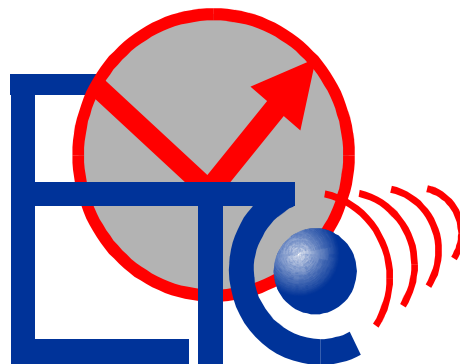


FACULTY OF ELECTRONICS AND TELECOMMUNICATIONS ENGINEERING



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INTELLIGENT INDUSTRIAL ELECTRONIC SYSTEMS RESEARCH CENTER – I. I. E. S.

GENERAL PRESENTATION

Intelligent Industrial Electronic Systems (I.I.E.S.) is a **research center**, type C, that has been evaluated and accredited by CNC SIS. The Center was created in 11.05.2001, in accordance with the CNC SIS certificate, nr. 106/CC-C. The director of the Center is **prof. dr. eng. Mircea CIUGUDEAN**.

MAIN ACTIVITIES

The Center performs research and design activities in domains such as:

- Robotics (production systems, drive control, mobile robots, sensors)
- Integrated circuits design
- Power electronics (dc-dc converters, power factor correction, neuro-fuzzy control, fuzzy controllers, power active filters)
- Neural networks and intelligent sensors.

CONTACT

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RESEARCH FIELDS

Integrated Circuits Design

- Keywords: ASIC, VLSI, DA, arithmetic coprocessor

Robotics

- Keywords: sensor, robot, transducers, industrial robot driving

Neural Computing and Intelligent Sensors

- Keywords: intelligent sensors, artificial neural network, sensor data processing

Power Electronics

- Keywords: power converters, power quality, harmonic pollution, power factor correction, soft switching, chaos

Electronic Packaging and Testing Field

- Keywords: CAE, CAD, CAM, test sequence-generation, self-testing design, test points, EMC, logic analysis, spectral analysis

Researches in *INTEGRATED CIRCUITS DESIGN*

FIELD DESCRIPTION

The research group in this domain is lead by prof. dr. eng. Mircea CIUGUDEAN and also includes an associate professor, one lecturer, three assistants, and three graduate students. The group will grow further by four graduate students and three PhD students per year.

Researches in *ROBOTICS*

FIELD DESCRIPTION

The Research Team in Robotics (RTR) is lead by prof. dr. eng. Tiberiu MURESAN and prof. dr. eng. Ivan BOGDANOV. The team includes one more professor, associate professors, three lecturers and one assistant professor.

The members of the RTR are members of the Robotics Association from Romania which is part of the International Federation of Robotics with the headquarters in Stockholm, Sweden.

In the last years the main research subjects were:

- Pilot intelligent production systems
- Research on passive systems and active intelligent systems interaction
- Microcontroller based control of electrical drives
- Interpolation in robot control
- Mobile robots control
- Sensors for robotics
- Equipment for leading the welding heads.

The Robotics Research Team uses six PC computers and simulation software.

INTERNATIONAL PROGRAMMES

1. SIARAS, Skill-based Inspection and Assembly for Reconfigurable Automation Systems

Programme: EU Sixth Framework Programme
FP6- 017146, 2005

Total value: 1,000,000 EURO (35,000 EURO for UPT, 4000 EURO for ETc).

Director: Prof.dr.eng. Ivan BOGDANOV

Members: Prof.dr.eng. Tiberiu MURESAN

Prof.dr.eng. Virgil TIPONUT

Prof.dr.eng. Vasile GUI

Prof.dr.eng. Alimpie IGNEA

Prof.dr.eng. Dan STOICIU

Lect.dr.eng. Cătălin CĂLEANU

Assist.eng. Dan ANDREICIUC

Partners:

1. Fraunhofer Gesellschaft, Germany
2. Asentics GmbH & Co.KG, Germany
3. ABB Automation Technologies AB, Germany
4. Sick AG, Germany
5. Inos Hellas SA, Greece
6. Lunds Universitet, Sweden
7. "Politehnica" University of Timisoara, RO
8. S.C. Robcon SRL, RO

FIELD AND GRANT DESCRIPTION

The project concerns about the novel concept "skill-based manufacturing", i.e. production units with embedded knowledge about their skills being able to interact to solve a given manufacturing task. Given the situation of the existing highly automated manufacturing systems, the automate design and/or reconfiguration of the known manufacturing systems has to be achieved.

ACTIVITIES AND RESULTS

- Modelling the skills of the systems components (actuators, sensors, robots, machines, machine components);
- Matching and modelling of production tasks;
- Creating of two main servers: the Skill Server and the Task Server for the main data bases;
- Skill-Mining;
- Automate design of systems configuration.

Contact person:

Prof.dr.eng. Ivan Bogdanov

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RESEARCH PROJECTS

1. CNCISIS grant A, nr. 639***Integrated environment for assisted movement of visually impaired persons***

Value: 30,000 RON

Director: Prof.dr.eng. Virgil TIPONUT

Members: Prof.dr.eng. Alexandru GACSADI
 Assoc.prof.dr.eng. Stefan ONIGA
 Lect.eng. Calin LAR
 Lect.eng. Ioan GAVRILUT
 Lect.eng. Ciprian GAVRINCEA
 Assist.eng. Laviniu TEPELEA

FIELD AND GRANT DESCRIPTION

The project aims to an integrated environment that improves the mobility of blind persons in to a limited area. The proposed solution includes wearable equipment, placed on the subject, who guides the blind user to navigate autonomous with obstacles avoidance and stationary equipment, which supervises the motion, in order to avoid some unexpected events.

ACTIVITIES AND RESULTS

The research activity within the project has been focused in this year in the following main area of interest:

- Development of a sensorial module capable to give information on the presence and the position of obstacles in front of the subject; the same unit is responsible for the attitude of the blind person (the position of the head in both horizontal and vertical plains),
- Development of the supervising system, which monitors the position of the subject in his movement to reach the target,
- Research and experiments in order to develop a simple and efficient man-machine interface that will allow the communication between the subject and the electronic system.

A wearable prototype that meets all the above requirements will be developed by the end of this year.

2. CNCISIS grant A, nr. 2739/ 19.05.2006, theme 8, CNCISIS code 351***Image quality improvement in sonar systems by speckle noise reduction***

Value: 9,500 RON

Director: Assoc.prof.dr.eng. Dorina ISAR

Members: Prof.dr.eng. Sabin IONEL
 Prof.dr.eng. Andrei CÂMPEANU
 Prof.dr.eng. Alexandru ISAR
 Lect.dr.eng. Cornel BALINT
 Assist.eng. Sorin POPESCU
 Assist.eng. Maria KOVACI
 Assist.eng. Andy VESA
 Assist.eng. Marius SĂLĂGEAN
 PhD Stud. Ioana ADAM
 PhD Stud. Mircea BORA

FIELD AND GRANT DESCRIPTION

The images obtained using a set of sound or ultrasound transducers such the SAR images used in aerial navigation or the sea floor images acquired with sonar or the echo graphic images are perturbed by a multiplicative acquisition noise, called speckle noise. For the correct interpretation of the information contained in these images, the enhancement of the quality of those images, based on the rejection of the speckle noise is required. For this purpose the wavelets theory is used more often today. An algorithm dedicated to the reduction of the speckle noise has the following steps: the speckle noise is transformed into an additive noise by the computation of the logarithm of the acquired image; the discrete wavelet transform of the obtained result is then computed; then the non-linear filtering of the new result is performed, reducing the noise; the inverse discrete wavelet transform is then computed and the anti-logarithm of the new result is computed. So, the noise-free estimation of the acquired image is obtained. The purpose of our grant submission is to match this denoising algorithm to the specificities of the sea floor images acquired with sonar images: the statistics of the information contained, the statistics

of the speckle noise, the time required for acquisition. The results obtained will be used for the realization of some computing programmes dedicated to the use of geologists for the interpretation of sea floor images, to study the tectonic changes, for the appreciation of the age of different components or of the relief modifications tendencies or for the ecology or military control of different regions. The performances of those programmes will be superior to the performances of the programmes already conceived, affecting less the statistics of the useful image contained into the images to be processed, being faster and using less memory.

ACTIVITIES AND RESULTS

Our researches concentrated this year on the choice of the best wavelet transform for sonar image processing. At the beginning we had used the enhanced diversity wavelet transform, DEDWT, invented in our research team few years ago. Using this transform we decreased the sensitivity of the discrete wavelet transform with respect to the mother wavelet involved. Some diversification mechanisms were developed in the paper "Alexandru Isar, Sorin Moga, Corina Nafoarniță, Marius Oltean, Ioana Adam, *Image Denoising Using Wavelet Transforms With Enhanced Diversity*, Proceedings of International Conference Communications 2006, Bucharest, June, 3-4, 2006."

The theoretical proof for the synthesis of partial results used in DEDWT computation can be found in "Quinquis A., Isar D., Isar A., *Multi-scale MAP Denoising of SAR Images*, Proceedings of IEEE International Conference Oceans'06, Boston, USA, September 20-23", because SAR images represent a more general case than SONAR images.

Later we found more useful a complex wavelet transform, namely the double tree complex wavelet transform, DTCWT. Its use for denoising SONAR images is treated in the paper "Alexandru Isar, Dorina Isar, Ioana Adam, *Denoising Sonar Images*, Proceedings of The Romanian Academy, Series A, Volume 7, Number 2 May - August 2006, pp. 1-14", where we presented a comparison between our results and the results obtained using classical filters for SONAR images denoising, i.e. Lee and Frost filters. Discussing the subject with the members of a research team from IFREMER Brest in France we agreed that the results obtained using DTCWT are better because it is a translation quasi-invariant transform with an enhanced directional selectivity. But the complex transform is very sensitive with the choice of wavelet mother. Consequently we proposed ourselves another objective: the design of diversity enhanced complex wavelet transform. The one-dimensional form of this transform, invented in our research team, was published in Proceedings of International Symposium ETc 2006:

"I. Adam, M. Oltean, M. Bora, *A New Quasi Shift Invariant Non-Redundant Complex Wavelet Transform*, Proceedings of International Symposium ETc 2006, September 21-22, 2006, Timișoara".

Researches in NEURAL COMPUTING AND INTELLIGENT SENSORS

The research group is coordinated by prof.dr.eng. Virgil TIPONUT and includes three assistant professors from the Department of Applied Electronics, 8 post-graduates from other universities in Romania and industrial companies (Romania, Canada, USA), who are developing their PhD thesis.

FIELD DESCRIPTION

- VLSI Implementation of Cellular Neural Networks (CNN)
- Applications of CNN in Intelligent Sensors
- Applications of CNN in Robotics (Mobile Robots and Colony of Interacting Robots)

The research activities are also focused in the field of Computational Intelligence (CI) applications. Using CI paradigms problems like biometrics - face detection and recognition, time series prediction or autonomous mobile robot navigation are tackled. For coding purpose, mainly MATLAB and C are employed.

Hardware/Software resources:

- General purpose PC compatible computers
- DSP boards from Texas Instruments
- Microconverter boards from Analog Devices
- Software development tools
- Prototyping facilities

RESEARCH PROJECTS

1. CNCISIS grant AT MedC, AT41, nr. 2739/19.06.2006 C SHARP/DOT NET Implementation for a Facial Detection and Recognition Neural System.

Value: 20,000 RON

Director: Lect.dr.eng. Cătălin-Daniel Căleanu

Members: Lect.dr.eng. Muguraș Mocofan

Lect. dr. eng. Adrian Avram

Assist.eng. Valentin Maranescu

Caciora Radu, student

Adrian Harea, student

FIELD AND GRANT DESCRIPTION

The aim of this project is to develop a system for automatic face detection and recognition using a new and powerful programming language and technology, namely C Sharp and DOT NET. It is based on one of the most promising Artificial Intelligence's paradigm - Neural Networks, combined with advanced digital image processing

techniques, e.g. Gabor filters. The motivations underlying chosen software are in relation with the need of a real time operation mode and a versatile implementation of the following stages required by above mentioned system: interfacing videocapturing devices and manipulate video streams; image acquisition and theirs Internet broadcasting; image processing; object oriented neural networks implementation; Internet services; create/access/maintain multimedia databases. Among applications of such facial detection and recognition system, are: continue monitoring of public places, e.g. rail stations, airports, in order to locate certain individuals, searching large mug shot databases, sensitive areas access control, etc.

ACTIVITIES AND RESULTS

The knowledge dissemination of the research activity was done by proposing the following papers to some international journals and conferences:

1. C.D. Căleanu, C. Botoca, "C++ Solutions for a Face Detection and Recognition System", FACTA UNIVERSITATIS, Ser. Elec. Energ., Nis, Yugoslavia, 2006
2. C.D. Căleanu, V. Gui, F. Alexa, "Face Recognition via Direct Search Optimized Gabor Filters", 5th WSEAS International Conference on System Science and Simulation in Engineering, (ICOSSE'06) Tenerife, Canary Islands, Spain, December 16-18, 2006
3. C.D. Căleanu, V. Gui, F. Alexa, "Direct Search Optimized Feature Extraction", WSEAS Transactions on Systems and Control, 2006

All above mentioned papers have been accepted for publishing. The following paper was proposed for publishing into a Romanian Academy journal and is still currently under evaluation:

C.D. Căleanu, G. Pradel, V. Maranescu, F. Alexa, "Combined Pattern Search Optimization of Feature Extraction and Classification Parameters in Facial Recognition", Romanian Journal of Information Science and Technology, 2006

RESEARCH TEAM

Prof.dr.eng. Alexandru GACSADY
Lect.dr.eng. Catalin CALEANU
Lect.eng. Aurel FILIP
Lect.eng. Calin LAR
Lect.eng. Ioan GAVRILUT
Assist.eng. Laviniu TEPELEA

Contact person

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Researches in POWER ELECTRONICS

The main research themes investigated are:

- Improvement and development of new high-frequency PWM and resonant dc/dc converter topologies
- Elaboration of new power factor correction circuits
- New control techniques for power factor correction circuits using classical solutions or neuro-fuzzy controllers
- Research on ac-ac matrix converters and the corresponding control methods
- Improvement of the electrical drives using active power filters and fuzzy regulators
- Research regarding topologies and operation improvement of active power filters
- Development of experimental prototypes for the different circuits as resulted from the theoretical research

The research team uses as technical support six PCs, design and simulation software for power electronics, two power analyzers and many other power electronics devices.

For the present, the research team efforts are focused on creating a power quality test center, according to European regulations.

INTERNATIONAL PROGRAMMES AND GRANTS

1. LEONARDO DA VINCI Community Vocational Training Action Programme E-learning Distance Interactive Practical Education (EDIPE) CZ/06/B/PP-168022

Value: 25,000 EURO

Director: Assoc.prof.dr.eng. Dan LASCU

Members: Prof.dr.eng. Viorel POPESCU
Assoc.prof.dr.eng. Mihaela LASCU
Lect.dr.eng. Adrian POPOVICI
Lect.dr.eng. Dan NEGOIȚESCU
Lect.dr.eng. Adrian POPOVICI
Assist.eng. Mircea BĂBĂIȚĂ

Partners: Technical University of Brno, SK
Technische Universiteit Delft, NL
Technische Universität Wien, AT
Institut für Elektrische Antriebe und Maschinen, Wien, AT
Ruhr Universität Bochum, D
National Technical University of Athens, GR
Institut National Polytechnique de Lorraine, FR
Budapest Muszaki es Gazdasagtudományi Egyetem, HU
Fakulta elektrotechniky a informatiky
Technická univerzita V Košiciach, SK

Trencianska Univerzita Alexandra
Dubceka v Trencine, SK
University of Maribor FERI, SL

FIELD AND PROGRAM DESCRIPTION

So far the E-learning and Distance-learning via the Internet, is focusing on information delivery where typically multi-media rich web pages are offered to the student sitting at home in front of the computer, taking lessons in a certain subject, while keeping contact to other students and teacher via e-mail, chat-rooms, on-line tests, etc.

Other issues focus on the style of teaching under the impression of extensive usage of multi-media like videoclips, audio or "slide shows" in the classroom or via distance (Internet). Advanced material use interactivity and combination of text explaining the theory with interactive programs that allow student to do little experiments via a simulator or solving some engineering problems. The rapid changes in society and technology have also generated a demand for more flexible engineers having many more qualifications than just a high level of technical or scientific specialisation. The drawback of a pure theoretical approach in undergraduate electrical engineering (EE) curriculum is that there is paid less attention to the phenomena that loom by laboratory experiments and exploration of system components. The result of this, in combination with the rapid development of computer applications, is that hands-on and laboratory experience vanished and computer simulations are getting more and more attention.

However, it is crucial to let students have some real practice. The real experiment gives the students a sense of practical testing and they can also see the influence of the second/higher order effects, real time effects, effect of parasitics which are difficult or impossible to be simulated perfectly. The reason is that the simulation is always based on more or less simplified model. Therefore it is important to give to the students a real world experience.

However, to build an experiment is expensive and it is impossible for an educational institute to have the complete scale of experiments. From the learner point of view, there is a need for easy accessible hardware experiment. The hardware experiment should therefore be redesigned such that they also can be accessed on the Web. This way the advance in ICT will be combined with the real practical experience.

The proposed virtual or distance laboratory does not present any web-based simulation. It is a real electro-technical experiment conducted in the laboratory but remotely accessed, controlled and monitored by web-based tools. The experiment is either conducted online or based on recorded valued (virtual experiment). It allows students to perform experiment safely, without a guidance and official working hours in the laboratory are not

limiting the users. The students can also experience the appearance of the measurement instrument, the electronic components and many more factors such as lay-out. The facility is useful for today's requirement of teaching in the Internet.

The experiments should be not only analysis oriented (to measure and see the results) but also synthesis oriented. It should involve a design aspect. Therefore the measurements are designed as a project with educational philosophy. The technology of such integration is planned to be realised within framework of the project. First of all the technology of such an integration and guidelines to achieve distance Interactive Practical Education will be defined. With this new e-learning tool this technology will be applied to the basic fields of applied electrical engineering starting from fundamentals of EE, through electronics, power electronics, applications of power electronics, dynamics of electro-mechanical systems, including industrial application of electrical drives, motion control and also complex drive systems will be addressed. A complete set of 18 different interactive design oriented virtual or distance laboratories will be prepared with the active participation of the educational expert. This technology will enable us to transfer results of different sectors of education and it will revolutionize education as it is today.

During the kick-off meeting hold in Vienna on November 30th-December 1st the project web page, evaluation group, dissemination plan, financial management, contents of the materials, selection of software for distance practicals management and a workshop on profect oriented and design oriented education were established.

Contact person

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2. National Instruments Educational Grant

Director: Assoc.prof.dr.eng. Dan LASCU
Members: Assoc.prof.dr.eng. Mihaela LASCU
Prof.dr.eng. Viorel POPESCU
Lect.dr.eng. Dan NEGOIȚESCU

FIELD DESCRIPTION

To encourage the use of computer-based learning in academic classrooms and instructional laboratories, National Instruments has developed an educational equipment grant program for qualifying institutions.

The following equipment grants was provided: LabVIEW 8.20 Professional, NI Elvis 6070, NI PCI-6070E, SCB-68.

The equipment started to be included and will be used in the Graphical Programming and Power Electronics Laboratories.

RESEARCH TEAM

Prof.dr.eng. Viorel POPESCU – head of the group
 Prof.dr.eng. Tiberiu MURESAN
 Assoc.prof.dr.eng. Dan LASCU
 Lect.dr.eng. Adrian POPOVICI
 Lect.dr.eng. Dan NEGOITESCU
 Lect.eng. Mircea BABAITA

Contact person

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Researches in ELECTRONIC PACKAGING AND TESTING

The research group in this domain is coordinated by prof. dr. eng. Horia CÂRSTEA, and includes two assistants and three graduated-students. The group established relationships with several regional powerful companies in the electronic packaging field, like SOLECTRON, ABB, TELCO and NOVAR. Also, the group has preferential relations with ALCATEL Network System, Romania in the field of testing electronic equipment.

PhD RESEARCH ACTIVITIES

1. Scientific supervisor *Prof.dr.eng. Virgil TIPONUȚ*

PhD students

- Alexandru DARIE: *Optimizing the Performance of a Mobile Robot Society*
- Ciprian GAVRINCEA: *Researches on a Neural Network Implementation for Processing the Signals Generated by Muscle System*
- Liviu LUCACIU: *Contributions to the Biometric Systems Development and Implementation*
- Marian BURSAȘIU: *Contributions to the Optimization of Neural Network Applications Developmen.*
- Alin BRÎNDUȘESCU: *Contributions to the biological signals simulation using artificial neural networks*
- Ionuț MIREL: *Methods for Digital Video Images Processing*
- Călin LAR: *Contributions to the Sensorial Data Fusion*
- Sorin POPESCU: *Optimization of the electrical welding process by means of artificial neural networks*
- Lavinia ȚEPELEA: *Human-Machine Interface.*
- Lucian BUGLEA: *Smart Transducers Array*
- Philipp ROEBROCK, *Multi Sensor Controlled Assembly and Application with Manipulators*

➤ Ioan GAVRILUȚ: *Contributions to the Autonomous Mobile Robot Navigation Using CNN*

2. Scientific supervisor: *Prof.dr.eng. Tiberiu MUREȘAN*

PhD students:

- Solomon MIMIS: *Integrated Circuits for Transmission Bit Error Rate Measurement*
- Petru PAPAȘIAN: *Intelligent Subsystems for Optimal Control of Technological Processes*
- Dan Mircea ANDREICIUC: *Analysis and Correction Methods for Positioning and Orientation of Mobile Industrial Robots*
- Sebastian TIPONUȚ: *Researches regarding the implementation of embedded systems using predefined templates*

3. Scientific supervisor: *Prof.dr.eng. Mircea CIUGUDEAN*

PhD students:

- Aurel FILIP: *Researches on CMOS Frequency References*
- Marlene DANEȚI: *Propagation time estimation algorithms for noise sources location*
- Benjamin DRAGOI: *Researches on CMOS Integrated Digital Correlator Conception and Design*
- Radu MIHAESCU, *Telecommunication-system integrated optimum structures based on mobile cellular automatic devices*
- Iosif MUDRA: *Researches on CMOS Integrated Fast Synchronous Comparators*
- Bogdan MARINCA: *Ultrasonic Investigation Optimization by Algorithms Implemented in Dedicated Integrated Circuits.*

4. Scientific supervisor: *Prof.dr.eng. Viorel POPESCU*

PhD students:

- Mircea BĂBĂIȚĂ: *Reaserches on a.c.–d.c. converters*
- Cornel GLISICI: *Contributions regarding improved capabilities of uninterruptible power supplies*
- Corina IVAN: *Energy parameters optimization in dc-dc converters*
- Marin TOMȘE: *Contributions to theoretical and experimental study of inductive heating power supplies*

- Daniel ALBU: *Contributions regarding improved capabilities of switched mode converters with PFC applications*
 - Dorin CIZMAȘIU: *Power factor control in ac-dc conversion systems*
 - Dan SIMU: *Adaptive systems for unconventional technologies*
 - Lucian PĂUN: *DC/DC converters with optimized energy parameters*
 - Adrian ȘCHIOP: *Contributions to theoretical and experimental study of power converters with ac motor drive applications*
 - Cristian VRÂNCILĂ: *Theoretical and experimental contributions regarding active power filters*
5. Scientific supervisor: Prof.dr.eng. Horia CÂRȘTEA

PhD students:

- Dumitru MĂRGELOIU: *Contributions to the improvement of electronic equipment for monitoring and controlling of low and medium voltage electrical network parameters*
- Ovidiu MIȚARIU: *Contributions to the improvement of autotesting equipment in digital data conditioning and transmission*
- Mirel BURLACU: *Research regarding CMOS analog integrated circuits based on unconventional principles*
- Corneliu TRIPA: *Contributions to the development of fault diagnose and identification tests in applied electronics equipment*
- Mircea RIF: *Automated system for data acquisition, processing and management in industry*
- Mircea MIHĂESCU: *Contributions to the development of dynamical diagnose and reconfiguration tests in digital fault redundant systems*
- Liviu ION: *Contributions to the development of digital regulation in electrical driven industrial processes*
- Andy BERCOVICI: *Contributions to the increase of fiability in digital electronics equipment*
- Cornel GLĂVAN: *Contributions to increased security of digital transmissions in special applications.*
- Liviu CHIȘ: *Contributions to pattern recognition test development in automated visual control*

- Călin SÂRBU: *Contributions to predictive test development concerning electrostatic discharge in electronic industry*

PHD THESES SUSTAINED

1. Ioan LIE, *Contributions to the Optimization of the Methods and Electronic Equipments for Ultrasonic Investigation*, Scientific supervisor Prof.dr.eng. Tiberiu MUREȘAN
2. Dan SIMU, *Contributions in Configuring Automated Testers Structures with Applicability in Avionics*, Scientific supervisor Prof.dr.eng. Viorel POPESCU

PhD ESSAYS PRESENTED

1. Aurel FILIP, *High-frequency RC oscillators applied in the transducer interface*, Scientific supervisor Prof.dr.eng. Mircea CIUGUDEAN
2. Andy BERCOVICI, *Circuit elements in hybrid integrated circuits technology*, Scientific supervisor Prof.dr.eng. Horia CÂRȘTEA
3. Andy BERCOVICI, *Reliability, mentenability and availability management of electronic equipment*, Scientific supervisor Prof.dr.eng. Horia CÂRȘTEA
4. Dumitru MĂRGELOIU, *Strategies of fault tolerance implementation in digital electronic systems*, Scientific supervisor Prof.dr.eng. Horia CÂRȘTEA
5. Dumitru MĂRGELOIU, *Actual stage of autotesting electronic equipment*, Scientific supervisor Prof.dr.eng. Horia CÂRȘTEA
6. Dumitru MĂRGELOIU, *Error detecting and correcting codes for fault protective redundance implementation in autotesting electronic equipment*, Scientific supervisor Prof.dr.eng. Horia CÂRȘTEA
7. Lucian PĂUN, *Electrical energy converters*, Scientific supervisor Prof. dr. eng. Viorel POPESCU
8. Lucian PĂUN, *Non-dissipative commutation converters*, Scientific supervisor Prof. dr. eng. Viorel POPESCU
9. Marin TOMȘE, *Own realisations concerning the optimisation of inductive heating sources*, Scientific supervisor: Prof. dr. eng. Viorel POPESCU
10. Ciprian GAVRINCEA, *Actual research regarding the implementation of a neural network for processing the signals generated by the muscle and nervous system*, Scientific supervisor Prof. dr. eng. Virgil TIPONUȚ
11. Ciprian GAVRINCEA, *Analysis of solutions for implementation of a neural network*

- dedicated to muscle signal processing*, Scientific supervisor Prof. dr. eng. Virgil TIPONUȚ
12. Ciprian GAVRINCEA, *Rezultate teoretice si experimentale privind implementarea unei retele neuronale pentru procesarea semnalelor generate de sistemul muscular si nervos. Theoretical and experimental results regarding the implementation of a neural for processing the signals generated by the muscle and nervous system*, Scientific supervisor Prof. dr. eng. Virgil TIPONUȚ
 13. Ionuț MIREL, *Image deinterlacing methods*, Scientific supervisor Prof. dr. eng. Virgil TIPONUȚ
 14. Ionuț MIREL, *New solutions for image filtering and rescaling*, Scientific supervisor Prof. dr. eng. Virgil TIPONUȚ
 15. Ionuț MIREL, *Contour detection methods. Nonlinear image processing*, Scientific supervisor Prof. dr. eng. Virgil TIPONUȚ
- PhD THESIS PRESENTED IN THE DEPARTMENT SEMINARS*
- Ciprian GAVRINCEA: *Researches on a Neural Network Implementation for Processing the Signals Generated by Muscle System*
 - Ionuț MIREL: *Methods for Digital Video Images Processing*

PUBLICATIONS

BOOKS

1. Mureșan, T., Gontean, A., Băbăiță, M., *Digital Circuits*, West Publishing House, Timișoara, 2006, ISBN 973-36-0416-X, 218 pages, (published in Romanian)
 2. Pradel, G., Căleanu, C., *Symbolic trajectory description in mobile robotics*, in V. Kordic, A. Lazinica and M. Merdan (eds.), "Mobile Robotics. Moving Intelligence", Advanced Robotic Systems, Vienna, Austria
- ### PUBLISHED PAPERS
1. Băbăiță M., Popescu V., Popovici A., Papazian P., *Modeling, Analysis and Simulation Results Regarding a Power Factor Correction Rectifier*, Scientific Bulletin of the „Politehnica” University of Timișoara, Transactions on Electronics and Telecommunications, "ETc2006", Tome 51 (65), fasc 1, 2006, ISSN 1583-3380, pp. 136-141
 2. Băbăiță, M., Popescu, V., Popovici, A., *A new technique for PFC rectifiers design*, Annals of the University of Oradea, Fasc. Electrot., Sect. Electronics, 2006, pp. 21-25
 3. Băbăiță, M., Popescu, V., Popovici, A., Lascu, D., Negoșescu, D., *New Power Factor Correction Rectifiers with Fast Response*, WSEAS Transactions on Systems, Issue 4, Vol 5, April 2006, ISSN 1109-2777, pp. 727-734
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RESEARCH INTERESTS

- Prof.dr.eng. Mircea CIUGUDEAN: *Conception of Analog Integrated Circuits and their Applications*

- Prof.dr.eng. Tiberiu MUREȘAN: *Digital Circuits, Industrial Robot Driving, Switched Mode Power Supplies*
- Prof.dr.eng. Viorel POPESCU: *Switched-Mode Power Supplies, Industrial Electronics*
- Prof.dr.eng. Virgil TIPONUȚ: *Analog Electronic Circuits, Logic Programmed Systems, Sensors and Transducers, Neural Networks*
- Prof.dr.eng. Mihail Eugen TĂNASE: *Doppler Telemetry*
- Prof.dr.eng. Ivan BOGDANOV: *Industrial Robots, Computer control of electrical drives*
- Prof.dr.eng. Sabin IONEL: *DSP applications, Statistical signal processing. Failure diagnosis*
- Prof.dr.eng. Horia CÂRSTEA: *Electronic Technology, Electrical Equipment Testing*
- Assoc.prof.dr.eng. Ioan JIVEȚ: *Designing ASIC (VLSI) Circuits, Design of Digital Systems with Micro-Controllers and Micro-Processors, Clinical Applications of Electrical Bio-impedance Tomography*
- Assoc.prof.dr.eng. Aurel GONTEAN: *Programmed Logic Systems, Digital Circuits*
- Assoc.prof.dr.eng. Dan LASCU: *High Frequency Power Processors, Power Factor Correction Circuits, Switched-Mode Power Supplies, CAD Design in Power Electronics*
- Assoc.prof.dr.eng. Dan ANDREICIUC: *Industrial Robots, Mobile Robots*
- Assoc.prof.dr.eng. Dorina ISAR: *Industrial Process Control Equipment, Signal Processing for Signal / Noise Ratio Enhancement*
- Lect.dr.eng. Lucian JURCA: *Analog Electronic Circuits*
- Lect.dr.eng. Adrian POPOVICI: *Industrial Electronics, Materials for Electronics*
- Lect.dr.eng. Cătălin CĂLEANU: *Electronic Devices and Circuits*
- Assist.eng. Aurel FILIP: *Analog Electronic Circuits*
- Assist.eng. Sorin POPESCU: *Analog Electronic Circuits, Logic Programmed Systems*
- Assist.eng. Ioan LIE: *Electronics, Doppler Telemetry*
- Assist.dr.eng. Dan NEGOIȚESCU: *Industrial Electronics, Power Factor Correction Circuits*
- Assist.eng. MIRCEA BĂBĂIȚĂ: *Digital Circuits*
- Assist.eng. Valentin MARANESCU: *Conception of Analog Integrated Circuits*
- Assist.eng. Beniamin DRĂGOI: *Conception of Analog Integrated Circuits*
- Assist.eng. Marlene DĂNEȚI: *DSP applications, Statistical signal processing, Failure diagnosis*
- Assist.eng. Petru PAPAȘIAN: *Digital Circuits*
- Assist.eng. Bogdan MARINCA: *Doppler Telemetry*

DEPARTMENT OF COMMUNICATIONS

RESEARCH GROUP IN SIGNAL PROCESSING

RESEARCH FIELDS

- Adaptive signal processing
- Image processing
- Digital watermarking
- Time-frequency representations
- Wavelets theory applications
- Multiresolution analysis
- Nonlinear signal processing
- Neural networks
- Coding
- Compression
- Communication networks

KEYWORDS

Signals Circuits and Systems, Adaptive Signal Processing, Time-Frequency Representations, Wavelets Theory and Applications, Nonlinear Signal Processing, Neural Networks, Image Processing, Microwave Technique, Theory of Information and Coding, Data Transmission, Modern Communication Networks, Telecommunication Circuits, Digital Signal Processing, Digital Watermarking, Data Transmission on Radio Channels, Mobile Radio Communications

INTERNATIONAL PROGRAMMES AND GRANTS

1. *Development of Software Defined Radio Platform: Optimal usage of radio resources and multiple air interface terminals*

Director: Philip CONSTANTINOU, Ioan NAFORNITA

Partners: National technical University of Athens, Greece, UPT, Timisoara, Romania

Beneficiary: Ministry of Development Greece, INTRACOM SA, Greece

2. GRANT Type Brancusi, *Débruitage des images SONAR en utilisant la théorie des ondelettes: applications aux systèmes d'aide à la décision pour la classification*

Director: Assoc.prof.dr.eng. Sorin MOGA, from ENST-Bretagne

Value: 3,780 Euro

Partners: France and Romania

Members: ENST Bretagne, Brest, France, UPT

Research team:

France: Assoc.prof. Sorin MOGA
Prof. Jean-Marc BOUCHER
Assoc.prof. Dominique PASTOR

Romania: Prof. Ioan NAFORNITA
Prof. Alexandru ISAR
Assoc.prof. Dorina ISAR
Assoc.prof. Corina BOTOCA

FIELD AND GRANT DESCRIPTION

This is the second phase of a France-Romania bilateral research programme, called Brancusi, during two years. It facilitates the activity of an international research team, encouraging the mobility between the two countries. The city of Brest, where ENST-B is located, was declared a pole of excellence in oceanographic research. This is the reason why we selected a research field dealing with the ocean exploration.

ACTIVITIES AND RESULTS

In the first phase of this grant, last year, the three members of the French research team visited our faculty. They have presented their results in a series of conferences organized in the framework of our French master. Sorin Moga presented the theory of neural networks, Jean-Marc Boucher presented some classification strategies with application in the treatment of SONAR images and Dominique Pastor presented some new results in the statistical signal processing.

Three members of the Romanian research team visited, last year, ENST-B. Professor Nafornita sustained a conference about the basics of the statistical signal processing, Corina Botoca presented some new results in the field of neural networks theory and Alexandru Isar visited the section of IFREMER located in Brest.

This year this mobility will continue. Sorin Moga already visited our faculty and presented to our

students his university and some mobility programs dedicated to students by the European Union. Two other French professors will visit our faculty. Three Romanian Professors will visit ENST-B also.

We have already published in common more than ten articles.

RESEARCH PROJECTS

1. CNCSIS grant No. A1/GR181/19.05.06, Code 637, type A, Title *Digital receivers performance increasing using wavelets theory*

Director: Prof.dr.eng. Alexandru ISAR

Value: 16,000 RON

Members: Prof.dr.eng.Miranda NAFORNITA
Prof.dr.eng. Andrei CAMPEANU
Assoc.prof.dr.eng. Dorina ISAR
Lect.dr.eng. Cornel BALINT
Assist.eng. Horia BALTA
Asist.eng. Radu LUCACIU
Assist.eng. Andy VESA
Assist.eng. Corina NAFORNITA
Techn. Virgil POPOVICI

FIELD AND GRANT DESCRIPTION

Every communication system is composed of an emission unit and a receiver. These two parts are connected through a communication channel. The information content of the signal at the output of the emission unit is affected by the channel noise. The complexity of the coder from the emission unit and of the decoder from the receiver, is selected in accordance with the channel noise characteristics. For more difficult channels, more complex and expensive coding-decoding systems must be used. If the communication channel is more difficult than expected then this detection system produces some errors. This is the reason why communication systems must be classified using the Bit Error Rate, BER, a decreasing function of the Signal to Noise Ratio, SNR, of the communication channel. The optimization of this function can be performed optimizing the channel coding-decoding systems, very modern solution, where the best results are obtained using turbocodes, or by the enhancement of the SNR at the input of the detection unit from the receiver. The present research takes into account this second strategy, and uses the properties of the wavelet functions. We propose the inclusion of a denosing system in the structure of a prototype receiver between the digital to analog convertor output and the input of the decoder, working in three steps: the computation of the discrete wavelet transform of the input signal, the nonlinear filtering of the result and the computation of the inverse discrete wavelet transform of the new result. When all the other blocks of the prototype receiver are not modified, the BER(SNR) characteristic of the new receiver is better than the BER(SNR) characteristic of the prototype receiver. If the realization of the same BER (SNR) characteristic for the two

receivers is required then the structure of the channel coding-decoding system can be simplified.

ACTIVITIES AND RESULTS

The coding techniques study was continued this year and the solution based on turbocodes was selected for our digital receiver. Different aspects regarding this solution were published by some of the members of our research team, coordinated by Prof.dr.eng. Miranda Nafornta, who collaborated with some well known researchers from abroad.

Another direction of our research, developed this year, was the study of digital detectors and of the wavelet modulation systems. The interfaces between these systems were also studied.

We have found that the best detectors are the soft ones. A solution based on neural networks was selected. It is described in few dissertations directed by some of the members of our research team.

We have made some simulations for the case of additive noise channels. The signal from the input of the detector is obtained at the output of a demodulation system. Because more and more recent studies recommend the wavelet modulation we started to investigate this kind of modulation. A wavelet modulation system consists in an Inverse Discrete Wavelet Transform (IDWT) computation block for the emission and in a Discrete Wavelet Transform (DWT) computation block for the receiver. In fact, a generalization of the Orthogonal Frequency Division Multiplexing, (OFDM), principle is obtained. This modulation type represents the subject of another PhD Thesis, directed by professor Miranda NAFORNITA. We have simulated a wavelet modulation system based on the DWT. The members of our research team frequently use this transform. Another example of its application is in the field of watermarking a telecommunication security technique. Another member of our research team, Corina NAFORNITA, explores this field, in the framework of her PhD Thesis. In her latest articles, she presented a very advanced watermark insertion in the DWT domain technique. The results obtained simulating the wavelet modulation were included in few dissertations directed by some of the members of our research team. The use of this type of modulation makes possible a redundant transmission facilitating the optimization of digital detectors. Now, we explore some new digital detectors that combine the advantages of denoising systems with the advantage of this extra redundancy. In the future we intend to study the efficiency of a wavelet modulation implemented with the aid of other wavelet transforms, exploited or invented in our research team: the double tree complex wavelet transform, DTCWT, the wavelet packets transform, WPT, and the Quaternionic wavelet transform, QWT.

2. CNCISIS grant No. –GR.226/14.09.2006 , Code - 342, type - A, Title Neural Networks Based System for the Diagnosis and Prognosis of Urological Diseases

Director: Assoc.prof.dr.eng .Corina BOTOCA

Value: 30,500 RON

Members: Prof.dr.eng. Vasile GUI
 Assoc.prof.dr.eng.Geta BUDURA
 Assoc.prof.dr.eng. Florin ALEXA
 Assoc.prof.MD. Viorel BUCURAS
 Assoc.prof.MD. Alice DEMA
 Lecturer MD Mircea BOTOCA
 Asist.eng. Nicolae MICLAU
 Assis.MD AlinCUMPNAS
 Assist.MD Razvan BARDAN
 MD Razvan DRAGOI
 Researcher Iulia CHINDE
 Researcher Monica MOROVAN

FIELD AND GRANT DESCRIPTION

Thematic area: Advanced informatics systems and models for the assistance of medical diagnosis and preventive medicine. The diagnosis and prognosis of a patient are usually realized by processing clinical information. When the volume and the variety of the information become too demanding for the clinician, the need for supportive statistical prediction methods emerges. When the classical methods, like statistical modeling, are failing, due to computational complexity and to long processing times, the artificial neural networks (ANN) could offer effective solutions, being able to perform real-time prediction of the diagnosis and prognosis of a disease. Our project aims to develop and validate a neural integrated system, in an adequate programming medium, capable to offer urological problems solutions. The proposed system will contain a package of complex analyses and evaluation programs, similar with the evaluation-decision model from the clinical medicine. The system inputs will be variables carefully selected, with different weights, obtained from the real situations and anytime comparable with the real, functional, clinical model. In order to collect the clinical data necessary to develop a diagnosis and prognosis system for urology clinical trials will be completed, on patients with prostate cancer, bladder cancer, kidney cancer, benign prostatic hyperplasia and urinary lithiasis. Models of clinical urological applications will be developed using various ANN architectures, multilayers perceptrons, radial basis function and competitive ANN. The comparison of the performance of different ANN architectures and training algorithm will be accomplished and the model with the best accuracy/complexity ratio will be selected, in order to integrate it into a unitary diagnosis system. During the last year of the project the functionality of the implemented system will be analyzed and clinical diagnosis algorithms, using the predictions offered by the ANN will be elaborated. The experience acquired by the team

will be shared with other interested research teams, forming a national research community in the field of NN applications in medicine.

ACTIVITIES AND RESULTS

A number of clinical trials protocols on patients with prostate cancer, bladder cancer, kidney cancer benign prostatic hyperplasia and urinary lithiasis have been developed, in order to collect the clinical data. The materials bases necessary for the system implementation was bought. The chemical materials necessary for the clinical trials have been aquired. Several portable systems and software programs for neural networks simulation have been studied and the most adequate package hard-software has been acquired. Scientific contacts with researches having the same preoccupations have been established in Prague, Czech Republic, in Wien, Austria and Nijmegen, Holland. A web site dedicated to the project research theme is under construction. The research results have been fructified through participation to national and international congresses and conferences, through publishing in specialized journals, totalizing a number of 11 published papers.

3. CNC SIS grant no. 2930/2006, code 47, type TD, theme no. 9, Digital watermarking of images in the transform domain, phase "Image Watermarking Attacks Analysis"

Director: Corina NAFORNITA
Value: 5,500 RON

FIELD AND GRANT DESCRIPTION

In the Internet communication era, the piracy of the multimedia products can be fought through watermarking. The watermark should carry valuable information about the owner and the original image. Watermarking for authentication of intellectual property should allow: marking the original image; extraction of the mark from the received image; comparison between the two marks. Current techniques for image watermarking are spatial domain or frequency domain methods. The second one is used frequently and is more versatile. A topic research subject in this matter is finding the best transform, invariant to usual operations (translation, rotation, scaling etc).

ACTIVITIES AND RESULTS

Research has been done to understand the present watermarking techniques and their applications. A research report has been published on the web page of the Communications Dept., which investigates the problem of fragile / semi-fragile watermarking. Two papers dealing with perceptual watermarking have been published at international conferences abroad and in Romania. Another paper proposes a new wavelet transform that might be used for watermarking.

PUBLICATIONS

BOOKS

1. Budura G., Botoca C., *Nonlinear Signal Processing Techniques. Applications*, "Politehnica" Publ. House, 2006, ISBN 973-625-292-2, 200 pages (published in Romanian)
2. Nafornta, M., Nafornta, I., *Microwaves. Fundamentals*, (vol.1), "Politehnica" Publ. House, 2006, ISBN 973-625-348-1, 978-973-625348-5, 500 pages, (published in Romanian)

PAPERS

1. Botoca, C., Budura, G., Miclău, N., *Competitive Learning Algorithms for Data Clustering*, Facta Universitatis Nis, Vol. 19, Issue no. 2, August, 2006, ISSN 0353-3670, 2006, pp. 261-269
2. Botoca, C., Budura, G., *Neural Symbol Decision Equalizer using Competitive Learning*, WSEAS Transactions on Circuits and Systems, Issue 6, Volume 5, June, 2006, ISSN 1109-2734, pp. 829-836
3. Botoca, C., Budura, G., *Symbol decision equalizer using a radial basis function neural network*, Proceedings 7th WSEAS International Conference on Neural Networks (NN'06) Cavtat, Croatia, June 12-14, 2006
4. Botoca, C., Budura, G., *Complex data clustering using a new competitive learning algorithm*, Proceedings, Applied Electronics, Pilsen, 6-7 Sept. 2006, ISSN 0353-3670, pp. 23-26
5. Budura, G., Botoca, C., *Efficient Implementation of the Third Order RLS Adaptive Volterra Filter*, Facta Universitatis Nis, Ser.: Elec. Energ., ISSN 0353-3670, vol. 19, no. 1, April 2006, pp. 1-9
6. Budura, G., Botoca, C., *Some Practical Considerations Regarding the Identification of a Nonlinear System*, Revue Roumaine des Sciences Techniques, Serie Electrotechnique et Energetique, ISSN-0035-4066, Tome 51, no. 1, 2006, pp. 79-90
7. Budura, G., Botoca, C., *Modeling and Identification of Nonlinear Systems Using the LMS Volterra Filter*, WSEAS Transactions on Signal Processing, ISSN 1790-5022, No. 2, February 2006, pp. 190-197
8. Câmpeanu, A., Gal, J., *OTA-C Biquad Cells Emulation of LC Ladder Filters*, Proceedings of the Symposium on Electronics and Telecomm. Sept. 2006, Timișoara, pp. 154-157
9. Gal, J., Câmpeanu, A., Naforniță, I., *Estimation of Noisy Sinusoids Instantaneous Frequency by*

- Kalman Filtering*, Proceedings of the Symposium on Electronics and Telecomm. Sept. 2006, Timișoara, pp. 69-72
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 11. Atto, A.M, Pastor, D, Isar, A, *On the Asymptotic Decorrelation of the Wavelet Packet Coefficients of a Wide-Sense Stationary Random Process*, Scientific Bulletin of the "Politehnica" Univ. of Timisoara, Trans. on Electronics and Telecommunications, ISSN 1583-3380, tome 51(65), fasc. 2, pp. 146-151
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PhD RESEARCH ACTIVITIES1. *Scientific Supervisor: Prof. dr. eng. Ioan NAFORNIȚĂ**PhD students*

- Mirela BIANU, *Contributions on adaptive signal processing in telecommunications*
- Cristian IGNEA, *Contributions on finding and measurement antenna parameters*
- Adrian FILIPESCU, *Contributions on Digital Filters Optimal Design*
- Ciprian DAVID, *Contributions on faults detection using image processing techniques*
- Romulus REIS, *Non-Stationary Signal Description by Non-Parametrical Method*
- Janos GAL, *Contributions on Kalman Filters Use in Telecommunications*
- Marius SALAGEAN, *Non-Stationary Signal Description by Non-Parametrical Method*
- Florin VANCEA, *Data Protection in Communication Networks*
- Andy VESA, *Improvement of Digital Radio Systems Detection,*
- Mircea COSER, *Systems Optimization using TRIZ Technique,*
- Teodora PELA, *Traffic Optimization on Metropolitan Area Networks,*
- Adina DABA, *Non-Stationary Signal Description by Non-Parametrical Method,*
- Florin Dumitru CHIS, *Improving Security Level In Broadband Networks.*
- Arpad IOZSA, first year student.
- Mirela MIOC, first year student.

2. *Scientific Supervisor: Prof. dr. eng. Miranda NAFORNIȚĂ**PhD students:*

- Horia BALTA, *Hierarchical coding for spread spectrum transmission systems*
- Radu LUCACIU, *Optical communication systems with OCDMA*
- Maria KOVACI, *N-PSK multiresolution modulations in the COFDM hierarchical systems*
- Caius ULITA, *Equalizers for radio channel modems*
- Mirela VIOR, *Quality transmission improvement using turbo codes*

- Sorin POPA, *Synchronization techniques improvement for radio channel transmission systems*
 - Marius OLTEAN, *Radio channel equalization using cyclic prefix*
 - Florin Lucian MORGOS, *Radio channels equalization techniques improvement*
3. *Scientific Supervisor: Prof. dr. eng. Alexandru ISAR*

PhD students:

- Ioana Adam, *Phd Title: The despecklisation of SONAR images by multi-resolution filtering*
- Mircea BORA, *Phd Title: The Signal to Noise Ratio Enhancement in Communication Systems Using Wavelets*

PhD ESSAYS PRESENTED

- Janos GAL, *Kalman filtering,* PhD Advisor: Prof. dr. eng. Ioan NAFORNIȚĂ
- Romulus REIS, *Use of time-frequency representations for non-stationary signal description,* PhD Advisor: Prof. dr. eng. Ioan NAFORNIȚĂ
- Sorin POPA, *Radio Transmission Systems Synchronization Methods,* PhD Advisor: Prof. dr. eng. Miranda NAFORNIȚĂ
- Florin Lucian MORGOS, *Radio Channels,* PhD Advisor: Prof. dr. eng. Miranda NAFORNIȚĂ
- Radu LUCACIU, *Optical systems with OCDMA performance analysis,* PhD Advisor: Prof. dr. eng. Miranda NAFORNIȚĂ

RESEARCH TEAM

- Prof.dr.eng. Ioan NAFORNIȚĂ: *Signals, Circuits and Systems, Adaptive Signal Processing, Time-frequency Representations, Wavelets Theory's Applications, Microwave Techniques, Image processing, Digital watermarking*
- Prof.dr.eng. Miranda NAFORNIȚĂ: *Theory of Information and Coding, Data Transmission, Signals, Circuits and Systems, Modern Communication Networks*
- Prof.dr.eng. Alexandru ISAR: *Signals, Circuits and Systems, Wavelets Theory's Applications, Time-frequency Representations, Compression, Coding*
- Prof.dr.eng. Andrei CÂMPEANU: *Telecommunication Equipment Technology, Telecommunication Circuits*
- Lect.dr.eng. Corina BOTOCA: *Microwave Techniques, Signals, Circuits and Systems, Neural networks*

- Lect.dr.eng. Georgeta BUDURA: *Signals, Circuits and Systems, Nonlinear Signal Processing, Telecommunication Circuits*
- Lect.dr.eng. Cornel Balint: *Speech coding, Telecommunications network, Digital Switching*
- Assist.eng. Horia BALTĂ: *Optical Transmission and Processing of Information, Statistical Theory of Information Transmission, Theory of Information and Coding*
- Assist.eng. Maria KOVACI: *Statistical Theory of Information Transmission, Theory of Information and Coding, Signals Circuits and Systems*
- Assist.eng. Janos GAL: *Signals, Circuits and Systems, Telecommunication Circuits*
- Assist.eng. Radu LUCACIU: *Optical Transmission and Processing of Information*

- Assist.eng. Nicolae MICLĂU: *Optical Transmission and Processing of Information, Theory of Information and Coding*
- Assist.eng. Corina NAFORNIȚĂ: *Digital Signal Processing, Digital Watermarking*
- Assist.eng. Marius OLTEANU: *Data Transmission on Radio Channels*
- Assist.eng. Marius SĂLĂGEAN: *Signals, Circuits and Systems*

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RESEARCH GROUP IN IMAGE PROCESSING AND MULTIMEDIA TECHNOLOGIES

RESEARCH FIELDS

- Television and Digital Television
- Image Compression
- Digital Image Processing
- Motion Analysis
- Pattern Recognition
- Interactive Multimedia Techniques
- Media Streaming
- Multimedia Databases
- Internet Security Techniques
- E-learning
- Advanced learning technologies
- WWW, Hypermedia and Internet

KEYWORDS

Image Processing, Sound Processing, Multimedia, Image Compression, Interactive Applications, Web Services, E-learning

RESEARCH CONTRACTS

1. CEEEX Project, Contract Nr. CEX 60 / 28.07.2006, Control and Monitoring from the Distance System for Intelligent Buildings „COMODICP”, period 2006-2008

Director: Prof.dr.eng. Radu VASIU

Value 2006: 22,000 RON

Members: Prof.dr.eng. Radu VASIU
Lect.dr.eng. Mugur MOCOFAN
Assist.eng. Marian BUCOS
Assist.eng. Mihai ONITA

Partners: Technical University of Cluj-Napoca
“Transilvania” University of Brasov
Siemens PSE Brasov

FIELD AND GRANT DESCRIPTION: Intelligent buildings apply technologies to improve the building environment and functionality for occupants/tenants while controlling costs. Improving end user security, comfort and accessibility all help user productivity and comfort levels. The owner/operator wants to provide this functionality while reducing individual costs. Technologies make this possible. An effective energy management system, for example, provides lowest cost energy, avoids waste of energy by managing occupied space, and makes efficient use of staff through centralized control and integrating information from different sources. An efficient integrated system enables a modern, comprehensive access and security system to operate effectively and exchange information with other building systems. Fully integrated functionality includes the ability to open doors, notify responsible staff of unwanted intrusions and ensure that lighting, fire and other building management systems are informed of staff that arrive or depart the building. This information can then be used to manage the local environment and the resulting energy usage. Life safety systems, notably fire systems, are heavily regulated by stringent code requirements. These requirements do not, however, prevent the information from a fire system being provided to

other systems. This opportunity can be exploited to open doors and illuminate a building when fire alarms are received. Transducers (detectors) can measure many building parameters, e.g., vibration, strain and moisture, to continually monitor the building's infrastructure condition. To integrate these systems and exchange information effectively, a ubiquitous and reliable communications infrastructure is needed. These systems are typically managed by personal computers (PCs) using data processing communication techniques and both wired and wireless communication technologies. The key communications issues are redundancy, resilience, security and the assurance for all users that "their data" is secure. Integration considerations may be addressed through standards and conventions, or manufacturers' protocols. Since proprietary solutions permeate the industry, total interworking is currently unattainable, but the future will require full interoperability, with information exchanged among all systems, hence we will need technologies that translate

2. CEEEX Project, Contract Nr. CEX 05-D8-77 / 19.10.2005, Foresight Scenarios for the Romanian Economical Sectors with Innovation Potential in the View of the Year 2020 „INOVFOR”, period 2005-2008, UPT coordinator

Director: Assoc.prof.dr.eng. Marian MOCAN

Value 2006: 130,000 RON

Members: Prof.dr.eng. Radu VASIU
 Prof.dr.eng. Marius OTESTEANU
 Prof.dr.eng. Aldo DE SABATA
 Assoc.lect.eng. Diana ANDONE
 Lect.dr.eng. Mugur MOCOFAN
 Assist.eng. Marian BUCOS
 Assist.eng. Mihai ONITA
 Eng. Marius CONDREA
 Eng. Iasmina ERMALAI

Partners: I.N.C.S.M.P.S. Bucharest
 I.P.A. SA Bucharest
 CURS SA Bucharest
 INOE Bucharest

FIELD AND GRANT DESCRIPTION: The main goal of the project is to elaborate a National Strategy for Research – Development – Innovation, and according to that to develop a R&D National Plan for the period 2007-2013. This plan will be correlated with:

- the general external and security policy objectives, aiming to asses Romania as a power and stability factor in the Black Sea and the Balcam Peninsula area;
- the necessity of European integration, with minimal costs, having in view the strenghtening of the Romanian economy in order to face the competition on the new market;

- the strenghtening of the functionality of the specific economical mechanisms of an emerging market;
- the creation of the premises to decrease the differences between Romania and the other members of the European Union;
- the move towards an economy based on knowledge;
- the necessity to create the premises for the development of the domestic market, the increase of the work opportunities and of the profesional training, the amelioration of the working conditions, of the health and living conditions for the population, the creation of the local brands and trade marks;
- the creation of a scientific and technological stock, concentrated to the areas with good opportunities to make the most from the human capital;
- the design of the institutional system and of the regulations able to allow the sustainability, the development, the use and the efficiency of the scientific and technological capital, as determined;
- the coherent development of the resources and their correlation to the need of scientific and technological capital, for the areas with development potential.

The project's objectives are:

- to make an analysis of the strong points, of the weak points, of the effective and potential opportunities, of the effective and potential factors of risk resulting from the economical evolution on long term, medium term and short term
- to develop a strategy and a potential national plan for R & D
- to make proposals able to create the framework and the instruments needed for valorising the existing opportunities, for translating some potential opportunities into effective ones, for minimizing the existing risks and for preventing the identified potential risks
- to elaborate the main scenarios for the Romanian economical and social development until 2020, as a premise for the elaboration of a consolidated foresight endeavour, made up from „critical domains / technologies”
- to elaborate the National Plan for research – development – innovation, that will include the means and ways to encourage and support the critical domains / technologies, the modalities for their effective implementation, the monitoring and evaluation tools, the financing mechanisms and resource allocation principles, the modalities to promote excelency.

Project details can be found at:

www.cm.upt.ro/inovfor

3. CEEX Project, Contract Nr. CEX 05-D8-5/10.10.2005, Development of the Concept of Social Responsibility in the Romanian Companies, in the European Context „RSE & UE”, period 2005-2008

Director: Assoc.prof.dr.eng. Marian MOCAN

Value 2006: 195,000 RON

Members: Prof.dr.eng. Radu VASIU
Assoc.lect.eng. Diana ANDONE
Lect.dr.eng. Mugur MOCOFAN
Assist.eng. Marian BUCOS
Assist.eng. Mihai ONITA
Eng. Marius CONDREA
Eng. Iasmina ERMALAI

Coordinator: I.N.C.S.M.P.S. Bucharest

Partners: I.P.A. SA Bucharest
CURS SA Bucharest
INOE Bucharest

FIELD AND GRANT DESCRIPTION: The Lisbon Agenda (2000) establishes as the main strategical objective that „the EU should become the most competitive and dynamic knowledge based economy in the world, capable of sustainable economical growth, with more and better work places and with a bigger social cohesion”. The project represents an effective contribution to the implementation of those desires.

The project objectives are:

- Realization of a report about the existing situation at international level, including in the EU, referring to the concept of social cohesion
- Design of informatic instruments for documentation, communication, collaboration and implementation of some activities
- Elaboration of some empirical analyses regarding the existing situation in Romania, including the external dimension (Corporate Social Responsibility – CSR)
- Elaboration of a methodology for the investigation of the internal dimension of IRS/CSR in Romania
- Elaboration of a methodology for the investigation of the dimension of IRS/CSR at the level of organisation in Romania
- Evaluation of the dimension of the economical, social and environmental aspects, at the level of organisation, in Romania
- Evaluation of the impact of IRS/CSR towards the competitiveness, occupational quality, inclusion and social cohesion
- Determination of some directions of perspective in applying IRS/CSR in Romania, in European context.

Project details can be found at:

www.cm.upt.ro/rse&ue

4. CNCISIS grant No. 2738/19.05.06, A1 / GR181 / 19.05.06, Code 600, type A, Object tracking estimation in video sequences

Director: Florin ALEXA

Value: 16,000 RON

Members: Prof.dr.eng Corneliu I. TOMA
Prof.dr.eng Vasile GUI
Lect.dr.eng. Muguras MOCOFAN
Lect.dr.eng Catalin CALEANU
Assist. eng. Andy VESA
Assist. eng. Ciprian DAVID
Assist. eng. Artur MULLER
Eng.Codrut IANASI
Andreea GALEANU, PhD student
Stud. Daniela CLIM

FIELD AND GRANT DESCRIPTION: In the context of rapid development of multimedia technologies, visual surveillance with traffic estimation and facial recognition, represent an important goal for many applications. The objective is to develop a tool for people counting intended to offer statistical knowledge useful in the objective evaluation of the efficiency of the services delivered to clients in fast foods. The system will be able to accurately estimate the number of people passing through different areas and to derive mean, minimum and maximum amount of time for servicing clients at different moments of the day or to average such information on different time intervals. Always, it will be possible to use in automat tracking of mobile robots. The system will operate based on a PC environment in connection with a variable number of webcams in an Ethernet network.

The goal of the work is to develop a system with robust and real-time operation. The system has to cope well with crowded environments. This will be achieved through the following contributions:

- a fast background detection using nonparametric kernel density estimation
- a robust and accurate tracking method for people tracking in crowded environments
- use of a multimodal strategy to improve segmentation and tracking results
- find robust solutions for using deformable models in people counting

Accomplishing the proposed goals enables extension of the application range to several related fields, such as multimedia image sequence compression, video indexing for browsing, road traffic analysis etc.

5. Research Contract 404 / 2006 with Siemens VDO Automotive, Germany: Rain Simulator Design for Study of Environmental Parameters' Influence on Sensors Used in Automotive Industry

Director: Prof.dr.eng. Marius OTEȘTEANU

Value: 29,000 Euro

Members: Prof.dr.eng. Aurel GONTEAN
 Prof.dr.eng. Vasile GUI
 Eng. Ștefan DUNĂ
 PhD student Sandra RUGINĂ
 PhD stud Georgina SARBU-DOAGĂ
 Eng. Constantin ALECSA
 Tehn. Cornel CRISTA

FIELD AND GRANT DESCRIPTION: The research studied the influence of various parameters for some sensors used in automotive industries. The theoretical work included phenomenon modelling and data analysis; practical experiments conducted in different environmental conditions established sensors the behaviour. Comparisons between modelled situation and real world measurement were also performed. The results included a simulator, automation and a database software, data logging and graphs, extensive conclusions.

6. Socrates Erasmus Curriculum Development project: *International On-Line Master in Multimedia (IMM – CD)*

Director: Prof.dr.eng. Radu VASIU
Value: 40,600 EURO
Members: Prof.dr.eng. Nicolae ROBU
 Assoc.lect.eng. Diana ANDONE
 Lect.dr.eng. Mugur MOCOFAN
 Assoc.lect.eng. Daniel HAIDUC
 Assist.eng. Marian BUCOS
 Assist.eng. Mihai ONITA
 Eng. Marius CONDREA
 Iasmina ERMALAI, PhD student
Partners: Univ. of Nice, FR
 JME Associates, UK
 Univ. of Technology, Kaunas, LT
 E-Collegium, Budapest, HU
 Univ. of Godollo, HU
 Mimoza Kft, Budapest, HU
 Univ. of Zvolen, SK

FIELD DESCRIPTION:The scope of the project, which is funded by the European Commission for 2 years (Oct. 2004 – Sept. 2006) is to introduce an International on-line Master degree in Multimedia. The consortium of participants established an International Academic Board that is responsible for establishing the curricula and for checking the quality of the courses. Each partner university takes part to the course development, the allocation of courses being done based on competition. Some of the courses might be allocated for development to recognized experts in e-learning from USA, Finland and Greece.

After course development, the degree program will run through e-learning, tutoring being realized on-line by the course developers. The partner universities will ensure local support centres, in order to allow face-to-face meetings for the students they enrolled. Final examination will be done through face-to-face examination done by the

course leaders, the only participants to the degree program that will have to travel internationally.

“Politehnica” University of Timisoara is the program coordinator and contractor.

Further details on the project can be found at:
www.immaster.net

7. Leonardo da Vinci II project: *Measure to Improve (METOIM)*

Director: Prof.dr.eng. Radu VASIU
Value: 51,476 EURO
Members: Assoc.lect.eng. Diana ANDONE
 Assoc.lect.eng. Daniel HAIDUC
 Assist.eng. Marian BUCOS
 Assist.eng. Mihai ONITA
 Eng. Marius CONDREA
 Lucia RAZMERITA, journalist
 Cristian TECU, PhD student
Partners: IAL Toscana, IT
 BFI Steiermark Graz, AT
 M2A Technologies, FR
 Macedonian Institute of Employment (MAKINE), GR
 OFA Kht., HU

FIELD DESCRIPTION: The project's main objectives are:

- to sensibelize managers and responsible working in Labour Social Association or Syndicates to improve the quality of, and access to, continuing vocational training and the Lifelong acquisition of skills and competences
- to arise conscience on workers about the importance of vocational activities, but also informal initiatives (i.e. for instance the participation to the so-called "Study Sessions" promoted by small groups of people to enhance their knowledge on a particular topic, participate to "Counselling sessions" whereby testing their competences and their known/unknown needs)
- to implement an innovative ICT tool which can be transferred to different contests, such as the entrepreneurial one, to measure the communication and information needs/demands
- to experiment the above said tool in a small representative group of "managers" and "workers" and/or "Labour representatives" and "workers"
- to promote equal opportunities, especially at the Social representative level in order to carry out projects to help women to better balance their family with working timetable

Further details on the project can be found at:
www.metoim.org

8. Leonardo da Vinci II project: e2Engineering

Director: Prof.dr.eng. Radu VASIU
Value: 23,153 EURO
Members Assoc.lect.eng. Diana ANDONE
 Assist.eng. Marian BUCOS
 Assist.eng. Mihai ONITA
 Prof.dr.eng. Doina DRAGULESCU
 Prof.dr.eng. Mirela TOTH-TASCAU
 Eng. Iasmina ERMALAI, PhD student
 Eng. Cristian TECU, PhD student
 Eng. Marius CONDREA
 Lucia RAZMERITA, journalist
Partners: Univ. Godollo, HU
 Univ. Miskolc, HU
 EADTU – European Association of
 Distance Teaching Universities, NL
 Univ. of Gdansk, PL
 Univ. of Kosice, SK
 Ethos Associates, UK

FIELD DESCRIPTION: The project's aim is to develop IT tools able to facilitate on-line education in technical fields, especially Computer Aided Engineering. Course modules and examples of remarkable technical achievements will be developed and offered on-line using the COEDU e-learning platform. Courses will be developed jointly and will be translated and offered in five languages: English, Hungarian, Romanian, Polish and Slovakian. Pilot courses will be offered free of charge.

9. Leonardo da Vinci II project: E-REPORT. Transnational virtual study circles: e-learning supports for tutorship and learning groups

Director: Prof.dr.eng. Radu VASIU
Value: 75,000 EURO
Members Assoc.lect.eng. Diana ANDONE
 Assist.eng. Marian BUCOS
 Assist.eng. Mihai ONITA
 Lect.dr.eng. Matei TAMASILA
 Eng. Iasmina ERMALAI, PhD student
 Eng. Cristian TECU, PhD student
 Eng. Andrei TERNAUCIUC, PhD student
 Eng. Marius CONDREA
 Lucia RAZMERITA, journalist
Partners: Università degli Studi di Palermo, IT
 University of Salzburg, AT
 Confederación Empresarial de la
 Provincia de Alicante – COEPA, ES
 Gotland University, Gotland, SE
 Karolinska Institute, Stockholm, SE

FIELD DESCRIPTION: *E-REPORT* project will contribute to set up a communitarian repertory of reference material with regard to the development of innovative methods and best practices in the field of e-learning system for VET (universities and vocational institutes). Particularly, the project is

aimed at setting up the basis for the constitution of a transnational virtual study circle.

This demands a comprehensive and transnational approach that implies:

- analyses of the educational and training needs in the field of e-learning;
- international comparison of the quality and the quantity of the existing online courses provided by both universities and vocational institutes;
- international comparison between contents, methods and services adopted in this field in order to standardize them;
- the elaboration of a shared repertory of contents, methodologies, services and training tools;
- the testing and validation of this repertory to a significant sample of the final users of the project's output;
- the promotion of processes of virtual mobility among european students and teachers/trainers;
- the transnational communication and exchange between universities and vocational centres, public and private;
- the ongoing valorisation and dissemination of the results during the project, involving the final users of the outputs

10. Socrates Minerva project: "e-Taster – short, free on-line courses – "tasters" – for multilingual, international delivery"

Director: Assoc.lect.eng. Diana ANDONE
Value: 61,314 EURO
Members Prof.dr.eng. Radu VASIU
 Lect.dr.eng. Mugur MOCOFAN
 Assoc.lect.eng. Daniel HAIDUC
 Assist.eng. Marian BUCOS
 Assist.eng. Mihai ONITA
 Eng. Marius CONDREA
 Lucia RAZMERITA, journalist
 Cristian TECU, PhD student
 Iasmina ERMALAI, PhD student
Partners: Univ. Miskolc, HU
 E-Collegium, Budapest, HU
 Univ. of Godollo, HU
 Mimoza Kft, Budapest, HU
 EADTU – European Association of
 Distance Teaching Universities, NL
 Univ. of East London, UK
 Univ. of Gdansk, PL
 Univ. of Kosice, SK
 Univ. of Plovdiv, BL

FIELD DESCRIPTION: The project aims to develop a multilingual platform for e-learning course delivery. It also aims to develop short on-line courses, "tasters" for full version content offered commercially.

11. CEEPUS Grant CII-HU-0008-01-0607 Telecommunication

Director: Prof.dr.eng. Marius OTEȘTEANU

Partners: Czech Technical University Prague, CZ
University of Zagreb, CR
Budapest Polytechnic, HU
University of Maribor, SL
Slovak University of Technology in
Bratislava, SK

Members: Prof.dr.eng. Vasile GUI
Assoc.prof.dr.eng. Florin ALEXA
PhD student Daniel POPA
PhD student Sandra RUGINA
Student Iulia BUBLEA
Student Liliana PÎRVA

PUBLICATIONS

BOOKS

- Popescu, D., Ottesteanu, M., Napoli, R., Ionescu, F., Chicco, G., Covrig, M., (editors), *Proceedings of the 2nd WSEAS International Conference on Dynamical Systems and Control (CONTROL '06)*, Bucharest, Romania, 2006, CD-ROM, ISSN 1790-5117, ISBN 960-8457-54-8
- Popescu, M. O., Cepisca, C., Ottesteanu, M., Andrei, H., Martin, O., Ioan, D., Simian D. (editors), *Proceedings of the 8th WSEAS International Conference on Mathematical Methods and Computational Techniques in Electrical Engineering (MMACTEE '06)*, Bucharest, Romania, 2006, CD-ROM, ISSN 1790-5117, ISBN 960-8457-54-8
- Toma, C.I., Alexa, Fl., VasIU, R., *Principles of Analogue and Digital Television*, vol. I, "Politehnica" Publ. House, Timisoara, 2006, ISBN 973-625-267-1, 248 pages (published in Romanian)

PAPERS

- Vasiu, R., Andone, D., Bucos, M., *Development of the METOIM Web Tool for Competences Self-Evaluation*, in *E-Competences for Life, Employment and Innovation*, Editors: Andras Szucs, Ingeborg Bo, Published in Vienna, Austria by EDEN (European Distance and E-Learning Network), June 2006, ISBN 963 06 0063 3, pp. 75-80
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 17. Fuiorea D., Pescaru D. Al., Gui V., Toma C. I., *Feature Based 2D Image Registration Using Mean Shift Parameter Estimation*, Scientific Bulletin of the "Politehnica" University, Timișoara, Tom 51(65), Fasc. 2, 2006, ISSN 1583-3380, pp. 77-80
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PhD RESEARCH ACTIVITIES

1. Prof. dr. eng. Corneliu I. TOMA

Ph.D. students:

- Ionel STANCIU: *Multimedia Communications Over Wireless Networks*.
- Andreea GĂLEANU: *Contributions at the performance improvement of the GSM system*.
- Artur MULLER: *Contributions in implementing of the multimedia databases, with local and remote access*.
- Mirela L. IOANEȘIU: *Contributions at the network security by the using of the virtual private networks (VPN)*.
- Daniel C. HAIDUC: *Contributions in the color digital reproduction field*.
- Constantin M. BUCOS: *Modeling and analysis of mobile virtual organizations*.
- Radu TĂNASE: *Ultrasound electronic systems for the movement evaluation in the fluid environment*.
- Mihai I. ONIȚĂ: *Video communications in multimedia applications*.
- Mircea TOMOROGA: *Contributions at the conception and design of the analog integrated circuits in CMOS technology*
- Florin-Josef LĂTĂREȚU: *Contributions at the intelligent telecommunication network achievement*.
- Daniela Narcisa FUIOREA – BULUCEA
- Alin SCOROȘANU

2. Prof. dr. eng. Marius Oteșteanu

Ph.D. students:

- Sandra RUGINA, first year student
- Georgiana SÂRBU-DOAGĂ, first year student
- Hay BOENKE, first year student
- Daniel POPA, first year student

3. Prof.dr.eng. Radu VASIU

PhD students:

- Iasmina ERMALAI, *Contributions to the Use of New Information Technologies in e-Learning*
- Artur SRAUM, *Contributions to Interactive Web Programming*
- Cristian TECU, *Contributions to the Use of Video, Photo and Audio Applications in Professional Presentations*
- Andrei TERNAUCIUC, first year student
- Virgil ROTARU, first year student

PHD THESIS SUSTAINED

- Valentin I. MARANESCU *Contributions to the improvement of voltage stabilizers performances using interconnected integrated voltage regulators*, PhD Advisor: Prof.dr.eng. Corneliu TOMA.
- Codruț N. Ianăși, *Nonparametric density estimation techniques for background subtraction in video surveillance*, PhD Advisor: Prof.dr.eng. Corneliu TOMA

PhD ESSAYS PRESENTED

- Mihai I. ONIȚĂ, *Mobile telephony and internet networks streaming technology*
- Daniel C. HAIDUC, *The present and outlook stage in the image display technologies*
- Daniel C. HAIDUC, *Calibration of the image displays. Color management systems*
- Mircea TOMOROGA, *The models of the digital-to-analog converter using in the design*
- Mirela L. IOANEȘIU, *Data security by cryptography*
- Mirela L. IOANEȘIU, *VoIP service extension using adaptive personal mobile communication*
- Sandra RUGINĂ, *Analysis, Modeling and Measuring Rain Characteristics*
- Georgiana SÂRBU-DOAGĂ, *Study of Functions and Components Required for Building a Rain Simulator*

➤ Sandra RUGINĂ, *Software Environment for the Laster Precipitation Monitor*

➤ Georgiana SÂRBU-DOAGĂ, *Programming Siemens Simatic S7-200. LabView-PLC Communication*

RESEARCH TEAM

➤ Prof.dr.eng. Corneliu TOMA: *Television, Analogue Electronics, Image Compression, Motion Analysis, Pattern, Recognition, Multimedia Technologies;*

➤ Prof.dr.eng. Marius OTEȘTEANU: *Television, Telephone Transmission Systems, Information Recording Techniques;*

➤ Prof.dr.eng. Vasile GUI: *Image Processing, Electronic Circuits and Devices;*

➤ Prof.dr.eng. Radu VASIU: *Multimedia, Image Compression, Digital Television, Interactive Multimedia Applications, Web Services, E-learning;*

➤ Assoc.prof.dr.eng. Florin ALEXA: *Image and Sound Processing;*

➤ Lect.dr.eng. Mugur MOCOFAN: *Machine Vision and Pattern Recognition, Multimedia, Studio Equipment, Video Production;*

➤ Assoc.lect.eng. Diana ANDONE: *Multimedia Applications, E-learning, Adaptive and Adaptable Technology, Media Research;*

➤ Assoc.lect.eng. Daniel HAIDUC: *Computer Graphics, Animation Techniques;*

➤ Assist.eng. Constantin Marian BUCOS: *Multimedia Databases, Object Oriented Programming;*

➤ Assist.eng. Mihai ONITA: *Audio-video Compression, Digital Television, Multimedia Applications.*

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RESEARCH CENTER IN INSTRUMENTATION, MEASUREMENT AND ELECTROMAGNETIC COMPATIBILITY – I.M.C.E.M.



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GENERAL PRESENTATION

The Director of the IMCEM research center is **Prof. dr. eng. Alimpie IGNEA**.

The center was created in 11 May 2001, in accordance with the CNC SIS certificate nr. 102/CC-C. IMCEM belongs to the Department of Measurement and Optical Electronics, Faculty of Electronics and Telecommunications. For the Electromagnetic Compatibility field, IMCEM is part of the Multi-User Research Base “National Interuniversity Centre for High Voltage Engineering and Electromagnetic Compatibility”.

The main research and development fields are:

- *Electric and Electronic Measurement and Instrumentation*: improving measurement methods, sensors and transducers;
- *Electromagnetic Compatibility*: EMC measurements and tests at high frequencies, electromagnetic supervision;
- Main activities since the creation of the centre:
- IMCEM endowment with high specialized equipment for measurements, tests, and education through a TEMPUS programme, a Multi-User Research Base grant and other sources;

- the achievement of scientific and development research objectives through grants and scientific research contracts, consulting, technical expertise, technical assistance, design; ANTSI, CNC SIS grants were obtained and local collaboration with Siemens VDO Automotive and Solectron exist, to be continued and extended;

- Identification of new partners and research programs.

Researches in SIGNALS SPECTRAL ANALYSIS AND SYNTHESIS WITH APPLICATIONS TO DIGITAL MEASURING SYSTEMS

KEYWORDS

Data acquisition, spectral estimation, neural networks, digital synthesized AC calibrators

FIELD DESCRIPTION

Digital measuring systems standardization is one of the basic operations in measuring techniques. The standardization problem is more difficult when a higher resolution measuring device is used. Consequently, digital processed signals for standardization are frequently used. Their spectral content is revealed through spectral analysis.

RESEARCH TEAM

- Prof.dr.eng. Eugen POP: *General Theory of Measurement, Digital Processing of Signals in Measuring Instruments*
- Prof.dr.eng. Liviu TOMA: *Data Acquisition Systems. Microprocessor System Architecture, Digital Processing Structures*
- Prof.dr.eng. Traian JURCA: *Electronic Measuring Instruments. Structural Components of Precision Instrumentation, Programmable Measuring Systems*
- Prof.dr.eng. Dan STOICIU: *Electronic Measuring Instruments, Metrology, Quality and Maintenance, Measuring in Industrial Processes*
- Prof.dr.eng. Aldo De SABATA: *Adaptive Methods in Measurements, Signal Processing*
- Lect.dr.eng. Septimiu MISCHIE: *Electronic and Electric Measuring, Programmable Measuring Systems, Structural Components of Precision Instrumentation*

➤ Assist.dr.eng. Robert PASZITKA:
*Microprocessor System Architecture, Data
 Acquisition Systems*

Researches in **ELECTROMAGNETIC COMPATIBILITY**

KEYWORDS

Electromagnetic compatibility, EMC directives, immunity to electromagnetic interferences, conducted and radiated emissions, shielding, grounding, site surveys

FIELD DESCRIPTION

Main research-development directions: improving measurement methods, sensors and transducers, EMC measurements and tests at high frequencies, electromagnetic supervision.

ACTIVITIES AND RESULTS

The research in this field provides means and equipments for EMC and educational improvement in EMC design. It is intended to minimize conducted and radiated emissions and to suppress electromagnetic interferences, performing the tests and verification concerned with the electric, electronic and radio equipments in accordance to EMC directives.

GRANTS AND CONTRACTS

1. Platform for the Study of Electrical, Electronical and Chemical Concurrent Phenomena that Occur in the Thermo-Solar Conversion Process and in the Photo-Voltaic Effect. Automation of Functioning and Exploitation of Solar Assets Based on Thermo-Solar and Photo-Voltaic Conversion

Granted by the Ministry of Education and Research

Director: Prof.dr.eng. Nicolae ROBU, Rector of the "Politehnica" University

Chief of the Electronics Laboratory: Prof.dr.eng. Aldo DE SABATA

Duration: three years, 2006-2008

Total value: 4,232,764 RON

Total value from MEC: 3,385,000 RON

Total value from "Politehnica": 700,000 RON

Value for ETc Faculty, 2006: 83,000 RON

PROJECT OUTLINE

Researches on the use of new sources of energy and quality of the environment are developing at a high pace in the European Union in the present. For example, a 5,5 million EURO Energetically Independent Solar House has been built in Germany, at Freiburg. In all countries of the EU, an intense campaign is directed for drawing attention and education of the public on energy problems such as decrease of home and industrial

consumption and economy of classical energy resources.

In order for the know-how and experience gained at the "Politehnica" University of Timisoara in the field of alternate sources of energy to be effectively applied, it is necessary to educate students and staff in solar techniques. In this way, our research in this inter- and multi-disciplinary field can be further developed, by taking advantage of oportunities provided by accessing the European Union.

Th efficiency of solar pannels varies between 30 and 50%, and it is considered good, the efficiency of photovoltaic pannels is between 9 and 24%, and it is considered satisfactory, the efficiency of thermal stocking is about 60%, the efficiency of electrical stocking is approximately 80%. The efficiency of stocking as hydrogen reaction heat is larger than 96%, and the efficiency of nanostructured cells is about 4%.

Consequently, it is necessary to create diatherman materials with very high transmittance in the visible domain, atherman materials with very high absorbtion properties on a large wavelength spectrum, insulating materials with very low thermal conductivity, selective layers, antireflection layers, semiconductor materials with efficiency of 30%, nanostructured cells with efficiency of about 12%.

The "Politehnica" University of Timisoara has built its Solar House as an energetic system in 1982-1986. The asset, built by self funding, has been designed by specialists from the Civil Engineering Faculty, and it contains two floors and underground. The best construction materials that could be found at that time have been used, in order to minimize thermal losses.

We want to create a platform of five integrated, electronically connected laboratories around the Solar House, at five faculties: Energetics, Automatics, Electronics, Architecture and Civil Engineering, and Physics. The purpose is to create, study, and measure new materials, measure solar radiation in our region, design new structures of solar architecture, find new ways of thermal and electrical stocking of solar energy, design and built home and industrial solar energy systems. We propose to introduce new subjects for license, master, and doctoral students.

These objectives can be realized by the rehabilitation of the Solar House and of its energetic chain based on thermo-solar conversion and photo-voltaic effect, by the creation and connection of the five laboratories, and acquisition of modern equipment.

The University might have financial benefits by providing spectro-photometric measurements and customized solar design.

We can introduce now 12 new license laboratory subjects, e.g. *Solar Energy Supplied Electrolysis*. We can introduce at this moment 14 master

laboratory subjects, e.g. *Study of an Integrated Thermal-Photovoltaic System*. For the PHD school we can introduce now 4 themes, e.g. *Complete Analysis of the Energy Chain in a Photovoltaic Pannel*. We have now 13 research subjects pending by lack of financement, e.g. *Creation of New, High Transmittance Materials*. We have 12 new chapters to be introduced for the master/PHD school.

The Platform facilities will be used for research, design of solar systems and buildings, publishing of books and papers in journals, organization and participation at national and international conferences and exhibitions, license, master, and doctoral schools on alternative sources of energy, public demonstrations, home and industrial solutions and design.

2. Contract 551/2006: A new model of a lead acid battery

Director: Lect.dr.eng. Septimiu Mischie
Value: 630 Euro
Members: Technician Cornel Cristea
Beneficiary: SIEMENS VDO AUTOMOTIVE

FIELD DESCRIPTION

This project presents a new and improved model of a lead acid battery that takes into account the variations of the received or delivered battery current. The method of parameterizing the model parameters and experimental results are also presented.

ACTIVITIES AND RESULTS

The structure of the proposed model has been obtained following the behavior of a lead acid battery in four different cases, as by experiments was obtained.

This model is a dynamic one, that is it takes into account the variations of the received or delivered battery current. It is valid for time intervals of a few minutes, so the SOC (state of charge) of the battery can be approximated as being constant.

The parameters of the battery model has been determined by measuring the current through the battery and the voltage across the battery during the following sequence: discharge, rest, charge and again rest. For this purpose, an experimental bench was set up. It contains the battery, a resistive load, a power supply, two relays and a resistive shunt, that is used to current through battery measurement. The voltage across the battery and the voltage across the shunt are acquired with a National Instruments PCI 6023 data acquisition board.

The presented model contains elements that take account to different behavior of the battery in charging state, in discharging state or in the rest period.

3. CNCSIS Grant Theme No. 19, Code 173, Electromagnetic monitoring in Spitalul Clinic Judetean No. 1 Timisoara

Director: Prof.dr.eng. Alimpie IGNEA
Value: 28,000 RON
Members: Prof.dr.eng. Traian JURCA
 Prof.dr.eng. Aldo DE SABATA
 Prof.dr.eng. Mircea CHIVU
 Assoc.prof.dr.eng. Mihaela LASCU
 Assist.eng. Ciprian DUGHIR
 Assist.eng. Adrian MIHAIUTI
 Assist.eng. Cora IFTODE
 Assist.eng. Liliana STOICA

FIELD AND GRANT DESCRIPTION

Considering the increase of electromagnetic pollution, electromagnetic monitoring becomes very important at locations with a specific destination, especially the ones that include life protection. Spitalul Clinic Judetean nr.1 of Timisoara (Department Hospital) is a high-class unit, with modern equipment, which performs a wide range of surgical interventions. From the point of view of electromagnetic compatibility, the hospital is a large electric power consumer, built in a place with high electromagnetic perturbations (radio and TV emitting antennas, tramway and trolleybus lines, big enterprises around, mobile communication networks, its own electric and electronic equipment, etc). The electromagnetic monitoring in the hospital is recommended because: it allows identification of the quiet zones, the ones with major risk level and the means to reduce that level, the placement of some equipments, etc. Monitoring assumes identification of perturbation sources, followed by measurements of perturbations level. Measurements are done daily, weekly or for a long term, correlated with other events (tramways passing by, lightings, etc). The conducted perturbations will be supervised in the electrical supply network and other networks. The monitoring of radiated perturbations concerns RF emissions, and the hospital's perturbing sources (the existing ISM equipments). Determining the correlation between perturbations, their sources and the transmission means allow for the reduction of their level. The information we get during the monitoring process will be arranged into a map of perturbations distribution according to their characteristics: continuous or intermittent behaviour, level, frequency range, etc. During measurements we will use the telemetry on INTERNET and wireless technology.

ACTIVITIES AND RESULTS

- Data recording and choice of monitoring methods
- Identification of sources for disturbances, monitoring points establishment and elaboration of monitoring methods concerning the disturbances types
- Perturbations level measurement
- Low frequency magnetic field induction measurement

- External sources radiated high frequency perturbations measurement.
- Continuous magnetic field induction measurement
- Design and realization of data acquisition systems for monitoring the transmission of conducted perturbations

4. Contract for the creation of a postuniversity lecture: *Design techniques for the compliance assurance concerning the CEM standards*

Director: Prof.dr.eng. Alimpie Ignea

Members: Lect.dr.eng. Ioan Lie

Assist.eng. Marius Rangu

Beneficiary: SC NOVAR Honeywell Life Safety

Value: 21,000 RON

FIELD AND GRANT DESCRIPTION

The lecture is postuniversity level with following task: in 60 hours of lectures and practical activities the design engineers have to familiarize with specific electromagnetic compatibility problems and the use of some modern design techniques for the compliance realisation in correspondence with these standards. In the theoretical part there have been treated the EMC standards, the electromagnetic coupling, the modality of realising the safeguard protection and shielding, EMC design of PCBs and electronic equipments. The practical part is concerning to the design and simulation of PCB using the computer for the compliance assurance with the EMC standards. The lecture finishes with the realisation of an PCB project by each one, choosed in concordance with the beneficiary.

5. PNCDI-INFRAS Program nr. 247 / 2004 *Interlaboratory tests for uncertainty measurements evaluation in electromagnetic compatibility*

Director: Prof.dr.eng. Alimpie IGNEA

Value: 23,500 RON

Members: Prof.dr.eng. Traian JURCA

Prof.dr.eng. Aldo DE SABATA

Assist.eng. Adrian MIHAIUTI

Assist.eng. Cora IFTODE

FIELD DESCRIPTION

- Study concerning the testing methodology on perturbations receivers used for measuring electromagnetic interferences in the electromagnetic compatibility settled domain;
- Elaborating the interlaboratory comparison size scheme in Round Robin system (circular test);
- Design and realization of verifying systems concerning the perturbations receivers and preparing the testing procedures;
- Design and realization of unit source for mobile perturbations;
- Interlaboratory attempts with perturbations receivers for each partner;

- Processing and evaluation of interlaboratory measurements results.

ACTIVITIES AND RESULTS

In the first phase was made a study concerning the electromagnetic perturbations sources used in CEM which is part of the research report concerning all the participants to the INFRAS contract.

In the second phase there have been realised 6 exemplars of a comb generator that have been distributed to the contract participants. One of the generators has been used using the method "round robin" for testing the measuring receivers belonging to the contract participants.

WORK-SHOP CO- ORGANISATION

a) Workshop: *Where are we running from*, organised in Bucharest inside the CERF exposition 2006, date 5 May 2006, with the participation of following paper: Prof.dr.eng. Alimpie Ignea, *Electromagnetic Field Interaction –Living Organism*

b) Workshop: *Romanian Regulations Harmonised with the European Directives*, Bucharest on 22 June 2006

Investigated domains: *Low Voltage, Electromagnetic Compatibility, Radio Equipments and Telecommunications*

Paper presented: Prof.dr.eng. Alimpie Ignea, *Measurement Spaces / EMC Testing*

c) Workshop: *Harmonised Romanian Regulations with the European Directives*, Craiova on 22 December 2006

Investigated domains: *Voltage, Electromagnetic Compatibility, Radio Equipments and Telecommunications*

Paper presented: Prof.dr.eng. Alimpie Ignea, *Antennas Calibration*

6. CNCSIS grant No. 2, CODE 340, type A, *Dynamic Characterization and Modelling of the Analog-to-Digital Converters Used in High-Speed Data Communications*

Director: Assoc.prof.dr.eng. Daniel Belega

Value: 7,200 RON

Members: Assist.eng. Dughir Ciprian

Assist.eng. Dragoi Beniamin

FIELD AND GRANT DESCRIPTION

- Presentation of a new method for dynamic testing of analog-to-digital converters by ramp testing signals.
- Development of a test system for analog-to-digital converters (ADCs) in which the ADC dynamic parameters are estimated by the proposed method.
- Determination of a constraint for the normalized frequency used in the three-parameter sine-fit algorithm for estimating with high accuracy of the dynamic parameters of an ADC by means of this algorithm.

➤ Determination of the theoretical expressions for calculating the parameters of a multifrequency signal by means of the interpolated discrete Fourier transform (DFT) method with a H -term maximum sidelobe decay windows ($H \geq 2$).

7. CNCISIS grant No. 58GR/19.05.2006, Theme No. 9, Code CNCISIS 369, Modern Techniques for Biomedical Signal Processing and Hypermedia Transmitting

Director: Assoc.dr.eng. Mihaela LASCU

Value: 10,000 RON

Members: Prof.dr.eng. Alimpie IGNEA
 Prof.dr.eng. Traian JURCA
 Prof.dr.eng. Aldo DE SABATA
 Assist. eng. Liliana STOICA
 Assist. eng. Gabriel GĂȘPĂRESC
 Assist.eng. Cora IFTODE
 Assist.eng. Adrian MIHAIUTI
 Master student Adrian Val HAREA
 Master student Marius Ady MIKLOS

FIELD AND GRANT DESCRIPTION

The purpose of the present project is biosignal acquisition, processing and modelling as well as presenting different analysis techniques and implementing the most effective methods for information storage, sorting and display. The clinically relevant information in the signal is often hidden by noise and interference, and the signal features may not be readily comprehensible by the visual or auditory systems of a human observer. In most of the cases biomedical signal processing requires a filtering operation for noise and power-line interference removal; spectral analysis is performed to understand the frequency characteristics of the signals and while modelling is necessary for feature representation and parameterization. Computer analysis of biomedical signals has the potential to add objective strength to the interpretation of the expert. Thus it becomes possible to improve the diagnostic confidence or accuracy even for an expert with many years of experience. This approach to improved health care could be labelled as computer-aided diagnosis. The main task is biomedical signal acquisition, data base realisation and the development of algorithms for biomedical signal analysis. It is intended to setup comparative performance study regarding the different implemented methods that lead to a correct diagnosis. The project will contribute to high quality human resources (PhD's, graduating students, postgraduate students).

ACTIVITIES AND RESULTS

The research results will be disseminated by publishing books, papers and by direct contact with the interested hospitals. The main purpose is to have in future an illness diagnosis with a greater accuracy.

The project is fitting the strategy plan of Politehnica University Timisoara. The research activities will take place in the Electromagnetic Compatibility Laboratory, which is equipped with high performance measurement, acquisition and processing systems, as a result of different research projects.

RESEARCH TEAM

- Prof.dr.eng. Alimpie IGNEA: *Electronic and Electric Measurements, Measuring in Industrial Processes, Measuring Systems in Electromagnetic Compatibility, Electromagnetic Supervising of sites, Antennas calibration, Nonlinearities study of high frequency devices*
- Prof.dr.eng. Mircea CHIVU: *Electronic and Electric Measurements, Measuring of the Electrical and Non Electrical Quantities, Television Channels Broadcasted Via Satellite*
- Prof.dr.eng. Aldo De SABATA: *Microwave and Optoelectronics Measurements, Antennas calibration*
- Assoc.prof.dr.eng. Mihaela LASCU: *Measuring of the Electrical and Not Electrical Quantities, Electrical Measuring of the Non Electrical Quantities, Measuring in Industrial Processes, Virtual Instrumentation*
- Lect.dr.eng. Daniel BELEGA: *Measuring Systems in Electromagnetic Compatibility, Instruments for Measurements, Digital Processing Structures*
- Assist.eng. Ciprian DUGHIR: *Electromagnetic Supervision of Sites, Antennas calibration*

Researches in SENSORS AND TRANSDUCERS

KEYWORDS

Piezoelectric sensors, optical crystals, optical effects, piezoelectric crystals, bulk waves, surface waves, sensor arrays

FIELD DESCRIPTION

Optoelectrical and piezoelectric crystals are frequently used in technique. Due to their property of converting optical and mechanical signals, these materials fit for transducers construction. Theoretical and experimental approaches were made on current measuring and magneto optic and piezoelectric sensors. An I²C interface has been experimented.

RESEARCH TEAM

- Prof.dr.eng. Sever CRIȘAN: *Optical Electronics, Electrical Measurement, Sensors and Transducers*

- Assist.eng. Emil LUZAN: *Measuring of Environmental Factors, Measuring of the Electrical and Non Electrical Quantities*
- Lect.dr.eng. Adrian VÂRTOSU: *Microwaves, Microwaves and Optoelectronics Measurement, Television Channels Broadcasted Via Satellite.*

INTERNATIONAL PROGRAMMES

1. COST 289 Spectrum and Power Efficient Broadband Communications

Prof. Aldo DE SABATA is delegate 2 for Romania, representative of the "Politehnica" University of Timișoara.

2. Passive Intermodulation WORKSHOP

Organised by Kathrein company from Rosenheim, Germany, May 17, 2006, where Prof.Dr.Ing. Alimpie IGNEA participated with the paper entitled *About Intermodulation*

PHD RESEARCH ACTIVITIES

1. *Scientific Supervisor: Prof.dr.eng. Eugen POP*
PhD students:
 - Liliana STOICA: *Contributions to Digital Signal Processing*
2. *Scientific Supervisor: Prof. dr. eng. Sever CRIȘAN*
PhD students:
 - Octavian LUCA: *Spectral analysis of bioelectrical signals*
 - Ovidiu VETREȘ: *Perturbations study of low frequency electromagnetic fields*
3. *Scientific Supervisor: Prof.dr.eng. Alimpie IGNEA*
PhD students:
 - Ciprian DUGHIR: *Contributions to antennas calibration*
 - Cristina VĂLIU: *Contributions to the nonlinearities study of high-frequency circuits*
 - Cora IFTODE: *Electromagnetic field effects on living organism*
 - Gabriel GĂȘPĂRESC: *Perturbation monitoring in electrical networks*
 - Adrian MIHĂIUȚI: *Contributions in antennas calibration*
 - Doru Lucian COCOȘ, *Neural Networks and Fuzzy Logic applications to electronic meter calibration*
 - Teodor PETRIȚA, *Contributions to radiofrequency disturbances monitoring*

- Raul Ionel: *Contributions to noise sources detection algorithms using virtual instrumentation*
- Michael Kleinkes (Germany): *Mathematical analysis of off-line programmed robots in industrial application cells monitoring*

PhD ESSAYS PRESENTED

1. Gabriel GĂȘPĂRESC, *Soft Programms for Data Compression*, May 2006
2. Adrian MIHĂIUȚI, *Antennas Characteristics Measurements*, May 2006
3. Teodor PETRIȚA: *Radiofrequency Perturbations Monitoring*, June 2006
4. Adrian MIHĂIUȚI, *Nonlinearity Antennas Study*, September 2006
5. Raul IONEL, *Virtual Instrumentation – Actual Stage and Perspectives*, January 2006
6. Raul IONEL, *Automated Spectral Analysis of Noise Sources Generated Signals*, June 2006
7. Michael KLEINKES, *Frequency Analysis of 3-Dimensional Movements*, June 2006
8. Michael KLEINKES, *Accuracy Effecting Elements in the Drive-Train of Industrial Robots*, June 2006
9. Michael KLEINKES, *Application of Denavit-Hartenberg Parameters for Forward and Reverse Robot Kinematics*, June 2006.

PUBLICATIONS

BOOKS

1. Ignea, A., *Measurements in telecommunications*, "Politehnica" Publ. House, Timișoara, 2006, ISBN 973-625-381-3, 192 pages (published in Romanian)
2. Ignea, A., (coordinator), *Aspects concerning perturbations monitoring from a site*, Waldpress Publ., Timișoara, 2006, ISBN 973-7878-22-1, 80 pages (published in Romanian).

PAPERS

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2. De Sabata, A., Ignea, A., *Sampling expansions on lattices for multidimensional, multiband signals*, WSEAS Transactions on Signal Processing, Issue 1, Vol. 2, Jan. 2006, ISSN 1790-5022, pp. 60-66

3. Dughir, C., Gășpăresc, G., *Preconditioning Circuit for Electrical Power System Disturbances Measurement*, Scientific Bulletin of the "Politehnica" University of Timisoara, Sept 2006, Timisoara, Tom 51(65), Fasc 1, 2006, ISSN 1583-3380, pp. 164-169
4. Dughir, C., Gășpăresc, G., Stoica, L., *Remote Surveillance System Using Smartcat BL2100 Single Board Computer*, International Symposium "Universitaria Simpro" 2006, Universitas Ed., Petroșani, 13-14 October 2006, ISSN 1842-4449, pp. 114-117
5. Dughir, C., Gășpăresc, G., *Three Channels Analysis System for Electrical Power System Disturbances Measurement*, Bulletin of the Politechnic Institute of Iași, Tom LII(LVI), Fasc. 5, 2006
6. Frigură-Iliasa, F.M., Popa, C., Zeng, E., Stoica, L., *Some Aspects Concerning the Functional Limits of a ZnO Based Varistor*, Proceedings "Electrical Engineering, Electronics, Automation", University of Rousse "Angel Kanchev", Bulgaria, Vol. 45, No. 3.1, 2006, ISSN 1311-3321, pp. 56-60
7. Frigură-Iliasa, F.M., Popa, C., Zeng, E., Stoica, L., *Some Improvements Concerning the Manufacturing Process of ZnO Based Varistors*, Proceedings "Electrical Engineering, Electronics, Automation", University of Rousse "Angel Kanchev", Bulgaria, Vol. 45, No. 3.1, 2006, ISSN 1311-3321, pp. 51-55
8. Gășpăresc, G., Dughir, C., Ignea, A., *Research of Electromagnetic Disturbances Using A Disturbance Generator with GUI*, Symposium on Electromagnetic Compatibility "SICEM 2006", Bucharest, 9 November 2006
9. Gășpăresc, G., Dughir, C., *Building A Transient Disturbances Generator With Graphical User Interface in Matlab*, Scientific Bulletin of the "Politehnica" University of Timisoara, Sept 2006, Timisoara, Tom 51(65), Fasc 1, 2006, ISSN 1583-3380, pp. 49-52
10. Gășpăresc G., Dughir C., *Electromagnetic Disturbances Generator with Graphical User Interface Build in Matlab*, Scientific Bulletin of the "Gheorghe Asachi" Technical University of Iasi, Trans. Electrotechnics, Electronics, Energetics, Tom LII(LVI), Fasc. 5B, 2006, ISSN 1223-8139, pp. 826-831
11. Gășpăresc, G., Dughir, C., Stoica, L., *Signal Generator for Usual Waveforms and Electromagnetic Disturbances with Graphical User Interface*, International Symposium "Universitaria Simpro" 2006, Universitas Ed., Petroșani, 13-14 October 2006, ISSN 1842-4449, pp. 118-121
12. Ignea, A., Dughir, C., Gășpăresc, G., *Calibration Method for Nonlinear Voltage Divider Used as Preconditioning Circuit in the Electrical Power Network Disturbances Monitoring System*, Symposium on Electromagnetic Compatibility "SICEM 2006", Bucharest, 9 November 2006
13. Ignea, A., *Measuring receivers testing with comb generators in round-robin system*, Electromagnetic Compatibility International Symposium, Bucharest, November 2006, SICEM 2006
14. Ignea, A., Mihăiuți, A., *Signals Level Estimation from Radio Broadcasting Stations*, Electromagnetic Compatibility International Symposium, Bucharest, November 2006, SICEM 2006
15. Kleinkes, M., Ignea, A., Neddermeyer, W., Schnell, M., *Interpolation of linear track movements of modern industrial robots*, Etc-06
16. Lascu, M., Lascu, D., Lie, I., Tănase, M., *Compression, Noise Removal and Comparison in Digital Mammography using LabVIEW*, Proceedings 10th WSEAS International Conference on Computers, Vouliagmeni, Athens, Greece, July 13-15, 2006, pp. 671-676
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19. Matekovits, L., De Sabata, A., Pirinoli, P., Orefice, M., *Broadband measurement of the refractive index using microstrip lines*, Scientific Bulletin of the "Politehnica" University of Timisoara, Trans. on Electronics and Telecomm., Tom 51(65), Fasc. 1, 2006, ISSN 1583-3380, pp. 44-48
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24. Popa, M., Ionel, R., Voicu, G., Marcu, M., *Educational Virtual Instrumentation Application for System Identification*, Instrumentation and Measurement Conference 2006, Sorrento, Italy
25. Serafin, P., Ignea, A., *Application for Frequent Pattern Recognition in Telecommunication Alarm Logs*, Etc-06
26. Stoica, L., *A New Algorithm for Determining the Coefficients in B-spline Interpolation*, Scientific Bulletin of the "Politehnica" University of Timișoara, Transactions on Electronics and Communications, Vol.51(65), No.2, 2006, ISSN 1583-3380, pp. 5-8
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