

FACULTY OF ELECTRICAL AND POWER ENGINEERING



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DEPARTMENT OF ELECTROTECHNICS

MAIN RESEARCH FIELDS

- Galvanomagnetic effects studies
Keywords: transducers, circuits
- Fault analysis in medium-voltage power networks
Keywords: circuits, networks
- Numerical simulation of electromagnetic field
Keywords: electric & magnetic field, 2D-FEM
- Technical applications of magnetic liquids
Keywords: magnetic field, forces, geometry improvement
- Magneto elastic properties of amorphous alloys
Keywords: amorphous alloys, magneto elastic properties
- Electromagnetic energy in industrial applications and electromagnetic field at high frequency waves in non homogenous medium
Keywords: electromagnetic field, energy, microwaves, laser waves
- The analysis of two port networks as a gyrator
Keywords: gyrator, two port networks

Researches in GALVANOMAGNETIC EFFECTS STUDIES

FIELD DESCRIPTION

The domain refers to the analysis of electrical field in Hall plates and the behavior of Hall generator as a non-reciprocal circuit component. Also the study refers to the determination of parameters of the Hall generator as function of the direction of the magnetic induction.

ACTIVITIES AND RESULTS

We have developed computing methods of the electric field in the Hall plates. The problem of the non-reciprocity of the Hall generator was completely elucidated by the introduction of the Hall generator non-reciprocity. As a consequence, was established a most general formulation of the condition of non-reciprocity. There were made devices as wattmeters Hall, amperimeters Hall, tesllameters Hall, and others.

RESEARCH TEAM

- Prof. doc. dr. eng. Constantin ȘORA, head of the team
- Prof. dr. eng. Ioan VETREȘ
- Prof. dr. eng. Ștefan HĂRĂGUȘ

- Assist. eng. Ildiko TATAI

RESEARCH OFFERS

Consulting on the achievement of the Hall generator and for the calculation of the electric field in the Hall plates

Researches in FAULT ANALYSIS IN MEDIUM-VOLTAGE POWER NETWORK

FIELD DESCRIPTION

Proper detection of line-to-ground faults in medium-voltage power network depends on the neutral-grounding system in use in the considered network. Intensive research was made, both analytical and by numerical simulation, in order to obtain the correct value of the fault currents and other quantities needed for the protection.



A digital protection blok tip BHT – 10^a.

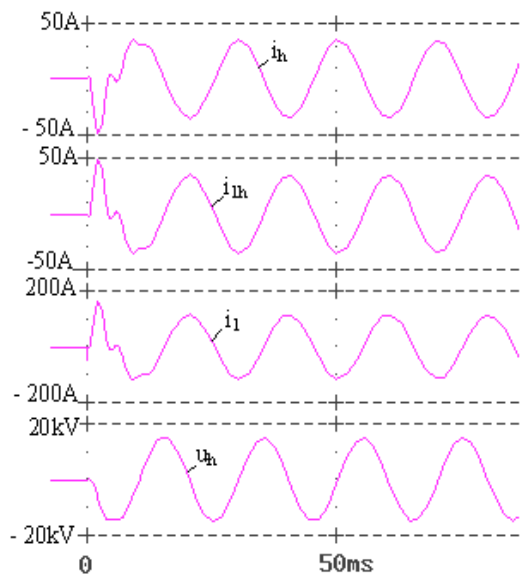
ACTIVITIES AND RESULTS

Analysis of single and double fault groundings in medium voltage power networks. Design and realization of digital relays to detect such faults in medium voltage power networks with not grounded neutral, respectively grounded via a compensation reactor. The possibility of the detection of non-symmetries in low voltage power network was also investigated, and a digital protective device to detect such regimes has been designed.

Simple ground faults have been simulated using PSPICE medium. The results have been used to design the protection blocks. The Qfield FEM-2D program has been used to analyze the step voltage values for a ground fault in an electrical overhead line.

The results were published in technical journals, and the protective devices were implemented in the

National Power System in the frame of three Grants namely MENER and CEEX. The quality of electrical energy and the compatibility of Romanian Quality of Electrical Energy with the E.U. standards were also investigated.



Not-grounded neutral network; $R_1=1 \Omega$.

RESEARCH TEAM

- Prof. dr. eng. Dumitru TOADER
- Prof. dr. eng. Ștefan HĂRĂGUȘ
- Ș.l.dr.eng. Constantin Blaj

RESEARCH OFFERS

Research for specifically medium voltage power network, technical advice and the digital protective devices, are offered.

Researches in NUMERICAL SIMULATION OF ELECTROMAGNETIC FIELDS

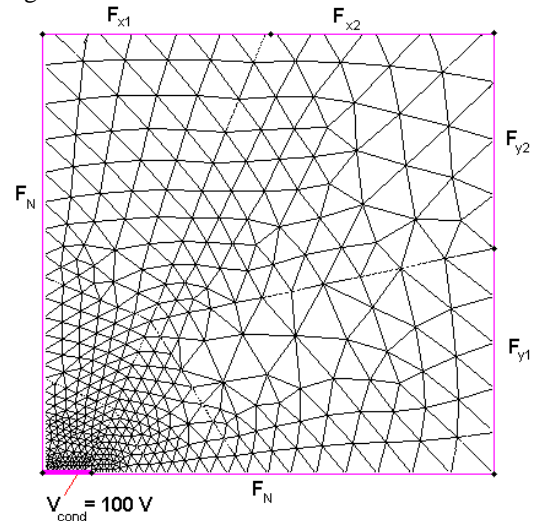
FIELD DESCRIPTION

The use of numerical methods for solving electromagnetic and thermal fields in technical devices: galvanomagnetic devices, electromagnets and permanent magnet systems, magnetoelastic and high DC currents transducers, electrical machines, induction heating equipments.

ACTIVITIES AND RESULTS

Optimal design of special purposes electromagnets, high sensitivity relays with permanent magnets. Analysis of the electromagnetic and thermal field in induction heating equipments.

There is proposed a method of magnetic field analysis with FEM in iron plates packages, where very thin air gap are involved. The method uses an equivalent geometry that avoids the very small finite elements of the real air gap regions. Also, the method can be used in other situations where very thin domains are involved in connection with much larger domains.



Modelisation on the quarter of the domain.

The electric field was calculated in the area of the flame of a burner, in order to improve the burning conditions of the combustible. For experiment was made a model of an adjustable burner, including the power supply for the electrodes.

RESEARCH TEAM

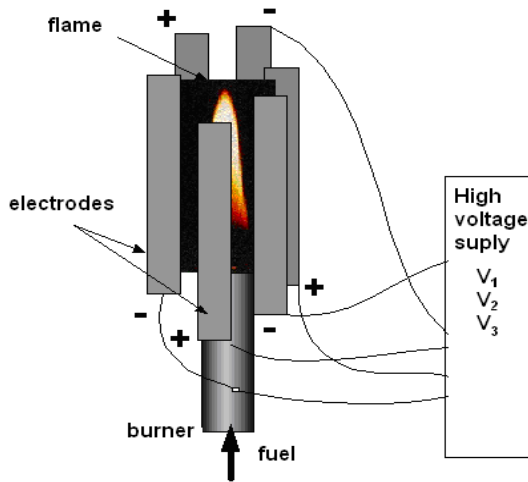
- Prof. doc. dr. eng. Constantin ȘORA

➤ Prof. dr. eng. Ioan DE DABATA

- Prof. dr. eng. Ioan VETREȘ
- Prof. dr. eng. Dumitru RADU
- Prof. dr. eng. Ștefan HĂRĂGUȘ
- Prof. dr. eng. Ioan BERE
- Assoc. prof. dr. eng. Dumitru IRIMIA
- Assoc. prof. dr. eng. Mariana TITIȚĂZAN
- Lect. dr. eng. Constantin BLAJ
- Lect. dr. eng. Marian GRECONICI
- Assist. eng. Daniela VESA
- Prep. eng. Lucian LUCOAI

RESEARCH OFFERS

Optimal design of electromagnetic devices using numerical methods. 2D-FEM numerical analysis of electromagnetic and thermal field in inductive heating processes. Dielectrics in high frequency electromagnetic fields.



The electrodes position to adjust the flame in a electrostatic field.

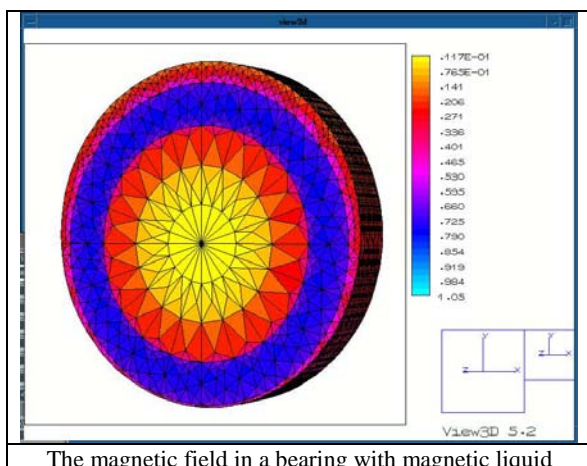
Researches in TECHNICAL APPLICATIONS OF MAGNETIC LIQUIDS

FIELD DESCRIPTION

The magnetic liquids have found a large interest in technical applications such as: magneto gravimetric separation, magnetic bearings and seals, pressure and flow transducers, inclinometers, accelerometers. Most of these applications are based on the magnetic field forces, depending on the magnetic properties of magnetic liquid and the geometry of the devices. The research of our group is concerned to find the adequate magnetic liquid and the geometry of the devices, in order to improve their performances.

ACTIVITIES AND RESULTS

The analytical and numerical evaluation of the magnetic force that acts on the shaft of cylindrical bearings represents the main research of the group. There has been investigated the cylindrical bearing



The magnetic field in a bearing with magnetic liquid

with permanent magnetized shaft and magnetic liquid, and the cylindrical bearing with alternating poles (sandwich type structure). An approximate analytical expression of the magnetic force that acts on the shaft has been established, analyzing the influence of the geometrical design of the bearing

and the magnetic properties of the liquid. The analytical results have been compared with the numerical results using a 3D-FEM program.

RESEARCH TEAM

- Prof. dr. eng. Ioan DE SABATA
- Lect. dr. eng. Marian GRECONICI
- Lect. dr. eng. Constantin BLAJ

RESEARCH OFFERS

Magnetic field computation for magnetofluidic devices. The evaluation of the forces and energy distribution in magnetic liquids. Geometry design improvement of ferrofluidic devices, based on field calculation.

Researches in MAGNETOELASTIC PROPERTIES OF AMORPHOUS ALLOYS

FIELD DESCRIPTION

Amorphous alloys with magneto elastic properties are widely used in strain, displacement, or magnetic field sensors. Those properties, as well as other physical properties, are highly influenced by the alloy's composition. Research is conducted to optimize the magneto elastic properties via the alloy's composition, with emphasis on the addition of rare-earths elements.

ACTIVITIES AND RESULTS

A two years GRANT (2004, 2005, 2006) offered by CNCSIS.

RESEARCH TEAM

- Prof. dr. Ioan MIHALCA
- Conf. dr. Aurel ERCUȚA
- Prof. dr. eng. Ștefan HĂRĂGUȘ

RESEARCH OFFERS

Strain, displacement and magnetic field sensors based on magneto elastic amorphous alloys.

Researches in ELECTROMAGNETIC ENERGY IN INDUSTRIAL APPLICATIONS. ELECTROMAGNETIC FIELD AND HIGH FREQUENCY WAVES IN NON-HOMOGENOUS MEDIUM

FIELD DESCRIPTION

Activities about the definition of the electric power in nonsinusoidal regime for single wire circuits and about the definition of the electric power in three phase circuits.

The evaluation of electromagnetic energy in industrial application has a permanent importance, theoretical and economic. Also, the electromagnetic field and high frequency electromagnetic waves in the non-homogenous medium have several applications: telecommunications, industrial technology, medicine, biology, etc. The theoretical aspects are important in the study.

There were analyzed the electromagnetic and the thermal field in a dielectric sample placed into a resonant cavity.

ACTIVITIES AND RESULTS

The evaluation of the electromagnetic energy in rolling-mill plants and the optimization of consume rate is the priority of research. The thermoelectric effects in non-homogenous medium and the propagation of high frequency electromagnetic waves in different media are developed using advanced methods and programs, with important results.

Research was made about measuring the complex permittivity of dielectric sample using the cavity perturbation method. The experimental results are presented as function of frequency.

RESEARCH TEAM

- Prof. dr. eng. Nicolae BOGOEVICI
- Prof. dr. eng. Dumitru DABA
- Prof. dr. eng. Dumitru TOADER
- Assoc. prof. dr. eng. Dumitru IRIMIA
- Assist. eng. Daniela VESA

RESEARCH OFFERS

Optimization of the consume rate of electromagnetic energy in rolling-mill plants. The calculation of termoelectrical effects. Propagation of the electromagnetic waves in non homogenous medium, with the evaluation of electromagnetic energy.

Researches in THE PHYSICAL SYSTEMS WITH GYRATOR BEHAVIOUR

FIELD DESCRIPTION

The domain refers to the analysis of gyrators: the behaviour as a nonreciprocal circuit components; the classification of the physical systems depending on the behaviour as a gyrator; some analysis of operational amplifier gyrators

ACTIVITIES AND RESULTS

Classification of the physical systems with gyrator behaviour in two groups: those which are dimensioned to behave as a gyrator and those which are natural gyrators. The response of the RLC series circuit to step and sinusoidal signals (analytical and PSPICE simulation), where the simulated inductivity is an operational amplifier gyrator. Determination of the two port parameters for direct and inverse supplied two port. The resistive character of the gyrator with O.A. and his behaviour with the frequency, the inductivity simulation by means of a gyrator in RLC series circuit.

RESEARCH TEAM

- Prof. dr. eng. Constantin ȘORA
- Prof. dr. eng. Ștefan HĂRĂGUȘ
- Assist. eng. Ildiko TATAI

RESEARCH OFFERS

Works for a Ph.D. thesis. Electrical circuit theory (synthesis) and application to low frequency.

RESEARCH CONTRACTS

1. D. Toader, CEEX Subcontract 12271/12.10.2005, *New methods, ecological technologies and realization solutions in accordance with the E.U. standards, to improve the electrical energy quality*, CEEX Program
2. D. Toader, GRANT 524/29.11.2004, *Method and system for measuring and recording in real time the quantities needed to assess the quality of electrical energy for compatibility with E.U. standards*, MENER Program

PUBLICATIONS

BOOKS

1. D. Radu, *Fundamente de inginerie electrică*, 2th Edition, Orizonturi Universitare Publishing House, Timișoara, 2006, 200 pages, ISBN 973-638-253-2 (published in Romanian)
2. D. Irimia, *Electrotehnică. Teorie și probleme*, Politehnica Publishing House, Timișoara, 2006, 264 pages, ISBN 978-973-625-410-9 (published in Romanian)
3. M. Greconici, *Fundamente de inginerie electrică. Circuite mono și trifazate în regim permanent*, Orizonturi Universitare publishing House, Timișoara, 2006, 180 pages, ISBN 973-638-261-3, (published in Romanian)
4. St. Hărăguș, *Electromagnetic field and waves*, Politehnica Multiplication Center, Timișoara, 2006, 115 pages (published in Romanian)

PUBLISHED PAPERS

3. D. Toader, St. Hărăguș, C. Blaj, *Detection of broken conductor with ground contact faults in medium voltage power networks*, Facta Universitatis Series: Electronics and Energetics Vol. 19, No. 3, December 2006 University of Nisa, Serbia, pp.429-438
4. D. Toader, St. Hărăguș, C. Blaj, *Analysis of broken conductor with ground contact faults in medium voltage power network* Revue Roumen des sciences techniques. Serie Electrotechnique et energetique, Tome 63, nr.4, 2006, pp. 291-304
5. D. Toader, St. Hărăguș, C. Blaj, *The calculation of the touch voltage and of the pace voltage in the case of a broken conductor with ground contact fault*, Buletinul Institutului Politehnic din Iasi. Tomul LII (LVI) Fasc.5C Electrotehnica. Energetica. Electronica. 4-th International Conference on

- Electrical and Power Engineering EPE 2006, October 12-14, 2006, pp.1433 - 1439
6. D. Radu, D. Toader, C. Blaj, *About the magnetic field in iron plates packages*, Buletinul Institutului Politehnic din Iasi. Tomul LII (LVI) Fasc.5B Electrotehnica. Energetica. Electronica. 4-th International Conference on Electrical and Power Engineering EPE 2006, October 12-14, 2006, pp.677 - 683
 7. D. Toader, C. Ivaşcu, St. Hărăguş, *The electrical engineering faculty of Timisoara – an active contribution in the electrical field technical education*, Buletinul Institutului Politehnic din Iasi. Tomul LII (LVI) Fasc.5 Electrotehnica. Energetica. Electronica. 4-th International Conference on Electrical and Power Engineering EPE 2006, October 12-14, 2006, pp. 7-13
 8. G. Curcanu, D. Toader, T. Pandia, *Determination of overvoltages in high voltage networkes at single phase faults by numerical simulation and experiments*, Proceedings 12th International IGTE Symposium Gratz, September 2006 (CD)
 9. D. Toader, St. Hărăguş, I. Haţegan, P. Ruşet, I. Deaconu, *Power quality improvement in distribution systems by means of new protective blocks*, Proceedings The Sixth World Energy System Conference (WESC2006), Torino, Italy, July 10-12, 2006, (CD)
 10. D. Toader, St. Hărăguş, I. Haţegan, P. Ruşet, I. Deaconu, *Digital protective blocks for medium-voltage networks with isolated neutral-point*, Acta Electrotehnica, Vol. 47, Number 4, 2006. Special ISSUE, pp. 359-363 (CD), Universitatea Tehnică Cluj-Napoca
 11. D. Toader, I. Haţegan, P. Ruşet, I. Deaconu, *The power quality improvement in the distribution and transportation systems with use of new technologies for maintenance and with use of digital protection equipment*, Proceedings International Conference FOREN 2006 WEC Regional Energy Forum, 11-15 June 2006, Neptun (CD)
 12. D. Toader, I. Borlea, St. Hărăguş, *A fuzzy approach for neutral treatment strategy in medium voltage networks*, Proceedings International Conference FOREN 2006 WEC Regional Energy Forum, 11-15 June 2006, Neptun (CD)
 13. D. Toader, C. Blaj, I. Zamfira, S. Zamfira, *Considerations on the flame control using an applied electric field*, Proceedings International Conference FOREN 2006 WEC Regional Energy Forum, 11-15 June 2006, Neptun (CD)
 14. D. Popov, M. Greconici, *Receptivity of Nicola Tesla,s works in Romania*, Proceedings of the 6th International Symposium Nikola Tesla, 18-20 October 2006, Serbia, pp. 267-270

CONTACT

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DEPARTMENT OF ELECTRIC MACHINES, DRIVES, ELECTRICAL LIGHTING AND ELECTROTECHNOLOGIES

MAIN RESEARCH FIELDS

- Electric machines and equipment modeling, simulation, optimal design and testing (EME)
Keywords: electric machines, electric equipment, field calculation, optimal design, computer aided testing.
- Power electronics and motion control (PEMC)
Keywords: electric machines and drives, power electronics, speed and position control, digital control.
- Switched reluctance motor drive (SRMD)
Keywords: electric machines and drives, reluctance motor, power electronics, digital control.
- Power industrial electric drives (PIED)
Keywords: electric machines and drives, power electronics, speed control.
- Electrical lighting and Electrotechnologies (ELE)
Keywords: electromagnetic fields, applied electrostatics, welding, electrothermal processes, ultrasonics, power electronics, lighting devices.
- Logic of the creative process (LCP)
Keywords: logicization, algorithmization, cybernetization, inventics, innovation.

Researches are organized in the centre **New system of intelligent motion of the electric machines.**

Researches in *ELECTRIC MACHINES AND EQUIPMENTS, OPTIMAL DESIGN, TESTING, MODELING AND SIMULATION*

FIELD DESCRIPTION

Electric machines modeling including saturation and frequency effect both in the lumped parameter or distributed parameter (field distribution) forms are paramount for global optimization design and new computer - aided testing and parameter identification methods, modeling and simulation.

ACTIVITIES AND RESULTS

Since 1980 aggressive theoretical and experimental work on ever better electric machine modeling, simulation, optimal design, testing and parameter identification has been taking place with the results of two U.P.T. codes for optimal design of large power a.c. machines and a few new testing and parameter identification techniques for electric machines. Most of the work resulted in prototypes tested (or built) in cooperation in industrial partners.

Due to the long time collaboration with the Faculty of Automation and Computer Science from

Timișoara, in the field of data acquisition systems and digital signal processing, the D-109 Laboratory was affiliated at the research center in automation and computer science

RESEARCH BENEFICIARIES

Ministry of Hydro-Power plants such are Lotru-Ciunget, Slatina Aval-Drăgănești (hydro reversible generators of 14000 kVA), Iron Gates 1, Râul Mare Retezat (hydrogenerators of 175000 kVA), Turnu-Ruieni (hydrogenerators of 76500 kVA) and Nuclear Power Plant Cernavodă – Unit 2.

External cooperation – design and prototype of a low speed wind generator with HEXATRONIC Inc. – Canada.

RESEARCH TEAM

- Acad. Toma DORDEA
- Prof. dr. eng. Marius BIRIESCU
- Prof. dr. eng. Marius BABESCU
- Prof. dr. eng. Vladimir CREȚU
- Dr. eng. Gheorghe MADESCU, CS II
- Lect. dr. eng. Mihai MICEA
- Eng. Marțian MOȚ, CS III
- Dr. eng. Ileana TORAC, CS II
- Eng. Lucian OCOLIȘAN, CS III

RESEARCH OFFERS

Advanced design methods of large a.c. machines including saturation and frequency effects, coupled with dynamic simulation, advanced design methods for ultrahigh torque induction motors, new design methods for capacitor induction motors, computer - aided parameters identification - software and hardware - for electric machines, consulting on large power electric machines design and testing.

INTERNATIONAL PRIZES

1. Silver medal at the “Inventika” International Patent and Technologies Fair, București, 3-7 Oct. 2006, for the invention *Voltage transformer with variable ratio and fine control*, authors T. Dordea, V. Proca, A. Vintilă, M. Petrescu, E. Lăzărescu Gh. Madescu.
2. Gold medal – World Exhibition of Innovation, research and new technology, „Eureka 2006”, Brussels, idem.
3. Grand Genius – International Inventions Fair Budapesta, 11 September 2006, idem.

CONTACT PERSON

Prof. dr. eng. Marius Biriescu

E-mail: marius.biriescu@et.upt.ro

Researches in *INTELLIGENT MOTION CONTROL*

FIELD DESCRIPTION

Intelligent motion control integrates motors, static power converters, digital controllers, sensors in systems that perform industrial motion automation with high efficiency (low losses).

ACTIVITIES AND RESULTS

Research activities on linear and rotary motors & drives since 1975 with numerous prototypes built and tested. Integration of intelligent motion systems in Romanian industries up to 2000 kW units since 1994

Various applications of power electronics in energy conversion and digital control concerned with: wind and hydraulic energy conversion systems into electric energy by means of variable speed operation, starter-alternators with digital control designed for hybrid and electric vehicles, and PM machines-based digital control systems up to 150 rpm

RESEARCH BENEFICIARIES

Various Romanian industrial companies such as: Beespeed Automatizări Timișoara, UCM Reșița, Azomures Tg. Mureș, Aquatim Timișoara, SE Iernut, Electrocentrale Deva, CNCISIS, ANSTI etc.

External co-operations: Aalborg University Denmark, EBM Papst Germany, Casino University Italy

RESEARCH TEAM

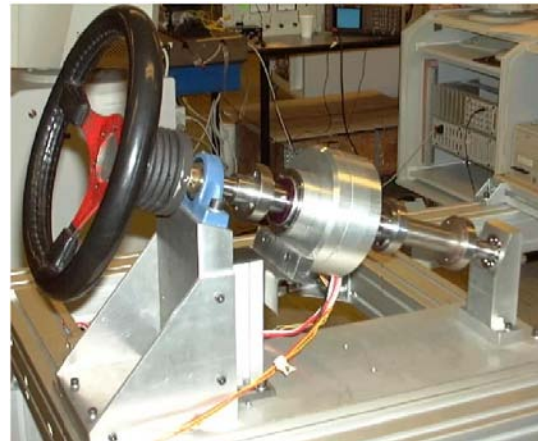
- Prof. dr. eng. Ion BOLDEA
- Assoc. Prof. dr. eng. Nicolae MUNTEAN
- Assoc. Prof. dr. eng. Lucian TUTELEA
- Lect. dr. eng. Cristian LASCU
- Lect. Prof. dr. eng. Lucian Miheț - POPA
- Ph.D. student Marcel Topor
- Ph.D. student Răzvan Ancuți
- Ph.D. student George Iliescu
- Ph.D. student Vasile Coroban
- Ph.D. student Agarlita Sorin
- Ph.D. student Cibu Lucian
- Ph.D. student Paicu Codruța
- Ph.D. student Vlad Grădinaru

RESEARCH OFFERS

HARDWARE: Integration of intelligent motion control systems in various industries (automotive electric actuators and renewable electric energy converters are key subjects of interest) from process identification to commissioning and service. Prototyping of new systems for given specifications.

SOFTWARE: Electric motor - linear and rotary - design software aids in the form as software licensed products by request.

International intensive courses: in Germany at EBMPapst, in Italy at Vicenza Centro Produttivita, in Korea at Hanyang University from Seul and at KIMM (Korean National Institute of Machinery and Materials).



Electric power steering assist

CONTACT PERSON

Prof. dr. eng. Ion BOLDEA

E-mail: boldea@lselinux.upt.ro

Researches in *SWITCHED RELUCTANCE MOTOR DRIVES*

FIELD DESCRIPTION

Switched reluctance motor (SRM) is a position-controlled power stepper motor with a very rugged topology and low costs but requires a specific static power converter and digital controller. Numerous potential applications in harsh environments look adequate for this kind of drive which drew world - wide attention in the last 10 years.

ACTIVITIES AND RESULTS

The actual activity aims at introducing the modeling, simulation and validation of the permanent and dynamic performances of the SR Drives

RESEARCH TEAM

- Prof. dr. eng. Gheorghe ATANASIU
- Prof. dr. eng. Dorin POPOVICI
- Lect. dr. eng. Alin ARGÈȘEANU
- Lect. dr. eng. Ciprian ȘORÂNDARU
- Assist. eng. Octavian CORNEA
- Assist. eng. Valeriu OLĂRESCU
- Ph.D. Student Marcus SVOBODA



Testing the dynamic performances of a SR drive

RESEARCH OFFERS

New drives with SRMs - from research to prototyping for various applications at variable speed, digital control of industrial drives with static power converters, medium power variable frequency motor drives (research and consulting)

CONTACT PERSON:

Prof. dr. eng. Gheorghe Atanasiu
E-mail: george.atanasiu@et.upt.ro

**Researches in POWER INDUSTRIAL
ELECTRIC DRIVES**

FIELD DESCRIPTION

Power electric drives with variable speed are useful to increase productivity and quality in various processes and require means for speed control invariably. The load requirements are very specific and the best solution depends notably on the application.

ACTIVITIES AND RESULTS

Since 1980, with emphasis on overhead cranes using various static power converters, research efforts have been developed to define, design, built and test power drives with variable speed. New design methods and converter realizations have been obtained both with rotary or linear motors.

RESEARCH BENEFICIARIES

Mechanical works Timisoara, Ministry of Education, PROMPT Research Institute.

RESEARCH TEAM

- Prof. dr. eng. Eugen SERACIN
- Prof. dr. eng. Gheorghe PĂPUȘOIU
- Eng. Ioan GHIUR
- Eng. Sorin MUȘUROI

RESEARCH OFFERS

Optimal design methods for power industrial drives, current inverter power drives, linear motors conveyors.

CONTACT PERSON

Prof. dr. eng. Eugen Seracin
E-mail: eugen.seracin@et.upt.ro

**Researches in ELECTRIC LIGHTING AND
EQUIPMENT FOR ELECTROTECHNOLOGIES**

FIELD DESCRIPTION

Modern lighting sources and lighting devices, optimal lighting design, power electronics for electric lighting, electrotechnologies - based on electromagnetic or electrostatic fields are widely used in the fabrications manufacturing systems and include electrothermal processes, welding power sources, power ultrasonics, electrostatic etching etc.

ACTIVITIES AND RESULTS

Since 1980 notable research efforts have been devoted to investigate induction - the welding process and the power sources, new electric welding and ultrasonic power electronics sources. A few prototypes have been built and tested. New researches have been oriented to ultrasonic enhancement of

liquid magnetic processing and sonosynthesis of nano-materials.

RESEARCH BENEFICIARIES

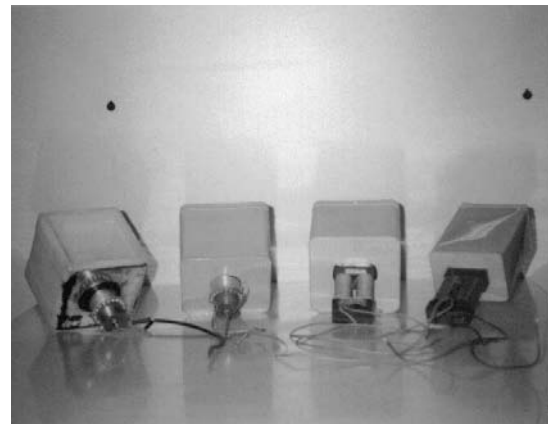
Ministry of Research, ISIM Timișoara

RESEARCH TEAM

- Prof. dr. eng. Ioan ȘORA
- Assoc. prof.. dr. eng. Dan NICOARĂ
- Assoc. prof. dr. eng. Alexandru HEDEȘ

RESEARCH OFFERS

Power electronics, for electrotechnologies, including high-frequency power transformers, arc welding power sources, advanced power electronics ultrasonics sources, (from research to prototyping), ultrasonic processing of materials, consulting in electrotechnologies and electric lighting devices.



Ultrasonic equipments for processing in liquid media

CONTACT PERSON

Prof. dr. eng. Ioan Șora
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MAIN PUBLICATIONS

BOOKS

1. S. Mușuroi, D. Popovici, *Accionări electrice su servomotoare*, Editura POLITEHNICA, 2006, ISBN (10) 973-625-352-X, ISBN (13) 978-973-625-352-2.
2. Gh. Atanasiu, S. Mușuroi, D. Popovici, *Modelare dinamică prin SIMULINK. Mașini electrice. Accionări electrice. Convertoare statice.*, Editura Politehnica, Timișoara, 2006, ISBN (10) 973-625-351-X, ISBN (13) 978-973-625-351-5
3. A. Argeseanu, M. Popa, *Algoritmi genetici. teorie si aplicatii*, Editura Politehnica, Timișoara, 2006, ISBN(10) 973-625-315-3, ISBN(13) 978-973-625-315-7

PUBLISHED PAPERS

1. T. Dordea, V. Muller, I. Torac, Gh. Madescu, M. Moț, L. Ocolişan, *Analytical method for the optimization of the Roebel bar*, Rev. Inginerías, julio-sept. 2006, vol.IX, nr.32, pp. 66-73, Nuevo Leon, Mexico, ISSN 1405-0676.

2. Gh. Madescu, M. Biriescu, M. Moț, L. Ocolişan, *Analysis of the radial magnetic field in an electric machine slot*, Proceedings of the Romanian Academy, Serie A, vol.7, no. 3, 2006, pp. 185-194.
3. I. Torac, A. Argeşeanu, *Some aspects concerning the magnetic field computation for the reluctance motor with axially-laminated rotor*, Proc. of 13th Conf. CNAE06, ISSN 1224-8495.
4. V. Groza, M. Biriescu, V. Crețu, Gh. Liuba, M. Moț, G. Madescu, *Testing of electrical machines with a dedicated system for data acquisition and processing*, International Conference on Electrical Machines - ICEM 2006, Chania, Crete Island, Greece, (Proceedings on CD).
5. T. Dordea, L. Ocolisan, I. Torac, M. Moț, Gh. Madescu, *The influence of the end coil on the current distribution in the elementary conductors of a Roebel bar*, Revue Roumaine Sci. Tech. – Electrotech. et Energ., 50, nr.2, pp. 133-142, București, 2005 (published in 2006).
6. V. Coroban, I. Boldea, Gh. D. Andreescu, F. Blaabjerg, *BEGA – Motor/Generator Vector Control for Wide Constant Power Speed Range*, OPTIM 2006, Brasov, Romania, May 2006, ISBN 973-635-703-1
7. I. Serban, Gh. D. Andreescu, C. Lascu, F. Blaabjerg, I. Boldea, *Sensorless Wound-Rotor Induction Machine (WRIM): Dual-Converter Motoring Control with Short-Circuited Stator*, OPTIM 2006, Brasov, Romania, May 2006, Proceedings, ISBN 973-635-703-1
8. I. Boldea, M. Topor, F. Marignetti, *Characterization of a low speed permanent magnet generator with fractionary nonoverlapping windings*, OPTIM 2006, Brasov, Romania, May 2006, Proceedings, ISBN 973-635-703-1
9. L. Miheț-Popa, I. Boldea, *Dynamics of Control Strategies for Wind Turbine Applications*, OPTIM 2006, Brasov, Romania, May 2006, Proceedings, ISBN 973-635-703-1
10. I. Serban, D. Iles-Klumpner, M. Risticovic, I. Boldea, *Cage-rotor IPMSM Drive for High-Speed Automotive Applications*, OPTIM 2006, Brasov, Romania, May 2006, Proceedings, ISBN 973-635-703-1 CD ROM
11. C. Lascu, L. Asiminoaei, I. Boldea, *High Performance Current Controller for Selective Harmonic Compensation in Active Power Filters*, OPTIM 2006, Brasov, Romania, May 2006, Proceedings, ISBN 973-635-703-1 CD ROM
12. G. Iliescu, L. Tutelea, I. Boldea, *Performance of a Single-Phase Self-Starting PM Brushless Motor Fed by a Chopper - Controlled Current - Source Thyristor Inverter*, OPTIM 2006, Brasov, Romania, May 2006, Proceedings, ISBN 973-635-703-1 CD ROM
13. R. Ancuți, I. Boldea, *V/f Control of PM-SM Super High Speed Drives with Flux and Power Angle Stabilizing Loops*, OPTIM 2006, Brasov, Romania, May 2006, Proceedings, ISBN 973-635-703-1
14. M. Fatu, I. Boldea, C. Lascu, L. Tutelea, Gh. D. Andreescu, *"Motion Sensorless Variable Speed PMSG Control at Power Grid"*, OPTIM 2006, Brasov, Romania, May 2006, Proceedings, ISBN 973-635-703-1
15. V. Coroban, I. Boldea, *"Characterization of Valve-Regulated Lead-Acid Batteries for Hybrid Electric Vehicles"*, OPTIM 2006, Brasov, Romania, May 2006, Proceedings, ISBN 973-635-703-1
16. I. Serban, Gh. D. Andreescu, L. Tutelea, C. Lascu, F. Blaabjerg, I. Boldea, *"New State Observers and Sensorless Control of Wound Rotor Induction Generator (WRIG) at Power Grid with Experimental Characterization"*, Proceedings of the 32nd Annual Conference of the IEEE Industrial Electronics Society, 7 November - 10 November, 2006
17. I. Boldea, C. Pitic, C. Lascu, Gh. D. Andreescu, L. Tutelea, F. Blaabjerg, P. Sandholdt, *DTFC-SVM motion-sensorless control of a PM-assisted reluctance synchronous machine as starter-alternator for hybrid electric vehicles*, IEEE Transactions on Power Electronics Volume 21, Issue 3, May 2006 pp. 711-719
18. D. Iles-Klumpner, I. Serban, M. Risticovic, I. Boldea, *Comprehensive Experimental Analysis of the IPMSM for Automotive Applications*, Conference Proceedings of EPE PEMC 2006, Portoroz, Slovenia, Sept. 2006 Vol III pp. 1776-1783, ISBN 1-4244-0121-6
19. E. Nica, C. Sorândaru, M. Vlad, *LabVIEW Tool for Dynamic Simulation of Optimized Induction Motor - Remote Engineering and Virtual Instrumentation Conference*, 29/30 June 2006, Maribor, Slovenia, Kassel University Press, ISBN 3-89958-194-6, 10 pages, CD-ROM
20. D. Popovici, O. Pop, *Simulink Model for Switched Reluctance Motor Drives*, Proceedings of OPTIM 2006, Braşov, Romania, ISBN 973-635-705-8, p31-37
21. A. Argeşeanu, *Essential aspects in the soft design of a new type of absolute encoder system (NAES) for long distance and fine accuracy*, IEEE-TTTC International Conference on Automation, Quality and Testing, Robotics, AQTR 2006, Cluj-Napoca, ISBN(10) 973-713-114-2, ISBN (13) 978-973-713-114-0
22. A. Argeşeanu, I. Torac, *Conception design of a new type of absolute encoder system (NAES) for long distance and fine accuracy* Buletinul Universităţii de Petrol și Gaze, Ploiesti, Vol LVIII,

- No2 bis /2006, pag.273-280, Proc. of 13th Conf. CNAE06, ISSN 1224-8495)
23. I. Torac, A. Argeseanu, *Some aspects concerning the squirrel cage induction motor efficiency improvement*, Buletinul Institutului Politehnic Iasi, Tom LII (LVI), Fasc. 5A, 2006 Electrotehnica, Energetica, Electronica, ISSN 1223-8139, pag .473-476
 24. I. Torac, A. Argeseanu, *Some aspects concerning the steel lamination quality influence on the squirrel cage induction motor efficiency*, Buletinul Institutului Politehnic Iasi, Tom LII (LVI), Fasc. 5A, 2006 Electrotehnica, Energetica, Electronica, ISSN 1223-8139, pag. 469-472
 25. A. Argeseanu, I. Torac, *A new quasi-absolute linear encoder system using a double coding strategy to long distance applications* Buletinul Institutului Politehnic Iasi, Tom LII (LVI), Fasc. 5B, 2006 Electrotehnica, Energetica, Electronica, ISSN 1223-8139, pag 949-954
 26. A. Argeseanu, I. Torac, *Experimental set-up and software optimization of the new quasi-absolute linear encoder system*, Buletinul Institutului Politehnic Iasi, Tom LII (LVI), Fasc. 5B, 2006 Electrotehnica, Energetica, Electronica, ISSN 1223-8139, pag 955-960
 27. A. Argeseanu, I. Torac *Innovative concept of a new absolute encoder for long displacement linear motor applications*, Acta Electrotehnica, vol. 47, no 4, 2006, ISSN 1841-3323, Special issue (selected paper from the 1st International Conference on Modern Power Systems MPS 2006, November 8-11, 2006, Cluj-Napoca, ROMANIA), pag. 221-224
 28. I. Torac, A. Argeseanu *Analyze of a solution for the squirrel cage induction motor efficiency improvement*, Acta Electrotehnica, vol. 47, no 4,2006, ISSN 1841-3323, Special issue (selected paper from 1st International Conference on Modern Power Systems MPS 2006, November 8-11, 2006, Cluj-Napoca, ROMANIA), pag 301-304
 29. Şora, I., Iagăr Angela, Rusu, M., Radu, D., Pănoiu, C., *The Numerical Simulation and Control of the Induction Heating of Steel Pieces*, Révue Roumaine des Sciences Techniques – Série Electrotechnique et Energetique, Bucharest, Tom 51, Vol. 2, 2006, ISSN 0035-4066, pp. 169-182
 30. I. Şora, A. Iagăr, N. Rusu, C. Pănoiu, *Research upon Modeling and Control of the Induction Heating Electrotechnology*, Journal of Electrical Engineering, www.jee.ro Vol. 6, 2006, ISSN 1582-4594
 31. I. Şora, A. Iagăr, N. Rusu, D. Radu, C. Pănoiu, *The numerical simulation of the electromagnetic and thermal fields within a steel piece, by means of FDM and FEM*, Revue Roumaine des sciences techniques. Serie Electrotechnique et energetique, Tome 51, nr.2, 2006, pp. 169-182
 32. M. Pănoiu, C. Pănoiu, I. Şora, *Experimental Research Concerning the Electromagnetic Pollution Generated by the –phase Electric Arc Furnaces in the Electric Power Supply Network*, Acta Electrotehnica, Cluj-Napoca, Vol. 47/2, 2006 ISSN 1841-3323, pp. 102-112
 33. D. Nicoară, A. Hedeş, I. Şora, *Ultrasonic Enhancement of an Electrochemical Machining Process*, Proceedings of the 5th WSEAS International Conference on Applications of Electrical Engineering (AEE'06), Prague, Czech Republic, March 12-14, 2006, ISSN 1790-5117, CD-ROM version
 34. Nicoară, D., Hedeş, A., Şora, I., *Ultrasonic Enhancement of an Electrochemical Machining Process*, WSEAS Transactions on Systems, Issue 5, Vol. 5, May 2006 ISSN 1109-2777, pp. 1180-1185
 35. I. Şora, D. Nicoară, A. Hedeş, *Aspecte privind poluarea electromagnetică generată de lămpi electrice cu descărcări*, Volumul Simpozionului Aniversar "ELBA-85 ani de tehnică și tehnologie în iluminat" Timișoara, 10 nov. 2006, ISBN (10)973-88147-0-7, pp. 57-64
 36. S. Muşuroi, C. Şorândaru, D.F. Şurianu, *The Modeling and Simulation of an Adjusting System for the Position of the Induction Machine Supplied by a PWM Inverter with the Identification of the Rotor flux*, Buletinul Institutului Politehnic Iași, Tomul LII (LVI), Fasc.5A, pag. 39-44, ISSN 1223-8139, Iași, 2006
 37. 2. S. Muşuroi, D.F. Şurianu, M. Moţ, *The Modeling and Simulation of a Scalar Adjusting System in Open Loop of the Speed of a Synchronous Motor with Permanent Magnets*, Buletinul Institutului Politehnic Iași, Tomul LII (LVI), Fasc.5A, pag. 45-49, ISSN 1223-8139, Iași, 2006.
 38. R. Babău O. Muntean, S. Scridon, A. Hedeş, I. Boldea, N. Muntean, *REGEN 1x15 kW - an industrial automation system for small scale hydrogenerators supplying insular or grid consumer*, Journal of Electrical Engineering, www.jee.ro, vol.6, no. 1/2006, pg. 68-75
 39. N. Muntean, A. Hedeş, S. Scridon, *Practical Aspects Regarding Implementation of Variable Speed Drives in Cooling Tower Fans*, Proceedings of the 6th WSEAS/IASME International Conf. on Electric Power Systems, High Voltages, Electric Machines, Tenerife, 2006, pg. 252-257
 40. N. Muntean, A. Hedeş, S. Scridon, *Investigation of the Harmonic Distortion Generated by Adjustable Speed Drives*, Proceedings of the 6th WSEAS/IASME International Conf. on Electric Power Systems, High Voltages, Electric Machines, Tenerife, 2006, pg. 70-75

PATENTS

1. V. Proca, M. Petrescu, T. Dordea, Gh. Madescu, *Voltage transformer with variable ratio and fine control*, Brevet RO 120364/2006
2. I. Boldea, N. Muntean, R. Babău, C. Tudoran, E. Lazărescu, *Echipament pentru alimentarea motoarelor electrice asincrone la medie tensiune*, Brevet RO121245/2006

RESEARCH GRANTS

- 1.I. Boldea, *Tehnologii noi de actuatoare electrice pentru automobile*, CEEEX nr. X2C33/2006-2008
- 2.I. Șora, *Nanomateriale cu porozitate controlată și proprietăți magnetice și optice dirijate, obținute prin metoda sol-gel și sonosinteză, cu potențial aplicativ în protecția mediului, biologie și medicină*, Proiect PC-D04-PT04-320, CEEEX "NANOBIOMED", Subprogram 9/ Contract 38/2005, Subcontract 1198/B/2005, Director Savii Cecilia
- 3.I. Șora, *Nanoparticule pe bază de fier și oxid de fier pentru nanofluid magnetice: preparare, caracterizare și aplicații*, Proiect P-CD CEEEX „Fe-MANANOF”/ Contract 11711/2005, Director Vekas Ladislau

4.I. Șora, *Centrul virtual pentru tehnologii integrate cu aplicații ale energiei electroultraacustice în ingineria materialelor avansate*, Proiect P-CD M1-C2-2235, CEEEX „ULTRATECH”, Subcontract 10612/2006, Director Oancă Octavian – ISIM Timișoara

5.L.Tutelea, *Actionari electrice noi pt. refrigerare - creșterea eficienței energetice cu cost redus*, Tema 18 Cod 357 CNCSIS/2006-2007

PhD THESIS DEFENDED

- 1.V. Verbițki, *Contributions Regarding the Revamping of Electric Arc Welding Equipments*, PhD supervisor: Prof. dr. eng. Șora Ioan
- 2.C. Șorândaru, *Electrical drive system using Switched Reluctance Motor*, PhD supervisor: Prof. dr. eng. Atanasiu Gheorghe

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DEPARTMENT OF POWER ENGINEERING

MAIN RESEARCH FIELDS

- Electromagnetic Compatibility in Power Systems

Keywords: electromagnetic field, environment, disturbance source, electromagnetic interference

- High Voltage Laboratory Tests and Quality Checking

Keywords: high voltage technique, overvoltages, testing record

- Modeling and Simulation of Electromagnetic Transients in Power Systems

Keywords: switching and lightning, overvoltages, transient response, simulation

- Power System Reliability

Keywords: loss of load probability, power system reliability, probability density function

- Power Apparatus and Equipments

Keywords: power apparatus, electrical equipment, switching devices, protection devices

- Power Quality

Keywords: harmonic analysis, data acquisition, computer aided statistical research

- Load forecasting

Keywords: energy forecasting, expert system

- Power System Restructuring

Keywords: power system, energy pool, transmission open access, ancillary services, independent system operator

- Power System Transient Stability and Voltage Stability

Keywords: power systems, power systems stability, transient stability, voltage stability

- Electrical Materials

Keywords: ferromagnetic materials, hysteresis loop, transformer iron core, non-linear analyses methods

- Electrical substations and Power plants

Keywords: electrical energy production, power transformer, switching devices, protection devices, secondary circuits

- Energy management

Keywords: energy efficiency, energy management systems, project feasibility

Researches in *ELECTROMAGNETIC COMPATIBILITY IN POWER SYSTEMS*

FIELD DESCRIPTION

Electromagnetically disturbances analysis produced by high and low perturbation sources; coupling

mode between sources and victims and against perturbation action to protect the energetically field receptors analyses.

ACTIVITIES AND RESULTS

Over-voltage protection equipments, using ZnO varistors

Mathematics modeling and measurements of induced voltages in two-line circuit and adjacently circuits

RESEARCH BENEFICIARIES

RN Transelectrica S.A., Timișoara

RESEARCH TEAM

- Prof. dr. eng. Flavius Dan ȘURIANU
- Prof. dr. eng. Viorel TITIHĂZAN
- Lect dr. eng. Ilona BUCATARIU

Researches in *HIGH VOLTAGE LABORATORY TESTS AND QUALITY CHECKING*

FIELD DESCRIPTION

The purpose of high voltage tests consists of certifying the quality of insulation systems and emitting testing bulletins, optimal computation and experimental testing of insulation disturbance location and characteristic parameters measuring.

ACTIVITIES AND RESULTS

Tests on sparkover voltages (high voltages resistance variable arresters).

Tests on insulators of glass and composite insulators for a.c. overhead lines ($U_n > 1000$ V).

Tests on medium voltage 20 kV steel-aluminum conductor insulated with XLPE.

Tests on insulation of welding equipment.

RESEARCH BENEFICIARIES

SC Electroconstrucția ELCO Oradea S.A., S.C. Electrica Banat Timișoara, ISIM Timișoara

RESEARCH TEAM

- Prof. dr. eng. Flavius Dan ȘURIANU
- Assoc. prof. dr. eng. Viorel TITIHĂZAN
- Assoc. prof. dr. eng. Adrian PANĂ
- Lect dr. eng. Mariana TITIHĂZAN

Researches in *MODELING AND SIMULATION OF ELECTROMAGNETIC TRANSIENTS IN POWER SYSTEMS*

FIELD DESCRIPTION

Studies present the statistical results of a switching or a lightning overvoltage performed on electromagnetic transients. The probability of shielding failures and

backflashover have been evaluated and compared to the characteristics of transmission lines in service. Overvoltages caused by line energization, single and three phase reclosing have been investigated by statistical approach using ATP – EMTP.

ACTIVITIES AND RESULTS

In scientific research programs several models have been developed for calculation of switching or lightning overvoltages.

RESEARCH TEAM

- Prof. dr. eng. Corneliu VELICESCU
- Assoc. prof. dr. eng. Gheorghe VUC
- PhD student Daniel DONDERA
- PhD student Răzvan POPA

RESEARCH OFFERS

Power systems transients - modeling and simulation
Power systems reliability studies
Transformer iron core, non-linear analyses methods.

Researches in POWER SYSTEMS RELIABILITY

FIELD DESCRIPTION

The research presents for different power systems configuration the probable energy value, which cannot be supplied and the loss of load probability. To obtain the probability density function the different probabilistic models are used like Gram-Charlier expansion or Monte Carlo simulation.

ACTIVITIES AND RESULTS

The scientific papers are published in power system reliability area.

RESEARCH TEAM

- Prof. dr. eng. Corneliu VELICESCU
- Prof. dr. eng. Mircea NEMEȘ
- PhD student Daniel DONDERA
- PhD student Răzvan POPA

RESEARCH OFFERS

Reliability evaluation of power system extension

Researches in POWER APPARATUS AND EQUIPMENT

FIELD DESCRIPTION

There are a very large category of electrical systems, which include all type of switching devices (from Low to High Voltage), all the equipment existing in power stations, protection systems (surge arresters, current protections), automatic equipment (relays, contactors), power electronic devices and digital command equipment (such as PLC-s).

ACTIVITIES AND RESULTS

Design of new electrical switching devices, equipment and installations
PCL's implementation for different applications

Software for digital command equipment
On-line systems for monitoring and diagnosis of electrical equipment

RESEARCH BENEFICIARIES

Ministry of Education and Research, S.C. Electrica S.A. (S.D. Timișoara and Sibiu), S.C. Transelectrica S.A. (S.T. Sibiu), Electroputere S.A. Craiova

RESEARCH TEAM

- Prof. dr. eng. Alexandru VASILIEVICI
- Prof. dr. eng. Iuliu DELESEGA
- Prof. dr. eng. Petru ANDEA
- Assoc. prof. dr. eng. Doru VĂȚĂU
- Lect. dr. eng. Flaviu FRIGURĂ
- Assist. eng. Eva ZENG
- Assist. eng. Cristian POPA

Researches in POWER QUALITY

FIELD DESCRIPTION

Analysis of harmonics, unsymmetrical operations; equivalent parameter measurements for harmonic frequencies; evaluation of static reactive power compensation; control of passive power filter in electrical distribution systems.

ACTIVITIES AND RESULTS

Measurements were made in substations for Romanian National Electricity Company. A complex digital data acquisition system was used for the statistical estimation of harmonic distortion and unsymmetrical operation. New solutions were developed for the improvement of power quality in distribution systems.

RESEARCH BENEFICIARIES

National Agency of Scientific Research
Electrical Power Distribution Company – Electrica
National Power Transmission Company – Transelectrica

RESEARCH TEAM

- Prof. dr. eng. Vasile DUȘA
- Prof. dr. eng. Petru GHEJU
- Assoc. prof. dr. eng. Adrian PANĂ
- Lect. dr. eng. Ilona BUCATARIU
- Assist. eng. Gabriel LIMBEAN

RESEARCH OFFERS

Measurement and characterization of harmonic distortion for large industrial loads, location of harmonics in power systems, estimation effects for harmonics and unbalanced load on power system's equipment, analysis of power quality.

Researches in LOAD FORECASTING

FIELD DESCRIPTION

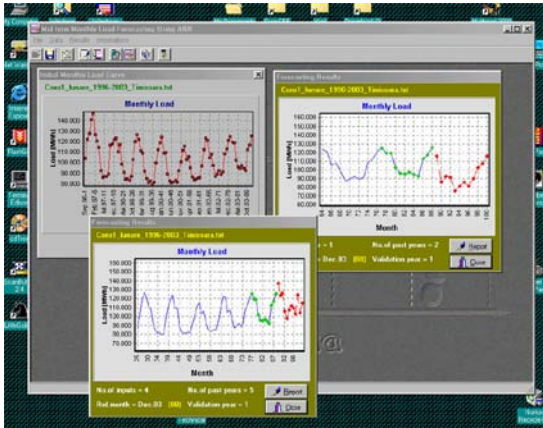
Analysis of electrical energy and power need for short and mid-term load forecasting; algorithm and

program development for monthly energy consumption and daily load curves.

ACTIVITIES AND RESULTS

Electrical load data acquisition from “Electrica Banat” substations and data files processing. Development of PRENPS and PELTMRNA programs for short-term daily load curve forecasting, respectively for mid-term monthly load forecasting.

Result analysis and forecast validation.



Load Forecast Software

RESEARCH TEAM

- Prof. dr. eng. Bucur LUȘTREA
- Assoc. prof. dr. eng. Adrian PANĂ
- Lect. dr. eng. Ioan BORLEA
- Lect. dr. eng. Ilona BUCATARIU
- Eng. Gabriel LIMBEAN

RESEARCH OFFERS

Short-term energy and load curve forecasting. Expert systems for the checking of used database at forecasting.

Researches in POWER SYSTEM RESTRUCTURING

FIELD DESCRIPTION

The unprecedented world - wide restructuring of the power industry move away from the traditional monopolies and toward greater competition, in the form an increased members of independent power producers and an unbundling of the main services that were until now provided by the utilities, has been building up for over a decade.

ACTIVITIES AND RESULTS

Managing risk on new market power and price stability
Pricing of network access

RESEARCH TEAM

- Prof. dr. eng. Mircea NEMEȘ
- Prof. dr. eng. Corneliu VELICESCU
- Assoc. prof. dr. eng. Gheorghe VUC

- Assoc. prof. dr. mat. Doru PĂUNESCU
(Department of Mathematics)
- Eng. Oana POP

RESEARCH OFFERS

Digital model of power system
Optimal Power Price Simulator (OPP)

Researches in POWER SYSTEM TRANSIENT STABILITY AND VOLTAGE STABILITY

FIELD DESCRIPTION

Computer aided analysis and improvement of the stability of the electric power system (transient stability, dynamic stability and voltage stability). New control technique for stability improvement. Developing of the master studies in these fields.



Power Systems Optimization Laboratory

ACTIVITIES AND RESULTS

Advanced software for stability analysis

New control techniques for the improvement of the dynamic behavior of synchronous generators
PHARE postgraduate and PhD program

RESEARCH BENEFICIARIES

Ministry of Education and Research
Electrical Power Distribution Company – Electrica
National Power Transmission Company – Transelectrica

RESEARCH TEAM

- Prof. dr. eng. Stefan KILYENI
- Prof. dr. eng. Mircea NEMEȘ
- Prof. dr. eng. Ștefan PREITL
- Prof. dr. eng. Bucur LUȘTREA
- Prof. dr. eng. Mihai MOGA
- Prof. dr. eng. Radu Emil PRECUP
- Lect. dr. eng. Ioan BORLEA
- Eng. Gabriel LIMBEAN
- Phd. Student Constantin BĂRBULESCU

RESEARCH OFFERS

Software for stability analysis and improvement
Studies concerning dynamic behavior of power systems
Advanced control techniques for transient and voltage stability improvement

Researches in *APPLIED NON-LINEAR MODELING OF FERROMAGNETIC MATERIALS*

FIELD DESCRIPTION

The modeling of non linear transformer iron core considered the hysteresis loop. Modeling methods for establishment and validation. Estimation of the transformer behavior under symmetrical (sinusoidal and non-sinusoidal) and asymmetrical supply conditions. Analyses the main quantities. Iron core losses harmonic analyses.

ACTIVITIES AND RESULTS

Measurements were performed in the “National Research Center for Welding and Material Trials-ISIM” and the “Power Energy Department” laboratories. A complex digital system was used for data acquisition and harmonics analyze of the transformer currents and tension for different supply conditions. The proposed transformer model was implemented into a welding machine and validated (comparison between the simulated and the measured results showed a very good agreement). Simulations were performed over in order to estimate the welding performances over a wide range of condition defined through: different firing pulse angle, materials, forms and thickness of welding pieces.

RESEARCH BENEFICIARIES

National Research Center for Welding and Material Trials-ISIM, Timisoara
Power Energy Department of the “Politehnica” University of Timisoara
ICPE Bucharest - manufacturer of the welding transformer under test

RESEARCH TEAM

- Assoc. prof. dr. eng. Doru VĂȚĂU
- Lect. Eng. dr. Flaviu FRIGURĂ

RESEARCH OFFER

Modeling single-phase transformers and equipments with ferromagnetic core.

Estimation of electromagnetic quantities: time variation shape, r.m.s., peak values, harmonic analyze over a wide range of conditions.

Time and frequency analysis of electromagnetic quantities.

Behavioral analysis of a complex system containing a transformer or an apparatus.

Iron core power losses detailed analysis.

Researches in *ELECTRICAL SUBSTATIONS AND POWER PLANTS*

FIELD DESCRIPTION

Constructive solutions optimization used for electrical equipments and installations in electrical

substations, operating principles and general characteristic optimization for the reliability and system management improvement.

Specific problems of planning for the electrical network operating control and command.

ACTIVITIES AND RESULTS

Solutions for the electrical substation auxiliaries supplying from the 220/110 kV autotransformer tertiary. Development of an expert system which offer informational support for substation operating recovery, which following a failure, that monitor continually all functions needed by protection and control and which come in to support for operating personnel.

RESEARCH TEAM

- Prof. dr. eng. Petru GHEJU
- Prof. dr. eng. Vasile DUȘA
- Prof. dr. eng. Bucur LUȘTREA
- Lect. dr. eng Ioan BORLEA
- Lect. dr. eng Ilona BUCATARIU
- Phd. Student Florin MOLNAR-MATEI
- Phd. Student Alexandru BĂLOI

RESEARCH OFFERS

The opportunity analysis of the implementation intelligent systems needed for filtering, cataloguing and store of the information provided from the protection and control systems in the electrical substations for substation remote control.

Researches in *ENERGY MANAGEMENT*

FIELD DESCRIPTION

Energy audit, energy management are the only means for sustainable energy use and best economical performance in entire society.

ACTIVITIES AND RESULTS

Measurements audit were made in substations for “Transelectrica” National Transmission Company. Were realized feasibilities studies for new solutions in auxiliary services supplying and for public lightning systems energy efficiency improvement.

RESEARCH BENEFICIARIES

National Agency of Scientific Research
Timisoara, Satu Mare City Councils
National Power Transmission Company – Transelectrica
Politehnica University from Timisoara

RESEARCH TEAM

- Prof. dr. eng. Flavius Dan ȘURIANU
- Assoc. prof. dr. eng. Gheorghe VUC
- Assoc. prof. dr. eng. Dan NICOARA
- Assoc. prof. dr. eng. Alexandru HEDES

RESEARCH OFFERS

Feasibility studies for energy efficiency projects, energy audits, energy policies advising.

PUBLICATIONS

BOOKS

1. I. Borlea, *Steady state power system diagnosis*, Ed. Orizonturi Universitare, Timișoara, 2006, 245 pp., ISBN (10) 973-638-260-5 (13) 978-973-638-260-4
2. I. Delesega, *Electrical devices and apparatus*, Ed. Orizonturi Universitare, Timișoara, 2006, 264 pp., ISBN (10)973-638-269-9, (13)978-973-638-269-7
3. V. Dușa, *Modern systems for control of power system operation*, Ed. Politehnica Timișoara 2006, 266 pp., ISBN (10) 973-625-382-1, (13) 978-973-625-382-9.
4. D. Vătău, D. F. Surianu, F. M. Frigură-Iliasa, J. P. Cambronne, *Considerations sur la qualité de l'énergie électrique*, Ed. Orizonturi Universitare 2006, Timișoara, 148 pp., ISBN: (10) 973-638-300-8 (13) 978-973-638-300-7
5. F. Șurianu, *Electromagnetic compatibility. Power systems applications*, Ed. Orizonturi Universitare, Timișoara, 2006, 194 pp., ISBN 973-638.

PUBLISHED PAPERS

1. M. Moga, *Advantages of topological indexes utilisation for electrical energy distribution network modeling in reconfiguration and regimes calculus*, Sixth Symposium of Informatics and Telecommunication in Power System, SIE 2006, Sinaia 1-3 Nov. 2006, Romania, pp. 168-174, ISSN 1842 4392
2. I. Borlea, B. Lustrea, V. Dușa, A. Buta, *Development of the main components of an expert system for substation fault diagnosis*, Regional Energy Forum – FOREN 2006, Neptun, 11-16 June 2006, Romania, Ed. Agir, S1-33, ISBN 973-720-032-2
3. I. Ardelean, V. Dușa, B. Luștrea, I. Borlea I., Gh. Vuc, *Consideration about utilization of energy conversion nonconventional technologies to supply main power station intenal services*, SIEE 2006 - International symposium of energy efficiency – fifth edition Romania, Cluj Napoca 03 – 05, Oct. 2006, Romania, , Paper 30, ISBN 973-686-928-8
4. I. Borlea, V. Dușa, B. Luștrea, *Expert System Fault Diagnosis for Timisoara 220 kV Substation, Simposium, Artificial Inteligence Systems in Power Systems*, Galați, 27 -28 Sept. 2006, Romania, pp. 23-30, ISBN 10-973-7870-73-5, 13-978-973-7870-73-5
5. N. Chiosa, A. Buta, I. Borlea, *Power systems recovery – condition for a better operating state of the electrical power systems*, FOREN 2006-WEC Regional Energy Forum, Section Sp-28, Neptun-Olimp 11-15 June 2006, Romania, Ed. Agir, ISBN 973-720-032-2
6. C. Bărbulescu, V. Bacria, *Decreasing the noise generated by a power supply station*, Proceedings of the VIIIth International Symposium „Young People and Multidisciplinary research”, Multidisciplinary Research Association of the West Zone of Romania, 11–12 May 2006, Timișoara, Romania, pp. 320 – 327, ISBN (10)973-8359-39-2 ISBN (13)978-973-8359-39-0
7. C. Bărbulescu, *Using plasma actuators for airflow control*, Proceedings of the IVth International Conference on Electrical and Power Engineering, 12–14 Nov. 2006, Iași, Romania, TOMUL LII (LVI), FASC. 5C, 2006, pp. 1464 –1469
8. C. Bărbulescu, J. P. Cambronne, St. Kilyeni, D. Vătău, *Airflow control using a surface dielectric barrier discharge*, Proceedings of the IVth International Conference on Electrical and Power Engineering, 12–14 Nov. 2006, Iași, Romania Publicată TOMUL LII (LVI), FASC. 5C, 2006, pp. 1470 – 1475
9. C. Bărbulescu, *Plasma techniques in airflow control. Part I: Theoretical background of surface dielectric barrier discharge*, Proceedings of the First International Conference on Modern Power Systems MPS 2006, 08-10.11.2006, Cluj-Napoca, Romania, Acta Electrotehnica, vol. 47, Nr.4, 2006, ISSN 1841-3323
10. C. Bărbulescu, J. P. Cambronne, St. Kilyeni, D. Vătău, *Plasma techniques in airflow control. Part 2: Experimental results of surface dielectric barrier discharge*, Proceedings of the First International Conference on Modern Power Systems MPS 2006, Cluj-Napoca, Romania, Acta Electrotehnica, vol. 47, Nr.4, 2006, ISSN 1841-3323
11. Bărbulescu C., Bacria V., *Acoustic arrangement of power supply substations*, Proceedings of the XIth International Conference “Man in the knowledge based organization”, Land Forces Academy “Nicolae Bălcescu”, 23.11.2006 – 25.11.2006, Sibiu, Romania, pp. 50-58, ISBN 973-7809-51-3, 978-973-7809-51-3
12. E. Aubert, C. Bărbulescu, J. P. Cambronne, *Establishment of the plasma actuator model*, Journal of Electrostatics, 2006, France, S2-10, ISSN 0304-3886
13. St. Kilyeni, I. Ardelean, P. Andea, G. Limbean, *On the opportunity of maintaining Timisoara's synchronous compensator in operation*, Proceedings 8th Regional Energy

- Forum - FOREN 2006, Neptun, Romania, June 2006, Ed. Agir, S1-14, ISBN 973-720-032-2
14. G. A. Florea, S. Gal, L. Lipan, E. Mateescu, I. Ardeleanu, F. D. Şurianu, *Safety of the Personnel Working on Multicircuit Power Overhead Lines Implies the Precise Knowledge of the Magnetic Induced Voltages. Algorithm, Software and Comparison with Measurements at Real Scale*, ESMO 2006, IEEE PES 11th International Conference on Transmission and Distribution Construction, Operation and Live-Line Maintenance, Albuquerque, New Mexico, USA, 15-19 Oct. 2006, S1-12, ISBN 1-424-0724-9
 15. F. Frigură, S. Bungescu, *PLC's Implementation in Command of a Conveyor Band Sequence*, Anghel Kancev University Ruse 2006, Bulgaria, Scientific Revue, Electrical Engineering Series, Volume 45, Book 3.2 and 3.1, pp. 46-50, ISSN 1311-3321
 16. F. Frigură, C. M. Popa, E. Zeng, L. Stoica, *Some Improvements Concerning the Manufacturing Process of a ZnO Based Varistor*, Anghel Kancev University Ruse 2006, Bulgaria, Scientific Revue, Electrical Engineering Series, Volume 45, Book 3.2 and 3.1, pp. 51-55, ISSN 1311-3321
 17. F. Frigură, C. M. Popa, E. Zeng, L. Stoica, *Some Aspects Concerning the Functional Limits of ZnO Based Varistors*, Anghel Kancev University Ruse 2006, Bulgaria, Scientific Revue, Electrical Engineering Series, Volume 45, Book 3.2 and 3.1, pp. 56-60, ISSN 1311-3321
 18. F. Frigură, M. Frigură, *The Influence of Sb₂O₃'s Concentration on the Opening Voltage of a Metal Oxide Varistor*, Proceedings of the 8th International Symposium "Young People and Multidisciplinarity Research", Timişoara, Mai 2006, pp. 127-132, ISBN (10)-973-8359-39-2, (13)-978-973-8359-39-0
 19. M. Frigură, F. Frigură, *The Influence of MnO₂'s Concentration on the Opening Voltage of a Metal Oxide Varistor*, Proceedings of the 8th International Symposium "Young People and Multi-disciplinarity Research", Timişoara, Mai 2006, pp. 133-138, ISBN (10)-973-8359-39-2, (13)-978-973-8359-39-0

RESEARCH PROJECTS / CONTRACTS

1. B. Luştrea, Contract nr. 88/02.08.2006, nr. UPT: 499/ 03/ 08/ 2006, *Raising of substation operation security by means the knowledge and control of auxiliaries consumers features and identification of new solutions for backup supply. Case study 220 kV/110 kV Timisoara substation*, Beneficiary: C. N. Transelectrica S.A. Sucursala Timişoara
2. D. Vătău, Program SOCRATES, 49104-IC-6-2005-1-RO-ERASMUS-EPS-1 Bi-lateral agreement between UPT and UPS Toulouse (2006 – 2007), *Teaching staff and student mobility*
3. F. D. Surianu *A Study Concerning The Opportunity of Public Lighting Concession in Satu Mare – Satu Mare City Council*
4. F. Frigură, Grant CEEX Modulul II tip ET cod 33, 2006-2008, Contract 5908/2006, *The performance improvement of ZnO varistor based low voltage surge protection equipment.*

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