# DEPARTMENT OF MECHATRONICS AND ELECTRONICS

## 1 General Information

Department of Mechatronics and Electronics (KME) is part of the Faculty of Electrical Engineering at the University of Žilina. It is workplace which primary task is to train experts in area of electronics, industry automation, power-electronic and mechatronic systems on all levels of university education. Great importance is science-research activity of the department which is realized by variety of projects funded by international and national grants.

Department team is led by group of internationally recognized professors and associated professors with high scientific and educational erudition. Part of this group is also younger researchers and post-doctorate students. Strong part of collective is represented by intern doctorate students with significant participation in science-research activity.

A department supports wide variety of activities in addition to already mentioned. Department supports research for industrial, national and foreign subjects and variety of student's activities and projects.

Like the previous years, the last year could be considered as a very successful one. Within the year the updating of laboratory equipment in the building AB was completed. Significant progress has been made in building of centres of excellence laboratories.

In the last year the research activity of the Department has achieved a significant increasing implemented by means of grant projects. Department staff participated in several international and national projects. Centres of Excellence CEEX2 and CEKR2 have been built within the frame of which the Department has cooperated with several prestigious Slovak institutions (SAS Košice, The Technical University of Košice and Jesenius Faculty of Medicine of the Comenius University in Martin). These projects represent a very significant support to research which has been done in our Department.

In the year 2012 the Department involves fourteen members of educational staff, eight research workers, eighteen internal PhD students and fourteen external PhD students. From the point of view of internal structure it has been divided into two divisions. The first one is focused on power- and applied electronics, the second one is operating in the field of mechatronics and industry automation.

The Department provides educational process at all three levels of the university study. The bachelor degree is covered by the accredited course of study for Electrical Engineering (specialization in Mechatronic Systems). Master degree includes the accredited course of study for Power Electronic Systems (in Power Electronics specialization and Mechatronic and Automotive Systems specialization). In doctorate study the department staff participated in providing training courses in Powerline Electronics, Automation and Telecommunications.

Within the frame of educational pedagogical operation the Department has been providing education of electronics, mechatronics, micro-computer systems involving industrial controllers and power electronics at the Faculty of Electrical Engineering, and also at further faculties of the University of Zilina. Such education has been dedicated for different study branches and specializations in the bachelor, magisterial and doctoral studies, both in internal and external ones.

The Department also has organized and provided research and development, expertizing and contracts, and develops publication activity in the field of electronics, control systems, mechatronics and power electronics mainly. Further education is provided by the Department in the field of power electronic systems, microcomputer control systems, industrial controllers and programmable logic systems.

Professional activities of the Department have been applied and disseminated on creation and operation of quality and reliable electronic devices and systems, application of programmable logic areas in design of electronic systems, reconfigurable circuits study as well as diagnostics and analyzing of the failures using image analysis. Topology optimizing for power semiconductor converters and their electro-magnetic compatibility belongs to main activities of the Department.

In present time the Department operates with six laboratories dedicated for pedagogical operation, including final projects, final and master thesis providing. Beside above mentioned labs the Department offers for utilizing three high-tech workplaces dedicated for research and development activities and to experimental part of PhD study providing. It deals with the laboratory of power electronics, the laboratory of digital image processing and laboratories of digital signal processors and industrial programmable logic controllers.

## 2 Staff of the Department

| | |
|---|---|
| Head of the Department: | Pavol Špánik |
| Vice-head of the Department: | Branislav Dobrucký |
| Secretary for Education: | Anna Kondelová |
| Administrative Support: | Andrea Prandová |

### 2.1 Sections of the Department

2.1.1 Section of Electronics and Control Systems

| | |
|---|---|
| Head of the Section: | Jozef Čuntala |
| Professors: | Branislav Dobrucký, Pavol Špánik |
| Visiting Professors: | Alfio Consoli |
| Associate Professors: | Jozef Čuntala, Miroslav Hrianka, Libor Hargaš, Jozef Budaj, Jozef Kuchta |
| Research Fellows: | Peter Drgoňa, Michal Frivaldský, Dušan Koniar, Ondrej Hock, Michal Praženica |
| Senior Lecturers (with PhD): | Rastislav Pavlanin, Rastislav Havrila |
| Senior Lecturers (without PhD): | Ivan Kožehuba, Jozef Lakatoš, Peter Šindler, Anna Kondelová |

2.1.2 Section of Mechatronic Systems and Industry Automation

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|---|---|
| Head of the Section: | Fedor Kállay |
| Professors: | Fedor Kállay |
| Associate Professors: | Pavel Pavlásek |
| Research Fellows: | Marek Paškala |
| Senior Lecturers (with PhD): | Anna Simonová |

2.1.3 Postgraduate Students

Internal (full-time): Michal Praženica (until 31st August 2012), Ondrej Hock (until 31st August 2012), Jozef Kandráč (until 31st August 2012), Stanislav Štofan, Ján Kašša (until 31st August 2012), Miloslav Kolpach, Peter Hurtuk (until 31st August 2012), Martin Priečinský (until 31st August 2012), Roman Radvan, Andrej Rybovič, Tomáš Kapusta, Jozef Sedlák, Slavomír Kaščák, Peter Čuboň, Marek Valčo, Jozef Šedo, Juraj Koscelník (from 2nd September 2012), Zuzana Liptáková (from 2nd September 2012)

External (part-time): Peter Šindler, Anna Kondelová, Marek Paškala, Peter Čerňan, Peter Jeck, Ivan Lovás, Andrej Kaňovský, Jaroslav Ilončiak, Matej Bielik, Erika Záhorcová Polčanová, Zuzana Ridzoňová, Daniela Hívešová, Marián Novota, Anna Bystričanová Holásková

# 3 Teaching

## 3.1 Courses in Bachelor and Master Degree Programmes

### 3.1.1 Bachelor Degree Programmes

| Code | Title | Semester | Lessons-Seminars-Exercises hours/week | Teachers |
|---|---|---|---|---|
| *Courses at the Faculty of Electrical Engineering* | | | | |
| 31302 | Electronics I | 3 | 2-0-3 | Čuntala |
| 31212 | Introduction to Industry Automation and Mechatronics | 3 | 1-0-3 | Kállay |
| 31402 | Automatic Regulation 1 | 4 | 2-2-0 | Simonová |
| 31413 | Electric Light and Heat | 4 | 2-1-1 | Pavlásek |
| 31414 | Electromagnetic Compatibility | 4 | 2-2-0 | Špánik |
| 31415 | Electronics II | 4 | 2-0-3 | Hrianka |
| 31426 | Measurement of Non-Electric Parameters | 4 | 2-0-2 | Kállay |
| 31427 | Power Supplies | 4 | 2-0-1 | Špánik |
| 31430 | Computers in Industrial Automation | 4 | 2-0-2 | Kállay |
| 31502 | Power Electronics | 5 | 3-1-2 | Špánik |
| 31511 | Microprocessor Technology | 5 | 3-0-2 | Čuntala |
| 31524 | Logical Circuits | 5 | 3-0-2 | Hrianka |
| 31528 | Multimedia Technology | 5 | 2-0-1 | Pavlásek |
| 31542 | Image Processing and Analysis | 5 | 2-0-2 | Hrianka |
| 31552 | Computer and Office Technique | 5 | 2-0-1 | Pavlásek |
| 31556 | Mechatronics | 5 | 2-0-2 | Pavlásek |
| 31557 | Automatic Regulation 2 | 5 | 2-1-1 | Simonová |
| 31563 | Design of Electronic Devices | 6 | 2-2-6 | Čuntala |
| 31628 | Power Semiconductor Systems | 6 | 3-1-1 | Špánik |
| 31630 | Bachelor Project Power Electronic Systems | 6 | 0-0-6 | Kállay |
| 31634 | Bachelor Project Mechatronic Systems | 6 | 0-0-6 | Kállay |
| *Courses at the Faculty of Mechanical Engineering* | | | | |
| 2B092 | Drives of Mechatronic Systems | 5 | 2-0-1 | Špánik |
| 2B127 | Electronics | 6 | 2-0-2 | Čuntala |

### 3.1.2 Master Degree Programmes

| Code | Title | Semester | Lessons-Seminars-Exercises hours/week | Teachers |
|---|---|---|---|---|
| *Courses at the Faculty of Electrical Engineering* | | | | |
| 32107 | Electromagnetic Compatibility in Electr. | 1 | 2-2-0 | Špánik |
| 32111 | Information and Industrial Networks | 1 | 2-0-2 | Kállay |

| | | | | |
|---|---|---|---|---|
| 32117 | Design of ASIC | 1 | 1-3-0 | Čuntala |
| 32119 | Computers in Industrial Automation 2 | 1 | 2-0-2 | Kállay |
| 32126 | Control of Electric Actuators | 1 | 3-1-1 | Dobrucký |
| 32129 | Theory of Automatic Control 1 | 1 | 2-1-1 | Simonová |
| 32136 | Power Semiconductor Converters | 1 | 3-0-3 | Špánik |
| | | | | |
| 32200 | Analysis and Synthesis of PE Circuits | 2 | 2-2-0 | Špánik |
| 32211 | Measurement and Digit. Data Processing | 2 | 2-2-0 | Pavlásek |
| 32216 | Microprocessors, Microcomputers and DSP | 2 | 2-0-3 | Dobrucký |
| 32233 | Microproc. and Microcomputer Systems | 2 | 3-0-3 | Dobrucký |
| 32236 | Theory of Automatic Control 2 | 2 | 2-1-1 | Simonová |
| | | | | |
| 32300 | Power Electronics Applications in ET & EE | 3 | 3-0-1 | Dobrucký |
| 32324 | Design and Construction of PE Systems | 3 | 2-2-0 | Špánik |
| 32325 | Design of ASIC | 3 | 1-3-0 | Čuntala |
| 32330 | Semiconductor Sensors | 3 | 2-2-0 | Lakatoš |
| 32334 | Semestral Project | 3 | 0-4-0 | Špánik |
| 32341 | Virtual Instrumentation | 3 | 2-0-2 | Hargaš |
| 31515 | Mechatronic Systems | 3 | 2-0-2 | Pavlásek |
| | | | | |
| 32402 | Diploma Thesis PES | 4 | 0-2-0 | |
| 32404 | Diploma Seminar | 4 | 0-2-0 | Špánik |
| 32405 | Discrete Control of Power Systems | 4 | 6-0-6 | Dobrucký |
| 32406 | Dispatching Systems | 4 | 4-0-4 | Kállay |
| 32416 | Industrial Informatics | 4 | 4-0-4 | Kállay |

*Courses at the Faculty of Mechanical Engineering*

| | | | | |
|---|---|---|---|---|
| 2N125 | Electronic Control Elements | 1 | 2-2-0 | Špánik |
| 2N244 | Exploitation of Computer Networks | 1 | 2-0-2 | Kállay |
| 2N246 | Microcomputer Technics | 1 | 2-0-2 | Čuntala |
| 2N014 | Information and Industry Networks | 2 | 2-0-2 | Kállay |
| 2N125 | Electronic Control Elements | 2 | 2-2-0 | Špánik |
| 2N140 | Converter Drives | 3 | 2-2-0 | Špánik |
| 2N141 | Control Microcomputers | 3 | 2-2-0 | Dobrucký |

*Courses for Foreign Students – LLP/Erasmus Program*

Course / Teacher / Student of University
31413 Electric Light and Heat *(Pavlásek),*
Diogo Adriano da Silva Nogueira, Universidade do Porto, PT
31415 Electronics II *(Hrianka, Kondelová),*
Ivan Georgiev Karchev, College of Telecommunications and Post, Sofia, BG
31502 Power Electronics *(Dobrucký),*
Mete Torun, Uludag University, TR
31511 Microprocessor Technology (*Čuntala, Kondelová),*
Wojciech Szcepan Hawryluk, Lublin University of Technology, PL
Rafal Dyč, Lublin University of Technology, PL
31528 Multimedia Technology *(Pavlásek),*
Mete Torun, Uludag University, TR
32211 Measurement and Digit. Data Processing *(Pavlásek),*
Ivan Georgiev Karchev, College of Telecommunications and Post, Sofia, BG

# 4 Research & Development

The Department also has organized and provided research and development, expertizing and contracts, and develops publication activity in the field of electronics, control systems, mechatronics and power electronics mainly.

Professional activities of the Department have been applied and disseminated on creation and operation of quality and reliable electronic devices and systems, application of programmable logic areas in design of electronic systems, reconfigurable circuits study as well as diagnostics and analyzing of the failures using image analysis. Topology optimizing for power semiconductor converters and their electro-magnetic compatibility belongs to main activities of the Department.

**Research and Development Laboratories**

## 4.1 Laboratory of Electromagnetic Compatibility

The laboratory is built nowadays. In laboratory, will be realized research in emission a resistance of convertors with high switching frequency.

## 4.2 Laboratory of Physical Models

The laboratory of physical models offers base for development of physical models. Laboratory contains basic mechanical and electronic tools and measurement devices for electronic circuits. Laboratory is accessible for both employees and students which are supervised.

## 4.3 Laboratory of Doctoral Research

Employees of the Department are dealing with science-research activity in analysis and design of power convertor systems, electromagnetic compatibility and image analysis in biomedicine. There are realized also computer simulations and verifications.

## 4.4 Laboratory of Low Power Drives Research

Laboratory is focused on research, design and testing of two-phase low power drives and perspective control structures for low power drives. Development of convertors for two-phase drives and experiments in field of sensor-less motor position determination is realized.
Equipment of laboratory includes dSpace work station, measurement devices, oscilloscopes, function generators, power analyzer, power supplies, converters and electrical motors.

**Education and Research Laboratories**

## 4.5 Laboratory of Power Electronics

Lessons of Power Electronics Systems.

## 4.6 Laboratory of Industrial Automation

Lessons of Industrial Automation application.

### 4.7 Laboratory of Control Systems

Lessons of Control Systems and DSP programming.

### 4.8 Laboratory of Logic Circuits

Lessons of the Logic Systems and research in area of digital image processing.

### 4.9 Laboratory of Microelectronics

Lessons of ASIC design and methods of control, analysis and synthesis of power systems.

## 5 Research and Educational Projects

### 5.1 National Projects

5.1.1 Research Projects Funded by the Scientific Grant Agency of the Slovak Republic (VEGA)

***VEGA 1/0943/11: Research of Adaptive Multi-Tank Power System for Renewable Energy Sources***

Summary: Project is dealing with development of system for accumulation and distribution of electric energy from renewable energy sources. Primary source of energy is photovoltaic cell.
Realization: 01/2011 – 12/2013
Coordinator: Pavol Špánik
Co-operator: Branislav Dobrucký, Fedor Kállay, Jozef Čuntala, Miroslav Hrianka, Libor Hargaš, Peter Šindler, Anna Kondelová, Ivan Kožehuba, Marek Paškala, Michal Frivaldský, Peter Drgoňa, Dušan Koniar, Anna Simonová, Peter Hurtuk, Jozef Kandráč, Martin Priečinský

***VEGA 01/1099/11: Modelling and Simulation of Environment Dynamic Interaction of Driver–Car–Transport Instantiation***

Realization: 01/2011 – 12/2013
Coordinator: Mikuláš Alexík, FMSI, University of Žilina
Sub-Coordinator: Branislav Dobrucký

5.1.2 Research Projects Funded by the Slovak Research and Development Agency (APVV)

***LPP-0366-09: High Frequency Power Electronic Converters***

Summary: Project deals with research of complex problematic of power converters operating in very high frequency region of 500-1000 kHz.
Realization: 09/2009 – 10/2012
Coordinator: Pavol Špánik
Co-operators: Jozef Kandráč, Martin Priečinský

***APVV-0138-10: Research and Development of the Small Power Drives with Two-phase Motors***

Summary: Development of two-phase low power electric drives concerning to home appliances and industrial low power applications.

Realization: 05/2011 – 10/2014
Coordinator: Pavel Záskalický, TUKE Košice
Sub-Coordinator: Branislav Dobrucký
Co-operators: Michal Frivaldský, Peter Drgoňa, Michal Praženica, Ján Kašša, Slavomír Kaščák

5.1.3 Projects of European Structural Funds

***ITMS 26220120046: CEEX2 Centre of Power Electronic Systems and Materials for their Components, Operational Program Research and Development II***
Summary: Completion and updating of workplaces of power electronic systems. Completion and updating of workplaces for power electronic system materials.
Realization: 09/2010 – 08/2013
Coordinator: Pavol Špánik, Branislav Dobrucký
Co-operators: Jozef Čuntala, Peter Šindler, Peter Drgoňa, Anna Simonová, Marek Paškala, Libor Hargaš, Michal Frívaldský, Pavel Pavlásek, Rastislav Pavlanin

***ITMS 2622010034: CEKR2 Centre for Experimental and Clinical Respirology II***
Summary: Workstation updating of experimental and clinical respirology.
Realization: 01/2010 – 03/2013
Coordinator: Miroslav Hrianka
Co-operator: Libor Hargaš, Anna Simonová, Stanislav Štofan

***ITMS 26220220019: MKC Ciliary Kinetics Measurement of Respiratory Tractus***
Summary: Design and assembly of measurement system for analysis of micro objects kinematics
Realization: 03/2009 – 09/2012
Coordinator: Miroslav Hrianka
Co-operator: Libor Hargaš, Dušan Koniar

***ITMS 26110230004: Systemisation of Advanced Technology and Knowledge Transfer between Industrial Sphere and University Environment***
Summary: Strategic objective of the project is – according to the main goal of the call OPV-2009/1.2/01-SORO – Support of innovative forms of education at universities and development of human resources in research and development of operating programme Education – Universities and research and development as driving means for knowledge society development
Realization: 05/2010 – 04/2013
Coordinator: Milan Saga, Faculty of Mechanical Engineering, University of Žilina
Co-operator: Pavol Špánik, Branislav Dobrucký, Michal Frívaldský, Jozef Čuntala

***ITMS 26110230005: Flexible and Attractive Education at University of Žilina for Needs of Labour Market, and Knowledge Society***
Realization: 2010 – 03/2013
Coordinator: Renáta Švarcová
Co-operator: Pavol Špánik, Branislav Dobrucký, Pavel Pavlásek, Libor Hargaš, Jozef Čuntal

***ITMS 26220220078: Research of High-Economic components of Electric Drive Systems of Driving Traction Vehicles and Urban Mass Transportation Vehicles***
Summary: Research of components of electric drive systems for electric locomotives and urban mass transportation vehicles using of latest principles, materials, circuit and construction solutions leading to primary energy savings, minimising of back influences onto supply system and emission minimising.

Realization: 09/2010 – 11/2013
Coordinator: Pavol Špánik
Co-operator: Fedor Kállay, Peter Šindler, Michal Frivaldský, Anna Kondelová, Peter Drgoňa, Marek Paškala

***ITMS 26220220046: The Development of Parallel Kinematic Structures Prototypes for Application in the Area of Production Machines and Robots***
Realization: 09/2009 – 05/2013
Coordinator: Viera Poppeová, Faculty of Mechanical Engineering, University of Žilina
Co-operator: Peter Šindler

***ITMS 26220220088: Applied Research and Development of Inovative Energy Resources for Ultra High Pressure Pulses***
Summary: Project deals with analysis and design of plasmabit electrical part for deep drill holes. Energy transfer is investigated in operation steady states as well as critical states.
Realization: 09/2010 – 08/2013
Coordinator: Pavol Rafajdus
Co-operator: Branislav Dobrucký

### 5.2 International Projects

5.2.1 CEEPUS II Projects

**CII-SK-0030-06-1011*: From preparation to development, implementation and utilisation of joint programs in study area of Production Engineering – contribution to higher flexibility and mobility of students in central European region***
Summary: Computer aid for production technologies
Realization: 01/2008 – 08/2013
Coordinator: Ivan Kuric, Faculty of Mechanical Engineering, University of Žilina
Co-operators: Fedor Kállay

5.2.2 Custom-made Research Projects

**P-103-0007/08*: Analysis of heat fields in power electronic systems***
Summary: Project deals with appraisal of lifetime of supercapacitors.
Realization: 06/2012 – 12/2012
Customer: Panasonic Electronic Devices Europe GmbH
Coordinator: Pavol Špánik
Co-operators: Jozef Čuntala, Branislav Dobrucký, Jozef Lakatoš, Libor Hargaš, Michal Frivaldský, Peter Drgoňa, Roman Radvan

## 6 Co-operation

### 6.1 Co-operation Partners in Slovakia

EVPÚ a.s Nová Dubnica
Panasonic Electronic Devices Slovakia, s.r.o., Trstená
NES Nová Dubnica
Power-One, Dubnica nad Váhom
Siemens s.r.o., Bratislava, Žilina
Vedeckotechnologický park, Žilina

LJF Martin, UK Bratislava
ABB Slovakia, Bratislava
DataTherm, s.r.o. Žilina
Robotec s.r.o. Sučany
CONTINENTAL MATADOR s.r.o. Púchov
HAGARD: HALL a.s. Nitra, Žilina
IPESOFT s.r.o. Žilina
Považská cementáreň a.s., Ladce
Energo controls s.r.o. Žilina
ControlTech, s.r.o. Trnava
Schneider Electric Slovakia, s.r.o., Bratislava, Žilina
MACRO, s.r.o., Žilina
SSE, a.s. Žilina
Súkromná zváračská škola, Žilina
Department of el. engineering, mechatronics and industrial engineering, FEI TU Košice
Department of mechatronic systems, FM TUAD, Trenčín
Department of automation and regulation, FEI STU, Bratislava
Department of electric machines and apparatus, FEI STU, Bratislava
INA Kysuce, a.s. Kysucké Nové Mesto
KIA Motors, s.r.o. Žilina
GRANIT, s.r.o. Žilina
AAUTO, s.r.o. Žilina
VIP AUTO, s.r.o. Žilina
TEAM DC, Bratislava
GS1 Slovakia, Žilina
Htest Slovakia, Banská Bystrica
SSC, Bratislava
NDS, Bratislava
SEMIKRON s.r.o. Vrbové
EMIS s.r.o. Bratislava

### 6.2 International Co-operation Partners

Universitá degli studi di Catania, IT, DIEES, Prof. Alfio Consoli
Panasonic Electronic Devices Co., Ltd., Kadoma, JPN
Panasonic Electronic Devices Europe GmbH, Lüneburg, DE
Politecnico di Bari, IT, DEE, Prof. Francesco Cupertino
University of Nottingham, UK, Prof. Greg ASHER, Prof. Pat Wheeler
University of Picardie – Jules Verne, Amiens, FR, Prof. Gérard-André Capolino
National University of Ireland, Dublin, IRL, Prof. Annroi de Paor
University of Porto, PT, Prof. Maciel Barbosa
Technische Universität Dresden, DE, Dr. Peter Büchner
Technische Universität Darmstadt, DE, Prof. Andreas Binder
Technikum Wien, AT, Prof. Felix Himmelstoss
Technische Universität Bochum, DE, Prof. Andreas Steimel
National Instruments Czech Republic, s.r.o., CZ, Peter Brieška
Technical Univesity RWTH Aachen, DE, Prof. Blazek Vladimir
Politechnika Radomska, PL, Prof. Miroslav Luft, Assoc. Prof. Elzbieta Szychta
XILINX USA, University program
Humusoft s.r.o. Praha, CZ, Karel Bittner
TU – VŠB Ostrava, CZ, Prof. Pavel Brandstetter, Prof. Petr Chlebiš
FAIRCHILD Semiconductor - Power Franchise, EU
FreeScale s.r.o., Rožňov pod Radhoštěm, CZ
Rockwell Automotion s.r.o., Praha, CZ

Technological & Cultural Park of Lavrion, GR
TIM Science Park, Timisoara, RO
University Ioan Slavici, Timisoara, RO
The University of Strathclyde, Glasgow, UK
EQUINOCCIO Madrid, ES

### 6.3 Visitors to the Department

| *Name* | *Institution* | *Length of stay* |
|---|---|---|
| Dr. hab. inž. Elzbieta SZYCHTA, PhD. | University of Radom, Poland | 4 days |
| Prof. Ing. Miroslav LUFT, PhD. | University of Radom, Poland | 4 days |
| Nobuki ITOH, PhD. | Panasonic, Japan | 5 days |
| Dipl.-Ing. Norbert GLAPA | Panasonic, DE | 5 days |
| Miho NISHIGUCHI | Panasonic, Japan | 5 days |
| Prof. Eng. Giuseppe SCARCELLA, PhD. | UNICT Catania, IT | 2 days |
| Assoc. Prof. Ing. Mario CACCIATO, PhD. | UNICT Catania, IT | 2 days |
| Ing. Giacommo SCELBA, PhD. | UNICT Catania, IT | 2 days |

### 6.4 Visits to Foreign Institutions

| *Name* | *Institution* | *Length of stay* |
|---|---|---|
| Doc. Ing. Miroslav HRIANKA , PhD. | RWTH – Aachen, DE | 7 days |
| Prof. Ing. Branislav DOBRUCKÝ, PhD. | University of Catania, IT | 6 days |
| Prof. Ing. Pavol ŠPÁNIK, PhD. | UNICT Catania, IT | 5 days |
| Prof. Ing. Pavol ŠPÁNIK, PhD. | University of Radom, PL | 2 days |
| Ing. Andrej RYBOVIČ | HTW Dresden, DE DAAD | 6 months |
| Ing.Tomáš KAPUSTA | University of Catania, IT | 3 months |
| Ing. Jozef SEDLÁK | ZČU, Plzeň, CZ | 3 months |

*Participation in Foreign conferences:*
*Active:*

| | | |
|---|---|---|
| Prof. Ing. Branislav Dobrucký, PhD. | IEEE, IECON 2012, Montreal, CA | 5 days |
| Prof. Ing. Branislav Dobrucký, PhD. | LogiTrans, Szczyrk, PL | 2 days |
| Prof. Ing. Branislav Dobrucký, PhD. | TRANSCOMP, Politechnika Radomska, Zakopané, PL | 2 days |
| Prof. Ing. Branislav Dobrucký, PhD. | ICREPQ 2012, Santiago de Comp., ES | 5 days |
| Prof. Ing. Branislav Dobrucký, PhD. | CESDS 2012, KRYNICA, PL | 4 days |
| Prof. Ing. Pavol Špánik, PhD. | CESDS 2012, KRYNICA, PL | 4 days |
| Ing. Peter Čuboň | CESDS 2012, KRYNICA, PL | 4 days |
| Ing. Jozef Sedlák | CESDS 2012, KRYNICA, PL | 4 days |
| Ing. Juraj Koscelník | CESDS 2012, KRYNICA, PL | 4 days |
| Ing. Liptáková Zuzana | CESDS 2012, KRYNICA, PL | 4 days |
| Ing. Slavomír Kaščák | CESDS 2012, KRYNICA, PL | 4 days |
| Ing. Tomáš Kapusta | CESDS 2012, KRYNICA, PL | 4 days |
| Doc. Ing. Miroslav Hrianka, PhD. | IEEE, IECON 2012, Montreal, CA | 5 days |
| Doc. Ing. Libor Hargaš, PhD. | IEEE, IECON 2012, Montreal, CA | 5 days |
| Doc. Ing. Libor Hargaš, PhD. | LogiTrans, Szczyrk, PL | 2 days |
| Prof. Ing. Pavol Špánik, PhD. | LogiTrans, Szczyrk, PL | 2 days |
| Ing. Ján Kašša, PhD. | IN-TECH, Rijeka, HR | 3 days |
| Prof. Ing. Pavol Špánik, PhD. | MMMSE 2012, Orlando, FL, USA | 5 days |
| Ing. Michal Frivaldský, PhD. | MMMSE 2012, Orlando, FL, USA | 5 days |
| Ing. Peter Drgoňa, PhD. | MMMSE 2012, Orlando, FL, USA | 5 days |
| Ing. Ondrej Hock,PhD. | Applied Electronics, ZČU, Plzeň | 2 days |

| | | |
|---|---|---|
| Ing. Michal Frivaldský, PhD. | Applied Electronics, ZČU, Plzeň | 2 days |
| Ing. Peter Čuboň | 12th PhD students workshop, Ostrava, CZ | 1 day |
| Ing. Marek Valčo | 12th PhD students workshop, Ostrava, CZ | 1 day |

Paper without presentation:

| | | |
|---|---|---|
| Prof. Branislav Dobrucký | ASM 2012, Sorento, IT | 3 days |
| Prof. Branislav Dobrucký | EPE PEMC 2012 ECCE Europe, Novy Sad, SCG | 4 days |
| Prof. Branislav Dobrucký | Electronics 2012, Palanga, Litva | 3 days |
| Prof. Branislav Dobrucký | ICPM 12, Liberec, CZ | 3 days |
| Prof. Branislav Dobrucký | SPEEDAM 2012, Sorento, IT | 3 days |
| Ing. Slavomír Kaščák | SPEEDAM 2012, Sorento, IT | 3 days |
| Ing. Michal Praženica, PhD. | SPEEDAM 2012, Sorento, IT | 3 days |
| Ing. Jozef Šedo | 12th PhD students workshop, Ostrava, CZ | 1 day |

# 7 Other Activities

## 7.1 Specialized Lectures, Courses Organized by the Department

*Title of Lecture/Course: RFID Identifiers*
Customer: GS1 SLOVAKIA, Department of Mechatronics and Electronics, University of Žilina
Lecturer: Pavel Pavlásek
Date: 17th December to 19th December 2012

*Title of Lecture/Course: Identification of Goods and Services by RFID*
Customer: GS1 SLOVAKIA, Department of Mechatronics and Electronics, University of Žilina
Lecturer: Miroslav Štaffen, Pavel Pavlásek
Date: 19th December 2012

*Title of Lecture/Course: Control of Tunnel Operation*
*Distant Education for Operators at the Bôrik Tunnel*
Customer: SSC
Lecturer: Fedor Kallay
Date: November 2012

*Competition: The Technical Idea of the Year*
Participants: Secondary school students
Organizers: Pavol Špánik, Michal Frivaldský, Peter Drgoňa, Peter Šindler, Libor Hargaš
Date: 13th June 2012

## 7.2 Invited Lectures/Papers

Elimination of safety risks on first class roads
Lecturer: Pavel Pavlásek
Where/Date: Road Conference 2012, Bratislava / 20th – 21st March 2012

## 7.3 Membership in International Institutions/Committees

Branislav Dobrucký - Senior Member of IEEE IE Society

| | |
|---|---|
| | - Reviewer for Publishing Company Elsevier, NL |
| | - Reviewer for EPE journal, Brussels, BE |
| | - Steering Programme Committee of International IASTED 2012 Conference |
| | - Member of SMTC 2012 Evaluation Committee - competition |
| Pavel Pavlásek | - Member of the Editorial Board of the Strojárstvo (Machinery) Journal |
| | - Member of the Editorial Board of the Inžinierske stavby Journal |
| | - Member of Brandon Hall Excellence in Learning Technology Awards |
| | - Expert of FP7 Programme NMP – 2007 – 3.4 – 1 |
| | - Expert of Romanian Ministry of Education, Research and Youth |
| Pavol Špánik | - Senior Member of IEEE IE Society |
| | - Member of the Scientific Board of FEI – TU Ostrava, CZ |
| | - Member of the Electronics Committee, FEI – TU Ostrava, CZ |
| Michal Frivaldský | - Member of IEEE IE Society |
| Peter Drgoňa | - Member of IEEE IE Society |

### 7.4 Membership in National Institutions/Committees

| | |
|---|---|
| Branislav Dobrucký | - Steering Programme Committee of ALER 2012 Conference |
| | - Steering Programme Committee of ELEKTRO 2012 Conference |
| Pavel Pavlásek | - Member of the Commission of Transport and Road Administration port (The Žilina Self-governing region) |
| | - Member of the Grant Commission for Education and Culture No.2 of the Ministry of Education of Slovak Republic |
| | - Member of the Commission of the Ministry of Education of Slovak Republic for Selection of the Aid of Candidates from Developing Countries and Compatriots |
| | - Representative of Regional Assembly of Žilina Self-governing Region |
| | - Director General of Slovak Road Administration |
| | - Member of the Supervisory Board of SSE – Distribúcia a.s. Žilina |
| | - Member of the Supervisory Board of Letisková spoločnosť a.s. Žilina |
| Pavol Špánik | - Member of the Working Group „Industry Technologies“ at Ministry of Education, Science, Research and Sport of the Slovak Republic |
| | - Member of the Working Group „Electro-mobility“ at Ministry of Economy of the Slovak Republic |

### 7.5 Membership in University Boards

| | |
|---|---|
| Branislav Dobrucký | - Member of the Editorial Board of ZU Scientific Journal – Communication – Scientific Letters |
| | - Editorial Board of Publication Committee of ZU |
| | - Member of the Scientific Board of FEE ZU |
| | - Member of the Electrical Engineering Committee, FEE ZU |
| | - Member of the Automation and Control Committee – Process Control, FEE ZU |
| Pavol Špánik | - Member of the Senate ZU |
| | - Member of the Academic Senate of FEE ZU |
| | - Member of the Scientific Board of FEE ZU |
| | - Member of the Electrical Engineering Committee, FEE ZU |
| | - Member of the Power Engineering Committee, FEE ZU |
| | - Member of the Automation and Control Committee – Process Control, FEE ZU |
| | - Member of the Measurement Technique Committee, FEI TU Košice |
| Pavel Pavlásek | - Member of the Technical Subjects Didactics Committee, STU Bratislava |

Michal Frivaldský - Member of the Academic Senate of FEE ZU

## 8 Publications

**Journals indexed in a world-wide database (Thomson Scientific Master Journal List, Scopus)**

[1] SPANIK, P., CUNTALA, J., FRIVALDSKY, M., DRGONA, P.: Investigation of Heat Transfer of Electronic System through Utilization of Novel Computation Algorithms, In: *Electronics and Electrical Engineering, Kaunas 2012*, No.7 (123), pp.31-36, ISSN 1392-1215, Thomson index

[2] ZASKALICKY, P., DOBRUCKY, B.: Complex Fourier Series Mathematical Model of a Three-Phase Inverter with Improved PWM Output Voltage Control, In: *Electronics and Electrical Engineering, Kaunas 2012*, No. 7, (123), pp. 65-68, ISSN 1392-1215, Thomson index

[3] KANDRAČ, J., FRIVALDSKY, M., PRAZENICA, M., SIMONOVA, A.: Design and Verification of proposed Operation Modes of LLC Converter, In: *Electronics and Electrical Engineering Kaunas 2012*, Vol. 18, No.8, pp. 27 - 30, ISSN 1392–1215, Thomson index

[4] SPANIK, P., FRIVALDSKY, M., RADVAN, R., VALCO, M.: Dynamic Behavior of Selected SiC and QspeedTM Diodes and their Comparisons in Various Practical Application, In: *Proceedings of 2011 International Conference on Applied Electronics*, Pilsen, 5. – 7. September, 2012, Czech Republic, ISSN 1803-7232, pp.: 273 – 278, Thomson index

[5] SPANIK, P., HOCK, O., FRIVALDSKY, M.: Utilization of the New Trends of FPGA Circuit Simulations in Power Converter Applications, In: *Proceedings of 2011 International Conference on Applied Electronics*, Pilsen, 5. – 7. September, 2012, Czech Republic, ISSN 1803-7232, pp.: 279 – 282, Thomson index

[6] HARGAS, L., KONIAR, D., STOFAN, S.: Advanced Methodology for Frequency Description of Biomechanical Systems, In: *Procedia Engineering, ELSEVIER*, 48/2012, pp. 205 - 212, ISSN 1877-7058, SCOPUS index

[7] KONIAR, D., HARGAS, L., STOFAN, S.: Segmentation of Motion Regions for Biomechanical Systems, In: *Procedia Engineering, ELSEVIER*, 48/2012, pp. 205 - 212, ISSN 1877-7058, Scopus index

**Other Reviewed Foreign Journals**

[8] DOBRUCKY, B., KASSA, J., SPANIK, P., PRAZENICA, M.: Possibilities of 2-Phase Electronic Converters for Electric Vehicle Drivers, In: *Czasopismo Logistyka nr 3/2012*, pp. 467 – 471, ISSN 1231 – 5478

[9] HARGAS, L., SINDLER, P., ZABORSKY, L., SIMONOVA, A.,KONIAR, D.: Diagnostic Device for Overhead Contact Line Static Parameters Measurement, In: *Czasopismo Logistyka nr 3/2012*, pp. 743 – 750, CD1-ROM, ISSN 1231 – 5478

[10] PAVLANIN, R., SPANIK, P., DOBRUCKY, B.: Comparison of Multi-Resonant- and Hysteresis Band Controllers used in Current Control Loop of Shunt Active Power Filter, In: *Renewable Energy & Power Quality Journal, No. 10*, 25. 4. 2012, pp. 846, ISSN 2172-038X

[11] DOBRUCKY, B., KOSCELNIK, J., PRAZENICA, M. : Verification of the System Parameters of Gear Reducer, In: *Technika Transportu Syznowego*, Zakopane, 9/2012, pp. 153-158, ISSN 1232-3829

**Other Reviewed Slovak Journals**

[12] ABDAMULA, M., DOBRUCKY, B.: State-Space Analysis of 2nd – and 4th Order Resonant Filter LC and LCLC under Transient Condition, In: *Journal of Applied Mathematics*, Vol. IV, No. II, 2011, Slovak University of Technology in Bratislava, pp. 333 - 340, ISSN 1337 – 6365

[13] KONIAR, D., HARGAS, L., HRIANKA, M., LIPTAKOVA, Z., SIMONOVA, A.: Design and Control of Microscope Light Unit for High-speed Camera Recording, In: *Pediatrics, Scientific Medical Journal*, 7 / 2012, pp. 17, ISSN 1336-863X (in Slovak)

[14] HARGAS, L., KONIAR, D., HRIANKA, M., LIPTAKOVA, Z., DURDIK, P., JOSKOVA, M., BANOVCIN, P.: High-speed Screening for Cilliary Diagnostics, In: *Pediatrics, Scientific Medical Journal*, 7 / 2012, pp. 15, ISSN 1336-863X (in Slovak)

**Papers in proceedings of the world congress/conference published in prestigious foreign publisher such as Springer, Kluwer, Elsevier, John Wiley etc., or published bz world-wide reputable scientific institutions such as IFAC, IFIP, IEEE, ACM, IET, SPIE, or listed in Web of Science**

[15] KASCAK, S., ZASKALICKY, P., DOBRUCKY, B., PRAZENICA, M.: Two-Phase Space Vector Modulation of FOC Controlled ASM Fed by 2-Phase VSI inverter. In*: 15th International Power Electronics and Motion Control Conference EPE-PEMC 2012 ECCE Europe*, Novi Sad (RS), Sep 4-6, 2012, pp. DS2c.13-1 - DS2c.13-5, ISBN 978-1-4673-1971-3, IEEE catalog number CFP1234A-USB

[16] KASCAK, S., PRAZENICA, M., DOBRUCKY, B.: Position Control of Two-Phase Induction Motor using dSpace, In: *38th Annual Conference of the IEEE Industrial Electronics Society – IECON*, 25 - 28. October 2012, Montreal, Canada, pp. 1948 - 1953, ISBN 978-1-4673-2420-5, IEEE Catalog Number: CFP12IEC-USB

[17] DOBRUCKY, B., PRAZENICA, M., KASCAK, S., KASSA,J.: HF Link LCTLC Resonant Converter with LF AC Output, In: *38th Annual Conference of the IEEE Industrial Electronics Society – IECON*, 25 - 28. October 2012, Montreal, Canada, pp. 446- 451, ISBN 978-1-4673-2420-5, IEEE Catalog Number: CFP12IEC-USB

[18] KONIAR, D., HARGAS, L:, STOFAN, S., PASKALA, M.: Lightning Unit Control & Design for Highspeed Acquisition and Light Microscopy, In: *38th Annual Conference of the IEEE Industrial Electronics Society – IECON*, 25 - 28. October 2012, Montreal, Canada, pp. 1537 - 1540, ISBN 978-1-4673-2420-5, IEEE Catalog Number: CFP12IEC-USB

[19] KASCAK, S., DOBRUCKY, B., PRAZENICA, M., ZASKALICKY, P.: Two-Phase VSI Inverter using Space Vector Modulation for Field Oriented DSM Drive, In : *Symposium on Power Electronics, Electrical Drives Automation and Motion SPEEDAM 2012*, Sorento – Italy June 20th-22nd, 2012 pp.304-308, ISBN: 978-1-4673-1300-1, IEEE Catalog number: CFP1248A – CDR

[20] KONIAR, D., ŠTOFAN, S., HARGAŠ, L., HRIANKA, M., SIMONOVÁ, A.: Hardware Conditioning in Process of High Speed Imaging, In: *ELEKTRO 2012 – International conference Žilina – Rajecké Teplice*, Slovakia, May 21st -22 nd, pp. 66 - 69, ISBN 978-1-4673-1178-6, 2012 IEEE Catalog Number CFP1248S-CDR

[21] DOBRUCKÝ, B., BEŇOVÁ, M., KAŠČÁK, S.: LCTLC Resonant Converter Analysis with Direct AC and Rectifying Output, In: *ELEKTRO 2012 – International conference Žilina – Rajecké Teplice*, Slovakia, May 21st -22 nd, pp.115 – 120, ISBN 978-1-4673-1178-6, 2012 IEEE Catalog Number CFP1248S-CDR

[22] HOCK, O., DRGOŇA, P.: PWM Modulator with Increased Reliability in FPGA Circuit, In: *ELEKTRO 2012 – International conference Žilina – Rajecké Teplice*, Slovakia, May 21st - 22 nd, pp.121-123, ISBN 978-1-4673-1178-6, 2012 IEEE Catalog Number CFP1248S-CDR

[23] HURTUK, P., RADVAN, R., FRÍVALDSKÝ, M.: Investigation of Possibilities to Increasing Efficiency of Full Bridge Converter Designed for Low Output Voltage and High Output Current Applications, , In: *ELEKTRO 2012 – International conference*

*Žilina – Rajecké Teplice,* Slovakia, May 21st -22 nd, pp. 129 - 132, ISBN 978-1-4673-1178-6, 2012 IEEE Catalog Number CFP1248S-CDR

[24] KANDRÁČ, J., PRIEČINSKÝ, M., FRÍVALDSKÝ, M.: Finding Possibilities of Detailed and Very Accurate Modelling of High Frequency Converter, , In: *ELEKTRO 2012 – International conference Žilina – Rajecké Teplice*, Slovakia, May 21st -22 nd, pp.133 - 136 ISBN 978-1-4673-1178-6, 2012 IEEE Catalog Number CFP1248S-CDR

[25] KAPUSTA,T.: EMI Filters for Photovoltaic Converters, In: *ELEKTRO 2012 – International conference Žilina – Rajecké Teplice*, Slovakia, May 21st -22 nd, pp. 137 -140, ISBN 978-1-4673-1178-6, 2012 IEEE Catalog Number CFP1248S-CDR

[26] KAŠČÁK, S., PRAŽENICA, M., VALČO, M., ČUBOŇ, P., KLASOVITÝ, M.: Vector Control of Two-Phase IM using dSpace, In: *ELEKTRO 2012 – International conference Žilina – Rajecké Teplice*, Slovakia, May 21st -22 nd, pp. 141 - 144, ISBN 978-1-4673-1178-6, 2012 IEEE Catalog Number CFP1248S-CDR

[27] RYBOVIC, A., PRIECINSKY, M., PASKALA, M.: Control of the Inverted Pendulum using State Feedback Control, In: *ELEKTRO 2012 – International conference Žilina – Rajecké Teplice*, Slovakia, May 21st -22 nd, pp.145 - 148, ISBN 978-1-4673-1178-6, 2012 IEEE Catalog Number CFP1248S-CDR

[28] SPANIK, P., DRGONA, P:, FRIVALDSKY, M., SEDO, J., SIMONOVA, A.: Analysis of Currents with Utilization of Digital Measurement Device, , In*: ELEKTRO 2012 – International conference Žilina – Rajecké Teplice*, Slovakia, May 21st -22 nd, pp.149- 152, ISBN 978-1-4673-1178-6, 2012 IEEE Catalog Number CFP1248S-CDR

[29] VALCO, M., CUBON, P., JECK, P.: Influence of Different Loads on the Inverter Output Voltage, , In: *ELEKTRO 2012 – International conference Žilina – Rajecké Teplice*, Slovakia, May 21st -22 nd, pp. 153 - 157, ISBN 978-1-4673-1178-6, 2012 IEEE Catalog Number CFP1248S-CDR

[30] SEDLAK, J., BRANT, M., SEEWALD, R.: Influence of Remanent Magnetization on the Diagnostic of Distribution 25MVA Transformer by SFRA Method, , In: *ELEKTRO 2012 – International conference Žilina – Rajecké Teplice*, Slovakia, May 21st -22 nd, pp. 465 - 468, ISBN 978-1-4673-1178-6, 2012 IEEE Catalog Number CFP1248S-CDR

[31] SPANIK, P., DRGONA, P., FRIVALDSKY, M., RADVAN, R., HURTUK, P., BUDAY, J.: Optimization of Efficiency of Power Electronic Converter Suited for Electroplating, In: *IMCIC, 12 - The 3rd International Multi-Conference on Complexity, Informatics and Cybernetics*, 25 - 28 march 2012-Orlando, Florida, USA, pp.82-86, ISBN-13:978-1-936338-53-5, (ISBN-13:978-1-936338-56-6) EBSCO

[32] FRIVALDSKY, M., DRGONA, P., SPANIK, P., GLAPA, N.: Development of Thermal Simulation Model of Supercapacitor Module Targeting Optimal Requirement on Computational Time, In*: IMCIC, 12 - The 3rd International Multi-Conference on Complexity, Informatics and Cybernetics*, 25-28 march 2012-Orlando, Florida, USA, pp.237-241, ISBN-13:978-1-936338-53-5, (ISBN-13:978-1-936338-56-6) EBSCO

[33] DRGONA, P., FRIVALDSKY, M., SPANIK, P., SEDO, J., KUCHTA, J.: Real Time Analysis of Spectrum of Supply Current with Utilization of Full Digital System, In: *IMCIC, 12 - The 3rd International Multi-Conference on Complexity, Informatics and Cybernetics*, 25 – 28 march 2012- Orlando, Florida, USA, pp.289-294, ISBN-13:978-1-936338-53-5, (ISBN-13:978-1-936338-56-6) EBSCO

[34] DRGONA, P., FRIVALDSKY, M., SPANIK, P., SEDO, J., KUCHTA, J.: Real Time Analysis of Spectrum of Supply Current with Utilization of Full Digital System, In: *IMCIC, 12 - The 3rd International Multi-Conference on Complexity, Informatics and Cybernetics*, 25 – 28 march 2012- Orlando, Florida, USA, pp.289-294, ISBN-13:978-1-936338-53-5, (ISBN-13:978-1-936338-56-6) EBSCO

[35] KASCAK, S., PRAZENICA, M., DOBRUCKY, B.: Indirect Rotor Field Oriented Control of Two-phase IM using Space Vector Modulation, In: *Lecture Notes in Information Technology*, Vol.9, 21-22 February 2012, Sanya, China, pp.515-520, ISSN: 2070-1918, SCOPUS

**Reviewed Conference Proceedings Abroad**

[36] KOSCELNIK, J., PRAZENICA, M., DOBRUCKY, B.: Modelling of Three-/Dual-Mass Flexible Coupling System Fed by Two-Phase Electronic Motor, In: *The 2nd Central European School of Doctoral Study*, pp. 25-29, 18-20.09.2012, Krynica, PL, ISBN 978-83-7351-507-9

[37] SEDLAK, J., HRKEL, M.: Simulation of Field Oriented Control of PMSM for Traction Drive, In: *The 2nd Central European School of Doctoral Study*, pp. 22-24, 18-20.09.2012, Krynica, PL, ISBN 978-83-7351-507-9

[38] KONIAR, D., HARGAS, L., HRIANKA, M., LIPTAKOVA, Z.: Hardware and Virtual Instrumentation-Based Control of Lightning Unit for Microscopy, In: *The 2nd Central European School of Doctoral Study*, pp. 13-16, 18-20.09.2012, Krynica, PL, ISBN 978-83-7351-507-9

[39] KASCAK, S., RADVAN, R., CUBON, P., VALCO, M.: Speed/Position Control of Two-Phase Induction Machine, In: *The 2nd Central European School of Doctoral Study*, pp. 63-67, 18-20.09.2012, Krynica, PL, ISBN 978-83-7351-507-9

[40] KAPUSTA, T., SEDO, J., PASKALA, M, RYBOVIC, A.: Electromagnetic Interference of 300KHZ LLC Resonant Converter, In: *The 2nd Central European School of Doctoral Study*, pp. 33-36, 18-20.09.2012, Krynica, PL, ISBN 978-83-7351-507-9

[41] CUBON, P., RADVAN, R.: Analysis 2Q Converter for Automotive Applications, In: *The 2nd Central European School of Doctoral Study*, pp. 81-85, 18-20.09.2012, Krynica, PL, ISBN 978-83-7351-507-9

[42] SEDO, J.: Device for Monitoring of Frequency Spectrum of Current, In: *ICT a elektrotechnika pro praxi, XLIVI. Sešit katedry Elektrotechniky*, Vysoká škola báňská -Technická univerzita Ostrava – Poruba, 25.4.2012, príspevok č.26 CD-R, ISBN 978-80-248-2664-6

[43] CUBON, P., VALCO, M.: Design and Modelling of Selected Parts of the Electric Vehicle, In: *XLIVI. Sešit katedry Elektrotechniky*, Vysoká škola báňská -Technická univerzita Ostrava – Poruba, 25.4.2012, príspevok č.5 CD-R, ISBN 978-80-248-2664-6

[44] DOBRUCKY, B., KUDELCIK, J., VAVRUS, V., RAFAJDUS, P.: Transient Analysis of Power Cable for Ultra-Deep Geothermal Wells, In: *Int. Conference ICLVEM 12*, 15-16. 11. 2012 Slapanice, CZ, CD-ROM, ISBN 978-80-214-4602-1

[45] DOBRUCKY, B., KASCAK, S., PRAZENICA, M, KASSA, J.: Speed/Position Sensorless Control of Two-Phase PMSM Drive System Using Virtual Injection Method, In: *International Conference on Innovative Technologies IN-TECH 2012*, 26-29. 09. 2012, Rijeka, Croatia, pp. 63-67, ISBN 978-953-6326-77-8

[46] JOSKOVA, M., SADLONOVA, V., KONIAR, D., HARGAS, L., STOFAN, S., HRIANKA, M., FRANOVA, S.: Transport Changes at Ovalbuminom Mucocilliary Sensitivited Guinea-Pigs, In: *News at Experimental and Clinical Medicine*, 1/2012, pp. 54 - 60, ISBN 978-80-89544-27-1 (in Slovak)

[47] JOSKOVA, M., SADLONOVA, V., KONIAR, D., HARGAS, L., STOFAN, S., HRIANKA, M., FRANOVA, S.: Kinetics of Cilliary Respiratory Tract, In: *New Trends at Pharmacotherapy III,* 2012, pp. 18 - 21, ISBN 978-80-89544-19-6 (in Slovak)

[48] JOSKOVA, M., SADLONOVA, V., KONIAR, D., HARGAS, L., HRIANKA, M., FRANOVA, S.: Chronic Diseases and Mucocilliary Transport , In: *New Trends at Pharmacotherapy IV,* 2012, pp. 63 - 66, ISBN 978-80-89544-32-5 (in Slovak)

[49] CERNAN P., DOBRUCKY B.: Preliminary Results of DFBI Photovoltaic Converter Measurement, In: *Electromagnetic Disturbance in Distributive and Power Networks, Proc. of X$^{th}$ Conference ERU'12*, Brno (CZ), 28$^{th}$ – 29$^{th}$ November 2012, pp. CD-ROM, ISBN 978-80-260-3431-5 (in Slovak)

[50] MARCOKOVA, M., DOBRUCKY, B.: Several Theorems on Equiconvergence of Fourier Series, In: *International Symposium on Orthogonal Polynomials and Special Functions - a Complex Analytic Perspective OSCA 2012*, 11-15. 6. 2012, Copenhagen, pp. 31 – 32

**Abstracts of Reviewed Conference Proceedings Abroad**

[51] DOBRUCKY, B., KASCAK, S., PRAZENICA, M.: Speed/Position Sensorless Control of Two-Phase AM Drive System using Virtual Injection Method, In: *The 8th International Conference Mechatronic Systems and Materials*, Bialystok, Poland, 8-13.07.2012, pp. 108

**Reviewed Conference Proceedings in Slovakia**

[52] KOSCELNIK J., BENOVA M., P., DOBRUCKY B.: Modelling of Commutation Process of Diode Rectifier both in Current and Voltage Modes, In*: Proc. of TCB'12 Int'l Conf. on Technical Computing*, Bratislava (SK), Nov. 2012, pp. 41, ISBN 978-80-975519-4-5

[53] KONIAR, D., HARGAS, L., HRIANKA, M., JOSKOVA, M., BANOVCIN, P.: Automatic Search of Celliary Regions in High-speed Record, In: *Diagnostics and Treatment at Pediatric Pulmonology and Phthisiology,* 2012, pp. 62 - 68, ISBN 978-80-89544-35-6 (in Slovak)

[54] HARGAS, L., KONIAR, D., JOSKOVA, M., HRIANKA, M., SIMONOVA, A., DURDIK, P., BANOVCIN, P.: Frequency Analysis and Cilliary Cinematic Specification, In: *Diagnostics and Treatment at Pediatric Pulmonology and Phthisiology,* 2012, pp. 56 - 61, ISBN 978-80-89544-35-6 (in Slovak)

**Industrial Designs**

[55] DOBRUCKÝ, B., MIKULOVSKÝ, Š., MIKULOVSKÝ, J.: Certificate about enrollment of Industrial Design No 6055 with the title *,,Two-stroke Combustion Engines Using of Fuel and Exhaust-gas Energy",* issued by: Industrial Property Office of the Slovak Republic in Banská Bystrica, 2$^{nd}$ March 2012 (in Slovak).

[56] DOBRUCKÝ, B., MIKULOVSKÝ, Š., MIKULOVSKÝ, J.: Certificate about enrollment of Industrial Design No 6056 with the title *,, Four-stroke Combustion Engines Using of Fuel and Exhaust-gas Energy ",* issued by: Industrial Property Office of the Slovak Republic in Banská Bystrica, 2$^{nd}$ March 2012 (in Slovak).

[57] DOBRUCKÝ, B., MIKULOVSKÝ, Š., MIKULOVSKÝ, J.: Certificate about enrollment of Industrial Design No *6326* with the title *,,Piston Combustion Engine with Electromotor for Pendulous Motion and Mechanism for Rotating Motion",* issued by: Industrial Property Office of the Slovak Republic in Banská Bystrica, 5$^{th}$ December 2012 (in Slovak).

[58] DOBRUCKÝ, B., MIKULOVSKÝ, Š., MIKULOVSKÝ, J.: Certificate about enrollment of Industrial Design No *6327* with the title *,, Four-stroke Combustion Engine with Cylinders in Square Using of Fuel and Exhaust-gas Energy",* issued by: Industrial Property Office of the Slovak Republic in Banská Bystrica, 5$^{th}$ December 2012 (in Slovak).

[59] ŠPÁNIK, P., DRGOŇA, P., FRIVALDSKÝ, M., REHUŠ, J., HARVÁNEK, Z.: Certificate about enrollment of Industrial Design No 6221 with the title „*Electroplating System with Synchronous Rectifier",* issued by: Industrial Property Office of the Slovak Republic in Banská Bystrica, 25$^{th}$ July 2012 (in Slovak).

**SCI Citations**

SPANIK, P., FRIVALDSKY, M., DRGONA, P., KANDRAC, J.: Efficiency Increase of Switched Mode Power Supply through Optimization of Transistor Commutation´s Mode, In: *Electronics and Electrical Engineering*, Kaunas 2010, No.9 (105), pp. 49 - 52, ISSN 1392-1215, Thomson index

[60] STEPINS, D., JANKOVSKIS, J.: Reduction of Output Voltage Ripples in Frequency Modulated Power Converter, In. *Electronics and Electrical Engineering*, Kaunas 2012, No.3 (119), pp.45 - 48, ISSN 1392-1215, Thomson index

SPANIK, P., CUNTALA, J., FRIVALDSKY, M., DRGONA, P.: Investigation of Heat Transfer of Electronic System through Utilization of Novel Computation Algorithms, In: *Electronics and Electrical Engineering*, Kaunas 2012, No.7 (123), pp. 31 - 36, ISSN 1392-1215, Thomson index

[61] STEPINS, D., JANKOVSKIS, J.: Study of Frequency Modulated Boost Converter Operating in Discontinuous Conduction Mode, In. *Electronics and Electrical Engineering*, Kaunas 2012, No.6 (122), pp. 41 - 44, ISSN 1392-1215, Thomson index

DOBRUCKY, B., POKORNY, M., RACEK, V., HAVRILA, H.: A New Method of the Instantaneous Reactive Power Determination for Single-Phase Power Electronic Systems, In: *Proc. of EPE'99 Conf., Lausanne*, Sept. 1999

[62] KANDRAČ, J., FRIVALDSKY, M., PRAZENICA, M., SIMONOVA, A.: Design and Verification of proposed Operation Modes of LLC Converter, In: *Electronics and Electrical Engineering*, Vol. 18, No.8, Kaunas 2012, pp. 27 - 30, ISSN 1392–1215, Thomson index

HARGAS, L., HRIANKA, M., LAKATOS, J., KONIAR, D.: Heat Fields Modelling and Verification of Electronic Parts of Mechatronics systems, In: Metalurgija (Metalurgy), Vol. 49 (2/2010), ISSN 1334-2576

[63] SPANIK, P., CUNTALA, J., FRIVALDSKY, M., DRGONA, P.: Investigation of Heat Transfer of Electronic System through Utilization of Novel Computation Algorithms, In: *Electronics and Electrical Engineering*, Kaunas 2012, No.7 (123), pp. 31 - 36, ISSN 1392-1215, Thomson index

PAVLANIN, R., DOBRUCKY, B., SPANIK, P.: Investigation of compensation effect of shunt active power filter working under the non-sinusoidal voltage conditions. In: *IREE – Int'l Review of Electrical Engineering*, 2009, Publisher: Praise Worthy Prize (IT), Vol. 5, No. 4, pp. 785-791, ISSN 1827-6660

[64] BRANDSTETTER, P.: Sensorless Control of Induction Motor Using Modified MRAS. In: *IREE – Int'l Review of Electrical Engineering*, May-June 2012, Publisher: Praise Worthy Prize (IT), Vol. 7, No. 3, pp. 4404-4411, ISSN 1827-6660 Thomson index

SUL, R., DOBRUCKY, B.: CERNAN, P.: Evaluation of Efficiency of Active Clamp Dual Flyback Inverter for Photovoltaic Systems using Simulation Method. In: *Electronics and Electrical Engineering/Elektronika ir Elektrotechnika*, Publisher: Technologija, Kaunas (LT), 2010, No. 3 (119), pp. 23 - 26, ISSN 1392-1215

[65] EIDUKAS, D.: Quality Level Linear Models Electronic Systems. In: *Electronics and Electrical Engineering*, Publisher: Technologija, Kaunas, 2012, No. 3 (119), pp. 57-60, ISSN 1392-1215 Thomson index

DOBRUCKY, B., SPANIK, P., POKORNY, M.: Dynamic Single-Phase DVR System with Instantaneous Power Factor Estimator. In: *IREE – Int'l Review of Electrical Engineering*, 2008, Publisher: Praise Worthy Prize (IT), Vol. 1, No. 3, pp. 9-16, ISSN 1827-6660

[66] HANNAN, M. A., MOHAMED, A.: Study of Basic Properties of an Enhanced Controller for DVR Compensation Capabilities. In: *Review of Electrical Engineering/ Przeglad Elektrotechniczny,* Publisher: Sigma-NOT Spolka (PL), 2012, Vol. 88, No. 4A, pp. 293-299, ISSN 0033-2097 Thomson index

DOBRUCKY, B., SUL, R., SPANIK, P.: Safety Power Supply of Continual Processes using FACTS Devices. In: ATP Journal, Bratislava, 2005, pp. 79-81, ISSN 1335-2237

[67] OTCENASOVA, A., ALTUS, J., HECKO, P., ROCH, M.: Measurement Characteristics of Voltage in Practice and Possibilities for Improvement of Voltage. In: *Review of Electrical Engineering/ Przeglad Elektrotechniczny,* Publisher: Sigma-NOT Spolka (PL), 2012, Vol. 88, No. 9A, pp. 103-106, ISSN 0033-2097 Thomson index

DUDRIK, J., SPANIK, P., TRIP, N-D.: Zero-voltage and zero-current switching full-bridge dc-dc converter with auxiliary transformer, In: *IEEE TRANSACTIONS ON POWER ELECTRONICS, Volume: 21, Issue: 5*, Pages: 1328-1335 DOI: 10.1109/TPEL.2006.880285, 2006

[68] JELAJA, V. D., RAJARAM, M.: Comparison of Updated Soft Switched Full Bridge Converter Using Voltage-Doubler-Type Rectifier with Existing Techniques, In: *INTERNATIONAL REVIEW OF ELECTRICAL ENGINEERING-IREE, Volume: 7, Issue: 4*, Pages: 4739-4745 Part: Part a Published: JUL-AUG 2012 Thomson index

[69] EJJABRAOUI, K.; LEFRANC, P., MARCHAND, C.: Presizing Methodology of DC-DC Converters Using Optimization Under Multiphysic Constraints: Application to a Buck Converter, In: *IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, Volume: 59, Issue: 7*, Pages: 2781-2790 DOI: 10.1109/TIE.2011.2162210 Published: JUL 2012 Thomson index

SPANIK, P., FRIVALDSKY, M., DRGONA, P., KANDRAC, J.: Efficiency Increase of Switched Mode Power Supply through Optimization of Transistor Commutation´s Mode, In: *Electronics and Electrical Engineering*, Kaunas 2010, No.9 (105), pp. 49 - 52, ISSN 1392-1215, Thomson index

[70] STEPINS, D., JANKOVSKIS, J.: Study of Frequency Modulated Boost Converter Operating in Discontinuous Conduction Mode, In. *Electronics and Electrical Engineering*, Kaunas 2012, No.6 (122), pp. 41 - 44, ISSN 1392-1215, Thomson index

**SCOPUS, IEEE, ...**

HARGAS, L., HRIANKA, M., KONIAR, D.: Image Processing and Analysis. A Practical Approach – Text Book, In: Zilinska univerzita v Ziline 2008, ISBN 978-80-8070-962-4

[71] DUCHON, F., HUBINSKY, P., HANZEL, J., BABINEC, A., TÖLGYESSY, M.: Intelligent Vehicles as The Robotic Applications, In: *Procedia Engineering* 48 (2012), pp. 105-114, ISSN 1877-7058, Scopus

[72] DEKAN, M., CHOVANEC, L., BABINEC, A., VITKO, A.: New Modules for The iRobot Create Platform, In: *Procedia Engineering* 48 (2012), pp. 65-72, ISSN 1877-7058, Scopus

HARGAS, L., HRIANKA, M., KOZEHUBA, I., SPANIK, P.: Application of Virtual Instrumentation LabVIEW for Power Electronic System Analysis, In*: Proc. Of the 12th international power electronics and motion conference, EPE-PEMC 2006*, Portoroz, Slovenia, 30th August – 1st September 2006, ISBN 1-4244-0121-6, pp. 1699-1702

[73] SPAGNOLO, G.S., PAPALILLO, D, MARTOCCHIA, A.: An Educational Tool for DC-DC Converter, In: *10th International Conference on Environment and Electrical Engineering EEEIC*, 2011, ISBN 978-1-4244-8779-0, IEEE

[74] ALOULOU, A., BOUBAKER, O.: Enhancing Technical Skills of Control Engineering Students in Robotics by Using Common Software Tools and Developing Experimental Platforms, In: 2012 *International Conference on Education and e-Learning Innovations, ICEELI 2012*, Sousse, ISBN 978-1-4673-2226-3, IEEE

PAVLANIN, R.; DOBRUCKY, B.; SPANIK, P.: Investigation of compensation effect of shunt active power filter working under the non-sinusoidal voltage conditions. *IREE – Int'l Review of Electrical Engineering*, 2009, Publisher: Praise Worthy Prize (IT), Vol. 5, No. 4, pp. 785-791, ISSN 1827-6660

[75] BENAISSA, A.; BOUZIDI, M.; BARKAT, S.: Application of feedback linearization to the virtual flux direct power control of three-level three-phase shunt active power filter. In: *IREMOS - Int'l Review on Modelling and Simulations*, 2012, Publisher: Praise Worthy Prize (IT), Vol. 5, No. 3, pp. 1128-1140, ISSN 1974-9821 Scopus

**Other Publications**

[76] FIBICH, P.: Research of Perspective Converter Structures for Renewable Energy Sources, PhD, 2012 (in Slovak)

[77] HOCK, O.: Implementation of Control Algorithms with Improved Reliability into Programmable Device FPGA Type , PhD thesis, 2012 (in Slovak)

[78] KAŠŠA, J.: Two-stage Two-phase Resonant Power Converter with Resonant Ist - and Matrix IInd Stages , PhD thesis, 2012

[79] PRAŽENICA, M.: Research of Electronic System Based on Direct Converters in Matrix Connection with Orthogonal Output with Variable Output Voltage and Variable Frequency , PhD thesis, 2012

[80] HURTUK, P.: Optimization of Parameter Efficiency of Power Supplies for Electroplating, PhD thesis, 2012

[81] KANDRÁČ, J.: Optimization of Converter Commutation Process with High Switching Frequency, PhD thesis, 2012

[82] PRIEČINSKÝ, M.: Design of Converter Control System with Switching Frequency of 500 kHz, PhD thesis, 2012

[83] ČERŇAN, P.: Analysis and Synthesis of Microprocessor DSP Control of DFBI Inverter for Photovoltaic, PhD thesis, 2012

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