute of Power Transmission and Transformation Technology, China, People's Republic of; 3: Griffith University, Australia

Session Title	[PA-M2] Optimization and Design 1
Date and Time	June 19 (Monday) / 11:00-12:50
Place	Rm. 102 (1F)
Session Chair	Zhuoxiang Ren (Université Pierre et Marie CURIE, France)

PA-M2-1 **Digest ID: 3**

Electromagnetic Wave Travel Time in Biological Tissue for Imaging 99

Yang, Dan; Xu, Bin; Wang, Xu; Luan, Feng; Zhang, Dianhai
northeastern university, China, People's Republic of

PA-M2-2 **Digest ID: 74**

Design Optimization of A Novel Scale-Down Hybrid-Excited Dual-PM Generator for Direct-Drive Wind Power Application 101

Wang, Qingsong (1); Niu, Shuangxia (1); Yang, Lin (2)
1: The Hong Kong Polytechnic University, Hong Kong S.A.R. (China); 2: State Power Economic Research Institute, Beijing, China

PA-M2-3 **Digest ID: 88**

Electromagnetic Field Characteristic Analysis of Interior Permanent Magnet Motor considering Operating Conditions 103

Lee, Do-Jae; Park, Yu-Seop
Koea National University of Transportation, Korea, Republic of (South Korea)

PA-M2-4 **Digest ID: 95**

Influence of Die Cast Rotor Fill Factor on the Starting Performance of Induction Machines 105

Yun, Jangho (1,2); Lee, Sungho (2); Jeong, Myung (1); Lee, Sang Bin (1)
1: Korea University, Korea, Republic of (South Korea); 2: Hyundai Heavy Industries, Korea, Republic of (South Korea)

PA-M2-5 **Digest ID: 107**

Analysis of Magneto-Mechanical Jiles-Atherton-Sablik Model Regarding its Sensitivity to Non-linear Algorithm Parametrization 107

Mailhé, Benjamin Joseph; Bernard, Laurent; Sadowski, Nelson; Batistela, Nelson Jhoe; Bastos, João Pedro Assumpção
GRUCAD - Universidade Federal de Santa Catarina, Brazil

PA-M2-6 **Digest ID: 120**

Distribution characteristic and combined optimization of maximum cogging torque of surface mounted few slots permanent-magnet machines 109

Jin, Ping (1); Guo, Yujing (1); Fang, Shuhua (2); Lin, Heyun (2); Yang, Hui (2)
1: Hohai University, China, People's Republic of; 2: Southeast University, China, People's Republic of

PA-M2-7**Digest ID: 134**

The Design of Iron Loss Minimization of 600W IPMSM by Quasi-Newton Method 111

Baek, Sung-Min (1); Cho, Gyu-Won (2); Kim, Yong-Tae (2); Kim, Gyu-Tak (1)

1: Changwon National University, Korea, Republic of (South Korea); 2: S&T Motiv, Motor R&D Center, Korea, Republic of (South Korea)

PA-M2-8**Digest ID: 145**

HEV Motor Comparison of IPMSM with Sintered Rare-Earth Magnet and PMASynRM with Bonded Dy Free Magnet in the Same Size 113

Hwang, Yo Han (1,2); Park, Jung Woo (2); Kim, Tae Hwang (2); Shin, Duck Woong (2); Lee, Ju (1)

1: Hanyang University, Korea, Republic of (South Korea); 2: Hyundai Wia, Korea, Republic of (South Korea)

PA-M2-9**Digest ID: 156**

A Wind Driven Optimization Algorithm for Global Optimization of Electromagnetic Devices 115

Ho, S. L. (1); Yang, Shiyou (2)

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

PA-M2-10**Digest ID: 160**

Multi-Objective Synthesis of NFC-Transponder Systems based on PEEC Method 117

Bauernfeind, Thomas (1); Baumgartner, Paul (1); Biro, Oszkar (1); Hackl, Andreas (2); Magele, Christian (1); Renhart, Werner (1); Torchio, Riccardo (3)

1: Institute of Fundamentals and Theory in Electrical Engineering, Graz University of Technology, Austria; 2: Institute of Automotive Engineering, Graz University of Technology, Austria; 3: Dipartimento di Ingegneria Industriale, Università degli Studi di

PA-M2-11**Digest ID: 166**

Design of Surface-Mounted Permanent Magnet Vernier Machines Considering Harmonic Characteristics of Winding MMF 119

Jang, Daekyu; Chang, Junghwan

Dona-A University, Korea, Republic of (South Korea)

PA-M2-12**Digest ID: 172**

Fast Calculation of Copper Losses in Flush-Butt Welding Transformer 121

Sakhno, Liudmila (1); Sakhno, Olga (2); Zaryvaev, Roman (3)

1: Peter the Great St. Petersburg Polytechnic University, Russian Federation; 2: Peter the Great St. Petersburg Polytechnic University, Russian Federation; 3: Pskovelectrosvar – a producer of high power welding machines, Pskov, Russian Federation

PA-M2-13**Digest ID: 155**

Tunable Waveguide Filter Design using Topology optimization based on the ON/OFF method 123

Shin, Hyundo (1); Yoo, Jeonghoon (2)

1: Graduate School of Mechanical Engineering, Yonsei University; 2: School of Mechanical Engineering, Yonsei University

PA-M2-14

Digest ID: 364

Study on Surface Charge Distribution Characteristics on surface of Dielectric under Negative Corona in Sphere-plane Gaps 125

Du, Zhiye; Huang, Congpeng; Lian, Qixiang; Ruan, Jiangjun; Yuan, Jiaxin
Wuhan University, China, People's Republic of

Session Title	[PA-M3] Multi-physics and Coupled Problems 1 / Electromagnetic Sensors
Date and Time	June 19 (Monday) / 11:00-12:50
Place	Rm. 103-104 (1F)
Session Chair	Patrick Kuo-Peng (Univ. Federal de Santa catarina, Brazil)

PA-M3-1	Digest ID: 413
----------------	-----------------------

Domain Decomposition Method and Model Order Reduction Method for Electromagnetic-Thermal Coupled Problem 127

Li, Hailin (1); Yuan, Dongsheng (1); Huangfu, Youpeng (1); Feng, Hanke (1); Wang, Shuhong (1); Zhu, Jianguo (2)
 1: Xi'an Jiaotong University, China, People's Republic of; 2: University of Technology, Sydney, Australia

PA-M3-2	Digest ID: 516
----------------	-----------------------

Electromagnetic-Thermal-Fluid Coupled Simulation of Variable Impedance Energy-saving Transformer 129

He, Haoyan; Li, Hailin; Wang, Shuhong
 State Key Laboratory of Electrical Insulation and Power Equipment, School of Electrical Engineering, Xi'an Jiaotong University, 28 West Xianning Rd, Xi'an 710049, China, shwang@mail.xjtu.edu.cn

PA-M3-3	Digest ID: 65
----------------	----------------------

3D Nonlinear Modeling of Magnetostrictive Materials Based on DEAM 131

Qin, Zhi (1); Xu, Xiaoyu (2); Yan, Shuai (2); Talleb, Hakeim (1); Ren, Zhuoxiang (1)
 1: Université Pierre et Marie Curie, France; 2: Institute of Microelectronics of Chinese Academy of Science, China

PA-M3-4	Digest ID: 97
----------------	----------------------

Easy Finite-Element Implementation of Circuit-Field Problems 133

Escarela-Perez, Rafael (1); Melgoza-Vazquez, Enrique (2); Olivares-Galvan, Juan Carlos (1); Arjona-Lopez, Marco Antonio (3); Trillaud, Frederic (4)
 1: Universidad Autonoma Metropolitana; 2: Instituto Tecnologico de Morelia; 3: Instituto Tecnologico de la Laguna; 4: Universidad Nacional Autonoma de Mexico

PA-M3-5	Digest ID: 111
----------------	-----------------------

Temperature Rise Prediction of the Novel Fast Vacuum Circuit Breaker Bus Bar Using a 2-D Coupled Model 135

Yu, Xiao (1); Yang, Fan (1); Ai, Shaogui (2); Du, Wei (3); Li, Xing (1); Gao, Bing (1)
 1: Chongqing University, China, People's Republic of; 2: State Grid Ningxia Power Company, Yinchuan, China; 3: Wuhan NARI Limited Company of State Grid Electric Power Research Institute, Wuhan, China

PA-M3-6	Digest ID: 115
----------------	-----------------------

Effects of Multi-Axial Mechanical Stress on Loss Characteristics of Electrical Steel Sheets and Interior Permanent Magnet Machines 138

Yamazaki, Katsumi (1); Mukaiyama, Hirofumi (1); Daniel, Laurent (2)
1: Chiba Institute of Technology; 2: Group of Electrical Engineering in Paris (GeePs)

PA-M3-7

Digest ID: 140

Vibration Properties of Two-stage Magnetic-valve Controllable Reactor 140

Zhang, Pengning; Li, Lin
State Key Laboratory of Alternate Electrical Power System with Renewable Energy Sources (North China Electric Power University), China, People's Republic of

PA-M3-8

Withdrawn

PA-M3-9

Digest ID: 190

Ultrasonic Nonlinear Characteristics of Plastic Damage in Aluminum Plate 142

Zhang, Chuang (1); Cao, Xiaolin (1); Liu, Suzhen (1); Jin, Liang (2); Yang, Qingxin (2); Zhang, Changgeng (2)
1: Hebei University of Technology, China, People's Republic of; 2: Tianjin Polytechnic University, China, People's Republic of

PA-M3-10

Digest ID: 589

Applied Current Thermoacoustic Imaging 144

Yang, Yanju (1,2); Li, Yanhong (1,2); Xia, Zhengwu (1); Li, Yuanyuan (1,2); Sun, Wenxiu (1,2); Liu, Guoqiang (1,2)
1: Institute of Electrical Engineering, Chinese Academy of Sciences, China, People's Republic of; 2: University of Chinese Academy of Sciences, China, People's Republic of

PA-M3-11

Withdrawn

PA-M3-12

Digest ID: 216

Space discretized ferromagnetic model for non-destructive eddy current testing 146

Gupta, Bhaawan (1,2); Ducharme, Benjamin (1); Sebald, Gael (1,2); Uchimoto, Tetsuya (2)
1: LGEF, INSA LYON, FRANCE; 2: ELYTMAX, TOHOKU UNIVERSITY, JAPAN

PA-M3-13

Digest ID: 245

Shape Optimization of the SPM Motor for Noise Reduction Based on Magnetic-structural-acoustic Coupled Analysis 148

Lim, Sunghoon; Joo, Yongwoo; Min, Seungjae
Department of Mechanical Engineering and Science, Kyoto University, Kyoto, Japan

PA-M3-14

Digest ID: 260

Basic Consideration of Analysis Method for Magnetostriction Bone Conduction Speaker 150

Takanami, Shimpei (1); Kitagawa, Wataru (1); Takeshita, Takaharu (1); Masuda, Akihiro (2); Nakashima, Masahiro (2)
1: Nagoya Institute of Technology, Japan; 2: SANKO MOLD Co., LTD, Japan

PA-M3-15

Digest ID: 266

Portable Lorentz Force Eddy Current Testing System with Rotational Motion 152

Schmidt, Reinhard (1); Otterbach, Jan Marc (1); Ziolkowski, Marek (1,2); Brauer, Hartmut (1); Toepfer, Hannes (1)

1: Technische Universität Ilmenau, Germany; 2: West Pomeranian University of Technology Szczecin, Poland

PA-M3-16

Digest ID: 269

Finite Element Method Incorporating Coupled Magneto-Elastic Model for Magneto-Mechanical Energy Harvester 154

Ahmed, Umair; Harju, Jarmo; Poutala, Jarmo; Ruuskanen, Pekka; Rasilo, Paavo; Kouhia, Reijo

Tampere University of Technology, Finland

PA-M3-17

Digest ID: 298

Vibration Prediction of Non-Oriented Silicon Iron Power Transformer Core under DC Bias 156

LIU, Mingyong (1,2); HUBERT, Olivier (2); TANG, Zuqi (1); BOUILLAUD, Frédéric (1); MININGER, Xavier (1); BERNARD, Laurent (3)

1: GeePs, France; 2: LMT Cachan, France; 3: GRUCAD/EEL/CTC, Brazil

PA-M3-18

Digest ID: 695

Electromagnetic-Thermal Coupling Analysis of an Outer-Rotor I-Shaped Flux-Switching Permanent-Magnet Motor Considering Driving Cycles 158

Liu, Chang; Quan, Li; Zhu, Xiaoyong; Xiang, Zixuan; Fan, Deyang

School of Electrical and Information Engineering, Jiangsu University, Zhenjiang 212013 China

PA-M3-19

Digest ID: 328

Numerical Method for Forming Process of Resin Bond Magnet 160

Mitsufuji, Kenta; Nambu, Masahito; Hirata, Katsuhiro; Miyasaka, Fumikazu

Osaka University, Japan

PA-M3-20

Digest ID: 336

Temperature rise calculation of a flux-switching permanent-magnet double-rotor machine using electromagnetic-thermal coupling analysis 162

Mo, Lihong

Huaiyin Institute of Technology, China, People's Republic of

PA-M3-21

Digest ID: 480

A New Technique of Nondestructive Inspection for Underground Pipelines by Using Differential Excitation Coils 164

Kim, Hui Min; Park, Gwan Soo

Pusan National University, Korea, Republic of (South Korea)

PA-M3-22

Digest ID: 514

Design of a New Low-Consumption Fluxgate Sensor 166

Yang, Xiaoguang; Jin, Shuangshuang; Xu, Linliang; Gao, Linghu; Gao, Lijing; Li, Yongjian; Ge, Manling
Hebei University of Technology, China, People's Republic of

PA-M3-23

Digest ID: 596

Analysis of Hysteresis Phenomenon in a Current Sensor 168

Ishikawa, Takeo; Tanaka, Keigo
Gunma University, Japan

PA-M3-24

Digest ID: 414

Oscillations of the Electromagnetically Levitated Liquid Droplet 170

Li, Hailin (1); Yuan, Dongsheng (1); Huangfu, Youpeng (1); Feng, Hanke (1); Wang, Shuhong (1); Zhu, Jianguo (2)
1: Xi'an Jiaotong University, China, People's Republic of; 2: University of Technology, Sydney, Australia

PA-M3-25

Digest ID: 526

Research on Power Transformer Winding Deformation Under Multiple Short-Circuit Conditions Through Magnetic-Structural Coupling analysis 172

Wang, Shuang; Wang, Shuhong; Huangfu, Youpeng; Li, Hailin; Yuan, Dongsheng; Wang, Song
State Key Laboratory of Electrical Insulation and Power Equipment, Faculty of Electrical Engineering, Xi'an Jiaotong University, China, People's Republic of

Session Title	[PA-A4] Optimization and Design 2
Date and Time	June 19 (Monday) / 14:10-16:00
Place	Rm. 101 (1F)
Session Chair	Dianhai Zhang (Shenyang Univ. of Tech., China)

PA-A4-1

Digest ID: 8

Performance Analysis of Four Topologies of Ferrite Permanent Magnet Synchronous Generators for a Small Wind Energy Turbine 174

Kölzer, José Fabio; Bazzo, Thiago de Paula; Carlson, Renato; Sadowski, Nelson
Universidade Federal de Santa Catarina, Brazil

PA-A4-2

Digest ID: 575

Robust Tolerance Design Optimization of a Claw Pole PM Motor with Soft Magnetic Composite Cores 176

MA, BO; Lei, Gang; Zhu, Jianguo; Guo, Youguang
University of Technology Sydney, Australia

PA-A4-3

Digest ID: 410

Shape Design of a Rotor Bar for Improving Starting Torque And Running Efficiency in Squirrel Cage Induction Motor 178

Lee, Ha Jeong; Im, Sang Hyeon; Park, Gwan Soo
Pusan National University, Korea, Republic of (South Korea)

PA-A4-4

Digest ID: 159

A Real Coded Vector Population-Based Incremental Learning for Multi-objective Optimizations of Electromagnetic Devices 180

Ho, S. L. (1); Yang, Shiyu (2)
1: The Hong Kong Polytechnic University, Hong Kong; 2: Zhejiang University, China, People's Republic of

PA-A4-5

Digest ID: 174

Characteristics Investigation of a Variable Flux Magnetic-Geared Motor Using Mathematical and Numerical Methods 182

Niguchi, Noboru; Hirata, Katsuhiro; Kohara, Akira; Takahara, Kazuaki
Osaka University, Japan

PA-A4-6

Digest ID: 192

Stable and Efficient Magnetic Field Optimization of 18 MeV Sector Focused Cyclotron Magnet Using Bezier Curve Fitting 184

Kim, Su-Hun (1); Kwak, Chang-Seob (2); Lee, Se-Hee (1)
1: Kyungpook National University, Daegu, Republic of Korea; 2: Korea Electrotechnology Research Institute, Changwon, Republic of Korea

PA-A4-7

Withdrawn

PA-A4-8

Digest ID: 207

Analyzing and Weakening the Cogging Torque of Line-start Permanent Magnet Motor 186

Liu, Lin (1); Jing, Libing (1,2); Gao, Qixing (1); Luo, Zhenghao (1); Cheng, Jia (1); Lin, Ying (1); Zhang, Ting (1)
 1: China Three Gorges University, China, People's Republic of; 2: Huazhong University of Science and Technology, Wuhan, China, People's Republic of

PA-A4-9

Digest ID: 213

Enhanced Meta-model Based Optimization under Constraints using Parallel Computations 188

El Bechari, Reda (1,2); Brisset, Stéphane (1); Clénet, Stéphane (1); Mipo, Jean-Claude (2)
 1: Université Lille, Centrale Lille, Arts et Métiers ParisTech, HEI, EA 2697 - L2EP - Laboratoire d'Electrotechnique et d'Electronique de Puissance, F-59000 Lille, France; 2: Valeo Equipements Electriques Moteur, Créteil, France

PA-A4-10

Digest ID: 214

An Efficient Serial-Loop Strategy for Reliability-Based Robust Optimization of Electromagnetic Design Problems 190

Kim, Dong-Hun (1); Kang, Byungsu (1); Choi, K. K. (2)
 1: Kyungpook National University, Korea, Republic of (South Korea); 2: Dept. of Mechanical and Industrial Eng., Univ. of Iowa, Iowa City, IA 52242-1527, USA

PA-A4-11

Withdrawn

PA-A4-12

Digest ID: 229

Topological Optimization Using Basis Functions for Improvement of Rotating Machine Performances 192

Sasaki, Hidenori; Igarashi, Hajime
 Graduate School of Information Science and Technology, Hokkaido University, Japan

PA-A4-13

Digest ID: 236

Optimization of design parameters of a toroid HTS coil for large scale SMES 194

Lee, Ji-Young (1); Lee, Seyeon (2); Choi, Kyeongdal (2); Kim, Woo-Seok (2)
 1: Institute for Basic Science, Korea, Republic of (South Korea); 2: Korea Polytechnic University, Korea, Republic of (South Korea)

PA-A4-14

Digest ID: 237

Topology Optimization Based on On/Off Method for Synchronous Motor N/A

Watanabe, Kota; Suga, Takao; Kitabatake, Shinya
 Muroran Institute of Technology, Japan

Electromagnetic Actuation Scheme for Steering MNPs with Aggregations at Multi-Channel Vessels 196

Kafash Hoshidar, Ali (1,2); Le, Tuan-Anh (1); Yoon, JungWon (1)

1: Gyeongsang National University, Korea, Republic of (South Korea); 2: Islamic Azad University, Qazvin Branch, Qazvin (Iran)

Session Title	[PA-A5] Numerical Techniques 1
Date and Time	June 19 (Monday) / 14:10-16:00
Place	Rm. 102 (1F)
Session Chair	Stéphane Clenet (Arts et Métiers ParisTech., France)

PA-A5-1	Digest ID: 16
----------------	----------------------

Non-Intrusive Uncertainty Quantification with Polynomial Chaos Approximations for a Stochastic Stern-Gerlach Magnet Model 198

Loukrezis, Dimitrios (1,2); Polonskij, Ilja (1); Römer, Ulrich (1,2); De Gersem, Herbert (1,2)

1: Institut für Theorie Elektromagnetischer Felder, TU Darmstadt, Germany; 2: Graduate School Computational Engineering, TU Darmstadt, Germany

PA-A5-2	Digest ID: 26
----------------	----------------------

3-D Parallel Finite Element Method with Prismatic Edge Elements for Electromagnetic Field Analysis of IPM Motor 200

Kawase, Yoshihiro; Yamaguchi, Tadashi; Osada, Shunichi

Gifu University, Japan

PA-A5-3	Digest ID: 398
----------------	-----------------------

A New Divide and Conquer Method For Three-Dimensional Electrical Impedance Tomography 202

Martin, Sébastien; Choi, Charles

National Chiao Tung University, Taiwan

PA-A5-4	Digest ID: 39
----------------	----------------------

A new and robust hysteresis modeling based on simple equations 204

Bastos, João Pedro Assumpção (1); Hoffmann, Kleyton (1,2); Leite, Jean Viane (1); Sadowski, Nelson (1)

1: Universidade Federal de Santa Catarina, Brazil; 2: Universidade do Oeste de Santa Catarina, Brazil

PA-A5-5	Digest ID: 43
----------------	----------------------

Strong Coupling Method between Magnetic Field Equations and Hysteresis Model for Accurate Prediction of Core Loss in Inductive Components 206

Shimizu, Koichi (1); Furuya, Atsushi (1); Uehara, Yuji (1); Fujisaki, Jun (1); Ataka, Tadashi (1); Tanaka, Tomohiro (1); Oshima, Hirofumi (2)

1: Fujitsu Limited; 2: Fujitsu Laboratories Limited

PA-A5-6	Digest ID: 451
----------------	-----------------------

An Adaptive FEM Based on Magnetic Field Conservation Applying to Ferromagnetic Problems 208

Noguchi, So (1,2,3); Matsutomo, Shinya (4); Cingoski, Vlatko (5)

1: Hokkaido University, Japan; 2: National High Magnetic Field Laboratory; 3: Florida State University; 4: National Institute of Technology, Niihama College; 5: University "Goce Delcev" – Stip

PA-A5-7

Digest ID: 63

A Fast Tree Algorithm for the Calculation of Electrical Field in 1.5D Streamer Discharge Simulations 210

Zhuang, Chijie (1); Zhang, Yong (2); Zeng, Rong (1)

1: Tsinghua University, China, People's Republic of; 2: Courant Institute of Mathematical Sciences, New York University

PA-A5-8

Digest ID: 71

Time Decomposition Method for the General Transient Simulation of Low-Frequency Electromagnetics 212

He, Bo; Zhou, Ping; Lu, Chuan; Chen, Ningning; Lin, Dingsheng; Rosu, Marius
Ansys, United States of America

PA-A5-9

Withdrawn

PA-A5-10

Digest ID: 129

Computation of Hysteresis Torque and losses in a Bearingless Synchronous Reluctance Machine 214

Belahcen, Anouar (1,2); Mukhrejee, Victor (1); Martin, Florian (1); Rasilo, Paavo (1,3)

1: Aalto University, Dept. of Electrical Engineering and Automation, Finland; 2: Tallinn University of Technology, Dept. of Electrical Engineering, Estonia; 3: Tampere University of Technology, Dept. of Electrical Engineering, Finland

PA-A5-11

Digest ID: 146

Efficient Parallel Numerical Analysis of Rotating Bodies based on Hierarchical Domain Decomposition Method 216

SUGIMOTO, Shin-ichiro (1); OGINO, Masao (2); KANAYAMA, Hiroshi (3); TAKEI, Amane (4)

1: Tokyo University Science, SUWA, Japan; 2: Nagoya University, Japan; 3: Japan Women's University, Japan; 4: University of Miyazaki, Japan

PA-A5-12

Digest ID: 185

SCSM for Calculation of Motion-Induced Eddy Currents in Isotropic and Anisotropic Conductive Objects 218

Ziolkowski, Marek (1,2); Schmidt, Reinhard (1); Petkovic, Bojana (1); Gorges, Stephan (1); Weise, Konstantin (1); Brauer, Hartmut (1)

1: Technische Universität Ilmenau, Germany; 2: West Pomeranian University of Technology Szczecin, Poland

PA-A5-13

Digest ID: 230

Parametric Design Study of Electric Motor Using Multipolar Moment Matching Method Based on Model Order Reduction 220

Paul, Sarbajit; Chang, Junghwan

Dong-A University, Korea, Republic of (South Korea)

PA-A5-14

Digest ID: 316

Reduced Basis Finite-element Method for Electromagnetic Field Computation of Geometric Deformation Problems 222

Liu, Xiaoyu; Fu, Weinong
The Hong Kong Polytechnique University, Hong Kong S.A.R. (China)

PA-A5-15

Digest ID: 735

A Mixed Multiscale Finite Element Method with *A* and *J* for Eddy Currents in Iron Laminates N/A

Hollaus, Karl
Technische Universität Wien, Austria

Session Title	[PA-A6] Electromagnetic Compatibility
Date and Time	June 19 (Monday) / 14:10-16:00
Place	Rm. 103 (1F)
Session Chair	József Pávó (Budapest Univ. of Tech. and Economics, Hungary)

PA-A6-1 **Digest ID: 4**

A Methodology to Calculate Potentials on Buried Electrodes Considering Coupling Between Conductors by the Soil 224

Gazzana, Daniel S (1,2); Dias, Guilherme A. D. (1); Tronchoni, Alex. B. (1); Leborgne, Roberto C. (1); Bretas, Arturo S. (1,3); Telló, Marcos (4)
 1: UFRGS University, Brazil; 2: Swiss Federal Institute of Technology EPFL, Switzerland; 3: University of Florida, USA; 4: State Company of Electrical Energy CEEE-D, Brazil

PA-A6-2 **Digest ID: 5**

An Improved Soil Ionization Representation to Numerical Simulation of Impulsive Grounding Systems 226

Gazzana, Daniel S (1,2); Tronchoni, Alex B. (1); Bretas, Arturo S. (1,3); Thomas, Dave W. P. (4); Christopoulos, Christos (4)
 1: UFRGS University, Brazil; 2: Swiss Federal Institute of Technology EPFL, Switzerland; 3: University of Florida, USA; 4: University of Nottingham, UK

PA-A6-3 **Withdrawn**

PA-A6-4 **Withdrawn**

PA-A6-5 **Digest ID: 84**

Waveform Adjustments on Radiated Immunity Standards over the 210-216 MHz Frequency Range 228

de São José, Artur Nogueira (1); Adriano, Ricardo (1); Resende, Úrsula do Carmo (2); Menezes, Magno Alves de (3); Batalha, Rose Mary de Souza (3); Mologni, Juliano Fujioka (4)
 1: Federal University of Minas Gerais, Brazil; 2: Federal Center for Technological Education of Minas Gerais, Brazil; 3: Pontifical Catholic University of Minas Gerais, Brazil; 4: ESSS, Brazil

PA-A6-6 **Digest ID: 93**

The Friedman Test as a Statistical Tool to Deal with Measurement Noise in Electromagnetic Compatibility Analysis 230

Menezes, Magno Alves de (1); Batalha, Rose Mary de Souza (1); de São José, Artur Nogueira (2); Adriano, Ricardo (2); Resende, Úrsula do Carmo (3)
 1: Pontifical Catholic University of Minas Gerais, Brazil; 2: Federal University of Minas Gerais, Brazil; 3: Federal Center for Technological Education of Minas Gerais, Brazil

PA-A6-7 **Digest ID: 113**

Calculation of space charge density in negative corona based on finite element iteration and sound pulse method 232

Liao, Rujin; Liu, Hongbo; Zhu, Qingdai; Zhao, Xuotong; Liu, Kanglin; Li, Xing
 Chongqing University, China, People's Republic of

PA-A6-8

Digest ID: 268

A broadband electromagnetic homogenization method for composite materials 234

Al Achkar, Ghida (1); Pichon, Lionel (1); Benjelloun, Nabil (2); Daniel, Laurent (1)
1: GeePs (Group of Electrical Engineering, Paris), France; 2: Irseem - Esigelec, France

PA-A6-9

Digest ID: 280

FEM Computation in the Time Domain for Calibration of Electromagnetic Near-Field Scanning Technique 236

Bauer, Susanne Maria; Bíró, Oszkár; Koczka, Gergely; Gleinser, Andreas; Winkler, Gunter
TU Graz, Austria

PA-A6-10

Withdrawn

PA-A6-11

Withdrawn

PA-A6-12

Digest ID: 401

Frequency-dependent Multi-conductor Transmission Line Model for Shielded Power Cable Considering Geometrical Dissymmetry 238

Huangfu, Youpeng (1,2); Wang, Shuang (1); Wang, Song (1); Li, Hailin (1); Wang, Shuhong (1)
1: Xi'an Jiaotong University, China, People's Republic of; 2: Politecnico di Milano, Italy

PA-A6-13

Withdrawn

PA-A6-14

Digest ID: 471

Numerical Analysis of Transient Electromagnetic Radiation Field in GIS Electronic Instrument Transformer Under VFTO Excitation 240

Zhou, Tian; Guan, Xiangyu; Kang, Bing; Li, Zipin; Shu, Naiqiu
School of Electrical Engineering Wuhan University, China, People's Republic of

PA-A6-15

Digest ID: 505

Analysis Method of Induction Heater for Electric Vehicle 242

Yu, Seok-Hyun; Kang, Jun-Kyu; Kim, Ki-Chan
Hanbat National University, Korea, Republic of (South Korea)

PA-A6-16

Digest ID: 725

Steerable Electromagnetic Transmission of Metal Strips on A Magnetized Ferrite Slab 244

Park, Hyun Ho (1); Ahn, Seungyoung (2)
1: The University of Suwon, Korea, Republic of (South Korea); 2: The Cho Chun Shik Graduate School for Green Transportation, KAIST, Korea, Republic of (South Korea)

Session Title	[PA-A7] Bio-Electromagnetic Computation
Date and Time	June 19 (Monday) / 14:10-16:00
Place	Rm. 104 (1F)
Session Chair	Nathan Ida (The Univ. of Akron, USA)

PA-A7-1 **Digest ID: 112**

Research on the Inverse Problem of Electrical Impedance Tomography Based on Improved Regularization 246

Li, Xing (1); Yang, Fan (1); Yu, Shengjie (2); Yu, Xiao (1); Gao, Bing (1); Wang, Xiaoyu (3)
 1: Chongqing University, China, People's Republic of; 2: The Second Affiliated Hospital, Chongqing Medical University, China, People's Republic of; 3: Electric Power Science Research Institute of Zhejiang Electric Power Corporation, Hangzhou, China,

PA-A7-2 **Digest ID: 210**

EIT forward computation based on element-free Galerkin method for hematoma detection 248

Li, Ying; Wang, Hongbin; Yu, Miao; Zhang, Shuai; Ge, Manling; Xu, Guizhi
 Hebei University of Technology, China, People's Republic of

PA-A7-3 **Withdrawn**

PA-A7-4 **Digest ID: 591**

Effect of transcranial ultrasonic-magnetic stimulation on neural spiking behaviours in Izhikevich model 250

Zhang, Shuai; Cui, Kun; Xu, Guizhi; Yan, Weili
 Hebei University of Technology, China, People's Republic of

PA-A7-5 **Digest ID: 250**

Sensitivity of Low-frequency Local Field Potential Power to Tissue Anisotropy and Dipole Source on a Realistic Head Model by FEM Forward Simulation N/A

Ge, Manling; Ma, Xinxin; Chen, Shenghua; Feng, Zhiguo
 The Key Laboratory of Electromagnetic Field and Electrical Apparatus Reliability, Department of Electrical Engineering, Hebei University of Technology, Tianjin 300130, People's Republic of China

PA-A7-6 **Digest ID: 259**

Non-Uniform Magnetic Field Exposure Assessment Using Coupling Factors Based on 3-D Anatomical Human Model 253

Jung, Kyu-Jin; Shim, Jae-Hoon; Choi, Min-Soo; Byun, Jin-Kyu
 Department of Electrical Engineering, Soongsil University, Korea, Republic of (South Korea)

Numerical Simulations and Experimental Study of Magneto-Acousto-Electrical Tomography with Plane Transducer 255

Li, Yuanyuan (1,2); Liu, Guoqiang (1,2); Xia, Hui (2); Xia, Zhengwu (2)

1: University of Chinese Academy of Sciences, China, People's Republic of; 2: Institute of Electrical Engineering, Chinese Academy of Sciences, China, People's Republic of

Session Title [PB-M1] Optimization and Design 3

Date and Time June 20 (Tuesday) / 11:00-12:50

Place Rm. 101 (1F)

Session Chair So Noguchi (Hokkaido Univ., Japan)

PB-M1-1 **Digest ID: 9**

Cogging Torque Optimization of Flux Concentrated Transverse Flux PM Disk Generator by Skewing PM Poles 257

Yan, Jianhu (1); Feng, Yi (2); Jin, Ping (3)

1: Nanjing University of Science and Technology, China, People's Republic of; 2: Nanjing Institute of Technology, Nanjing, 211167, China; 3: Hohai University, Nanjing, 211110 China

PB-M1-2 **Digest ID: 549**

Optimal Design of Thinned Array by Using Hybrid Genetic Algorithm 259

Oh, hyun-su (1); Lee, Kang-in (2); Kim, Jong Mann (3); Chung, Young-seek (4)

1: Kwangwoon University, Korea, Republic of (South Korea); 2: Kwangwoon University, Korea, Republic of (South Korea); 3: Agency for Defense Development, Daejeon 34186, Korea.; 4: Kwangwoon University, Korea, Republic of (South Korea)

PB-M1-3 **Digest ID: 187**

Global Optimization of Electromagnetic Devices using Quantum Particle Swarm Optimization with Novel Methodology 261

Rehman, Obaid Ur; Yang, Shiyou; Khan, Shafiullah

Zhejiang University, China, People's Republic of

PB-M1-4 **Digest ID: 193**

A Kriging-Assisted Light Beam Search Method for Multiobjective Electromagnetic Inverse Problems 263

An, Siguang (1); Yang, Shiyou (2); Mohammed, Osama A. (3)

1: China Jiliang University, China, People's Republic of; 2: Zhejiang University, China, People's Republic of; 3: Florida International University, USA

PB-M1-5 **Digest ID: 240**

Iterative Kriging-based RBDO Methods for Expensive Black-Box Models 265

Deng, Siyang; El Bechari, Reda; Brisset, Stéphane; Clénet, Stéphane

Laboratoire d'Electrotechnique et d'Electronique de Puissance, France

PB-M1-6 **Digest ID: 512**

Influence of material and geometric parameters on the sensor based on active material 267

Trang, NGUYEN (1); Stéphane, CLENET (2)

1: Laboratoire d'Electrotechnique et d'Electronique de Puissance, Lille1, France; 2: Laboratoire d'Electrotechnique et d'Electronique de Puissance, ENSAM, France

PB-M1-7

Digest ID: 244

Shape Optimization for the Magnetizing Fixture to Reduce the Torque Ripple of the Ring-type SPM Motor 269

Lim, Sunghoon (1); Min, Seungjae (2); Hong, Jung-Pyo (2)

1: Department of Mechanical Engineering and Science, Kyoto University, Kyoto, Japan; 2: Department of Automotive Engineering, Hanyang University, Seoul, Korea

PB-M1-8

Digest ID: 176

Field Analysis and Multi-objective Design Optimization of E-Core Transverse-Flux Permanent Magnet Linear Motor 271

Fu, Dongshan; Xu, Yanliang

Shandong University, China, People's Republic of

PB-M1-9

Digest ID: 256

Shape Optimization of Deposited Layer Produced by Combined Cladding Process 273

Kotlan, Vaclav; Panek, David; Hamar, Roman; Dolezel, Ivo

University of West Bohemia, Czech Republic

PB-M1-10

Digest ID: 712

Incorporating Control Strategies into the Optimization of Synchronous AC Machines: A Comparison of Methodologies 275

Mohammadi, Mohammad; Silva, Rodrigo; Lowther, David

McGill University, Canada

PB-M1-11

Digest ID: 632

Performance of Quasi-Newton Method for Estimation of Relative Permittivity in 1-D Inverse Scattering Problem 277

Tsuburaya, Tomonori (1); Meng, Zhiqi (1); Okamoto, Yoshifumi (2); Wakao, Shinji (3)

1: Fukuoka University, Japan; 2: Hosei University, Japan; 3: Waseda University, Japan

PB-M1-12

Digest ID: 289

Pole Shape Optimization for Radiation Resistant Quadrupole Magnets of the SIS-100 Accelerator 279

Kalimov, Alexander (1); Leibrock, Hanno (2); Muehle, Carsten (2); Nalimov, Pavel (1)

1: St. Petersburg State Polytechnic University, Russian Federation; 2: GSI Helmholtzzentrum für Schwerionenforschung, Germany

PB-M1-13

Digest ID: 302

Distributed Cooperative Particle Swarm Optimization Algorithm For Electromagnetic Mechanisms Optimization 281

Xuerong, Ye (1); Hao, Chen (1); Huimin, Liang (1); Xinjun, Chen (2); Jiabin, You (1)

1: Harbin Institute of Technology; 2: SHANXI QUNLI ELECTRIC CO.LTD

Design, Analysis and Experimental Validation of Permanent Magnet Synchronous Motor for Articulated Robot Applications 283

Hong, Do-Kwan (1,2); Hwang, Wook (2); Lee, Ji-Young (1,2); Woo, Byung-Chul (2); Kang, Do-Hyun (2)

1: University of Science & Technology, Korea, Republic of (South Korea); 2: Korea Electrotechnology Research Institute, Korea, Republic of (South Korea)

Session Title	[PB-M2] Optimization and Design 4
Date and Time	June 20 (Tuesday) / 11:00-12:50
Place	Rm. 102 (1F)
Session Chair	Katsumi Yamazaki (Chiba Inst. of Tech., Japan)

PB-M2-1	Digest ID: 21
----------------	----------------------

Research on High Speed Permanent Magnet Machine Power Loss and Demagnetization Analysis 285

Zhang, Yue (1); Cao, Wenping (2); McLoone, Sean (1)
1: Queens University Belfast, United Kingdom; 2: Aston University, United Kindom

PB-M2-2	Digest ID: 590
----------------	-----------------------

A New Multimodal Optimization Approach and Its Application to the Design of Electric Machines 287

Yoo, Chung-Hee
Agency for Defense Development, Korea, Republic of (South Korea)

PB-M2-3	Digest ID: 339
----------------	-----------------------

Design of Small Dielectric Lens for Slot Antenna Using Topology Optimization 289

Itoh, Keiichi (1); Igarashi, Hajime (2)
1: Akita National College of Technology, Japan; 2: Graduate School of Information Science and Technology, Hokkaido University

PB-M2-4	Digest ID: 348
----------------	-----------------------

Stator Tooth Shape Optimization of a Permanent Magnet Linear Generator for Harvesting Oceanic Wave Energy 291

Farrok, Omar (1); Islam, Md. Rabiul (2); Zhu, Jianguo (3)
1: Ahsanullah University of Science & Technology, Dhaka-1208, Bangladesh.; 2: Rajshahi University of Engineering & Technology, Rajshahi-6204, Bangladesh.; 3: University of Technology Sydney, New South Wales 2007, Australia

PB-M2-5	Digest ID: 367
----------------	-----------------------

Multiobjective Lightning Search Approach Applied to Jiles-Atherton Vector Hysteresis Model Parameters Estimation 293

Coelho, Leandro dos Santos (1,2); Pierezan, Juliano (2); Batistela, Nelson Jhoe (3); Leite, Jean Viane (3)
1: Industrial and Systems Eng. Grad. Program (PPGEPS), Pontifical Catholic University of Parana, Curitiba, PR, Brazil; 2: Department of Electrical Engineering, Federal University of Parana (UFPR), Curitiba, PR, Brazil; 3: GRUCAD-EEL-CTC, Federal Universit

PB-M2-6

Digest ID: 380

A Segmented Brushless Doubly-Fed Generator for Wind Power Application 295

Jiang, Yongjiang; Zhang, Jianzhong; Li, Tianyi
Southeast University, China, People's Republic of

PB-M2-7

Digest ID: 383

Characteristics Analysis of High-Speed Three-Degree-of-Freedom Electromagnetic Actuator for Image Stabilizations 297

Heya, Akira (1); Hirata, Katsuhiko (1); Niguchi, Noboru (1); Yoshimoto, Takamichi (2); Ota, Tomohiro (2)
1: Osaka University, Japan; 2: Panasonic Corporation, Japan

PB-M2-8

Digest ID: 400

Pseudo-sensorless Control of Permanent-magnet Synchronous Motor Based on Linear Hall-effect Sensor Signal 299

Lee, Seung-Tae; Hur, Jin
Incheon National University, Korea, Republic of (South Korea)

PB-M2-9

Digest ID: 407

Reconstruction of Stress Corrosion Cracking Based on Multi-Frequency Eddy Current Testing Signals Using Genetic Algorithm 301

Wang, Li (1); Chen, Zhenmao (2); Wang, Xiaowei (2)
1: Xi'an University of Posts and Telecommunications, China, People's Republic of; 2: State Key Laboratory for Strength and Vibration of Mechanical Structures, Xi'an Jiaotong University, Xi'an, 710049, China

PB-M2-10

Digest ID: 409

Comparison and analysis of Bearingless Permanent Magnet Synchronous Motor with different Magnetized Rotor 303

zhang, tao
Huaiyin Institute of Technology, China, People's Republic of

PB-M2-11

Digest ID: 238

Starting Performance Improvement of Line-Start Permanent-Magnet Synchronous Motor Using Composite Solid Rotor 305

Yan, Bo; Wang, Xiuhe; Yang, Yubo
Shandong University, China, People's Republic of

PB-M2-12

Withdrawn

PB-M2-13

Digest ID: 478

Stability Analysis of Power Transformer Windings Based on Electromagnetic-Thermal-Structural Coupling Method 307

Zhang, Bo; Yan, Ning
Shenyang University of Technology, China, People's Republic of

Session Title	[PB-M3] Material Modelling 1
Date and Time	June 20 (Tuesday) / 11:00-12:50
Place	Rm. 103 (1F)
Session Chair	Joao Pedro Assumpcao Bastos (Univ. Federal de Santa catarina, Brazil)

PB-M3-1 **Digest ID: 784**

Equivalent Complex Permeability for Soft Magnetic Composites Application to Transformer 309

REN, Xiaotao (1); Corcolle, Romain (1,2); Daniel, Laurent (1)
1: Group of electrical engineering-Paris; 2: NYU Shanghai

PB-M3-2 **Digest ID: 78**

Model of Magnetostriction and Magnetization for Galfenol Rods with Considering the Effects of Anisotropy and Dynamic Losses 311

Li, Yafang; Huang, Wenmei; Wang, Bowen; Zhao, Ran
Key Laboratory of Electro-Magnetic Field and Electrical Apparatus Reliability of Hebei Province, Hebei University of Technology, Tianjin 300130, China

PB-M3-3 **Digest ID: 110**

Benchmark on the 3D Numerical Modeling of a Superconducting Bulk 313

Berger, Kevin (1); Escamez, Guillaume (2); Quéval, Loic (3); Kameni, Abelin (3); Alloui, Lofti (3,4); Ramdane, Brahim (2); Trillaud, Frédéric (5); Makong Hell, Ludovic (3,6); Meunier, Gérard (2); Masson, Philippe (6); Lévêque, Jean (1)
1: GREEN, Université de Lorraine, 54506 Vandoeuvre-lès-Nancy, France; 2: University Grenoble Alpes / CNRS, G2Elab, 38042 Grenoble, France; 3: Group of electrical engineering - Paris (GeePs), CNRS UMR 8507, CentraleSupélec, UPSud, UPMC, Gif-sur-Yvette, Fra

PB-M3-4 **Digest ID: 217**

Magnetic lump model for the hysteresis frequency dependence of a polymer matrix. 315

Gupta, Bhaawan (1,2); Ducharne, Benjamin (1); Sebald, Gael (1,2); Uchimoto, Tetsuya (2)
1: LGEF, INSA LYON, FRANCE; 2: ELYTMAX, TOHOKU UNIVERSITY JAPAN

PB-M3-5 **Digest ID: 314**

Modeling and Validation of Magnetic Anisotropy Model Based on Energy for Silicon Steel Goss Structure 317

Zhang, Changgeng (1); Li, Yongjian (1); Yang, Qingxin (2); Zhu, Jianguo (3)
1: Hebei University of Technology; 2: Tianjin Polytechnic University; 3: University of Technology Sydney

PB-M3-6

Digest ID: 659

A Two-dimensional Elemental Operator for Vectorial Hysteresis Model of Magnetic Material 319

Xu, Weijie (1); Duan, Nana (1); Li, Yongjian (2); Wang, Shuhong (1); Guo, Youguang (3); Zhu, Jianguo (3)
1: Xi'an Jiaotong University, China, People's Republic of; 2: Hebei University of Technology, China, People's Republic of; 3: University of Technology Sydney, Australia

PB-M3-7

Digest ID: 450

Ladder Circuit Modeling of Dynamic Hysteretic Property Representing Excess Eddy-Current Loss 321

Suehiro, Itsuki (1); Mifune, Takeshi (1); Matsuo, Tetsuji (1); Kitao, Junji (2); Komatsu, Taiga (2); Nakano, Masatsugu (2)
1: Graduate School of Engineering, Kyoto University; 2: Mitsubishi Electric Corporation

PB-M3-8

Digest ID: 423

Analysis of Iron Loss Distributions on the Metallic Support in Underground Power Cables 323

Song, Hye Eun; Im, Sang Hyeon; Park, Gwan Soo
Pusan National University, Korea, Republic of (South Korea)

PB-M3-9

Digest ID: 775

Uniform Formulation for Newton-Raphson Method and Fixed-Point Method in Finite Element Analysis with a Vector Hysteresis Model 325

Li, Wei (1); Fu, Weinong (2); Koh, Chang-Seop (3)
1: Tongji University, China; 2: The Hong Kong Polytechnic University, China; 3: Chungbuk National University, Korea, Republic of (South Korea)

PB-M3-10

Digest ID: 521

An Efficient Identification and Implementation of Preisach-Stoner-Wohlfarth Vector Hysteresis Model 327

Liu, Lei; Fu, W.N.
The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)

PB-M3-11

Digest ID: 750

Comprehensive Improvement of Temperature Dependent Jiles-Atherton Model Utilizing Variable Parameter Set 329

Zhang, Dianhai (1); Jia, Mengfan (1); Ren, Ziyang (1); Zhang, Yanli (1); Koh, Chang-Seop (2)
1: Shenyang University of Technology, China; 2: Chungbuk National University, Korea, Republic of (South Korea)

Session Title	[PB-M4] Novel Computational Methods for Machines and Devices 1
Date and Time	June 20 (Tuesday) / 11:00-12:50
Place	Rm. 104 (1F)
Session Chair	Maurizio Repetto (the Politecnico di Torino, Italy)

PB-M4-1	Digest ID: 44
----------------	----------------------

Magnetic field continuity conditions in finite element analysis 331

Lefevre, Yvan; Henaux, Carole; Llibre, Jean-François
LAPLACE, University of Toulouse, CNRS, France

PB-M4-2	Digest ID: 805
----------------	-----------------------

A Novel 2-Dimensional Analysis Method considering Axial Flux Leakage in Spoke-Type Permanent Magnet Machines 333

Seo, Jung-Moo (1); Ro, Ah-Reum (1); Jung, Hyun-Kyo (2)
1: Korea Electronics Technology Institute, Korea, Republic of (South Korea); 2: Seoul National University, Korea, Republic of (South Korea)

PB-M4-3	Digest ID: 85
----------------	----------------------

Design and Analysis of a PM Vernier Machine Considering the Effects of Flux Modulation and Core Losses 335

Kim, Byungtaek
Kunsan National University, Korea, Republic of (South Korea)

PB-M4-4	Withdrawn
----------------	------------------

PB-M4-5	Digest ID: 122
----------------	-----------------------

Magnetic Slot Wedge Application Analysis in Double-fed Asynchronous Motor-generator by Finite Element Method 337

Xiao, Yang (1); Zhou, Libing (1); Liu, Jianjun (1,2); Wang, Jin (1); Ma, Yiming (1)
1: Huazhong University of science and technology; 2: Dongfang Electric Machinery Co., Ltd, Dongfang Electric Corporation

PB-M4-6	Digest ID: 223
----------------	-----------------------

Analysis and Design of a Low Cost Linear Switch Reluctance Machine for Long Conveyor Transmissions 339

Zhang, Deng-Xu; Wang, Xiu-He; Wang, Dao-Han; Du, Xing-Fei
Shandong University, China, People's Republic of

PB-M4-7	Digest ID: 576
----------------	-----------------------

Field-Circuit Analysis of Torque Pulsations of an Induction Machine under Inter-Turn Short Circuit 341

Pietrowski, Wojciech; Górný, Konrad
Poznan University of Technology, Poland

PB-M4-8

Digest ID: 270

Detailed Electromagnetic Analysis of a High Specific Power Slotless Permanent Magnet Motor with Imbalanced Armature Windings 343

Cho, Han-wook (1); Yoon, Andy (2); Renner, Nathaniel (2); Haran, Kiruba (2)

1: Chungnam National University, Korea, Republic of (South Korea); 2: University of Illinois at Urbana-Champaign

PB-M4-9

Digest ID: 279

Rotor Induced Eddy Current Loss in Rectangular Bar Wave Windings of Permanent Magnet Electrical Machines for EV/HEVs 345

Fan, Xinggang; Qu, Ronghai; Li, Dawei; Wang, Cong; Li, Jian; Huo, Yongsheng

Huazhong University of Science and Technology, Wuhan, China

PB-M4-10

Digest ID: 320

Torque Analysis of a Novel Radial Flux Movable Stator Permanent Magnet Eddy-Current Coupling 347

Li, Yibo; Lin, Heyun; Yang, Hui; Wang, Haitao; Fang, Shuhua

Southeast University, China, People's Republic of

PB-M4-11

Withdrawn

PB-M4-12

Digest ID: 693

Demagnetization Investigation for Partitioned Rotor Permanent Magnet Flux Switching Machine by Transient Co-simulation Approach 349

Fan, Deyang; Zhu, Xiaoyong; Quan, Li; Xiang, Zixuan

Jiangsu University, China, People's Republic of

Session Title [PB-A5] Optimization and Design 5

Date and Time June 20 (Tuesday) / 14:10-16:00

Place Rm. 101 (1F)

Session Chair To be Announced

PB-A5-1 **Digest ID: 22**

Loss Calculation and Demagnetization Analysis for a High Speed Permanent Magnet Electrical Machine 351

Zhang, Yue (1); Cao, Wenping (2); McLoone, Sean (1)
 1: Queens University Belfast, United Kingdom; 2: Aston University, United Kindom

PB-A5-2 **Digest ID: 382**

A Permanent Magnet Brushless Doubly-Fed Generator with Segmented Structure 353

Jiang, Yongjiang; Zhang, Jianzhong; Li, Tianyi
 Southeast University, China, People's Republic of

PB-A5-3 **Digest ID: 420**

Modeling and Analysis of Hybrid Permanent Magnet Type Bearingless Motor 355

zhang, tao
 Huaiyin Institute of Technology, China, People's Republic of

PB-A5-4 **Digest ID: 487**

Dual Rotor Flux-Switching Permanent Magnet Machine with drum winding 357

Kwon, Jung-Woo; Kwon, Byung-il
 Hanyang University, Korea, Republic of (South Korea)

PB-A5-5 **Digest ID: 437**

Three-Axis Active Control Magnetic Bearing with Asymmetric Structure for High-Temperature Machines 359

Nakajima, Atsushi; Hirata, Katsuhiko; Niguchi, Noboru; Kato, Masayuki
 Osaka University, Japan

PB-A5-6 **Digest ID: 445**

Loss and efficiency of a flux-switching permanent-magnet double-rotor machine with high torque density 361

Mo, Lihong
 Huaiyin Institute of Technology, China, People's Republic of

PB-A5-7

Digest ID: 455

The Relationship of Magnetomotive Force under Different Excitation Modes of Dual-excited Synchronous Generator 363

Xu, Guorui; Hao, Xiajing; Hu, Yiping; Zhan, Yang; Zhao, Haisen
North China Electric Power University, China, People's Republic of

PB-A5-8

Digest ID: 457

Parametric Design Analysis of Magnetic Sensor Based on Model Order Reduction and Reliability-based Design Optimization 365

Paul, Sarbajit (1); Rajan, Arvind (2); Chang, Junghwan (1); Kuang, Ye Chow (2); Ooi, Melanie Po-Leen (3)
1: Dong-A University, Korea, Republic of (South Korea); 2: Monash University, Malaysia; 3: Heriot-Watt University Malaysia

PB-A5-9

Digest ID: 623

Design of High Torque Density Ferrite Permanent Magnet Motor 367

Jeong, Jae-Sik (1); Sim, Jae-Han (1); Kim, Hae-Joong (2); Hong, Jung-Pyo (1)
1: Hanyang University, Korea, Republic of (South Korea); 2: Korea Testing Certification, Rotating Machinery Center, Gyeonggi 692-8, Korea

PB-A5-10

Digest ID: 484

Dynamic Strength Calculation of Power Transformer Windings under Multiple Impact Conditions 369

Yan, Ning; Li, Wei; Zhang, Bo
Shenyang University of Technology, China, People's Republic of

PB-A5-11

Digest ID: 510

Design of High efficient Motor for Personal Mobility by Pole/Slot Combinations 371

Um, Dae Yong; Joo, Jae Deuk; Kim, Jeong Sik; Im, Sang Hyeon; Park, Gwan Soo
School of Electrical and Computer Engineering, Pusan National University, Busan 46241, Korea, Republic of (South Korea)

PB-A5-12

Digest ID: 555

Multiple Level Set Method for Optimal Design of Nonlinear Magnetostatic System 373

Seo, Kyung Sik; Lee, Kang Hyouk; Park, Il Han
Sungkyunkwan University, Korea, Republic of (South Korea)

PB-A5-13

Digest ID: 189

Ant Lion Approach Based on Tent Map for Multiobjective Transformer Design Optimization 375

Coelho, Leandro dos Santos (1); Pierezan, Juliano (2); Da Luz, Mauricio V. Ferreira (3); Leite, Jean Viane (3)
1: Industrial and Systems Eng. Grad. Program (PPGEPS), Pontifical Catholic University of Parana, Curitiba, PR, Brazil; 2: Department of Electrical Engineering, Federal University of Parana (UFPR), Curitiba, PR, Brazil; 3: GRUCAD/UFSC, Brazil

A New Topology Optimization Methodology Based on Constraint Maximum-Weight Connected Graph Theorem and Support Vector Machine 377

Xia, Meng (1); Yang, Shiyu (1); Ho, S. L. (2)

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

Session Title [PB-A6] Static and Quasi-Static Fields 2

Date and Time June 20 (Tuesday) / 14:10-16:00

Place Rm. 102 (1F)

Session Chair To be Announced

PB-A6-1 **Digest ID: 10**

Numerical Analysis and Experiments on the Electromechanical Behavior of Wired-Shape Conducting Particles 379

Techaumnat, Boonchai (1); Huynh, Viet Quoc (2); Hidaka, Kunihiro (3)
 1: Chulalongkorn University, Thailand; 2: Ho Chi Minh City University of Technology; 3: University of Tokyo

PB-A6-2 **Digest ID: 183**

Comparison of Numerical Error Estimators for Eddy Current Problems solved by FEM 381

TITTARELLI, Roberta (1); LE MENACH, Yvonnick (1); PIRIOU, Francis (1); CREUSE, Emmanuel (1); NICAISE, Serge (2); DUCREUX, Jean-Pierre (3)
 1: University of Lille, France; 2: University of Valenciennes; 3: EDF R&D, France

PB-A6-3 **Digest ID: 109**

The movement characteristics of the charged haze particulates in the ionized field and its influence on the contamination of insulator 383

yang, Fan (1); Gao, Bing (1); zhang, Songyang (2); yao, Degui (2); kou, Xiaokuo (2); liu, Zehui (2)
 1: ChongQing University, China, People's Republic of; 2: State Grid Henan Electric Power Corporation Research Institute, Henan Province

PB-A6-4 **Digest ID: 202**

Lean complementarity for non-linear magnetostatics 385

Kapidani, Bernard; Specogna, Ruben
 DPIA, University of Udine, Italy

PB-A6-5 **Digest ID: 219**

Iterative solution of eddy current problems on polyhedral meshes 387

Bettini, Paolo (1); Specogna, Ruben (2); Passarotto, Mauro (2)
 1: Department of Industrial Engineering (DII), University of Padova, Italy; 2: Polytechnic Department of Engineering and Architecture (DPIA), University of Udine, Italy

PB-A6-6 **Digest ID: 220**

A new finite element approach for electric field computation at the surface of overhead transmission line conductors 389

Farah, Arthur Araujo Maia (1); Afonso, Marcio Matias (2); Vasconcelos, João Antônio de (1); Schroeder, Marco Aurélio de Oliveira (3)
 1: Federal University of Minas Gerais, Brazil; 2: Federal Center for Technological Education of Minas Gerais, Brazil; 3: Federal University of São João del-Rei, Brazil

PB-A6-7

Digest ID: 231

Synthesis of Equivalent Circuit of Wireless Power Transfer Device Using Homogenization-based FEM 391

Otomo, Yoshitsugu; Sato, Yuki; Fujita, Shogo; Igarashi, Hajime
Hokkaido University, Japan

PB-A6-8

Z

PB-A6-9

Digest ID: 295

Improvement of the Finite Element Analysis of 3D, Nonlinear, Periodic Eddy Current Problems Involving Voltage Driven Coils under DC Bias 393

Plasser, Rene (1); Koczka, Gergely (2); Biro, Oszkar (1)
1: IGTE TU Graz, Austria; 2: Transformers Weiz, Siemens Inc, Austria

PB-A6-10

Digest ID: 300

Improved efficiency and accuracy using duality in hybrid boundary element-surface impedance boundary condition formulation. 395

Freschi, Fabio; Giacccone, Luca; Repetto, Maurizio
Politecnico di Torino, Italy

PB-A6-11

Digest ID: 349

Magnetic Force Analysis in a Gapped-Core Reactor Model under Harmonic Magnetizations by Efficient Frequency-Domain Decomposition 397

Zhao, Xiaojun (1); Du, Haiquan (1); Cheng, Zhiguang (2); Forghani, Behzad (3); Wang, Gang (1); Liu, Lanrong (2)
1: North China Electric Power University, China, People's Republic of; 2: Institute of Power Transmission and Transformation Technology, China, People's Republic of; 3: Infolytica Corporation, Canada

PB-A6-12

Digest ID: 366

Efficient Preconditioners for Galerkin Fast Multipole Boundary Element Method for 3D Electrostatic Field 399

Shi, Yuxin; Wang, Zezhong
North China Electric Power University, China, People's Republic of

PB-A6-13

Digest ID: 404

Magnetic Power Loss Estimation in Coaxial Magnetic Gears 401

Filippini, Mattia (1); Alotto, Piergiorgio (1); Bonisoli, Elvio (2); Ragusa, Carlo (3); Repetto, Maurizio (3); Vigliani, Alessandro (2)
1: Dept. of Industrial Engineering, University of Padova; 2: DIMEAS-Politecnico di Torino, Italy; 3: DENERG-Politecnico di Torino, Italy

PB-A6-14

Digest ID: 385

Parallel Solving of 3D Eddy Current Losses in Large Transformer Based on Element by Element Method 403

Wu, Dongyang (1,2); Yan, Xiuke (1); Tang, Renyuan (1); Xie, Dexin (1)
1: Shenyang University of Technology, China, People's Republic of; 2: Liaoning Efacec Electrical Equipment.,LTD,China, People's Republic of

Session Title	[PB-A7] Numerical Techniques 2
Date and Time	June 20 (Tuesday) / 14:10-16:00
Place	Rm. 103 (1F)
Session Chair	Kazuhiro Muramatsu (Chiba Univ., Japan)

PB-A7-1	Digest ID: 61
----------------	----------------------

Non-linear Eigenmode Computations for Superconducting Cavities with a Surface Impedance Condition 405

Marsic, Nicolas; Ackermann, Wolfgang; De Gersem, Herbert
Technische Universität Darmstadt

PB-A7-2	Digest ID: 55
----------------	----------------------

Low-rank tensor decompositions for high dimensional uncertainty quantification in electromagnetic field problems 407

Loukrezis, Dimitrios (1,2); Römer, Ulrich (1,2); De Gersem, Herbert (1,2)
1: Institut für Theorie Elektromagnetischer Felder, TU Darmstadt, Germany; 2: Graduate School Computational Engineering, TU Darmstadt, Germany

PB-A7-3	Digest ID: 76
----------------	----------------------

The Impact of Spatial Uncertainties in the Magnetic Reluctivity on the Field Quality of a Combined Function Magnet 409

Jankoski, Radoslav (1,2); Römer, Ulrich (1,2); Schöps, Sebastian (1,2)
1: Institut für Theorie Elektromagnetischer Felder; 2: Graduate School of Excellence Computational Engineering

PB-A7-4	Digest ID: 798
----------------	-----------------------

Compensation Strategy of the Numerical Analysis in Frequency Domain on Induction Motor considering Magnetic Flux Saturation 411

Park, Gyeong-Jae (1); Lee, Ji-Han (1); Seo, SangHyeok (1); Kim, Yong-Jae (2); Jung, Sang-Yong (1)
1: Sungkyunkwan University, Korea, Republic of (South Korea); 2: Chosun University, Korea, Republic of (South Korea)

PB-A7-5	Digest ID: 311
----------------	-----------------------

A Remesh-free Finite-element Method for Large Geometrical Variations and its Application to Electric Machine Design 413

Liu, Xiaoyu; Fu, Weinong
The Hong Kong Polytechnique University, Hong Kong S.A.R. (China)

PB-A7-6	Digest ID: 27
----------------	----------------------

Eddy Current Analysis of Three-Phase Transformer Made of Grain-Oriented Electrical Steel Sheets Using 3-D Parallel FEM 415

Kawase, Yoshihiro; Yamaguchi, Tadashi; Murashita, Masaya
Gifu University, Japan

PB-A7-7

Digest ID: 331

Design and Analysis of a Novel Inductor Motor with Auxiliary Permanent Magnet Excitation 417

Fu, Xinghe; Wang, Jianhao; Liu, Kai; Lin, Mingyao
Southeast University, People's Republic of China,

PB-A7-8

Digest ID: 387

Iterative Solution of MTL Based on the Spatial Decomposition and the 2nd order FDTD 419

du, xuelong; zhang, pengfei; zou, jun; yuan, jiansheng
Tsinghua University, China, People's Republic of

PB-A7-9

Digest ID: 391

Application of Improved H-matrices in Micromagnetic Simulations 421

Ida, Akihiro (1); Ataka, Tadashi (2); Takahashi, Yasuhito (3); Mifune, Takeshi (4); Iwashita, Takeshi (5); Furuya, Atsushi (2)
1: The University of Tokyo; 2: Fujitsu Limited; 3: Doshisha University; 4: Kyoto University; 5: Hokkaido University

PB-A7-10

Digest ID: 392

Data-Driven Model Order Reduction for magnetostatic problem coupled with circuit equations 423

Pierquin, Antoine (1,2); Henneron, Thomas (1,2); Clénet, Stéphane (1,3)
1: L2EP, France; 2: Univ. Lille; 3: Arts et Métiers Paris Tech

PB-A7-11

Digest ID: 396

A Novel Method for Transmission Line Current Reconstruction in Power Grid 425

Zhao, Gen (1); Hu, Jun (1); Ouyang, Yong (1); Wang, Zhongxu (1); Wang, Shan Xiang (2); He, Jinliang (1)
1: Tsinghua University, China, People's Republic of; 2: Stanford University, USA

PB-A7-12

Digest ID: 741

Design and Analysis Method of Alternating Rotor Core for Concentrated Flux-Type IPMSM 427

Jung, Kyung-Tae (1); Jung, Jae-Woo (2); Yoon, Myung-Hwan (1); Hong, Jung-Pyo (1)
1: Hanyang University, Korea, Republic of (South Korea); 2: Hyundai Mobis, Korea, Republic of (South Korea)

PB-A7-13

Digest ID: 417

A Novel Remesh-Free Method based on Finite Element Method for Electromagnetic Devices with Rotation or Translation 429

Zhang, Xiu (1,2); Zhang, Xin (1,2)
1: Tianjin Normal University, China, People's Republic of; 2: Tianjin Key Laboratory of Wireless Mobile Communication and Wireless Power Transmission, Tianjin Normal University

PB-A7-14

Digest ID: 436

Acoustic Inhomogeneity in Magnetoacoustic tomography with Magnetic Induction based on Split Bregman Methods 431

Zhang, Shuai; Li, Wenlong; Yang, Hongshuang; Xu, Guizhi
HEBEI UNIVERSITY OF TECHNOLOGY, China, People's Republic of

PB-A7-15

Digest ID: 481

An Improved XFEM for Field Analysis of Multilayer HTS Tapes with Multiple Nearby Geometrical Interfaces 433

Duan, Nana (1); Xu, Weijie (1); Wang, Shuhong (1); Zhu, Jianguo (2)
1: Xi'an Jiaotong University, China, People's Republic of; 2: University of Technology, Sydney, Australia

Session Title	[PB-A8] Wave Propagation 1
Date and Time	June 20 (Tuesday) / 14:10-16:00
Place	Rm. 104 (1F)
Session Chair	Sandor Bilicz (Budapest Univ. of Tech, and Economics, Hungary)

PB-A8-1	Digest ID: 42
----------------	----------------------

A Statistical Study of DORT method for Locating Soft Faults in Complex Wire Networks 435

Kafal, Moussa (1); Benoit, Jaume (1); Cozza, Andrea (2)

1: CEA, LIST, 91191 Gif sur Yvette CEDEX, France; 2: Group of Electrical Engineering - Paris (GeePs), CentraleSupélec, Université Paris-Saclay, 91192 Gif-sur-Yvette CEDEX, France

PB-A8-2	Digest ID: 87
----------------	----------------------

Numerical Investigation of Higher-Order Mode Characteristics in Polarizer Miter Bend 437

Fujita, Yoshihisa (1); Ikuno, Soichiro (2); Toru, Tsujimura (3); Kubo, Shin (3,4); Nakamura, Hiroaki (3,4)

1: National Institute of Technology, Hakodate College, Japan; 2: School of Computer Technology, Tokyo University of Technology, Japan; 3: National Institute of Fusion Science, National Institute of Natural Sciences, Japan; 4: Department of Energy Engineer

PB-A8-3	Digest ID: 99
----------------	----------------------

Magnetic resonator design in a VHF range using a systematic design approach 439

Shin, Hyundo (1); Yoo, Jeonghoon (2)

1: Graduate School of Mechanical Engineering, Yonsei University, Korea, Republic of (South Korea); 2: School of Mechanical Engineering, Yonsei University, Korea, Republic of (South Korea)

PB-A8-4	Digest ID: 101
----------------	-----------------------

Implementation of Microwave Simulation at Dispersive Material in Dataflow Architecture FDTD Dedicated Computer 441

Kawaguchi, Hideki (1); Matsuoka, Shun-suke (2)

1: Muroran Institute of Technology, Japan; 2: National Institute of Technology, Asahikawa College

PB-A8-5	Digest ID: 389
----------------	-----------------------

Tractable Bayesian Learning for Automated Design of Electromagnetic Structures 443

Patel, Ramesh; Roy, Kallol; Choi, Jaesik; Han, Ki Jin

Ulsan National Institute of Science and Technology, Korea, Republic of (South Korea)

PB-A8-6	Digest ID: 105
----------------	-----------------------

Study on defect detection in cylindrical cavity by electromagnetic ultrasonic creeping wave 445

Liu, Suzhen; Dong, Shuo; Zhang, Yanwei; Zhang, Chuang; Jin, Liang; Yang, Qingxin; Zhang, Changgeng
Hebei University of Technology, China

PB-A8-7

Digest ID: 688

Simulation Based Design of a New Capacitive Probe for Very Fast Voltage Measurements on High Voltage Cables 447

Obrist, Roman (1); Bucher, Matthias (1); Smajic, Jasmin (1); Hennig, John (2)
1: HSR University of Applied Sciences, Switzerland; 2: Comet AG, Switzerland

PB-A8-8

Digest ID: 206

Design of cubesat planar antennas using Niobium Pentoxide substrate 449

Travassos, X. Lucas (1); Queiroz, Idalmir (2); Fontgalland, Glauco (3); Dantas, Josiane (4)
1: Federal University of Santa Catarina, Brazil; 2: Federal University of Semiárido, Brazil; 3: Federal University of Campina Grande, Brazil; 4: Manufacturing and Technology Integrated Campus, Brazil

PB-A8-9

Digest ID: 273

Total-Field/Scattered-Field Separation Based on H-field Correction for the 3-D Nonstandard Finite-Difference Time-Domain Method 451

Ohtani, Tadao (1); Kanai, Yasushi (2); Kantartzis, Nikolaos (3)
1: Asahikawa, Japan; 2: Niigata Institute of Technology, Japan; 3: Aristotle University of Thessaloniki

PB-A8-10

Digest ID: 313

2D Time Domain Geometrical Optics with Ray Tracing Accelerated by Binary Space Partitioning 453

Lyu, Pengfei (1,2,3); Xu, Xiaoyu (1,2); Yan, Shuai (1,2); Ren, Zhuoxiang (1,4)
1: Institute of Microelectronics, Chinese Academy of Sciences, China; 2: Beijing Key Laboratory of 3D & Nano IC Electronic Design Automation Technologies, Beijing, China; 3: University of Chinese Academy of Sciences, Beijing, China; 4: Sorbonne Université

PB-A8-11

Digest ID: 355

A Numerical Method for Analyzing Electromagnetic Properties of a Moving Three-dimensional Object 455

Shao, JingHui; Ma, XiKui; Yin, ShuLi; Wang, JiaWei
Xi'an JiaoTong University, China, People's Republic of

PB-A8-12

Digest ID: 554

High-frequency electromagnetic field analysis by COCR method using anatomical human body models 457

Takei, Amane (1); Ogino, Masao (2); Sugimoto, Shin-ichiro (3)
1: University of Miyazaki, Japan; 2: Nagoya University, Japan; 3: Tokyo University of Science, Japan

Session Title	[PC-M1] Optimization and Design 6
Date and Time	June 21 (Wednesday) / 11:00-12:50
Place	Rm. 101 (1F)
Session Chair	Jang-young Choi (Chungnam Nat'l Univ., Korea)

PC-M1-1	Digest ID: 28
----------------	----------------------

Losses Calculation of Brushless Doubly-fed Generator with Hybrid Rotor 459

Yu, Siyang; Zhang, Fengge; Wang, Hao; Wang, Yutao
 Shenyang University of Technology, China, People's Republic of

PC-M1-2	Digest ID: 247
----------------	-----------------------

3-D Structural Design of Magnetic Actuator Using Hybrid Analysis-Based Design Optimization Method 461

Lim, Sunghoon (1); Min, Seungjae (2); Izui, Kazuhiro (1); Nishiwaki, Shinji (1)
 1: Department of Mechanical Engineering and Science, Kyoto University, Kyoto, Japan; 2: Department of Automotive Engineering, Hanyang University, Seoul, Korea

PC-M1-3	Digest ID: 458
----------------	-----------------------

Acceleration Method of Magnetic Structure Optimization Using Deep Neural Networks 463

Yoshimoto, Takamichi (1); Ota, Tomohiro (1); Asai, Yasuyoshi (1); Hirata, Katsuhiro (2)
 1: Panasonic Corporation, Japan; 2: Osaka University, Japan

PC-M1-4	Digest ID: 463
----------------	-----------------------

Design of Cryogenic Induction Motor Operating Submerged in the Liquid Nitrogen 465

Kim, Hui Min (1); Lee, Ki Wook (1); Kim, Do Gyun (2); Park, Jong Hoon (2); Park, Gwan Soo (1)
 1: Pusan National University, Korea, Republic of (South Korea); 2: Taeyang Electric Corporation, Korea, Republic of (South Korea)

PC-M1-5	Digest ID: 721
----------------	-----------------------

Investigation of Optimal Split Ratio in Brushless Dual-Rotor Flux-Switching Permanent Magnet Machine Considering Power Allocation 467

Xiang, Zixuan; Zhu, Xiaoyong; Quan, Li
 School of Electrical and Information Engineering, Jiangsu University, Zhenjiang 212013 China

PC-M1-6	Digest ID: 422
----------------	-----------------------

Designing Nonuniform Antenna Arrays by Adaptive Variable Differential Artificial Bee Colony Algorithm 469

Zhang, Xin (1,2); Zhang, Xiu (1,2)
 1: Tianjin Normal University, China, People's Republic of; 2: Tianjin Key Laboratory of Wireless Mobile Communication and Wireless Power Transmission, Tianjin Normal University

PC-M1-7

Digest ID: 793

A Novel Hybrid Algorithm Using Shape and Topology Optimization for the Design of Electric Machines 471

Jung, Seok-Won (1); Ro, Jong-Suk (2); Jung, Hyun-Kyo (1)

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

PC-M1-8

Digest ID: 490

Sensitivity Based Optimal Shape Design of Pre-heating Inductor for Laser Welding N/A

Karban, Pavel; Panek, David; Kotlan, Vaclav; Dolezel, Ivo

University of West Bohemia, Czech Republic

PC-M1-9

Withdrawn

PC-M1-10

Digest ID: 496

Multi-Domain Level-set Method for Design Optimization of Primary and Secondary Cores in Induction Heating Roll 473

Hirano, Kazuki (1); Hoshino, Reona (1); Kamiya, Tsuyoshi (1); Wakao, Shinji (1); Okamoto, Yoshifumi (2); Jeon, Woojin (3); Tsuburaya, Tomonori (4)

1: Department of Electrical Engineering and Bioscience, Waseda University; 2: Department of Electronics and Electrical Engineering, Hosei University; 3: Dongwonroll Co., Ltd.; 4: Department of Electrical Engineering, Fukuoka University

PC-M1-11

Digest ID: 501

Space-Time Kriging Surrogate Model to Consider Uncertainty of Time Interval of Torque Curve for Electric Power Steering Motor 475

Jang, Junyong (1); Lee, Jin Min (1); Cho, Su-gil (2); Kim, Saekyeol (1); Kim, Ji-Min (1); Hong, Jung-Pyo (1); Lee, Tae Hee (1)

1: Hanyang University, Korea; 2: Korea Research Institute Ships and Ocean Engineering, Korea

PC-M1-12

Digest ID: 502

Design of Synchronous Motor Using Advanced Inverse Cosine Function to Reduce Harmonics of Induced Voltage Under Load Condition 477

Lim, Myung-Seop; Jung, Kyung-Tae; Yoon, Myung-Hwan; Hong, Jung-Pyo

Hanyang University, Korea, Republic of (South Korea)

PC-M1-13

Digest ID: 506

Calculation of the Eddy Current Loss and Braking Characteristic Analysis of the Eddy Current Brake 479

Cho, Sooyoung (1); Lee, Ju (1); Kang, Dong-Woo (2); Lee, Hyungwoo (3)

1: Hanyang University, Korea, Republic of (South Korea); 2: Keimyung University, Korea, Republic of (South Korea); 3: Korea National University of Transportation, Korea, Republic of (South Korea)

PC-M1-14

Digest ID: 684

An Efficient Direct Search Methodology for Robust Optimizations of Electromagnetic Devices 481

Yang, Wenjia; Yang, Shiyu

Zhejiang University, China, People's Republic of

Session Title [PC-M2] Static and Quasi-Static Fields 3

Date and Time June 21 (Wednesday) / 11:00-12:50

Place Rm. 102 (1F)

Session Chair Behzad Forghani (Infolytica Corp., Italy)

PC-M2-1 **Digest ID: 18**

A Coarse Matrix Iterative Solver for Magnetostatic Domain Decomposition Analysis 483

Kanayama, Hiroshi (1); Ogino, Masao (2); Sugimoto, Shin-ichiro (3)
 1: Japan Women's University, Japan; 2: Nagoya University, Japan; 3: Tokyo University of Science, Suwa, Japan

PC-M2-2 **Digest ID: 175**

Presentation of a Novel Transverse-Flux Permanent Magnet Linear Motor and Its Magnetic Field Analysis Based on Schwarz-Christoffel Mapping Method 485

Fu, Dongshan; Xu, Yanliang
 Shandong University, China, People's Republic of

PC-M2-3 **Digest ID: 132**

The DPC-Hysteresis Model in Two-Dimensional Magnetostatic Finite Element Analysis 487

Willerich, Stephan; Roth, Christian; Herzog, Hans-Georg
 Technical University of Munich, Germany

PC-M2-4 **Digest ID: 661**

Study on thin open crack detectability of NDT induction thermography technique for magnetic material 489

azzabi zouraq, brahim
 POLYTECH' NANTES, France

PC-M2-5 **Digest ID: 439**

Finite Element Analysis of Unbounded Eddy-Current Problem with Cauer Ladder Network and Improvised Asymptotic Boundary Conditions 491

Sugahara, Kengo (1); Kameari, Akihisa (2); Ebrahimi, Hassan (2); Shindo, Yuji (3); Matsuo, Tetsuji (4)
 1: Faculty of Science and Engineering, Kindai University; 2: Science Solutions International Laboratory, INC.; 3: Kawasaki Heavy Industries, Ltd.; 4: Dept. Electrical Engineering, Kyoto University

PC-M2-6 **Digest ID: 461**

Analytical Calculation of Magnetic Field Distribution in Vernier Machines with Doubly Salient Structure 493

Jang, Daekyu; Chang, Junghwan
 Dona-A University, Korea, Republic of (South Korea)

PC-M2-7

Digest ID: 108

Influence of Shielding on the Magnetic Field Measurement by Direct H-Coil Method in a Double-Yoked SST 495

Mailhé, Benjamin Joseph; de Araujo Elias, Ricardo; Pitta Corrêa da Silva, Indiara; Batistela, Nelson Jhoe; Sadowski, Nelson; Kuo-Peng, Patrick
GRUCAD - Universidade Federal de Santa Catarina, Brazil

PC-M2-8

Digest ID: 522

Magnetic Equivalent Circuit Modeling of an Axial-Field Magnetic Gear 497

Ruiz Ponce, Gerardo Enrique; Arjona López, Marco Antonio; Hernández Flores, Concepción; Espinoza, Cristian
Tecnológico Nacional de México, Campus Laguna, Mexico

PC-M2-9

Digest ID: 548

Optimized Field/Circuit Coupling for the Simulation of Quenches in Superconducting Magnets 499

Cortes Garcia, Idoia (1); Schöps, Sebastian (1); Maciejewski, Michal (2,3); Bortrot, Lorenzo (2); Prioli, Marco (2); Auchmann, Bernhard (2,4); Verweij, Arjan (2)
1: Technische Universität Darmstadt, Darmstadt, Germany; 2: CERN, Geneva, Switzerland; 3: Lodz University of Technology, Lodz, Poland; 4: Paul Scherrer Institut, Villigen, Switzerland

PC-M2-10

Digest ID: 616

Parallel-in-time Simulation of Eddy Current Problems using Parareal 501

Schöps, Sebastian (1); Niyonzima, Innocent (2); Clemens, Markus (3)
1: Technische Universität Darmstadt, Germany; 2: Columbia University; 3: Bergische Universität Wuppertal

PC-M2-11

Digest ID: 560

The Solution of Multi-scale HVDC Geoelectric Current Field by Domain Decomposition Method Based on GMRES Iterative Algorithm 503

Tao, Ruixiang; Wang, Zezhong
North China Electric Power University, China, People's Republic of

PC-M2-12

Digest ID: 567

Magnetic field Energy Calculated by Magnetic Vector Potential in Open-Loop Problems 505

NI, Chouwei; ZHAO, Zhibin; CUI, Xiang
North China Electric power university, China, People's Republic of

PC-M2-13

Digest ID: 615

Investigating the Sensitivity of Frequency Response Function to Parameters in Equivalent Circuit of Transformer Winding Based on Two FRA Measurement Connection Ways 507

Wang, Song; Wang, Shuhong; Feng, Hanke; Guo, Ze; Wang, Shuang; Yuan, Dongsheng; Li, Hailin
State Key Laboratory of Electrical Insulation and Power Equipment, Faculty of Electrical Engineering, Xi'an Jiaotong University, China, People's Republic of

PC-M2-14

Digest ID: 637

Adaptive Stopping Criteria for Iterative Solver Applied to Potential Formulations in Magnetostatic Problems 509

Tang, Zuqi

GeePs – Génie Electrique et Electronique de Paris, France

Session Title	[PC-M3] Mathematical Modelling and Formulations 1 / Multi-scale Modelling and Homogenization
Date and Time	June 21 (Wednesday) / 11:00-12:50
Place	Rm. 103-104 (1F)
Session Chair	Dong-hun Kim (Kyungpook Nat'l Univ., Korea)

PC-M3-1	Digest ID: 7
----------------	---------------------

Generalized 3D Strong Coupled Model of Electrical Machines Closed in Loop with PI Controller 511

Superczynska, Paulina; Stepien, Slawomir; Stranz, Artur
Poznan University of Technology, Poland

PC-M3-2	Digest ID: 35
----------------	----------------------

Microwave Measurement of Initial Properties of Ferrites using Mode Splitting Phenomenon by the Rod Resonator Method 513

Kim, Tae-Wan; Park, Seong-Ook
Korea Advanced Institute of Science and Technology, Korea, Republic of (South Korea)

PC-M3-3	Digest ID: 69
----------------	----------------------

Core Loss Calculation Based On Finite Element Method with Jiles–Atherton Dynamic Hysteresis Model 515

Li, Yang (1); Zhu, Lihua (2); Zhu, Jianguo (3)
1: Tianjin Polytechnic University (TJPU), China, China, People's Republic of; 2: Tianjin Polytechnic University (TJPU), China, China, People's Republic of; 3: Faculty of Engineering and Information Technology, University of Technology Sydney, Australia

PC-M3-4	Digest ID: 70
----------------	----------------------

Study of Magnetoconvection Impact on a Solenoid Coil Cooling by Ferrofluid with a Spectral / Finite Element Method 517

Zanella, Raphaël (1,3); Nore, Caroline (1); Bouillault, Frédéric (2); Cappanera, Loic (3); Tomas, Ignacio (3); Mininger, Xavier (2); Guermond, Jean-Luc (3)
1: LIMSI, CNRS, Univ. Paris-Sud, Université Paris-Saclay, F-91405 Orsay, France; 2: GeePs, UMR 8507 CNRS / CentraleSupélec - Universités UPMC et UPSud, 91192 Gif sur Yvette cedex, France; 3: Department of Mathematics, Texas A&M University, College Station

PC-M3-5	Digest ID: 91
----------------	----------------------

Building Real Subspaces for Projection Based Model Order Reduction with Application in Computational Electromagnetics 519

Antunes Oliveira Leite, Mateus (1,2); Delinchant, Benoit (1); Guichon, Jean-Michel (1); Vasconcelos, João Antônio (2)
1: G2Elab, France; 2: Evolutionary Computation Laboratory, Brazil

PC-M3-6

Digest ID: 96

New algorithm for the source field component determination with resistive sheet and coaxial type conductors in T- Ω formulation 521

Lu, Chuan; Zhou, Ping; He, Bo
ANSYS Inc., United States of America

PC-M3-7

Digest ID: 658

Modeling and Analysis on Quasi-parallel Magnetic Field Created by Magnetic Rings Array 523

SUN, Feng; wei, wei
Shenyang University of Technology, China, People's Republic of

PC-M3-8

Digest ID: 384

Data-Driven Multi-Element Arbitrary Polynomial Chaos for Uncertainty Quantification in Sensors 525

Alkhateeb, Osama J.; Ida, Nathan
The University of Akron, United States of America

PC-M3-9

Digest ID: 130

Research on Grounding Grids Imaging Reconstruction Based on Magnetic Detection Electrical Impedance 527

Liu, kai (1); Yang, Fan (1); Zhang, Songyang (2); Zhu, Liwei (3); Hu, Jiayuan (3); Wang, Xiaoyu (3); Shen, Xiaoming (3)
1: Chongqing University, China, People's Republic of; 2: State Grid Henan Electric Power Corporation Research Institute, China, People's Republic of; 3: State Grid Zhejiang Electric Power Company Metering Center, China, People's Republic of

PC-M3-10

Digest ID: 142

Analysis of Surface Mounted Permanent Magnet Motors Using Combined Winding Function and Conformal Mapping Method 529

Faiz, Jawad; Rezaee-Alam, Farhad
University of Tehran, Iran, Islamic Republic of

PC-M3-11

Digest ID: 186

A 3D-PEEC Formulation Based on the Cell Method for Full-Wave Analyses with Conductive, Dielectric, and Magnetic Media 531

Moro, Federico; Alotto, Piergiorgio; Bettini, Paolo; Voltolina, Dimitri; Torchio, Riccardo
Dipartimento di Ingegneria Industriale, Università degli Studi di Padova, Italy

PC-M3-12

Digest ID: 203

Adaptive Mesh Refinement for Multi-Scale FEM for the Eddy Current Problem in Laminated Materials 533

Schöbinger, Markus; Schöberl, Joachim; Hollaus, Karl
Technische Universität Wien, Austria

PC-M3-13

Digest ID: 221

Implementation of an Effective Height of Bent Thin-Wire in Cartesian FDTD Mesh and Electric Charge Correction on the Staircased Edges 535

Gonçalves, Sandro Trindade Mordente; Fonseca, Tarcísio Carlos; Afonso, Márcio Matias
Federal Center of Technological Education of Minas Gerais, Brazil

PC-M3-14

Digest ID: 239

Design and Application of 2-Dimensional Equivalent Model for a Novel Hybrid Excitation Brushless Claw-Pole Alternator 537

Zhu, Changqing (1); Wang, Xiuhe (1); Yang, Yubo (1); Tang, Xu (2)
1: Shandong University, China, People's Republic of; 2: Qingdao Technological University, China, People's Republic of

PC-M3-15

Digest ID: 278

Quasi-3D Finite-Element Method for Simulating Cylindrical Induction Heating Devices 539

D'Angelo, Laura A. M.; De Gersem, Herbert
Technische Universität Darmstadt, Germany

PC-M3-16

Digest ID: 467

H-formulation using the Discontinuous Galerkin method for the 3D Modeling of Superconductors 541

MAKONG, LUDOVIC (1,2); KAMENI, ABELIN (1); BOUILLAULT, FREDERIC (1); QUEVAL, LOIC (1); MASSON, PHILIPPE (2)
1: GeePs - Group of electrical engineering - Paris; 2: University of Houston, Houston

PC-M3-17

Digest ID: 619

Modelling of Magnetic Characteristics of Soft Magnetic Composite Using Magnetic Field Analysis 543

Gao, Yanhui (1); Fujiki, Takuya (1); Dozono, Hiroshi (1); Muramatsu, Kazuhiro (1); Guan, Weimin (2); Yuan, Jiabin (2); Tian, Cuihua (2); Chen, Baichao (2)
1: Department of Electrical and Electronic Engineering, Saga University, Japan; 2: School of Electrical Engineering, Wuhan University, China

PC-M3-18

Withdrawn

PC-M3-19

Digest ID: 691

A High Efficient Post-Possessing Method for Computing Magnetic Flux in Coils Considering Magnetic and Conductive Regions 545

Huang, Limin; Meunier, Gérard; Chadebec, Olivier; Guichon, Jean-Michel; Galopin, Nicolas
Université Grenoble Alpes, France

PC-M3-20

Digest ID: 154

Electromagnetic Field Analysis Considering Reaction Field Caused by Eddy Currents and Hysteresis Phenomenon in Laminated Cores 547

Yamazaki, Katsumi; Sakamoto, Yuto
Chiba Institute of Technology

Session Title	[PC-A4] Optimization and Design 7
Date and Time	June 21 (Wednesday) / 14:10-16:00
Place	Rm. 101 (1F)
Session Chair	Sang-Yong Jung (Sungkyunkwan Univ., Korea)

PC-A4-1

Digest ID: 58

A Comparative Study on a New Coil Design with Traditional Figure-of Eight Coil for Transcranial Magnetic Stimulation 549

Li, Yanan; Fahimi, Babak
University of Texas at Dallas, United States of America

PC-A4-2

Digest ID: 541

Robust Optimization of the Shape of Permanent Magnets in a Synchronous Machine Considering Stochastic Quantities 551

Bontinck, Zeger (1,2); Lass, Oliver (3); Schöps, Sebastian (1,2); De Gersem, Herbert (2); Ulbrich, Stefan (3)
1: Graduate School of Computational Engineering, Technische Universität Darmstadt, Germany; 2: Institut für Theorie Elektromagnetischer Felder, Technische Universität Darmstadt, Germany; 3: Chair of Nonlinear Optimization, Department of Mathematics, Techn

PC-A4-3

Digest ID: 255

Optimization of Multi-objective Electromagnetic Device Based On Improved Artificial Searching Swarm Algorithm 553

Chen, Tanggong
Hebei University of Technology, China, People's Republic of

PC-A4-4

Digest ID: 246

Design Optimization of the Interior Permanent Magnet Motor for Torque Ripple Minimization using Hybrid Analysis Model 555

Lim, Sunghoon (1); Song, Won Seok (2); Min, Seungjae (2); Izui, Kazuhiro (1); Nishiwaki, Shinji (1)
1: Department of Mechanical Engineering and Science, Kyoto University, Kyoto, Japan; 2: Department of Automotive Engineering, Hanyang University, Seoul, Korea

PC-A4-5

Digest ID: 557

Study and Design of Resonant Charging System for High Voltage Transmission Line Monitoring Equipment 557

Cai, Changsong; Wang, Junhua; Hu, Meilin; Lin, Zhongzheng
Wuhan University, China, People's Republic of

PC-A4-6

Digest ID: 570

Shape Optimization of Devices Taking into Account Production Tolerances 559

Panek, David; Hamar, Roman; Dolezel, Ivo
University of West Bohemia, Czech Republic

PC-A4-7

Digest ID: 717

Experimental evaluation of Magnetic Skin effect in silicon-iron core for a High Speed Electrical Machines 561

Maia, Thales Alexandre Carvalho; Cardoso Filho, Braz de Jesus; Baratta, Igor Almeida
UFMG, Brazil

PC-A4-8

Digest ID: 794

Methodology for Topology Optimization of a Permanent Magnet Synchronous Motor under Line Start Conditions 563

Jędryczka, Cezary (1); Knypiński, Łukasz (1); Demenko, Andrzej (1); Sykulski, Jan (2)
1: Institute of Electrical Engineering and Electronics, Poznan University of Technology, 60-965 Poznań, Poland;
2: Electronics and Computer Science, University of Southampton, Southampton, SO17 1BJ, United Kingdom

PC-A4-9

Digest ID: 618

Multiobjective Pareto Optimization of Electromagnetic Devices Exploiting Hybrid Kriging 565

Xiao, Song (1); Liu, Guoqing (1); Zhang, Kunlun (1); Jing, YongZhi (1); Duan, Jiaheng (1); Di Barba, Paolo (2); Sykulski, Jan K (3)
1: Key Laboratory of Magnetic Suspension Technology and Maglev Vehicle Ministry of Education, School of Electrical Engineering, Southwest Jiaotong University, Chengdu, China, People's Republic of; 2: University of Pavia, Italy; 3: University of Southamp

PC-A4-10

Digest ID: 581

Characteristic Comparison of Various SynRMs according to the Geometric Structure by Experimental Verification 567

Shin, SangMan; Lee, YunHee; Lee, JungHo; Kim, YoungHyun
University of Hanbat National, Korea, Republic of (South Korea)

PC-A4-11

Digest ID: 585

Multi-Objective Optimization of Yagi-Uda Antenna Applying Enhanced Firefly Algorithm with Adaptive Cost-Function 569

Baumgartner, Paul (1); Bauernfeind, Thomas (1); Bíró, Oszkár (1); Hackl, Andreas (2); Magele, Christian (1); Renhart, Werner (1); Torchio, Riccardo (3)
1: Institute of Fundamentals and Theory in Electrical Engineering, Graz University of Technology, Graz, Austria;
2: Institute of Automotive Engineering, Graz University of Technology, Graz, Austria; 3: Dipartimento di Ingegneria Industriale, Università de

PC-A4-12

Digest ID: 587

A Study on the Optimizing design method of SynRM Rib thickness for High Torque and Efficiency 571

Lee, Jae-Kwang (1); Lee, Ki-Doek (2)
1: Hanyang University, Korea, Republic of (South Korea); 2: Intelligent Mechatronics Research Center, Korea Electronics Tehnology Institute, Republic of Korea

PC-A4-13

Digest ID: 592

Integrated Optimal BLAC Motor Design Process for Electric Booster Brake System 573

HWANG, KYU YUN; KWON, BYUNG IL
Hanyang University, Korea, Republic of (South Korea)

PC-A4-14

Digest ID: 599

Design of a Double Paths Magnetic Circuit Structure for High Force Density Hybrid Fuel Injector 575

Liu, Huai cong (1); Kim, Sol (2); Lee, Ho Joon (3)
1: Hanyang UNIV., Korea, Republic of (South Korea); 2: Yuhan University.,Korea, Republic of (South Korea); 3: Institute of Science and Technology.,Korea, Republic of (South Korea)

PC-A4-15

Digest ID: 613

Loss Reduction of Vehicle Horn Employing Rolled Silicon Steel Sheets 577

Sim, Jae-Han; Jung, Kyung-Tae; Hwang, Sung-Woo; Hong, Jung-Pyo
Hanyang University, Korea, Republic of (South Korea)

Session Title [PC-A5] Optimization and Design 8
Date and Time June 21 (Wednesday) / 14:10-16:00
Place Rm. 102 (1F)
Session Chair Chang-Eob Kim (Hoseo Univ., Korea)

PC-A5-1 **Withdrawn**

PC-A5-2 **Digest ID: 577**

Topology Optimization of Rotor Structure for Synchronous Motor Using the Method of Moving Asymptotes 579

OKAMOTO, Yoshifumi (1); HOSHINO, Reona (2); WAKAO, Shinji (2); TSUBURAYA, Tomonori (3)
 1: Hosei University, Japan; 2: Waseda University, Japan; 3: Fukuoka University, Japan

PC-A5-3 **Digest ID: 459**

Design of Magnetizer and Rotor of Ferrite Spoke-Type PMSM for Post-Assembly Magnetization 581

Seol, Hyun-Soo; Lee, Ju
 Hanyang University, Korea, Republic of (South Korea)

PC-A5-4 **Digest ID: 625**

Design of Cylindrical Permanent Magnet Linear Generator for Ocean Wave Energy Conversion with Level-Set Method 583

Fang, Hongwei; Chen, Hongxu
 Tianjin University, China, People's Republic of

PC-A5-5 **Digest ID: 286**

Design and Analysis of a Linear Wound Field Vernier Machine with Partitioned Stator 585

Faiz, Jawad; Nematsaberi, Alireza
 University of Tehran, Iran, Islamic Republic of

PC-A5-6 **Digest ID: 634**

The Electromagnetic Field and Radio Frequency Circuit Co-simulation for Magnetic Resonance Imaging Radio Frequency Coils 587

Li, Nan (1); Luo, Chao (2); Liu, Shengping (3); Li, Ye (2)
 1: Chongqing University of Technology, Chongqing 400054, China, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen 518055, China; 2: Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen 518055, Ch

PC-A5-7 **Digest ID: 635**

A Novel Axial Flux Spoke-Array Magnetic-Field-Modulated Machine for Hybrid Electric Vehicle 589

Lai, Junquan; Li, Jian; Qu, Ronghai
 Huazhong University of Science and Technology, China, People's Republic of

PC-A5-8

Digest ID: 651

Sizing Optimization of a Switched Reluctance Motor for Loudness Reduction 591

Kim, Hyungwoo (1); Hyun, Jaeyub (2); Wang, Semyung (1)

1: Gwangju Institute of Science and Technology, Korea, Republic of (South Korea); 2: Korea Research Institute of Standards and Science, Korea, Republic of (South Korea)

PC-A5-9

Digest ID: 682

Electric Motor Design of an Integrated Motor Propulsor for Unmanned Underwater Vehicles : The Effect of Waterproofing Can 593

Lee, Jiyoung (1,2); Hong, Dokwan (1,2); Ann, Minhyuk (2); Woo, Byungchul (2)

1: University of Science and Technology, Korea, Republic of (South Korea); 2: Korea Electrotechnology Research Institute, Korea, Republic of (South Korea)

PC-A5-10

Digest ID: 323

Analysis and Design of a Novel Heteropolar Radial Hybrid Magnetic Bearing 595

Xu, Wei (1); Zhu, Runze (1); Ye, Caiyong (1); Zhu, Jianguo (2); Lei, Gang (2)

1: Huazhong University of Science and Technology, Wuhan, China, People's Republic of; 2: University of Technology, Sydney, Australia

PC-A5-11

Digest ID: 698

Robust Design of an Axial Flux Permanent Magnet Synchronous Generator Based on Many-Objective Optimization Approach 597

Sabioni, Claret Laurente; Ribeiro, Marcos Felipe de Oliveira; Vasconcelos, João Antonio
Federal University of Minas Gerais, Brazil

PC-A5-12

Digest ID: 283

Influence of Interleaving Winding Arrangement on Leakage Inductance and Winding Loss of High-frequency Transformer 599

Chen, Bin; Li, Lin; Zhao, Zhibin

North China Electric Power University, China, People's Republic of

PC-A5-13

Digest ID: 704

Shape Sensitivity Analysis and Optimization of Current-Carrying Conductor for Current Distribution Control 601

Cheon, Woong Jin; Lee, Kang Hyouk; Park, Il Han

Sunkyunkwan University, Korea, Republic of (South Korea)

Session Title	[PC-A6] Numerical Techniques 3
Date and Time	June 21 (Wednesday) / 14:10-16:00
Place	Rm. 103 (1F)
Session Chair	Jung Ho Lee (Hanbat Nat'l Univ., Korea)

PC-A6-1 **Withdrawn**

PC-A6-2 **Digest ID: 72**

A Hybrid Parallel Method for 3D Nonlinear Periodic Eddy Current Problems with Motions 603

He, Bo; Zhou, Ping; Lu, Chuan
Ansys, United States of America

PC-A6-3 **Digest ID: 312**

Stabilized Bordered Block Diagonal Form for Solving Nonlinear Magnetic Field Problems 605

Liu, Xiaoyu; Fu, Weinong
The Hong Kong Polytechnic University, Hong Kong S.A.R. (China)

PC-A6-4 **Digest ID: 258**

Application of the Proper Generalized Decomposition to solve MagnetoElectric Problem 607

henneron, thomas (1); clénet, stéphane (2)
1: university Lille1, France; 2: Arts et Metiers ParisTech, Lille, France

PC-A6-5 **Digest ID: 453**

An Extended Thin Approximation Method to Simulate Screening Current in REBCO Coils 609

Noguchi, So (1,2,3); Miyao, Ryosuke (1)
1: Hokkaido University, Japan; 2: National High Magnetic Field Laboratory; 3: Florida State University

PC-A6-6 **Digest ID: 493**

Numerical Approach Using Only Meshless Method for Solving Steady-State Scattering Problems of Electromagnetic Wave 611

Saitoh, Ayumu; Takayama, Teruo; Kamitani, Atsushi
Yamagata University, Japan

PC-A6-7 **Digest ID: 497**

Highly Accurate Analysis of Magnetic Field by Local-Expansion Edge Element Method with Boundary Surface Integration 613

Uchiyama, Takuya (1); Wakayama, Yuki (1); Wakao, Shinji (1); Tokumasu, Tadashi (2); Takahashi, Yasuhito (3); Fujiwara, Koji (3)
1: Waseda University, Japan; 2: Toshiba Corporation Infrastructure Systems and Solutions Company, Japan; 3: Doshisha University, Japan

PC-A6-8

Digest ID: 535

Slip- and High-Frequency Flux Density Separation Method for Rotor Losses Prediction of Induction Motors at Load Conditions 615

Zhao, Haisen; Li, Bing; Zhan, Yang; Xu, Guorui
North China Electric Power University, China, People's Republic of

PC-A6-9

Digest ID: 600

Transient Finite Element Simulation of Non-Linear Eddy Current Problems with Biot-Savart-Field of Voltage-Driven Coils 617

Hollaus, Karl; Schöberl, Joachim; Silm, Haik
Technische Universität Wien, Austria

PC-A6-10

Digest ID: 640

3D modeling of magneto-elastic behavior using simplified multi-scale model : application on power transformer core 619

Tang, Zuqi (1); Liu, Mingyong (1,2); Bouillault, Frédéric (1); Mininger, Xavier (1); Hubert, Olivier (2)
1: GeePs – Génie Electrique et Electronique de Paris, France; 2: LMT Cachan, France

PC-A6-11

Digest ID: 660

Performance of Block IC Preconditioner with Fill-in for Linear Systems Derived from Finite Element Meshes Including Thin Elements 621

Tsuburaya, Tomonori (1); Okamoto, Yoshifumi (2); Meng, Zhiqi (1)
1: Fukuoka University, Japan; 2: Hosei University, Japan

PC-A6-12

Digest ID: 708

Breakdown Voltage Improvement and Analysis of GaN HEMTs through Field Plate Inclusion and Substrate Removal 623

Berzoy, Alberto; Lashway, Christopher; Moradisizkoohi, Hadi; Mohammed, Osama
Florida International University, United States of America

PC-A6-13

Digest ID: 716

Approximate Stochastic Model of Geometry Randomness on Interconnect Parasitic in VLSI Circuit 625

Yin, Ying (1,2); Xu, Xiaoyu (1,2); Lyu, Pengfei (1,2); Yan, Shuai (1,2); Ren, Zhuoxiang (3)
1: Institute of Microelectronics of Chinese Academy of Sciences, China, People's Republic of; 2: Beijing Key Laboratory of 3D & Nano IC Electronic Design Automation Technologies, Beijing, China; 3: Sorbonne Universités, UPMC Univ Paris 06, UR2, L2E, Paris

PC-A6-14

Digest ID: 736

Novel approach for torque calculation of surface-mounted PMSM considering axial end leakage flux 627

Jung, Jae-Woo (1); Park, Hyung-Il (1); Hong, Jung-Pyo (2); Lee, Byeong-Hwa (3)
1: Hyundai Mobis, Korea, Republic of (South Korea); 2: Hanyang University, Korea, Republic of (South Korea); 3: Korea Automotive Technology Institute, Republic of (South Korea)

PC-A6-15

Digest ID: 411

Electric Field Computations using Axial Green's Function Method on Refined Axial Lines 629

Jo, Junhong (1); Kim, Hong-Kyu (2); KIM, DO WAN (1)

1: Inha University, Korea, Republic of (South Korea); 2: Korea Electrotechnology Research Institute, Korea, Republic of (South Korea)

PC-A6-16

Digest ID: 786

Adaptive Sampling of Physical Optics Currents Based on EFIE Error Prediction 631

Kim, Jin-Hyeok (1); Chung, Young-Seek (2); Park, Gyu Churl (3); Jung, Hyun-Kyo (1)

1: Seoul National University, Korea, Republic of (South Korea); 2: Kwangwoon University, Seoul, South Korea;
3: Agency for Defense Development, Daejeon, South Korea

Session Title	[PC-A7] Material Modelling 2
Date and Time	June 21 (Wednesday) / 14:10-16:00
Place	Rm. 104 (1F)
Session Chair	Yanli Zhang (Shenyang Univ. of Tech., China)

PC-A7-1 **Digest ID: 218**

Dynamic magnetic scalar hysteresis lump model, based on Preisach model quasi-static contribution extended with dynamic fractional derivation contribution 633

Zhang, Bin (1); Gupta, Bhaawan (2,3); Ducharne, Benjamin (2); Sebald, Gael (2,3); Uchimoto, Tetsuya (3)
1: SHANDONG UNIVERSITY, CHINA; 2: LGEF, INSA LYON, FRANCE; 3: ELYTMAX, TOHOKU UNIVERSITY JAPAN

PC-A7-2 **Digest ID: 297**

Benchmark on the 3D Numerical Modeling of a Superconducting Bulk 635

Berger, Kevin (1); Escamez, Guillaume (2); Quéval, Loic (3); Kameni, Abelin (3); Alloui, Lofti (3,4); Ramdane, Brahim (2); Trillaud, Frédéric (5); Makong Hell, Ludovic (3,6); Meunier, Gérard (2); Masson, Philippe (6); Lévêque, Jean (1)

1: GREEN, Université de Lorraine, 54506 Vandoeuvre-lès-Nancy, France; 2: University Grenoble Alpes / CNRS, G2Elab, 38042 Grenoble, France; 3: Group of electrical engineering - Paris (GeePs), CNRS UMR 8507, CentraleSupélec, UPSud, UPMC, Gif-sur-Yvette, Fra

PC-A7-3 **Digest ID: 425**

Demagnetization Scheme for Avoiding Magnetic Mines Under the Exposure of Earth Magnetic Field 637

Im, Sang Hyeon (1); Lee, Ho Yeong (1); Chung, Hyun Ju (2); Park, Gwan Soo (1)

1: School of Electrical and Computer Engineering, Pusan National University, Busan 46241, Korea, Republic of (South Korea); 2: The 6th Research and development Institute-3, Agency for Defense Development, Changwon 51678, Korea, Republic of (South Korea)

PC-A7-4 **Digest ID: 534**

Numerical Inversion of a 2-Scale Magneto-Elastic Behaviour Model 639

Bernard, Laurent (1); Mailhé, Benjamin Joseph (1); Sadowski, Nelson (1); Daniel, Laurent (2)

1: GRUCAD/EEL/CTC, Universidade Federal de Santa Catarina, Florianopolis 88040-900, Brazil; 2: GeePs | Group of Electrical Engineering-Paris, UMR CNRS 8507, CentraleSupélec, Univ. Paris-Sud, Université Paris-Saclay, Sorbonne Universités, UPMC Univ Paris

PC-A7-5 **Digest ID: 675**

An Elemental Operator for Simulating Hysteresis of Soft Magnetic Composite Materials 641

Xu, Weijie (1); Duan, Nana (1); Li, Yongjian (2); Wang, Shuhong (1); Guo, Youguang (3); Zhu, Jianguo (3)

1: Xi'an Jiaotong University, China, People's Republic of; 2: Hebei University of Technology, People's Republic of; 3: University of Technology Sydney, Australia

PC-A7-6 **Digest ID: 702**

Investigation on the stability of the Vector Jiles-Atherton Model 643

Upadhaya, Brijesh (1); Perkkiö, Lauri (2); Singh, Deepak (1); Martin, Florian (1); Rasilo, Paavo (3); Belahcen, Anouar (1,4); Arkkio, Antero (1)
1: Aalto University, Department of Electrical Engineering and Automation, P. O. Box 11000, FI-00076 Aalto, Finland; 2: Aalto University, Department of Mathematics and Systems Analysis, P. O. Box 11000, FI-00076 Aalto, Finland; 3: Tampere University of Tec

PC-A7-7

Digest ID: 710

An Efficient Implementation of the Classical Preisach Model 645

Hussain, Sajid; Lowther, David
McGill University, Canada

PC-A7-8

Digest ID: 749

Dynamic Hysteresis Behavior Modeling of Ferromagnetic Material Based on Jiles-Atherton Theory 647

Zhang, Dianhai (1); Han, Yu (1); Ren, Ziyang (1); Zhang, Yanli (1); Koh, Chang-Seop (2)
1: Shenyang University of Technology, China; 2: Chungbuk National University, Korea, Republic of (South Korea)

PC-A7-9

Digest ID: 402

Efficient Numerical Implementation of a Vector Preisach Hysteresis Model for 3-D Finite Element Applications 649

Tousignant, Maxime (1,2); Sirois, Frederic (1); Dufour, Steven (1); Meunier, Gerard (2)
1: Polytechnique Montreal, Canada; 2: University Grenoble Alpes, France

PC-A7-10

Digest ID: 779

Improvement on Estimation Model of Hysteresis Loss in Induction Motor Core Considering Rotational Magnetization 651

Ren, Yajun (1); Zhang, Yanli (1); Zhang, Dianhai (1); Zeng, Linsuo (1); Xie, Dexin (1); Koh, Chang-Seop (2)
1: Shenyang University of Technology, China; 2: Chungbuk National University, Korea, Republic of (South Korea)

PC-A7-11

Digest ID: 782

A New Dynamic Hysteresis Model Based on Vector Play Model for Iron Loss Calculation Taking the Rotating Magnetic Fields into Account 653

Zhu, Lixun (1); Pham, Minh-Trien (2); Koh, Chang-Seop (1)
1: Chungbuk National University, Korea, Republic of (South Korea); 2: VNU University of Engineering and Technology, Vietnam

PC-A7-12

Digest ID: 399

Transversal Electrical Resistivity Evaluation of Rod Unidirectional Carbon Fiber-Reinforced Composite Using Eddy Currents 655

SAFER, Omar Adib (1,2); BENSALIM, Samir (1); TRICHET, Didier (3); WASELYNCK, Guillaume (3)
1: 2Laboratoire des Matériaux et du Développement Durable (LM2D), Université de Bouira, Algeria.; 2: Laboratoire de Génie Electrique (LGE), University de M'sila, M'sila; 3: Institut de Recherche en Energie Electrique de Nantes Atlantique, France

PC-A7-13

Digest ID: 353

Input and Output Power Balance in Finite-Element Analysis of Electric Machines Taking Account of Hysteretic Property 657

Kitao, Junji (1,2); Takahashi, Yasuhito (1); Fujiwara, Koji (1); Ahagon, Akira (3); Matsuo, Tetsuji (4); Daikoku, Akihiro (2)

1: Doshisha University, Japan; 2: Mitsubishi Electric Corp., Japan; 3: Science Solutions International Laboratory, Inc., Japan; 4: Kyoto University, Japan

Session Title	[PD-M1] Wave Propagation 2
Date and Time	June 22 (Thursday) / 11:00-12:50
Place	Rm. 101 (1F)
Session Chair	Yasushi Kanai (Niigata Inst. of Tech., Japan)

PD-M1-1 **Digest ID: 317**

Digital Filtering Technique in SB FDTD for SPP Propagation Modelling on Graphene Based Optical Structures 659

Masud Rana, Md (1); Rabiul Islam, Md (1); Xu, Wei (2); Zhu, Jianguo (3)

1: Rajshahi University of Engineering & Technology, Rajshahi-6204, Bangladesh; 2: School of Electrical and Electronics Engineering, Huazhong University of Science & Technology, China; 3: Faculty of Engineering & IT, University of Technology Sydney, Sydney

PD-M1-2 **Digest ID: 362**

A Numerical Method for Analyzing Electromagnetic Properties of a Moving Ferromagnet with One-side Conducting Border 661

Shao, JingHui; Ma, XiKui; Wang, JiaWei; Yin, ShuLi
Xi'an JiaoTong University, China, People's Republic of

PD-M1-3 **Digest ID: 102**

Systematic Design of Grating Structure to Induce Surface Plasmon Resonance at the Prescribed Wavelength 663

Seong, Hong Kyoung (1); Yoo, Jeonghoon (2)

1: Graduate School of Mechanical Engineering, Yonsei university, Korea, Republic of (South Korea); 2: School of Mechanical Engineering, Yonsei university, Korea, Republic of (South Korea)

PD-M1-4 **Digest ID: 433**

Optimum Design of a Patch Antenna with Metamaterial 665

SOUZA, EDUARDO DE (1); BATALHA, ROSE MARY DE SOUZA (1); SOARES, GUSTAVO LUIS (1); SILVA, ELSON JOSÉ DA (2)

1: PONTÍFICA UNIVERSIDADE CATÓLICA DE MINAS GERAIS - PUCMINAS, Brazil; 2: UNIVERSIDADE FEDERAL DE MINAS GERAIS - UFMG, Brazil

PD-M1-5 **Digest ID: 500**

Electromagnetic simulation of rotating propeller blades for radar detection purposes 667

Marak, Karoly; Peto, Tamas; Bilicz, Sandor; Gyimothy, Szabolcs; Pavo, Jozsef
Budapest University of Technology and Economics, Hungary

PD-M1-6

Digest ID: 605

Multi-Domain Transmission Conditions for Domain Decomposition Methods Applied to Scattering Problems 669

Baratta, Igor Almeida; da Silva, Elson José
Universidade Federal de Minas Gerais, Brazil

PD-M1-7

Digest ID: 138

Interactive Electromagnetic Simulation for Optimizing Photonic Crystal Waveguides Using GPU 671

Yokoyama, Yuki (1); Chen, Gong (2); Nakata, Susumu (1); Ikuno, Soichiro (2)
1: Ritsumeikan University, Japan; 2: Tokyo University of Technology, Japan

PD-M1-8

Digest ID: 692

Numerical computation of plasmonic resonances in devices made of several dispersive media N/A

Demésy, Guillaume; Nicolet, André; Zolla, Frédéric
Aix Marseille Univ, CNRS, Centrale Marseille, Institut Fresnel, F-13013 Marseille, France

PD-M1-9

Digest ID: 705

Hybrid Cross Approximation and Shared-Memory Programming for the Electric Field Integral Equation 673

Daquin, Priscillia (1); Poirier, Jean-René (1); Perrussel, Ronan (1); Buttari, Alfredo (2)
1: Université de Toulouse, CNRS, LAPLACE, Toulouse, France; 2: Université de Toulouse, CNRS, IRIT, Toulouse, France

PD-M1-10

Digest ID: 761

High-Resolution Millimeter Wave Ground Based-SAR Imaging via Compressed Sensing 675

Jung, Sang-hoon (1); Cho, Yong-sun (2); Kim, Jin-Hyeok (1); Park, Rae-seoung (3); Chung, Yong-seek (4); Jung, Hyun-Kyo (1)
1: Department of Electrical and Computer Engineering, Seoul National University, Seoul 08826, Korea; 2: R&D Center of Aerospace Division, Korean Air, Daejeon 34054, Korea; 3: Department of Electrical and Computer Engineering, University of Seoul, Seoul 13

Session Title	[PD-M2] Novel Computational Methods for Machines and Devices 2
Date and Time	June 22 (Thursday) / 11:00-12:50
Place	Rm. 102 (1F)
Session Chair	Bai Baodong (Shenyang Univ. of Tech., China)

PD-M2-1 **Digest ID: 390**

A Fast Solution of Rotor Harmonic Losses in Cage Induction Motors by Time-Stepping Finite Element Method 677

Zhan, Yang; Li, Bing; Zhao, Haisen; Xu, Guorui
North China Electric Power University, China, People's Republic of

PD-M2-2 **Digest ID: 252**

A Torque Compensation Control Scheme of PMSM considering a Wide Variation of Permanent Magnet Temperature 679

Cho, Suyeon (1); Jung, Hochang (1); Lee, Ju (2)
1: Korea Automotive Technology Institute, Korea, Republic of (South Korea); 2: Hanyang University, Electrical Engineering, Korea, Republic of (South Korea)

PD-M2-3 **Digest ID: 475**

Double-Circulatory Thermal Analyses of a Water-Cooled Permanent Magnet Motor Based on a Modified Finite Formulation Model 681

Zhu, Gaojia (1); Zhu, Yinghao (1); Zhu, Jianguo (2); Tong, Wenming (1); Han, Xueyan (1)
1: Shenyang University of Technology, China, People's Republic of; 2: University of Technology Sydney, Australia

PD-M2-4 **Withdrawn**

PD-M2-5 **Digest ID: 578**

Development of a Simplified Transformer Model for Transient Studies 683

Favela, Carlos (1); Hernandez, Coni (1); Gonzalez Dominguez, Jesus (1); Arjona, Marco A (1); Escalera-Perez, Rafael (2)
1: Instituto Tecnológico de La Laguna, Mexico; 2: Universidad Autónoma Metropolitana

PD-M2-6 **Digest ID: 614**

Calculation of Temperature Variation Effects on AC losses in HTS coils 685

Kim, Yungil (1); Lee, Ji-Young (2); Lee, Seyeon (1); Park, Sang Ho (1); Kim, Woo-Seok (1); Lee, Ji-Kwang (3); Choi, Kyeongdal (1)
1: Korea Polytechnic University, Korea, Republic of (South Korea); 2: Institute for Basic Science, Korea, Republic of (South Korea); 3: Woosuk University, Korea, Republic of (South Korea)

PD-M2-7

Digest ID: 361

Transient Behaviour of Large Transformer Windings Taking Capacitances and Eddy Currents into Account 687

Preis, Kurt (1); Rabel, Alexander (2); Renhart, Werner (1); Biro, Oszkar (1)
1: IGTE TU Graz, Austria; 2: Transformers Weiz, Siemens Inc, Austria

PD-M2-8

Digest ID: 697

Inverse Updating Method of High-frequency Equivalent Circuit Model in Transformer for Winding Deformation Diagnosis 689

Zhang, Haijun (1); Wang, Shuhong (2)
1: Hubei university of Arts and Science, China, People's Republic of; 2: Faculty of Electrical Engineering, Xi'an Jiaotong University, China, People's Republic of

PD-M2-9

Digest ID: 729

A Novel Method for Calculating Airgap Permeance of PM Machines Based on Equivalent Electrostatic FEA 691

Zou, Tianjie; Li, Dawei; Qu, Ronghai; Jiang, Dong
Huazhong University of Science and Technology, China, People's Republic of

PD-M2-10

Digest ID: 50

Design and Analysis of a Brushless DC Machine for a Miniature Battery Electric Vehicle 693

Sun, Xiaodong (1,2); Shi, Zhou (1); Xu, Xing (1,2); Yang, Zebin (3); Li, Ke (3); Zhu, Jianguo (4); Guo, Youguang (4)
1: School of Automobile and Traffic Engineering, Jiangsu University, China, People's Republic of; 2: Automotive Engineering Research Institute, Jiangsu University, China, People's Republic of; 3: School of Electrical and Information Engineering, Jiangsu U

PD-M2-11

Digest ID: 799

Rapid Electromagnetic Analysis and Design using Flux Tubes 695

STUIKYS, ALEKSAS (1); MOHAMMADI, MOHAMMAD HOSSAIN (2); LOWTHER, DAVID ALISTER (2); SYKULSKI, JAN (1)
1: UNIVERSITY OF SOUTHAMPTON, United Kingdom; 2: MCGILL UNIVERSITY, Canada

Session Title [PD-M3] Optimization and Design 9

Date and Time June 22 (Thursday) / 11:00-12:50

Place Rm. 103 (1F)

Session Chair Byungtak Kim (Kunsan Nat'l Univ., Korea)

PD-M3-1

Withdrawn

PD-M3-2

Digest ID: 776

A Novel Hybrid Algorithm of Black Hole and Differential Evolution for High Dimensional Electromagnetic Optimal Problems 697

Ren, Ziyang (1); He, Siying (1); Zhang, Dianhai (1); Koh, Chang-Seop (2)

1: Shenyang University of Technology, China; 2: Chungbuk National University, Korea, Republic of (South Korea)

PD-M3-3

Digest ID: 251

DC Current Control Method of Current Superimposition Variable Flux Reluctance Machine 699

Kohara, Akira; Hirata, Katsuhiro; Niguchi, Noboru
Osaka university, Japan

PD-M3-4

Withdrawn

PD-M3-5

Digest ID: 703

Modeling of Return Strokes with Their Initiation Processes under Consideration 701

Zhou, Mi (1); Wang, Jianguo (1); Wang, Daohong (2); Fan, Yadong (1)

1: Wuhan University, China, People's Republic of; 2: Department of Electrical, Electronic and Computer Engineering, Gifu University

PD-M3-6

Digest ID: 713

Automated Design of Rotor Topology for Synchronous Reluctance Machines considering Motor Control Strategies 703

Mohammadi, Mohammad; Li, Min; Silva, Rodrigo; Lowther, David
McGill University, Canada

PD-M3-7

Digest ID: 719

Analytical Modeling of Switched Flux Memory Machine 705

Yang, Hui; Lin, Heyun; Wang, Haitao; Li, Yibo; Fang, Shuhua; Huang, Yunkai
Southeast University, China, People's Republic of

PD-M3-8

Digest ID: 727

Investigation of the forces acting on the coils of a Modular Slotless Permanent Magnet Generator 707

Kallaste, Ants (1); Vaimann, Toomas (1,2); Rassõlkin, Anton (1); Belahcen, Anouar (1,2)
1: Tallinn University of Technology, Estonia; 2: Aalto University, Finland

PD-M3-9

Digest ID: 738

Design of an Axial Flux Permanent Synchronous Motor with Segmented Cores 709

Hwang, Nae-Won (1); Jung, Hyun-Kyo (2); Woo, Dong-Kyun (1)
1: Yeungnam University, Korea, Republic of (South Korea); 2: Seoul National University, Korea, Republic of (South Korea)

PD-M3-10

Digest ID: 743

Taguchi Robust Design Optimization for Water Cooled ISG Considering Temperature Distribution and Manufacturing Tolerance 711

Kim, Kyu-Seob (1); Lee, Byeong-Hwa (1); Lee, Bong-Hyun (1); Jung, Jae-Woo (2); Hong, Jung-Pyo (3)
1: KATECH, Korea, Republic of (South Korea); 2: Hyundai Mobis, Korea, Republic of (South Korea); 3: Hanyang University, Korea, Republic of (South Korea)

PD-M3-11

Digest ID: 751

Halbach Array Permanent Magnet Tubular Linear Generator for Direct-Driver Wave Energy Conversion 713

Liu, Chunyuan (1); Liu, Qiang (2); Zhu, He (1)
1: College of Mechanical and Electrical Engineering, Jiaying University, Jiaying, People's Republic of China; 2: Department of Electrical Engineering, Jiangsu Maritime Institute, People's Republic of China

PD-M3-12

Digest ID: 755

A New Multimodal Robust Optimization for Cogging Torque Reduction of Interior Permanent Magnet Motor 715

Park, Hyeon-Jeong (1); Yeo, Han-Kyeol (1); Jung, Hyun-Kyo (1); Jung, Sang-Yong (2); Ro, Jong-Suk (3)
1: Department of Electrical and Computer Engineering, Seoul National University, Seoul, Korea; 2: School of Electronic and Electrical Engineering, Sungkyunkwan University, Suwon, Korea; 3: School of Electrical and Electronics Engineering, Chung-Ang Univer

PD-M3-13

Digest ID: 771

Core Loss Analysis of Permanent Magnet Linear Synchronous Generator Considering the 3-D Flux Path 717

Kim, Chang-Woo; Kim, Jeong-Man; Seo, Sung-Won; Ahn, Ji-Hun; Choi, Jang-Young
Department of Electrical Engineering, Chungnam National University, 99 Daehak-ro, Yuseong-gu, Daejeon 305-764, Korea

PD-M3-14

Digest ID: 774

Robust Optimization for Reducing Cogging Torque of Permanent Magnet Motor with Static Analysis Assisted Technique. 719

Lee, Jae-Gil (1); Lim, Dong-Kuk (1); Jung, Hyun-Kyo (1); Jung, Sang-Yong (2); Woo, Dong-Kyun (3)
1: Seoul National University, Korea, Republic of (South Korea); 2: Sungkyunkwan University, Suwon, Republic of (South Korea); 3: Yeungnam University, Gyeongbuk, Republic of (South Korea)

Session Title	[PD-M4] Multi-physics and Coupled Problems 2
Date and Time	June 22 (Thursday) / 11:00-12:50
Place	Rm. 104 (1F)
Session Chair	Se-Hee Lee (Kyungpook Nat'l Univ., Korea)

PD-M4-1 **Digest ID: 64**

Simulation of Bipolar Charge Transport in Polymer Under a DC Electric Field Based on Discontinuous Galerkin Methods N/A

Zhuang, Chijie (1); Zheng, Yuesheng (2); Zeng, Rong (1); He, Jinliang (1)
 1: Department of Electrical Engineering, Tsinghua University, Beijing, China; 2: College of Electrical Engineering and Automation, Fuzhou University, Fuzhou, China

PD-M4-2 **Digest ID: 388**

Electromagnetic and Structural Coupling Analysis of Hybrid Driven PM Multi-DOF Motor 721

LI, Zheng; ZHI, Ruodong
 Hebei University of Science and Technology, China, People's Republic of

PD-M4-3 **Digest ID: 45**

FEM modeling of five-phase magnetoelectric composites for energy transducers 723

Talleb, Hakeim; Ren, Zhuoxiang
 L2E-UPMC, France

PD-M4-4 **Withdrawn**

PD-M4-5 **Digest ID: 430**

Electromagnetic-Thermal-Fluidic Analysis of Permanent Magnet Synchronous Machine by Bi-directional Method 725

Jiang, Yapeng; Wang, Dong; Chen, Junquan; Zhang, Qinghu
 Naval University of Engineering, China, People's Republic of

PD-M4-6 **Digest ID: 460**

A Study on Analytical Methods of FEM-based Edge Heating System 727

Jeong, Geochul (1); Cho, Suyeon (2); Yang, Youngmin (3); Choe, Gilyong (4); Bae, Jae-Nam (5)
 1: Hanyang University, Korea, Republic of (South Korea); 2: Korea Automotive Technology Institute, Korea, Republic of (South Korea); 3: Dawonsys, Korea, Republic of (South Korea); 4: Dawonsys, Korea, Republic of (South Korea); 5: Dongyang Mirae University

PD-M4-7

Digest ID: 544

Bezier Curve-based Shape Optimization of SF6 Gas Circuit Breaker to Improve the Dielectric Withstanding Performance for both Medium and Maximum Arcing Time 729

Kwak, Chang-Seob (1); Kim, Hong-Kyu (1); Kwak, Joo-Sik (2); Oh, Seung-Ryle (2); Lee, Se-Hee (3)
1: Korea Electrotechnology Research Insititute, Republic of Korea; 2: Power Transmission Laboratory, KEPCO Research Insititute, Republic of Korea; 3: Kyungpook National University, Republic of Korea

PD-M4-8

Digest ID: 201

Research on Stress Characteristics of Shunt Reactor Considering Magnetic and Magnetostrictive Anisotropy 731

Ben, Tong (1); Yang, Qingxin (1,2); Yan, Rongge (1); Zhu, Lihua (2); Zhang, Changgeng (1)
1: Hebei University of Technology, China, People's Republic of; 2: Tianjin Polytechnic University, China, People's Republic of

PD-M4-9

Withdrawn

PD-M4-10

Digest ID: 593

A Study of Arc Modelling in Low-Voltage Switching Devices 733

Shin, Dongkyu (1); Golosnoy, Igor O. (1); McBride, John W. (2,3)
1: School of Electronics and Computer Science, University of Southampton; 2: Faculty of Engineering and the Environment, University of Southampton; 3: University of Southampton Malaysia Campus

PD-M4-11

Digest ID: 627

Efficient Algorithm for Coupled Problem Simulation of High Dynamic Electromagnetic Actuators 735

Mach, Frantisek; Dolezel, Ivo
University of West Bohemia, Czech Republic

PD-M4-12

Digest ID: 674

Conductivity Reconstruction and Numerical Simulation for Magnetically Mediated Thermoacoustic Imaging 737

Li, Yanhong (1,2); Liu, Guoqiang (1,2); Xia, Hui (1); Xia, Zhengwu (1); Yang, Yanju (1,2)
1: Institute of Electrical Engineering, Chinese Academy of Sciences, China, People's Republic of; 2: University of Chinese Academy of Sciences, China, People's Republic of

PD-M4-13

Digest ID: 679

Lightning strike effects on composite aircraft 739

Audiffred, Diego Bonkowski de La Sierra; Travassos, Xisto Lucas; Possamai, Talita Sauter; Bohrer, Êmili; Narciso, Gabriella
Federal University of Santa Catarina, Brazil

PD-M4-14

Digest ID: 690

Magnetic Field Harmonics and its Effect on Vibration in a Bridge Configured Winding Induction Motor 741

Kumar, Gaurav (1); Kalita, Karuna (1); Tammi, Kari (2)
1: Indian Institute of Technology Guwahati, India; 2: Aalto University

Session Title [PD-A5] Optimization and Design 10

Date and Time June 22 (Thursday) / 14:10-16:00

Place Rm. 101 (1F)

Session Chair Shiyong Yang (Zhejiang Univ., China)

PD-A5-1

Digest ID: 73

Optimal Design of a New Modular Flux-Concentrated Doubly Salient Machine with PMs in Both Stator Yoke and Slot Openings 743

Wang, Qingsong (1); Niu, Shuangxia (1); Yang, Lin (2)

1: The Hong Kong Polytechnic University, Hong Kong S.A.R. (China); 2: State Power Economic Research Institute, Beijing, China

PD-A5-2

Digest ID: 209

Simulation on Electric Field Affected by Space Charge in Oil-paper Insulation System Under Polarity Reversal 745

Du, Zhiye; Lian, Qixiang; Yang, Zhifei; Jin, Shuo; Ruan, Jiangjun

Wuhan University, China, People's Republic of

PD-A5-3

Digest ID: 332

Characteristics Analysis of a Novel Motor with Two Controllable Rotors Employing 3-D FEM 747

Suzuki, Hironori; Hirata, Katsuhiro; Niguchi, Noboru; Morimoto, Eiki; Kohara, Akira

Osaka university, Japan

PD-A5-4

Digest ID: 553

Continuum Sensitivity Analysis and Shape Optimization of Dirichlet Conductor Boundary in Electrostatic System 749

Lee, Kang Hyouk; Choi, Chan Young; Park, Il Han

Sungkyunkwan University, Korea, Republic of (South Korea)

PD-A5-5

Digest ID: 572

Multilevel Design Optimization of a Claw Pole PM Motor with Soft Magnetic Composite Cores Considering Cogging Torque reduction 751

MA, BO; Lei, Gang; Zhu, Jianguo; Guo, Youguang

University of Technology Sydney, Australia

PD-A5-6

Digest ID: 694

Parameter Sensitivities Analysis and Optimization Design for Permanent Magnet Flux-Switching Motor by Nonlinear Varying-Network Magnetic Circuit Method 753

Jian, Yanhong; Zhu, Xiaoyong; Xiang, Zixuan; Fan, Deyang; Zeng, Xianxian

Jiangsu University, China, People's Republic of

PD-A5-7

Digest ID: 714

Effect of Acoustic Noise on Optimal SynRM Design Regions 755

Mohammadi, Mohammad (1); Rahman, Tanvir (2); Silva, Rodrigo (1); Wang, Bofan (1); Chang, Kang (2); Lowther, David (1)

1: McGill University, Canada; 2: Infolytica Corporation, Canada

PD-A5-8

Digest ID: 472

Uniform Magnetic Field distribution for free-positioning wireless power transfer system 757

Wang, Quandi; Wang, Yingcong

Chongqing University, China, People's Republic of

PD-A5-9

Digest ID: 777

Comparison of Reliability Analysis Between Regression Kriging and Sensitivity Assisted MCS Methods for Reliability-based Optimal Design of Electromagnetic Devices 759

Ren, Ziyang (1); Ma, Jianggang (1); Zhang, Dianhai (1); Zhang, Yanli (1); Koh, Chang-Seop (2)

1: Shenyang University of Technology, China; 2: Chungbuk National University, Korea, Republic of (South Korea)

PD-A5-10

Digest ID: 787

A Novel Multimodal Optimization Algorithm Using a Subgroup Concept for the Design of Electric Machines 761

Yeo, Han-Kyeol (1); Park, Hyeon-Jeong (1); Lim, Dong-Kuk (1); Jung, Sang-Yong (2); Ro, Jong-Suk (3); Jung, Hyun-Kyo (1)

1: Department of Electrical and Computer Engineering, Seoul National University, Seoul 08826, Korea; 2: School of Electronic and Electrical Engineering, Sungkyunkwan University, Suwon 16419, Korea; 3: School of Electrical and Electronics Engineering, Chun

PD-A5-11

Digest ID: 791

A Novel Strategy-Selelcting Hybrid Optimization Algorithm for Designing Electromagnetic Machines 763

Kang, Jae-Woo (1); Park, Hyeon-Jeong (1); Jung, Seok Won (1); Ro, Jong Suk (2); Jung, Hyun-Kyo (1)

1: Seoul national university, Korea, Republic of (South Korea); 2: School of Electrical and Electronics Engineering, Chung-Ang University, Dongjak-gu, Seoul, Korea

PD-A5-12

Digest ID: 473

Comparison of the Radial Force at the Modulating Pieces in the Coaxial Magnetic Gear and the Magnetic Geared Machine 765

Shin, Homin; Chang, Junghwan

Dong-A University, Korea, Republic of (South Korea)

PD-A5-13

Digest ID: 271

Coil Design Multi-Objective Optimization of Power Pad in WPT System for EV Applications 767

Mohamed, Ahmed A. S.; An, Siguang; Marim, Allan; Mohammed, Osama

Florida International University, United States of America

Optimal Design for Cogging Torque Reduction of an IPMSM Using PSO with Anti-Submarine Operation Concept 769

Yoon, Sung-Yeong (1); Lee, Jae-Gil (1); Ro, Jong-Suk (2); Jung, Hyun-Kyo (1)

1: Department of Electrical and Computer Engineering, Seoul National University, Seoul 151-744, Korea, Republic of (South Korea); 2: School of Electrical and Electronics Engineering, Chung-Ang University, Seoul 06974, Korea

Session Title	[PD-A6] Static and Quasi-Static Fields 4
Date and Time	June 22 (Thursday) / 14:10-16:00
Place	Rm. 102 (1F)
Session Chair	Gwansoo Park (Pusan Nat'l Univ., Korea)

PD-A6-1

Digest ID: 20

Nonlinear Three-Port Magnetic-Circuit Element for Ferromagnetic Yokes of Accelerator Magnet 771

De Gersem, Herbert (1); Srinivasan, Vaishnavi (1,2); Muehle, Carsten (2)

1: Technische Universität Darmstadt, Germany; 2: Helmholtzzentrum fuer Schwerionenforschung GSI, Germany

PD-A6-2

Digest ID: 648

A Convection-Conduction Model for Electrohydrodynamic Simulations 773

Ouedraogo, Yun (1); Gjonaj, Erion (1); Weiland, Thomas (1); De Gersem, Herbert (1); Steinhausen, Christoph (2); Lamanna, Grazia (2); Weigand, Bernhard (2); Preusche, Andreas (1); Dreizler, Andreas (1)

1: Technische Universität Darmstadt, Germany; 2: Universität Stuttgart, Germany

PD-A6-3

Digest ID: 212

A geometric formulation to solve eddy current problems in thin conductors of arbitrary topology on general meshes 775

Bettini, Paolo (1); Specogna, Ruben (2); Passarotto, Mauro (2)

1: Department of Industrial Engineering (DII), University of Padova, Italy; 2: Polytechnic Department of Engineering and Architecture (DPIA), University of Udine, Italy

PD-A6-4

Withdrawn

PD-A6-5

Digest ID: 643

Finite Element Analysis of Local Flux Density Variation Considering PWM Current Harmonics 777

Ahn, Donggyun; Yoon, Myung-Hwan; Hong, Jung-Pyo

Hanyang university, Korea, Republic of (South Korea)

PD-A6-6

Digest ID: 644

Magnetic Signature Prediction of Submarine Considering Mechanical Stress by Water Pressure 779

Kim, Sang-Hyun (1); Kim, Jong-Wang (1); Lee, Byung-Chul (1); Kim, Seong-Mo (1); Chung, Hyun-Ju (2); Lee, Hyang-Beom (1)

1: Soongsil University, Seoul, South Korea; 2: Agency for Defense Development, Changwon, South Korea

PD-A6-7

Digest ID: 253

Finite Element Analysis of Multi Layered Magnetoplated Wire Coils Using Homogenization Method 781

Fujita, Shogo; Igarashi, Hajime
Hokkaido University, Japan

PD-A6-8

Digest ID: 663

2D Volume Integral Formulations for Nonlinear Magneto-static Field Computation for Rotating Machines Pre-Design Considering Periodicities 783

Debray, Quentin Jean-Yves (1,2,3); Meunier, Gerard (2,3); Chadebec, Olivier (2,3); Coulomb, Jean Louis (2,3); Carpentier, Anthony (1)
1: Altair Engineering, France; 2: Université grenoble Alpes; 3: CNRS

PD-A6-9

Withdrawn

PD-A6-10

Digest ID: 157

Interior Penalty Discontinuous Galerkin Method for Magnetostatic Field Problems in Two Dimensions 785

Straßer, Sebastian; Herzog, Hans-Georg
Institute of Energy Conversion Technology, Technical University of Munich, Germany

PD-A6-11

Digest ID: 718

Simulation on Dual Laterolog Response based on the Circumferential Magnetic Field Strength Method 787

Zhang, Chao (1,2); Liu, Guoqiang (1,2); Li, Shiqiang (1); Liu, Yu (1), Yanhong Li (1)
1: Institute of Electrical Engineering, Chinese Academy of Science, China, People's Republic of; 2: Chinese Academy of Science, China, People's Republic of

PD-A6-12

Digest ID: 757

Calculation of Electric/Magnetic field under Power Transmission Line with Periodic Analysis, Dip Effect and Method of Image 789

Lee, JaeJoong (1); Chung, Young-Seek (2); Jung, Hyun-Kyo (3)
1: Company Auxiliary Research Institute, Powernix Co.Ltd, Daejeon 34025, Korea; 2: Department of Electronics Convergence Engineering, Kwangwoon University, Seoul 139-701, Korea; 3: Department and Computer Engineering, Seoul National University, Seoul 1517

PD-A6-13

Digest ID: 652

A Novel Approach for Axial End Leakage Flux of Spoke-type Interior Permanent Magnet Motors Using Magnetic Equivalent Circuit 791

Ryu, Jun-Yeol; Sim, Jae-Han; Yoon, Myung-Hwan; Hong, Jung-Pyo
hanyang university, Korea, Republic of (South Korea)

Session Title	[PD-A7] Mathematical Modelling and Formulations 2 / Software Methodology
Date and Time	June 22 (Thursday) / 14:10-16:00
Place	Rm. 103-104 (1F)
Session Chair	Raffaele Martone (Universita' degli Studi della Campania "L. Vanvitelli", Italy)

PD-A7-1 **Digest ID: 282**

A Two Dimensional Nonlinear Ambipolar Diffusion Equation Model of an IGBT and its Numerical Solution Methodology 793

Chen, Jiajia (1); Yang, Shiyu (1); Ho, S. L. (2)

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

PD-A7-2 **Digest ID: 304**

Solution of 2D Electromagnetic Scattering Using IIEFG-UPML Method 795

Lopes, Leonardo Bruno; Resende, Ursula do Carmo; Gonçalves, Sandro Trindade
CEFET-MG, Brazil

PD-A7-3 **Digest ID: 352**

The Planar Layered Two-Phase System Model of Frequency Response of Insulation System for Estimating Moisture in IOCT 797

BAI, Baodong; WANG, Qingpeng; CHEN, Dezhi; HE, Xiaoyu
Shenyang University of Technology, China, People's Republic of

PD-A7-4 **Digest ID: 365**

Influence of Magnetic Measurement Modeling on the Solution of Magnetostatic Inverse Problems Applied to Current Distribution Reconstruction in Switching Air Arcs 799

Dong, Jinlong; Zhang, Guogang; Geng, Yingsan; Wang, Jianhua
Xi'an Jiaotong University, China, People's Republic of

PD-A7-5 **Digest ID: 371**

A 3-D Electromagnetic Force Analytical Model for Air-core Halbach Permanent Magnet Linear Synchronous Motor 801

Duan, Jiaheng (1,2); Zhang, Kunlun (1,2); Zhang, Wenlong (1,2); Xiao, Song (1,2)

1: Key Laboratory of Magnetic Suspension Technology and Maglev Vehicle, Ministry of Education, P.R.C; 2: School of Electrical Engineering, Southwest Jiaotong University, Chengdu

PD-A7-6 **Digest ID: 379**

A Piecewise Linear Hysteresis Model for NdFeB Considering Temperature Effects 803

Chen, Junquan (1,2); Wang, Dong (1); Cheng, Siwei (1); Chen, Zhihua (1); Jiang, Yapeng (1); Shen, Yang (1); Birkammer, Florian (2); Gerling, Dieter (2)

1: Naval University of Engineering, People's Republic of China; 2: University of Federal Defense Munich, Germany

PD-A7-7

Digest ID: 124

Design and Performance Analysis of a Novel Rotary Transformer for Brushless Application 805

Zhong, Hui; Wu, Chao; Yang, Yubo
Shandong University, People's Republic of China

PD-A7-8

Digest ID: 114

An Exact Magnetic Equivalent Circuit Model for Analysis of Surface Mounted Permanent Magnet Motors 807

Faiz, Jawad; Rezaee-Alam, Farhad
University of Tehran, Iran, Islamic Republic of

PD-A7-9

Digest ID: 393

Analysis of the UPML Design Parameters in the Solution of Electromagnetic Scattering 809

Valvassoura, Giovanni; Afonso, Márcio Matias; Gonçalves, Sandro Trindade Mordente
Federal Center of Technological Education of Minas Gerais, Brazil

PD-A7-10

Digest ID: 406

Efficient NVH-Modeling of a Disc Rotor Axial-Flux Synchronous Motor as Integrated Motor Generator in Hybrid Applications 811

Kotter, Philipp (1); Morisco, David Philipp (1); Boesing, Matthias (1); Zirn, Oliver (2); Wegener, Konrad (2)
1: Robert Bosch GmbH, Germany; 2: ETH Zürich, Switzerland

PD-A7-11

Digest ID: 434

A research on the Demagnetization and Demagnetizing Factors for Normal Shape of Magnetic Materials 813

Im, Sang Hyeon; Park, Gwan Soo
School of Electrical and Computer Engineering, Pusan National University, Busan 46241, Korea, Republic of (South Korea)

PD-A7-12

Digest ID: 468

3D Equivalent Model to Compute the Electro-Magnetic Behaviour of Twisted Multi-filamentary Superconductors Wires 815

MAKONG, LUDOVIC (1,2); KAMENI, ABELIN (1); BOUILLAULT, FREDERIC (1); MASSON, PHILIPPE (2)
1: GeePs - Group of electrical engineering - Paris; 2: University of Houston, Houston

PD-A7-13

Digest ID: 492

Distributed Implicit Discontinuous Galerkin MHD Solver 817

Korous, Lukas (1); Karban, Pavel (1); Skála, Jan (2)
1: University of West Bohemia, Czech Republic; 2: Astronomical Institute of Czech Academy of Sciences

PD-A7-14

Digest ID: 499

Theoretical Energy Dissipation and Numerical Calculation of Passive Magnetic Fluid Damper 819

Yang, Xiaorui (1); Yang, Qingxin (1,2); Chen, Lifei (1); Guo, Bing (1); Yang, Wenrong (1)

1: Hebei University of Technology, China, People's Republic of; 2: Tianjin Polytechnic University, China, People's Republic of

PD-A7-15

Digest ID: 536

PWM Core-loss Analysis of Permanent Magnet Motor Using Current-Waveform 821

Lee, Jeong-Jong; Lee, Ki-Doek; Rhyu, Se-Hyun

Korea Electronics Technology Institute, Korea, Republic of (South Korea)

PD-A7-16

Digest ID: 543

A Fully GPU Solution Using Meshless Petrov Galerkin Local 823

Amorim, Lucas Pantuza; Mesquita, Renato Cardoso

Federal University of de Minas Gerais, Brazil

PD-A7-17

Withdrawn

PD-A7-18

Digest ID: 617

Development of a Reluctance Mesh Generator 825

Arjona, Marco A; Hernandez, Coni; Maldonado, Daniel

Instituto Tecnológico de La Laguna, Mexico

PD-A7-19

Digest ID: 672

Efficient Perturbation Method for Computing Two-Port Parameter Changes due to Foreign Objects for WPT Systems 827

Pavo, Jozsef (1); Badics, Zsolt (2); Bilicz, Sandor (1); Gyimothy, Szabolcs (1)

1: Budapest University of Technology and Economics, Hungary; 2: Tensor Research, LLC, Andover, MA, USA

PD-A7-20

Digest ID: 532

An Electrothermal Lumped Modeling Approach for Thin Bond Wires in Microelectronic Chip Packages 829

Casper, Thorben (1,2); Römer, Ulrich (1,2); Schöps, Sebastian (1,2)

1: Institut für Theorie Elektromagnetischer Felder, Technische Universität Darmstadt, 64289 Darmstadt, Germany; 2: Graduate School of Computational Engineering, Technische Universität Darmstadt, 64293 Darmstadt, Germany