6th Symposium on Advanced Electromechanical Motion Systems ELECTROMOTION 2005

27-29 September 2005
Lausanne, Switzerland

TECHNICAL SESSIONS

Oral Sessions

OS1 : 'Design and analysis of permanent-magnet motors'

OS2 : 'Advanced control of induction motor drives'

OS3 : 'Electric vehicles and traction drives'

OS4: 'Wind energy conversion and storage systems'

OS5 : 'Analysis and monitoring of induction motors'

OS6 : 'Electric generating systems'

OS7 : 'Performance estimation and control of permanent-magnet synchronous motor drives'

OS8 : 'Novel actuators and alternators'

Dialogue Sessions

DS1 : 'Modelling and design of electromechanical motion systems'

DS2 : 'Power converter supply and motion control of electric drive systems'

PAPERS BY TECHNICAL SESSIONS

Oral Session OS1 : 'Design and analysis of permanent-magnet motors'

Eddy-current losses computation for permanent-magnet synchronous motors
M. CRIVII and M. JUFER
Swiss Federal Institute of Technology Lausanne, SWITZERLAND

Highly utilised permanent-magnet synchronous machines with tooth-wound coils for industrial applications
Cs. DEAK and A. BINDER
Darmstadt University of Technology, GERMANY

Design study of low-speed direct-driven permanent-magnet motors with concentrated windings
Florence LIBERT and Juliette SOULARD
Royal Institute of Technology
Stockholm, SWEDEN

Matlab-Simulink model of permanent-magnet synchronous machines based on two-dimensional finite-element field computation
L. MELCESCU, M. COVRIG, S. CISMAS and Andreea FOCIUC
Polytechnic University of Bucharest, ROMANIA

Comparison of output characteristics of a permanent-magnet and a field-winding DC starter motor
B. MIRZAIEAN-DEHKORDI and A. KIYOUMARSI
Isfahan University, IRAN
M. MOALLEM
Isfahan University of Technology, IRAN

Multi-physic model for brushless DC motor: optimization process
P. RAGOT, M. MARKOVIC and Y. PERRIARD
Swiss Federal Institute of Technology Lausanne, SWITZERLAND

Design studies on transverse-flux machines by using three-dimensional finite element analyses
E. SCHMIDT
Vienna University of Technology, AUSTRIA

Three-dimensional finite-element analysis of high-torque permanent-magnet synchronous machines
H.S. ZIRE, C. ESPANET and A. MIRAOUI
University of Technology of Belfort-Montbéliard, FRANCE

Oral Session OS2 : 'Advanced control of induction motor drives'

Comparing microcontroller- and FPGA-based implementations of the space-vector control algorithm of three-phase induction motors
Z. BOULBAIR, F. AUGER and L. LORON
IREENA, Saint-Nazaire, FRANCE
R. AUBREE
ATMEL Nantes SA, Nantes, FRANCE
E. DAVID
IUT, Saint-Nazaire, FRANCE

Direct torque and flux control of saturated induction machines
A. CAMPEANU and M. BADICA
University of Craiova, ROMANIA
V. IANCU
Technical University of Cluj-Napoca, ROMANIA

Effect of magnetic saturation on vector-controlled induction-motor drive properties
J. LETTL and R. RATZ
Czech Technical University in Prague, CZECH REPUBLIC

Development of a vector control technique for induction motor sensorless drives using Kalman filters
E.D. MITRONIKAS and A.N. SAFACAS
University of Patras, GREECE

Transfer function determination for vector-controlled induction motor drives
O. STOICUTA
University of Petrosani, ROMANIA
H. CAMPIAN and T. PANA
Technical University of Cluj-Napoca, ROMANIA

Application of EKF to parameters estimation and neural-network control of an induction motor
K. YAZID and M. MENAA
'Houari Boumedienne' University of Sciences and Technology Algiers, ALGERIA
O. TOUHAMI and R. IBTIOUEN
National Polytechnic School of Algiers, ALGERIA

A novel direct-torque-control scheme of double-star induction motors
R. ZAIMEDDINE and R. KEBCHE
University of Mouloud Mammeri, ALGERIA
E.M. BERKOUK
National Polytechnic School of Algiers, ALGERIA

Oral Session OS3 : 'Electric vehicles and traction drives'

Design and analysis of a surface-permanent-magnet in-wheel motor for the propulsion of electric buses
M. ANDRIOLLO
Polytechnic of Milan, ITALY
G. BETTANINI, G. MARTINELLI, A. MORINI and A. TORTELLA
University of Padua, ITALY

A comparative analysis of neural control methods for proton-exchange-membrane fuel cells
M. CIRRINCIONE
University of Technology of Belfort-Montbéliard, FRANCE
G. CIRRINCIONE
'Jules Verne' University of Picardie
Amiens, FRANCE
M. PUCCI and G. VITALE
Institute of Intelligent Systems for Automation (ISSIA)
CNR - Section of Palermo, ITALY

Combined use of supercapacitors and fuel cells for traction applications
S. D'ARCO, D. IANNUZZI, E. PAGANO and C. TORTORA
University of Naples 'Federico II', ITALY

A new solution for increasing the efficiency of an electric scooter with supercapacitors through a novel, interleaved multi-channel DC/DC converter
B. DESTRAZ, P. BARRADE and A. RUFER
Swiss Federal Institute of Technology Lausanne (EPFL), SWITZERLAND

Electromechanical design and optimization of electromagnetic brake for rail vehicles
I. DOLEZEL
Czech Technical University in Prague, *CZECH REPUBLIC*
J. MORAVEC, J. SEDLACEK, M. MACH and B. ULRYCH
University of West Bohemia in Plzeň, CZECH REPUBLIC

Double-inverter drive system for electric ship propulsion
G. GRANDI, C. ROSSI and D. CASADEI
University of Bologna, ITALY

A failsafe drive method suitable for electric vehicles driving front and rear wheels independently
N. MUTOH, Y. MIYAMOTO and Y. TOMITA
Graduate School of Tokyo Metropolitan Institute of Technology, JAPAN

Modern control techniques used in electric and hybrid vehicles with induction motor drives
Z. SZYMANSKI
Silesian University of Technology
Gliwice, POLAND

Electric bicycle - The example of mechatronic inter-disciplinary case study
S. WIAK
Technical University of Lodz, POLAND
R. NADOLSKI and K. LUDWINEK
Technical University of Kielce, POLAND

Oral Session OS4 : 'Wind energy conversion and storage systems'

Energy-optimized direct torque control of an induction machine-based flywheel energy storage system associated to a variable-speed wind generator
G. CIMUCA, S. BREBAN and M.M. RADULESCU
Technical University of Cluj-Napoca, ROMANIA
C. SAUDEMONT and B. ROBYNS
HEI-Lille Engineering School, Catholic University of Lille, FRANCE

Design and construction of a low-speed rare-earth permanent-magnet wind-energy converter with new configuration
R. HANITSCH and M.S. WIDYAN
Berlin University of Technology, GERMANY

A shunt-connected inverter-based variable-speed wind-turbine generation
A. KUPERMAN and R. RABINOVICI
Ben-Gurion University of The Negev
Beer-Sheva, ISRAEL
G. WEISS
Imperial College London, UK

Analytical dimensioning of a direct-driven wind generator using a variable-reluctance magnet machine with vernier effect
I. MENY, P. ENRICI, J.R. DIDAT and D. MATT
University of Montpellier II, FRANCE

Variable-speed wind generator network interface power control based on resonant controller
J. PIERQUIN and B. ROBYNS
HEI-Lille Engineering School, Catholic University of Lille, FRANCE

On the flywheel design for energy storage systems
M. POLOUJADOFF and C. RIOUX
'Pierre et Marie Curie' University - Paris VI, FRANCE
M.M. RADULESCU
Technical University of Cluj-Napoca, ROMANIA

Stand-alone wind energy converter based on permanent-magnet synchronous generator
E.J.R. SAMBATRA, G. BARAKAT and B. DAKYO
GREAH - University of Le Havre, FRANCE

Polyphase permanent-magnet synchronous machine with concentrated winding for large direct-drive wind-generator applications
D. VIZIREANU, S. BRISSET and P. BROCHET
Central School of Lille (ECL), FRANCE

Oral Session OS5 : 'Analysis and monitoring of induction motors'

Generalized extended Park's vector approach for monitoring induction motor drive systems
B. BENSAKER
University of Annaba, ALGERIA
R. WAMKEUE
University of Québec in Abitibi-Témiscamingue
Rouyn-Noranda, Québec, CANADA

Analysis and design criteria for fractional unbalanced windings of three-phase motors
M.V. CISTELECAN and M.D. POPESCU
Research Institute for Electrical Machines
Bucharest, ROMANIA
B. COSAN
Ege University, Bornova - Izmir, TURKEY

Analytical investigation of rotor slot harmonics in induction motors with stator and rotor defaults
A. KHEZZAR, M. Y. KAİKAA and M. BOUCHERMA
Mentouri University, Constantine, ALGERIA

Time-harmonic finite element analysis of induction motors with an air-gap interface coupling
Y. OUAZIR and R. IBTIOUEN
National Polytechnic School of Algiers, ALGERIA
N. TAKORABET
National Polytechnic Institute of Lorraine (INPL)
Vandoeuvre-lès-Nancy, FRANCE
S. MEZANI
University of Sheffield, UK

Dynamic evaluation of shaded-pole motor models optimized by using the method of genetic algorithms
Vasilija SARAC
Siemens A.E., Skopje, REPUBLIC OF MACEDONIA
Lidija PETKOVSKA and G. CVETKOVSKI
'Sts. Cyril and Methodius' University
Skopje, REPUBLIC OF MACEDONIA

Monitoring of slip-ring induction motor based on pattern recognition of space vector diagrams
I. TSOUMAS and A.N. SAFACAS
University of Patras, GREECE

Oral Session OS6 : 'Electric generating systems'

Dynamic modeling of a high-speed permanent-magnet synchronous generator for microturbine application
S.E. ABDOLLAHI, A. VAHEDI and H. AZIZI
Iran University of Science and Technology
Tehran, IRAN
M. MIRZAYEE
Amirkabir University of Technology
Tehran, IRAN

Synchronous generator modeling using a non-steady state Park model
J.D. GABANO and G. CHAMPENOIS
University of Poitiers, FRANCE

Synchronous generator no-load voltage prediction using a combined analytical and finite-element approach
S. KELLER, M. TU XUAN and J.-J. SIMOND
Swiss Federal Institute of Technology Lausanne (EPFL), SWITZERLAND

Modelling and experimental analysis of a six-phase permanent-magnet synchronous machine in a variable-speed constant-frequency generating system
E.H. MILIANI, D. DEPERNET and J.-M. KAUFFMANN
University of Franche-Comté, Belfort, FRANCE

Control of a cascaded doubly-fed induction generator supplying linear and nonlinear loads on isolated grid
N. PATIN and J.-P. LOUIS
Superior Normal School (ENS) of Cachan, FRANCE
E. MONMASSON
University of Cergy-Pontoise, FRANCE

Simple-shunt and short-shunt connections based state modeling of stand-alone self-excited induction generators
R. WAMKEUE
University of Québec in Abitibi-Témiscamingue
Rouyn-Noranda, Québec, CANADA
L. SONGIA and M. LAKEHAL
University of Applied Sciences of Western Switzerland
Fribourg, SWITZERLAND

Oral Session OS7 : 'Performance estimation and control of permanent-magnet synchronous motor drives'

Performance analysis of an in-wheel vernier hybrid motor for electric propulsion
M. ANDRIOLLO
Polytechnic of Milan, ITALY
G. BETTANINI, G. MARTINELLI, A. MORINI and A. TORTELLA
University of Padua, ITALY

Performance estimation of a permanent-magnet synchronous motor using a neural network based on finite element results
L. HADJOUT
'Houari Boumedienne' University of Sciences and Technology Algiers, ALGERIA
R. IBTIOUEN
National Polytechnic School of Algiers, ALGERIA
N. TAKORABET
National Polytechnic Institute of Lorraine (INPL) Vandoeuvre-lès-Nancy, FRANCE
S. MEZANI
University of Sheffield, UK

Direct voltage and current control schemes applied to permanent-magnet synchronous motor
O. HASNAOUI
High Institute of Sciences and Technology, Tunis, TUNISIA
H. BRAHMI and R. DHIFAOUI
National Institute of Applied Sciences and Technology Tunis, TUNISIA
N. HIDOURI
High Institute of Informatics and Technology, Tunis, TUNISIA

Reduction of torque and speed ripple by the compensation of current measurement errors in a direct-torque-controlled permanent-magnet synchronous motor drive
L. LAURILA and J. PYRHONEN
Lappeenranta University of Technology, FINLAND

Simulation and experimental results of brushless AC motor sensorless operation
R. RABINOVICI and D. SANDLER
Ben-Gurion University of The Negev Beer-Sheva, ISRAEL

Torque ripple minimization in permanent-magnet synchronous motor drives

J. ZENG, Ph. DEGOBERT and J.-P. HAUTIER
National Superior School of Arts and Trades (ENSAM)
Lille, FRANCE

Oral Session OS8 : 'Novel actuators and alternators'

High-acceleration linear actuator dimensioning for electromagnetic valves application
C. BERNEZ, M. GABSI, H. BEN AHMED and M. LECRIVAIN
Superior Normal School (ENS) of Cachan, FRANCE

Forces of thermoelastic origin acting in electromechanical actuators
I. DOLEZEL
Czech Technical University in Prague, *CZECH REPUBLIC*
K. BENES, P. DVORAK and B. ULRYCH
University of West Bohemia in Plzeň, CZECH REPUBLIC

Unconventional microelectromechanical 3D-drive system with piezoceramic microactuators
M. IGNAT
National Institute of Electrical Research Engineering – Advanced Researches (INCDIE CA), Bucharest, ROMANIA

Switched reluctance machine vibration compensation with PZT actuators. Discussion on the actuators and sensors numbers
X. MININGER and M. GABSI
Superior Normal School (ENS) of Cachan, FRANCE
E. LEFEUVRE, C. RICHARD and D. GUYOMAR
National Institute of Applied Sciences (INSA) in Lyon, FRANCE
F. BOUILLAULT
SUPELEC, Orsay-Paris, FRANCE

Characterization of an axial-flux machine with non-overlapping windings as a generator
G. TOMASSI and F. MARIGNETTI
University of Cassino, ITALY
M. TOPOR and I. BOLDEA
Polytechnic University of Timisoara, ROMANIA

Computer simulations of comb drive actuator performances for micromirror driving
S. WIAK
Technical University of Lodz, POLAND
Renata SULIMA
Electrotechnical Institute, Warsaw, POLAND

Dialogue Session DS1 : 'Modelling and design of electromechanical motion systems'

New generation of the explosion-proof induction motors on a basis of the appropriate and energy-alternative technology
V.A. CHUVASHEV, Ye.A. VARENYK, Yu.N. PAPAZOV, V.Yu. CHUVANKOV and A.V. ZELEZNJAKOV
Ukrainian Research Drawing-and-Designing and Engineering Institute for Explosion-Proof and Mining Equipment with Pilot Plant (UkrRIEPE) Donetsk, UKRAINE
N.A. MOUKHAMETCHINE
JSC Tatneft, Tatarstan, RUSSIA

Cogging torque minimization for permanent-magnet axial-flux motor by using soft magnetic composite material
G. CVETKOVSKI and Lidija PETKOVSKA
'Sts. Cyril and Methodius' University Skopje, REPUBLIC OF MACEDONIA

Field diffusion equation in high-speed surface-mounted permanent magnet motors, parasitic eddy-current losses
F. DUBAS, C. ESPANET and A. MIRAOUI
University of Technology of Belfort-Montbéliard, FRANCE

Indirect measurement system for angular velocity
R.M. DUMITREAN, D. MOGA, D. PETREUS, Nicoleta STROIA, and R.A. MUNTEANU
Technical University of Cluj-Napoca, ROMANIA

Wind-diesel system using controlled energy short-term storage based on switched reluctance machine modeling
M. EL MOKADEM, P. REGHEM, C. NICHITA and B. DAKYO
GREAH - University of Le Havre, FRANCE

Thermal and electromechanical modelling of a small-power permanent-magnet DC actuator. Integration of degradation laws
A. EME, D. CHAMAGNE, R. GLISES and J.-M. KAUFFMANN
University of Franche-Comté, Belfort, FRANCE
F. CHALON and D. CUCHET
Faurecia Bloc Avant, Audincourt, FRANCE

High-speed monitoring system for electromechanical equipments
Virginia IVANOV and S. IVANOV
University of Craiova, ROMANIA

Permanent-magnet electrodynamic vibrator – Parameter identification
D.-H. KANG and J.-H. CHANG
Korea Electrotechnology Research Institute (KERI)
Changwon, SOUTH KOREA
I. VADAN, P. KARAISSAS and H. BALAN
Technical University of Cluj-Napoca, ROMANIA

Improved modeling of three-phase transformer analysis based on magnetic equivalent circuit diagrams and taking into account nonlinear B-H curve'
B. KAWKABANI and J.-J. SIMOND
Swiss Federal Institute of Technology Lausanne (EPFL), SWITZERLAND

Rotor eccentricity of third kind in a rotating electric machine
A. KIYOUMARSI and B. MIRZAIEAN-DEHKORDI
Isfahan University, IRAN

Influence of parameters and excitation degree on torque of low-power permanent-magnet synchronous motors
C. NICA and Monica-Adela ENACHE
University of Craiova, ROMANIA

Novel method of broken rotor-bar diagnosis in induction machine by DC supply
M.E.K. OUMAAMAR, F. BABAA, A. KHEZZAR and M. BOUCHERMA
Mentouri University, Constantine, ALGERIA
F. MEIBODY-TABAR
GREEN - National Polytechnic Institute of Lorraine (INPL)
Vandoeuvre-lès-Nancy, FRANCE

Modeling optimization and design of magnetizing coil
S. SRAIRI, C. ESPANET, A. DJERDIR and A. MIRAOUI
University of Technology of Belfort-Montbéliard, FRANCE

An analytical approach of the q-axis magnetizing inductance computation for the reluctance motor with axially-laminated rotor
Ileana TORAC
Romanian Academy – Timisoara Branch, ROMANIA

Aspects concerning the implementation of a virtual laboratory for reluctance motors using the Internet
V. TRIFA and C. MARGINEAN
Technical University of Cluj-Napoca, ROMANIA
C. RUSU
S.C. Tedelco S.R.L. Cluj-Napoca, ROMANIA

Dialogue Session DS2 : 'Power converter supply and motion control of electric drive systems'

Numerical simulation of the closed-loop control of electrical drive systems with stepper motors
Gh. BALUTA
Technical University of Iasi, ROMANIA
N. PAPACHATZIS
Department of Electrical Power
Larissa, GREECE

Multi-objective optimization platform for application-oriented switched reluctance-motor torque control'
F. D'HULSTER and K. STOCKMAN
Hogeschool West-Vlaanderen Kortrijk, BELGIUM
R.J.M. BELMANS
Catholic University of Leuven, BELGIUM

Rapid prototyping of controllers for electrical drive systems
P. DOBRA, Mirela TRUSCA and D. PETREUS
Technical University of Cluj-Napoca, ROMANIA

Hybrid Petri Net structure for an automatic packing system design'
M.A. DRIGHICIU, Gh. MANOLEA and Anca PETRISOR
University of Craiova, ROMANIA

Current higher harmonics investigation of an AC-DC-AC converter consisting of high-frequency semiconductor elements supplying a DC machine
K. GEORGAKAS, A.N. SAFACAS and I. TSOUMAS
University of Patras, GREECE

Control of three-level current rectifier – five-level NPC voltage-source inverter. Application to induction motor drives
R. GUEDOUANI, E.M. BERKOUK, B. FIALA and M.S. BOUCHERIT
National Polytechnic School of Algiers, ALGERIA

Efficient driving system with synchronous motor for traction applications
V. MAIER, S.G. PAVEL and Corina MARTINEAC
Technical University of Cluj-Napoca, ROMANIA

Adapting the sampling frequency for fuzzy control of an electric drive system
D. MIHAI
University of Craiova, ROMANIA

Low-cost visual servo system
D. MOGA, D. FRENTIU, V. TRIFA, M. MUNTEANU,
Nicoleta STROIA and T. MARITA
Technical University of Cluj-Napoca, ROMANIA

Precision microstepping system for bipolar stepper motor control
A. MORAR
'Petru Maior' University of Targu-Mures, ROMANIA

Hegel's dialectical method as a means for activating the students' thinking during delivering the lectures on the transients in induction motors
G.G. ROGOZIN
National Technical University of Donetsk, UKRAINE

Fuzzy controller design for field-oriented hybrid stepping motor drive
Cs. SZASZ
Technical University of Cluj-Napoca, ROMANIA

A novel algebraic PWM control method for neutral-point clamped inverters
A. TALHA and F. BOUCHAFAA
'Houari Boumedienne' University of Sciences and Technology
Algiers, ALGERIA
E. M. BERKOUK and M. S. BOUCHERIT
National Polytechnic School of Algiers, ALGERIA