

# IEEE TRANSACTIONS ON **MAGNETICS**

A PUBLICATION OF THE IEEE MAGNETICS SOCIETY

MARCH 2016

VOLUME 52

NUMBER 3

IEMGAQ

(ISSN 0018-9464)



**SELECTED PAPERS FROM THE 20TH INTERNATIONAL CONFERENCE ON THE  
COMPUTATION OF ELECTROMAGNETIC FIELDS (COMPUMAG 2015)**

**Montreal, QC, Canada, June 29-July 2, 2015**

# IEEE TRANSACTIONS ON MAGNETICS

A PUBLICATION OF THE IEEE MAGNETICS SOCIETY

MARCH 2016

VOLUME 52

NUMBER 3

IEMGAQ

(ISSN 0018-9464)

---

SELECTED PAPERS FROM THE 20TH INTERNATIONAL CONFERENCE ON THE COMPUTATION OF  
ELECTROMAGNETIC FIELDS (COMPUMAG 2015)

Montreal, QC, Canada, June 29–July 2, 2015

---

- 0300301 **Compumag 2015 Chairman's Foreword**  
D. A. Lowther
- 0300401 **Preface From the Editor-in-Chief**  
J. K. Sykulski
- 0300502 **Compumag 2015 Conference Organization**
- 

## PAPERS

### *Low Dimensional Systems*

- 1100204 **Adaptive Subdomain Model Order Reduction With Discrete Empirical Interpolation Method for Nonlinear Magneto-Quasi-Static Problems**  
Y. Sato, M. Clemens, and H. Igarashi
- 1100304 **Generation of Equivalent Circuit From Finite-Element Model Using Model Order Reduction**  
Y. Sato and H. Igarashi

### *Electronic Structure and Itinerant Magnetism*

- 1700104 **Uncertainty Quantification for Robust Topology Optimization of Power Transistor Devices**  
P. Putek, P. Meuris, R. Pulch, E. J. W. ter Maten, W. Schoenmaker, and M. Günther

### *Soft Magnetic Materials, Alloys and Films*

- 2000504 **Improvement of Convergence Characteristics of 1-D Dynamic Magnetic Field Analysis With Hysteresis for Iron Loss Estimation**  
S. Doi, T. Aoki, K. Okazaki, Y. Takahashi, and K. Fujiwara
- 2000604 **Analysis of Variable Stiffness Magnetorheological Elastomer Employing Particle Method and FEM**  
S. Murao, K. Hirata, and F. Miyasaka
- 2000704 **3-D Electromagnetic Field Analysis Combined With Mechanical Stress Analysis for Interior Permanent Magnet Synchronous Motors**  
K. Yamazaki and A. Aoki
- 2000804 **Coupled Magneto-Mechanical Analysis of Iron Sheets Under Biaxial Stress**  
U. Aydin, P. Rasilo, D. Singh, A. Lehtikoinen, A. Belahcen, and A. Arkkio
-

---

***Functional Materials Including Magnetocaloric, Magnetoelectric, Magnetoelastic, Magneto-optic Materials, Metamaterials***

- 2500204 **Analysis of the Out-of-Plane Coordinate Transformation to Obtain Anisotropic Layered Cloaks**  
F. J. F. Gonçalves, E. J. Silva, R. C. Mesquita, and R. R. Saldanha

***Biomagnetics***

- 5000204 **Evaluation of the Electric Field Induced in Transcranial Magnetic Stimulation Operators**  
O. Bottauscio, M. Zucca, M. Chiampi, and L. Zilberti
- 5000304 **A Potential-Based Formulation for Motion-Induced Electric Fields in MRI**  
L. Zilberti, O. Bottauscio, and M. Chiampi
- 5000404 **A Simplified Procedure for the Exposure to the Magnetic Field Produced by Resistance Spot Welding Guns**  
A. Canova, F. Freschi, L. Giaccone, and M. Manca

***Biomedical Diagnostics and Imaging***

- 5100104 **Real-Time Pose Detection for Magnetic-Assisted Medical Applications by Means of a Hybrid Deterministic/Stochastic Optimization Method**  
M. Alb, P. Alotto, G. Capasso, M. Guarnieri, C. Magele, and W. Renhart
- 5100204 **Forward Solver in Magnetoacoustic Tomography With Magnetic Induction by Generalized Finite-Element Method**  
S. Zhang, X. Zhang, H. Wang, M. Zhao, Y. Li, G. Xu, and W. Yan

***Measurement of Magnetic Properties–Dynamic***

- 6100204 **Magnetostriction of Silicon Steel Sheets Under Different Magnetization Conditions**  
Y. Zhang, Q. Li, D. Zhang, B. Bai, D. Xie, and C.-S. Koh
- 6100304 **Finite-Element Analysis of Magnetostriction Force in Power Transformer Based on the Measurement of Anisotropic Magnetostriction of Highly Grain-Oriented Electrical Steel Sheet**  
L. Zhu, H.-S. Yoon, H.-J. Cho, D.-J. Um, and C.-S. Koh

***Nondestructive Evaluation Including Magnetics and Eddy Currents***

- 6200104 **Uncertainty Analysis in Lorentz Force Eddy Current Testing**  
K. Weise, M. Carlstedt, M. Ziolkowski, and H. Brauer
- 6200204 **Sparse Grid Surrogate Models for Electromagnetic Problems With Many Parameters**  
S. Bilicz
- 6200304 **Field-Map Characterization From Magnetic Survey in High-Field Magnets**  
A. Formisano and R. Martone
- 6200404 **Application of Degenerated Hexahedral Whitney Elements in the Modeling of NDT Induction Thermography of Laminated CFRP Composite**  
H. K. Bui, G. Wasselynck, D. Trichet, and G. Berthiau

***Power Losses and Eddy Currents***

- 6300304 **Eddy Current Computation in Translational Motion Conductive Plate of an Induction Heater With Consideration of Finite Length Extremity Effects**  
M. Messadi, L. Hadjout, Y. Ouazir, H. Bensaidane, T. Lubin, S. Mezani, A. Rezzoug, and N. Takorabet
- 6300404 **Iron Loss Separation in High Frequency Using Numerical Techniques**  
L. Liu, W. N. Fu, S. Yang, and S. L. Ho
- 6300504 **Cauer Circuit Representation of the Homogenized Eddy-Current Field Based on the Legendre Expansion for a Magnetic Sheet**  
Y. Shindo, T. Miyazaki, and T. Matsuo
- 6300604 **New Approach for Accurate Prediction of Eddy Current Losses in Laminated Material in the Presence of Skin Effect With 2-D FEA**  
M. Taghizadeh Kakhki, J. Cros, and P. Viarouge
- 6300704 **Research on Calculating Eddy-Current Losses in Power Transformer Tank Walls Using Finite-Element Method Combined With Analytical Method**  
X. Yan, X. Yu, M. Shen, D. Xie, and B. Bai
-

---

**Computational Magnetics**

- 7000304 **Vector Hysteresis Model Associated With FEM in a Self-Excited Induction Generator Modeling**  
J. B. Padilha, P. Kuo-Peng, N. Sadowski, and N. J. Batistela
- 7000404 **Magnetic Field Analysis of Self-Propelled Rotary Actuator's Stator in Consideration of the Rolling Direction of the Steel Sheet**  
N. Soda and M. Enokizono
- 7000504 **A Dual Kriging Approach With Improved Points Selection Algorithm for Memory Efficient Surrogate Optimization in Electromagnetics**  
Y. Li, S. Xiao, M. Rotaru, and J. K. Sykulski
- 7000604 **Study of the Influence of the Fabrication Process Imperfections on the Performance of a Claw Pole Synchronous Machine Using a Stochastic Approach**  
S. Liu, H. D. Mac, S. Clénet, T. Coorevits, and J.-C. Mipo
- 7000704 **Reduction of a Finite-Element Parametric Model Using Adaptive POD Methods—Application to Uncertainty Quantification**  
S. Clénet, T. Henneron, and N. Ida
- 7000804 **A Modified Particle Swarm Optimization Algorithm for Global Optimizations of Inverse Problems**  
S. U. Khan, S. Yang, L. Wang, and L. Liu
- 7000904 **An Improved Light Beam Search Method in Multiobjective Inverse Problem Optimizations**  
S. An, Q. Li, and S. Yang
- 7001004 **A Hybridized Vector Optimal Algorithm for Multi-Objective Optimal Designs of Electromagnetic Devices**  
G. Hu, S. Yang, Y. Li, and S. U. Khan
- 7001104 **A New Methodology for Robust Optimizations of Optimal Design Problems Under Interval Uncertainty**  
S. Yang, J. Yang, Y. Bai, and G. Ni
- 7001204 **A Vector Tabu Search Algorithm With Enhanced Searching Ability for Pareto Solutions and Its Application to Multiobjective Optimizations**  
J. Yang, S. Yang, and P. Ni
- 7001304 **Synchronous Generator Fault Investigation by Experimental and Finite-Element Procedures**  
H. F. dos Santos, N. Sadowski, N. J. Batistela, and J. P. A. Bastos
- 7001404 **A–T Volume Integral Formulations for Solving Electromagnetic Problems in the Frequency Domain**  
G. Meunier, O. Chadebec, J.-M. Guichon, V. Le-Van, J. Siau, B. Bannwarth, and F. Sirois
- 7001504 **A Possibility-Based Robust Optimal Design Algorithm in Preliminary Design Stage of Electromagnetic Devices**  
Z. Ren, S. He, D. Zhang, Y. Zhang, and C.-S. Koh
- 7001604 **A Novel Memetic Algorithm Using Modified Particle Swarm Optimization and Mesh Adaptive Direct Search for PMSM Design**  
J. H. Lee, J.-W. Kim, J.-Y. Song, Y.-J. Kim, and S.-Y. Jung
- 7001704 **Modeling and Simulation Aspects of Transient Electromagnetic–Mechanical Analysis for Industrial Applications**  
Z. Tanasic, T. Werder Schläpfer, and J. Smajic
- 7001804 **Computation of Source for Non-Meshed Coils in a Reduced Domain With A–V Formulation**  
P. Ferrouillat, C. Guérin, G. Meunier, B. Ramdane, P. Dular, P. Labie, and D. Dupuy
- 7001904 **Kriging-Assisted Multi-Objective Design of Permanent Magnet Motor for Position Sensorless Control**  
M. Li, F. Gabriel, M. Alkadri, and D. A. Lowther
- 7002004 **Space-Time Field Projection: Finite-Element Analysis Coupled Between Different Meshes and Different Time-Step Settings**  
Z. Wang, T. Henneron, and H. Hofmann
-



- 
- 7002104 **Design of Electromagnetic Linear Actuator Using the Equivalent Magnetic Circuit Method**  
D. K. Han and J. H. Chang
- 7002204 **Novel Efficient Strategy to Design an Optimized Microwave Shield**  
C. Bianchi, F. Bressan, F. Dughiero, and R. Hunter
- 7002304 **A Derivative Splitting Approach to Sensitivity Analysis of Magnet Design**  
A. G. Chiariello, A. Formisano, F. Ledda, R. Martone, and F. Pizzo
- 7002404 **Efficient Reluctance Network Formulation for Modeling Design and Optimization of Linear Hybrid Motor**  
E. M. Barhoumi, F. Wurtz, C. Chillet, B. Ben Salah, and O. Chadebec
- 7002504 **Firefly Algorithm for Finding Optimal Shapes of Electromagnetic Devices**  
M. Alb, P. Alotto, C. Magele, W. Renhart, K. Preis, and B. Trapp
- 7002604 **Modeling of Magnetic Field Perturbations on the Balance Spring of a Mechanical Watch**  
R. Khairi, X. Mininger, R. Corcolle, L. Pichon, and L. Bernard
- 7002704 **Model of Magnetic Anisotropy of Non-Oriented Steel Sheets for Finite-Element Method**  
F. Martin, D. Singh, P. Rasilo, A. Belahcen, and A. Arkkio
- 7002804 **A Magnetic Vector Potential Volume Integral Formulation for Nonlinear Magnetostatic Problems**  
V. Le-Van, G. Meunier, O. Chadebec, and J.-M. Guichon
- 7002904 **1-D Lamination Models for Calculating the Magnetization Dynamics in Non-Oriented Soft Magnetic Steel Sheets**  
M. Petrun, S. Steentjes, K. Hameyer, and D. Dolinar
- 7003004 **Fast Magnetic Flux Line Allocation Algorithm for Interactive Visualization Using Magnetic Flux Line Existence Probability**  
T. Naoe, S. Noguchi, V. Cingoski, and H. Igarashi
- 7003104 **Reduction of Optimization Problem by Combination of Optimization Algorithm and Sensitivity Analysis**  
F. Mach
- 7003204 **Design Optimization for 10 MeV Cyclotron Magnets Employing Sequential Approximation and Automatic Boundary Shifting Techniques**  
C.-S. Kwak, S.-H. Kim, and S.-H. Lee
- 7003304 **Topology Optimization of a Magnetic Resonator Using Finite-Difference Time-Domain Method for Wireless Energy Transfer**  
H. Kim, J. Lee, J. Lee, J. Hyun, and S. Wang
- 7003404 **A Novel Methodology for the Demagnetization Analysis of Surface Permanent Magnet Synchronous Motors**  
S. G. Lee, K.-S. Kim, J. Lee, and W. H. Kim
- 7003504 **Bulk Forces and Interface Forces in Assemblies of Magnetized Pieces of Matter**  
A. Bossavit
- Numerical Methods*
- 7200304 **Efficient Finite-Element Computation of Circulating Currents in Thin Parallel Strands**  
A. Lehtikoinen and A. Arkkio
- 7200404 **Model-Order Reduction for the Finite-Element Boundary-Element Simulation of Eddy-Current Problems Including Rigid Body Motion**  
D. Klis, O. Farle, and R. Dyczij-Edlinger
- 7200504 **An Adaptive Deflation Domain-Decomposition Preconditioner for Fast Frequency Sweeps**  
O. Floch, A. Sommer, D. Klis, O. Farle, and R. Dyczij-Edlinger
- 7200604 **Indirect Coupling of the Cell Method and BEM for Solving 3-D Unbounded Magnetostatic Problems**  
F. Moro and L. Codecasa
-

- 
- 7200704 **Fast Solution of Induction Heating Problems by Structure-Preserving Nonlinear Model Order Reduction**  
L. Codecasa, P. Alotto, and F. Moro
- 7200804 **Evaluation of Electromagnetic Scattering by Conducting Bodies of Revolution With Discontinuous Currents**  
Ú. C. Resende, F. J. S. Moreira, J. R. Bergmann, and S. T. M. Gonçalves
- 7200904 **Fast MOR-Based Approach to Uncertainty Quantification in Transcranial Magnetic Stimulation**  
L. Codecasa, L. Di Rienzo, K. Weise, S. Gross, and J. Haueisen
- 7201004 **A Self-Adaptive Model-Order Reduction Algorithm for Nonlinear Eddy-Current Problems Based on Quadratic–Bilinear Modeling**  
D. Klis, S. Burgard, O. Farle, and R. Dyczij-Edlinger
- 7201104 **Topology Optimization of Electric Motor Using Topological Derivative for Nonlinear Magnetostatics**  
P. Gangl, S. Amstutz, and U. Langer
- 7201204 **Broadband SIBC Formulation for a Low-Dispersion Finite Volume Method in the Time Domain**  
A. Tsakanian, E. Gjonaj, H. De Gerssem, and T. Weiland
- 7201304 **A Comparative Study on Probabilistic Optimization Methods for Electromagnetic Design**  
D.-W. Kim, B. Kang, K. K. Choi, and D.-H. Kim
- 7201404 **Enriched Serial-Loop Optimization Method for Efficient Reliability-Based Electromagnetic Designs**  
D.-W. Kim, B. Kang, K. K. Choi, and D.-H. Kim
- 7201504 **Biogeography-Inspired Multiobjective Optimization and MEMS Design**  
P. Di Barba, F. Dughiero, M. E. Mognaschi, A. Savini, and S. Wiak
- 7201604 **Trefftz Approximations: A New Framework for Nonreflecting Boundary Conditions**  
A. Paganini, L. Scarabosio, R. Hiptmair, and I. Tsukerman
- 7201704 **Efficient Integration of High-Order Stencils Into the ADI-FDTD Method**  
T. T. Zygiridis, N. V. Kantartzis, C. S. Antonopoulos, and T. D. Tsiboukis
- 7201804 **A Fast Poisson Solver for 3-D Space Charge Calculations in a CPU+GPU Heterogeneous Routine**  
D. Zheng and U. van Rienen
- 7201904 **Calculation of Ion-Flow Field of HVdc Transmission Lines in the Presence of Wind Using Finite Element-Finite Difference Combined Method With Domain Decomposition**  
J. Qiao, J. Zou, J. Yuan, J. B. Lee, and M. Ju
- 7202004 **Investigation of Geometric Variations for Multicell Cavities Using Perturbative Methods**  
K. Brackebusch and U. van Rienen
- 7202104 **Application of the PGD and DEIM to Solve a 3-D Non-Linear Magnetostatic Problem Coupled With the Circuit Equations**  
T. Henneron and S. Clénet
- 7202204 **Excitation by Scattering/Total Field Decomposition and Uniaxial PML in the Geometric Formulation**  
M. Cicuttin, L. Codecasa, R. Specogna, and F. Trevisan
- 7202304 **Novel Formulation to Determine the Potential on the Soil Surface Generated by a Lightning Surge**  
D. S. Gazzana, G. A. D. Dias, R. C. Leborgne, A. S. Bretas, M. Telló, D. W. P. Thomas, and C. Christopoulos
- 7202404 **High-Speed Shielding Current Analysis in High-Temperature Superconducting Film With Cracks**  
A. Kamitani, T. Takayama, and A. Saitoh
- 7202504 **Complementary Discrete Geometric  $h$ -Field Formulation for Wave Propagation Problems**  
M. Cicuttin, L. Codecasa, R. Specogna, and F. Trevisan
- 7202604 **Time-Periodicity Condition of Nonlinear Magnetostatic Problem Coupled With Electric Circuit Imposed by Waveform Relaxation Method**  
G. Caron, T. Henneron, F. Piriou, and J.-C. Mipo
-

- 
- 7202704 **Fast Frequency and Material Properties Sweeps for Quasi-Static Problems**  
R. Specogna
- 7202804 **The Coupling Surface Method for the Solution of Magnetoquasi-Static Problems**  
G. Rubinacci and F. Villone
- 7202904 **Reduced-Order Model Accounting for High-Frequency Effects in Power Electronic Components**  
Y. Paquay, C. Geuzaine, M. R. Hasan, and R. V. Sabariego
- 7203004 **Efficient Computation of the Neural Activation During Deep Brain Stimulation for Dispersive Electrical Properties of Brain Tissue**  
C. Schmidt, T. Flisgen, and U. van Rienen
- 7203104 **A Boundary Integral Method for Computing Eddy Currents in Non-Manifold Thin Conductors**  
P. Bettini, P. Dłotko, and R. Specogna
- 7203204 **Sparsification of BEM Matrices for Large-Scale Eddy Current Problems**  
P. Alotto, P. Bettini, and R. Specogna
- 7203304 **A Novel Application of Selective Modal Analysis to Large-Scale Electromagnetic Devices**  
A. Cenedese, M. Fagherazzi, and P. Bettini
- 7203404 **Response Surface Models for the Uncertainty Quantification of Eccentric Permanent Magnet Synchronous Machines**  
Z. Bontinck, H. De Gersem, and S. Schöps
- 7203504 **A Provably Stable and Simple FDTD Formulation for Electromagnetic Modeling of Graphene Sheets**  
F. Afshar, A. Akbarzadeh-Sharbaf, and D. D. Giannacopoulos
- 7203604 **A Rational Approach to  $B$ - $H$  Curve Representation**  
P. Diez and J. P. Webb
- 7203706 **Consistent Integral Equation Modeling of Cloaking Planar Microstrip Antennas**  
A. N. Papadimopoulos, N. L. Tsitsas, C. A. Valagiannopoulos, N. V. Kantartzis, C. S. Antonopoulos, and T. D. Tsiboukis
- 7203804 **A Generalized Domain-Decomposition Stochastic FDTD Technique for Complex Nanomaterial and Graphene Structures**  
N. V. Kantartzis, T. T. Zygiridis, C. S. Antonopoulos, Y. Kanai, and T. D. Tsiboukis
- 7203904 **Nonlinear Electrical Impedance Tomography Reconstruction Using Artificial Neural Networks and Particle Swarm Optimization**  
S. Martin and C. T. M. Choi
- 7204004 **Multirate Coupling of Controlled Rectifier and Non-Linear Finite Element Model Based on Waveform Relaxation Method**  
A. Pierquin, T. Henneron, S. Brisset, and S. Clénet
- 7204104 **Multidisciplinary Optimization Formulation for the Optimization of Multirate Systems**  
A. Pierquin, S. Brisset, and T. Henneron
- 7204204 **A Performance Comparison of Adaptive Operator-Customized Wavelet Basis and Adaptive  $h$ -Refinement Methods for 2-D Finite-Element Analysis**  
M. G. Filippi, M. G. Vanti, and P. Kuo-Peng
- 7204304 **A Dynamic Dual-Response-Surface Methodology for Optimal Design of a Permanent-Magnet Motor Using Finite-Element Method**  
X. Liu and W. N. Fu
- 7204404 **Acceleration of the Finite-Element Gaussian Belief Propagation Solver Using Minimum Residual Techniques**  
Y. El-Kurdi, D. Fernández, W. J. Gross, and D. D. Giannacopoulos
- 7204504 **Domain Decomposition Methods for Time-Harmonic Electromagnetic Waves With High-Order Whitney Forms**  
N. Marsic, C. Waltz, J.-F. Lee, and C. Geuzaine
-

- 
- 7204604 **Multirate Technique for Explicit Discontinuous Galerkin Computations of Time-Domain Maxwell Equations on Complex Geometries**  
A. Kameni, B. Seny, and L. Pichon
- 7204705 **An Enhanced Total-Field/Scattered-Field Scheme for the 3-D Nonstandard Finite-Difference Time-Domain Method**  
T. Ohtani, Y. Kanai, and N. V. Kantartzis
- 7204804 **Nonlinear Interpolation on Manifold of Reduced-Order Models in Magnetodynamic Problems**  
Y. Paquay, O. Bruls, and C. Geuzaine
- 7204904 **Comparison of Nonlinear Domain Decomposition Schemes for Coupled Electromechanical Problems**  
A. Halbach, P. Dular, and C. Geuzaine
- 7205004 **A Time-Domain Approach of Ion Flow Field Around AC-DC Hybrid Transmission Lines Based on Method of Characteristics**  
B. Zhang, J. Mo, J. He, and C. Zhuang
- 7205104 **Variable Preconditioning of Krylov Subspace Methods for Hierarchical Matrices With Adaptive Cross Approximation**  
A. Ida, T. Iwashita, T. Mifune, and Y. Takahashi
- 7205204 **Validation of Meshless Method Based on Weighted Least Square Method for Simulating Electromagnetic Levitation**  
S. Matsuzawa, K. Mitsufuji, Y. Miyake, K. Hirata, and F. Miyasaka
- 7205304 **Multi-Component Layout Optimization Method for the Design of a Permanent Magnet Actuator**  
S. Lim, S. Jeong, and S. Min
- 7205404 **3-D Modeling of Heterogeneous and Anisotropic Superconducting Media**  
L. Makong, A. Kameni, P. Masson, J. Lambrechts, and F. Bouillault
- 7205504 **Level-Set-Based Topology Optimization Using Remeshing Techniques for Magnetic Actuator Design**  
S. Jeong, S. Lim, and S. Min
- 7205604 **Magnetostatic Shield Analysis by Double-Layer Charge Formulation Using Difference Field Concept**  
K. Ryu, T. Yoshioka, S. Wakao, Y. Takahashi, K. Ishibashi, and K. Fujiwara
- 7205704 **A Computational Approach for a Wireless Power Transfer Link Design Optimization Considering Electromagnetic Compatibility**  
A. O. Hariri, T. Youssef, A. Elsayed, and O. Mohammed
- 7205804 **Fully Coupled Finite-Element Analysis for Surface Discharge on Solid Insulation in Dielectric Liquid With Experimental Validation**  
H.-Y. Lee, I. M. Kang, and S.-H. Lee
- 7205904 **Modeling of Resonant Wireless Power Transfer With Integral Formulations in Heterogeneous Media**  
S. Bilicz, S. Gyimothy, J. Pavo, L. L. Toth, Z. Badics, and B. Balint
- 7206004 **Space-Time PML and Subgrid Connections for Finite Integration Method**  
K. Arai, T. Mifune, and T. Matsuo
- 7206104 **Accurate Treatment of Nonconformal Material Interfaces in the Finite Integration Technique**  
S. Kirsch, L. Kuen, and R. Schuhmann
- 7206204 **Corona Discharge Simulation of Multiconductor Electrostatic Precipitators**  
P. Alotto and L. Codecasa
- 7206304 **Numerical Analysis of Discrete Geometric Method on Plasmonic Structures**  
S. Yan, X. Xu, C. Pflaum, and Z. Ren
- 7206404 **Uncertainty Quantification Using Sparse Approximation for Models With a High Number of Parameters: Application to a Magnetoelectric Sensor**  
T. T. Nguyen, D. H. Mac, and S. Clenet
- 7206504 **Finite Formulation of Surface Impedance Boundary Conditions**  
V. Cirimele, F. Freschi, L. Giaccone, and M. Repetto
-

- 
- 7206604 **Improved Architecture of FDTD Dataflow Machine for Higher Performance Electromagnetic Wave Simulation**  
H. Kawaguchi
- 7206704 **Numerical Analysis of Behavior of High-Viscosity Electromagnetic Fluid Using a Coupled Method of Particle Method and FEM**  
T. Yamamoto, S. Matsuzawa, S. Ogawa, T. Ota, and K. Hirata
- 7206804 **Equivalent-Circuit Generation From Finite-Element Solution Using Proper Orthogonal Decomposition**  
T. Shimotani, Y. Sato, and H. Igarashi
- 7206904 **Lean Complementarity for Poisson Problems**  
R. Specogna
- 7207004 **Fast Finite-Element Analysis of Motors Using Block Model Order Reduction**  
T. Shimotani, Y. Sato, T. Sato, and H. Igarashi
- 7207104 **New Measurement System of Magnetic Near-Field With Multipolar Expansion Approach**  
A. Bréard, F. Tavernier, Z. Li, and L. Krähenbühl
- 7207204 **An Error-Correction Scheme for the Electrothermal Modeling of Device Structures**  
D. Duque and S. Schöps
- 7207304 **Toward Real-Time Finite-Element Simulation on GPU**  
Q. Dinh and Y. Marechal
- 7207404 **Interpolating Moving Least-Squares-Based Meshless Time-Domain Method for Stable Simulation of Electromagnetic Wave Propagation in Complex-Shaped Domain**  
T. Itoh and S. Ikuno
- 7207504 **Numerical Analysis of the Power Balance of an Electrical Machine With Rotor Eccentricity**  
B. Silwal, P. Rasilo, L. Perkkiö, A. Hannukainen, T. Eirola, and A. Arkkio
- 7207604 **Periodic Boundary Conditions in the Natural Element Method**  
B. M. F. Gonçalves, M. M. Afonso, E. H. R. Coppoli, M. A. O. Schroeder, R. S. Alípio, B. Ramdane, and Y. Marechal
- 7207704 **Coupled FEM-MMP for Computational Electromagnetics**  
J. Smajic, C. Hafner, and J. Leuthold
- 7207804 **Convergent Expressions for Periodic Potentials in Stratified Media Using Asymptotic Extractions**  
G. Valerio, S. Paulotto, P. Baccarelli, D. R. Jackson, D. R. Wilton, W. A. Johnson, and A. Galli
- 7207904 **Finite-Element-Integral Equation Full-Wave Multisolver for Efficient Modeling of Resonant Wireless Power Transfer**  
Z. Badics, S. Bilicz, S. Gyimóthy, and J. Pávó
- 7208004 **Vector Interpolation on Natural Element Method**  
D. Pereira Botelho, Y. Marechal, and B. Ramdane
- 7208104 **Degenerated Hexahedral Whitney Elements for Electromagnetic Fields Computation in Multi-Layer Anisotropic Thin Regions**  
H. K. Bui, G. Wasselynck, D. Trichet, and G. Berthiau
- 7208204 **Coupled Magnetothermal Analysis of Gradient Coils in MRI Scanners**  
F. Freschi, H. Sanchez Lopez, F. Tang, M. Repetto, and S. Crozier
- 7208304 **Modified Social-Spider Optimization Algorithm Applied to Electromagnetic Optimization**  
C. E. Klein, E. H. V. Segundo, V. C. Mariani, and L. dos S. Coelho
- 7208404 **Numerical Analysis and Experiment of Floating Conductive Particle Motion Due to Contact Charging in High-Voltage System**  
K. H. Lee, M. K. Baek, S. G. Hong, Y. S. Kim, H. S. Choi, and I. H. Park
- 7208504 **Multiobjective Krill Herd Algorithm for Electromagnetic Optimization**  
H. V. H. Ayala, E. H. V. Segundo, V. C. Mariani, and L. dos S. Coelho
-



- 
- 7208604 **Co-Kriging Assisted PSO Algorithm and Its Application to Optimal Transposition Design of Power Transformer Windings for the Reduction of Circulating Current Loss**  
B. Xia, G.-G. Jeong, and C.-S. Koh
- 7208704 **A Novel Adaptive Dynamic Taylor Kriging and Its Application to Optimal Design of Electromagnetic Devices**  
B. Xia, T.-W. Lee, K. Choi, and C.-S. Koh
- 7208804 **60 GHz Indoor Propagation With Time-Domain Geometric-Optics**  
P. Lyu, X. Xu, S. Yan, and Z. Ren
- 7208904 **A Mixed Surface Volume Integral Formulation for the Modeling of High-Frequency Coreless Inductors**  
Z. De Grève, J. Siau, G. Meunier, J.-M. Guichon, and O. Chadebec
- 7209004 **Hybrid Algorithm Combining Genetic Algorithm With Evolution Strategy for Antenna Design**  
K. Choi, D.-H. Jang, S.-I. Kang, J.-H. Lee, T.-K. Chung, and H.-S. Kim
- 7209104 **Finite-Element Homogenization of Laminated Iron Cores With Inclusion of Net Circulating Currents Due to Imperfect Insulation**  
J. Gyselinck, P. Dular, L. Krähenbühl, and R. V. Sabariego
- 7209204 **Speedup of Magnetic-Electric Matrices Assembly Computation by Means of a Multi-GPUs Environment**  
A. G. Chiariello, S. Mastrostefano, M. Nicolazzo, G. Rubinacci, A. Tamburrino, S. Ventre, and F. Villone
- 7209304 **Coupling Interfaces and Their Impact in Field/Circuit Co-Simulation**  
K. Gausling and A. Bartel
- Hysteresis Modeling*
- 7300104 **Temperature-Dependent Extension of a Static Hysteresis Model**  
F. Sixdenier, O. Messal, A. Hilal, C. Martin, M.-A. Raulet, and R. Scorretti
- 7300204 **Modeling of Hysteresis Losses in Ferromagnetic Laminations Under Mechanical Stress**  
P. Rasilo, D. Singh, U. Aydin, F. Martin, R. Kouhia, A. Belahcen, and A. Arkkio
- 7300304 **Inclusion of a Direct and Inverse Energy-Consistent Hysteresis Model in Dual Magnetostatic Finite-Element Formulations**  
K. Jacques, R. V. Sabariego, C. Geuzaine, and J. Gyselinck
- 7300404 **Prediction of Iron Losses Using Jiles–Atherton Model With Interpolated Parameters Under the Conditions of Frequency and Compressive Stress**  
S. Hussain and D. A. Lowther
- 7300504 **Implementation of Iron Loss Model on Graphic Processing Units**  
S. Hussain, R. C. P. Silva, and D. A. Lowther
- 7300604 **Anisotropic Vector Play Model Incorporating Decomposed Shape Functions**  
T. Fujinaga, T. Mifune, and T. Matsuo
- Finite Element Modeling*
- 7400304 **Adaption for 2-D Edge Elements in the Nonconforming Voxel Finite-Element Method**  
M. Nazari and J. P. Webb
- 7400404 **An Accurate and Efficient Hybrid Method for the Calculation of the Equivalent Capacitance of an Arbitrary-Shaped Coil**  
H. Li and W. M. Rucker
- 7400504 **Application of Edge Elements to 3-D Electromagnetic Field Analysis Accounting for Both Inductive and Capacitive Effects**  
S. L. Ho, Y. Zhao, W. N. Fu, and P. Zhou
- 7400604 **Polygonal Finite Elements of Arbitrary Order**  
T. Mukherjee and J. P. Webb
- 7400704 **FEM-DBCI Solution of Open-Boundary Electrostatic Problems in the Presence of Floating Potential Conductors**  
G. Aiello, S. Alfonzetti, S. A. Rizzo, and N. Salerno
- 7400804 **Eddy Current Computation by the FEM-SDBCI Method**  
G. Aiello, S. Alfonzetti, E. Diletto, and N. Salerno
-

- 
- 7400904 **Multiphysics Modeling of Thin-Layer Magnetoelectric Laminate Composites Using Shell Element**  
H. Talleb and Z. Ren
- 7401004 **Multi-Physics Calculation and Contact Degradation Mechanism Evolution of GIB Connector Under Daily Cyclic Loading**  
X. Guan, N. Shu, B. Kang, Q. Yan, Z. Li, H. Li, and X. Wu
- 7401104 **Real-Time Prediction of Temperature for Electromagnetic Heating Therapy in Deep-Seated Tissue**  
W.-C. Wang, G.-E. Lin, C.-C. Tai, Y.-J. Lan, and T.-C. Yu
- 7401204 **A Mesh Deformation Algorithm and Its Application in Optimal Motor Design**  
L. Yang, S. L. Ho, W. N. Fu, and L. Liu
- 7401304 **2-D Reduced Model for Eddy Currents Calculation in Litz Wire and Its Application for Switched Reluctance Machine**  
M. Al Eit, F. Bouillault, C. Marchand, and G. Krebs
- 7401404 **Quasi-3-D Finite-Element Method for Cylindrically Symmetric Models With Small Eccentricities**  
D. Doornaert, C. Glorieux, H. De Gerssem, R. Puers, W. Spileers, and J. Blanckaert
- 7401504 **Numerical Model of the Dynamic Response of 3-D Conducting Structures With Magnetic Damping**  
A. Portone, G. Rubinacci, and P. Testoni
- 7401604 **Parallel Finite-Element Analysis of Rotating Machines Based on Domain Decomposition Considering Nonconforming Mesh Connection**  
Y. Takahashi, K. Fujiwara, T. Iwashita, and H. Nakashima
- 7401704 **An Electromagnetic Field and Electric Circuit Coupled Method for Solid Conductors in 3-D Finite-Element Method**  
W. N. Fu, Y. Zhao, S. L. Ho, and P. Zhou
- 7401804 **Preliminary Study of Space-Time Finite-Element Eddy-Current Analysis**  
J. Niimi, T. Mifune, and T. Matsuo
- 7401904 **Dispersive Möbius Transform Finite-Element Time-Domain Method on Graphics Processing Units**  
D. S. Abraham and D. D. Giannacopoulos
- 7402004 **Modeling Periodic Layered Structures by Shell Elements Using the Finite-Element Method**  
I. Bardi, G. Peng, and L. E. R. Petersson
- 7402104 **Electromagnetic-Thermal-Deformed-Fluid-Coupled Simulation for Levitation Melting of Titanium**  
H. Li, S. Wang, H. He, Y. Huangfu, and J. Zhu
- 7402204 **Topology Optimization Based on Regularized Level-Set Function for Solving 3-D Nonlinear Magnetic Field System With Spatial Symmetric Condition**  
Y. Okamoto, S. Wakao, and S. Sato
- 7402304 **3-D FE Method Analysis of Static Fields for Non-Conforming Meshes With Second-Order Node-Based Elements**  
G. J. Wallinger and O. Bíró
- 7402404 **Numerical Simulation of Solid-Solid Phase Transformations During Induction Hardening Process**  
M. Spezzapria, M. Forzan, and F. Dughiero
- 7402504 **A Magnetodynamic Error Criterion and an Adaptive Meshing Strategy for Eddy Current Evaluation**  
D. Dupuy, D. Pedreira, D. Verbeke, V. Leconte, P. Wendling, L. Rondot, and V. Mazaauric
- 7402604 **Finite Element Implementation and Experimental Validation of 2-D/3-D Magnetic Force Formulas**  
W. Boughanmi, F. Henrotte, A. Benabou, and Y. Le Menach
- 7402704 **High-Accuracy Electromagnetic Field Simulation Using Numerical Human Body Models**  
A. Takei, K. Murotani, S.-I. Sugimoto, M. Ogino, and H. Kawai
- 7402804 **Progressive Current Source Models in Magnetic Vector Potential Finite-Element Formulations**  
P. Dular, P. Kuo-Peng, M. V. Ferreira da Luz, and L. Krähenbühl
- 7402904 **Numerical Impact of Using Different  $E$ - $J$  Relationships for 3-D Simulations of AC Losses in  $MgB_2$  Superconducting Wires**  
G. Escamez, F. Sirois, A. Badel, G. Meunier, B. Ramdane, and P. Tixador
-

---

*Electromagnetic Devices – Not Electrical Machines*

- 8000404 **Magnetic Design Optimization Approach Using Design of Experiments With Evolutionary Computing**  
P. Di Barba, F. Dughiero, M. Forzan, and E. Sieni
- 8000504 **No-Slip Motion of a Spherical Magnet on the Top of a Conductive Plate**  
S. Dufour, G. Vinsard, and E. Saadjan
- 8000604 **Shielding Effectiveness of Perforated Screens Through an Inverse Problem-Based Resolution**  
I. Briki, L. Pichon, and J. Ben Hadj Slama
- 8000704 **Generalized Harmonic Analysis of Computed and Measured Magnetic Fields**  
B. Auchmann, S. Kurz, C. Petrone, and S. Russenschuck
- 8000804 **Electric Vector Potential Formulation to Model a Magnetohydrodynamic Inertial Actuator**  
M. Mesurolle, Y. Lefèvre, and C. Casteras
- 8000904 **Optimizing Transcutaneous Energy Transmitter Using Game Theory**  
D. Wolter Ferreira Touma and L. Lebensztajn
- 8001004 **Optimal Design of a Compact Filter for UWB Applications Using an Improved Particle Swarm Optimization**  
Y.-C. Yun, S.-H. Oh, J.-H. Lee, K. Choi, T.-K. Chung, and H.-S. Kim

*Electrical Machines*

- 8101004 **Pareto Optimization in Terms of Electromagnetic and Thermal Characteristics of Air-Cooled Asynchronous Induction Machines Applied in Railway Traction Drives**  
J. Buschbeck, M. Vogelsberger, A. Orellano, and E. Schmidt
- 8101104 **Fast Steady-State Field-Circuit Model for SMPM-BLdc Motors Driven From 120° and 180° Quasi-Square Wave Inverters**  
M. Jagiela, T. Garbiec, J. Gwozdz, and J. Kolodziej
- 8101204 **Estimation of FEM Model Parameters Using Data Assimilation and Its Application to an Electrical Machine**  
A. Bacchus, A. Tounzi, J.-P. Argaud, B. Bouriquet, M. Biet, L. Macaire, and Y. Le Menach
- 8101304 **Robust Multidisciplinary Design Optimization of PM Machines With Soft Magnetic Composite Cores for Batch Production**  
G. Lei, C. Liu, Y. Guo, and J. Zhu
- 8101404 **Charge Transport Simulation in Single-Layer Oil-Paper Insulation**  
J. Shuo, R. Jiangjun, D. Zhiye, H. Guodong, Z. Lin, G. Weimin, Y. Zhifei, and L. Lingyan
- 8101504 **EM-SS-Wavelets for Characterization of High-Speed Generators in Distributed Generation**  
A. A. Arkadan and M. El Hariri
- 8101604 **Simplified 3-D Modeling for Skewed Rotor Slots With End-Ring of Cage Induction Motors**  
K. Yamada, Y. Takahashi, and K. Fujiwara
- 8101704 **Magnetic Field Analysis of Reactors for Power Conditioner System Taking Into Account Magnetic Hysteresis**  
S. Kusakabe, Y. Takahashi, K. Fujiwara, and N. Yamada
- 8101804 **Estimation of Rotor Type Using Ferrite Magnet Considering the Magnetization Process**  
K.-S. Kim, M.-R. Park, H.-J. Kim, S.-H. Chai, and J.-P. Hong
- 8101904 **Characteristics of IPMSM According to Rotor Design Considering Nonlinearity of Permanent Magnet**  
M.-R. Park, H.-J. Kim, Y.-Y. Choi, J.-P. Hong, and J.-J. Lee
- 8102004 **Electromagnetic Vibration of Motor Core Including Magnetostriction Under Different Rotation Speeds**  
L. Zhu, B. Wang, R. Yan, Q. Yang, Y. Yang, and X. Zhang
- 8102104 **Extraction of High-Frequency Phase-to-Phase Coupling in AC Machine Using Mixed-Mode Network Parameters**  
Y. Ryu and K. J. Han
-

- 
- 8102204 **Computation of Wound Rotor Induction Machines Based on Coupled Finite Elements and Circuit Equation Under a First Space Harmonic Approximation**  
S. Mezani, T. Hamiti, L. Belguerras, T. Lubin, and C. Gerada
- 8102304 **On the Role of Robustness in Multi-Objective Robust Optimization: Application to an IPM Motor Design Problem**  
A. Salimi and D. A. Lowther
- 8102404 **Visualization and Analysis of Tradeoffs in Many-Objective Optimization: A Case Study on the Interior Permanent Magnet Motor Design**  
R. Silva, A. Salimi, M. Li, A. R. R. Freitas, F. G. Guimarães, and D. A. Lowther
- 8102504 **Shape Optimization of a Hybrid Magnetic Torque Converter Using the Multiple Linear Regression Analysis**  
S.-J. Kim, C.-H. Kim, S.-Y. Jung, and Y.-J. Kim

*Motors, Generators and Actuators*

- 8200304 **Computational Method of Effective Remanence Flux Density to Consider PM Overhang Effect for Spoke-Type PM Motor With 2-D Analysis Using Magnetic Energy**  
J.-Y. Song, J. H. Lee, Y.-J. Kim, and S.-Y. Jung
- 8200404 **Mass Ionized Particle Optimization Algorithm Applied to Optimal FEA-Based Design of Electric Machine**  
W. Han, T. T. Tran, J.-W. Kim, Y.-J. Kim, and S.-Y. Jung
- 8200504 **Design of Saliency-Based Sensorless-Controlled IPMSM With Concentrated Winding for EV Traction**  
M.-S. Lim, S.-H. Chai, and J.-P. Hong
- 8200606 **Search Region Management Method for Local Search Algorithm Employing Design Optimization of Brushless DC Motor**  
T.-Y. Lee, P. X. Trung, J.-W. Kim, Y.-J. Kim, and S.-Y. Jung
- 8200704 **Design and Optimization of Electric Continuous Variable Transmission System for Wind Power Generation**  
Y. Wang, S. Niu, W. N. Fu, and S. L. Ho
- 8200804 **A Computationally Efficient Algorithm for Rotor Design Optimization of Synchronous Reluctance Machines**  
M. H. Mohammadi, T. Rahman, R. Silva, M. Li, and D. A. Lowther
- 8200904 **Characteristics Analysis of a 2-D Differentially Coupled Magnetic Actuator**  
Y. Sakaïdani, K. Hirata, and N. Niguchi
- 8201004 **Interstellar Search Method With Mesh Adaptive Direct Search for Optimal Design of Brushless DC Motor**  
B. Son, G.-J. Park, J.-W. Kim, Y.-J. Kim, and S.-Y. Jung
- 8201104 **Analytical Calculation of the Magnetic Vector Potential of an Axisymmetric Solenoid in the Presence of Iron Parts**  
H. V. Alizadeh and B. Boulet
- 8201204 **Optimal Design of an Axial Flux Permanent Magnet Synchronous Motor for the Electric Bicycle**  
D.-K. Lim, Y.-S. Cho, J.-S. Ro, S.-Y. Jung, and H.-K. Jung
- 8201304 **A Novel Multimodal Optimization Algorithm for the Design of Electromagnetic Machines**  
C.-H. Yoo, D.-K. Lim, and H.-K. Jung
- 8201404 **Effects of Stress and Magnetostriction on Loss and Vibration Characteristics of Motor**  
H. Ebrahimi, Y. Gao, H. Dozono, K. Muramatsu, T. Okitsu, and D. Matsushashi

*Inductors and Transformers*

- 8400104 **Compensation Considerations for Bidirectional Inductive Charging Systems of Electric Vehicles With Coil Positioning Flexibility**  
S. G. Cimen, A. Pfannkuchen, and B. Schmuelling
-

---

8400204 **Transformer Windings' RLC Parameters Calculation and Lightning Impulse Voltage Distribution Simulation**

T. Župan, B. Trkulja, R. Obrist, T. Franz, B. Cranganu-Cretu, and J. Smajic

*Emerging Topics Including Coupled Functionalities, New Devices, Emergent Phenomena etc.*

9100104 **Electroquasistatic-Thermal Modeling and Simulation of Station Class Surge Arresters**

Y. Späck-Leigsnering, E. Gjonaj, H. De Gerssem, T. Weiland, M. Gießel, and V. Hinrichsen

9100204 **Error Field Impact on Plasma Boundary in ITER Scenarios**

L. Barbato, A. Formisano, R. Martone, and F. Villone

*Other Topics Relevant To TMAG Scope*

9400304 **An Improved Multi-Objective Genetic Algorithm for Large Planar Array Thinning**

Y.-F. Cheng, W. Shao, S.-J. Zhang, and Y.-P. Li

9400404 **Electromagnetic Interference Prediction of  $\pm 800$  kV UHVDC Converter Station**

H. Sun, X. Cui, and L. Du

9400504 **Calculation of Electromagnetic Radiation of VSC-HVdc Converter System**

H. Sun, L. Du, and G. Liang

9400604 **Adaptive Strategies in the Leader Propagation Model for Lightning Shielding Failure Evaluation: Implementation and Applications**

C. Zhuang, H. Liu, R. Zeng, and J. He

9400704 **Adaptive Back-Projection Algorithm Based on Climb Method for Microwave Imaging**

Y.-S. Cho, H.-K. Jung, C. Cheon, and Y.-S. Chung

9400804 **Effect of Magnetic Contact on Macroscopic Permeability of Soft Magnetic Composite**

Y. Ito, H. Igarashi, M. Suzuki, Y. Iwasaki, and K. Kawano

9400904 **Design Sensitivity Analysis for Shape Optimization of Nonlinear Magnetostatic Systems**

E. Kuci, F. Henrotte, P. Duysinx, P. Dular, and C. Geuzaine

9401004 **Generalized PEEC Analysis of Inductive Coupling Phenomena in a Transmission Line Right-of-Way**

L. Blattner Martinho, J. Siau, B. Bannwarth, J.-M. Guichon, O. Chadebec, G. Meunier, and V. C. Silva

9401104 **Tools for Visualizing Cuts in Electrical Engineering Education**

A. Stockrahm, J. Kangas, and P. R. Kotiuga

9401204 **Transient Simulation of Nonlinear Electro-Quasi-Static Field Problems Accelerated by Multiple GPUs**

C. Richter, S. Schöps, J. Dutiné, R. Schreiber, and M. Clemens

9401304 **Hole Sensitivity Analysis for Topology Optimization in Electrostatic System Using Virtual Hole Concept and Shape Sensitivity**

K. H. Lee, S. G. Hong, M. K. Baek, and I. H. Park

---

9500704 **CONFERENCE AUTHOR INDEX**

---