

# DEPARTMENT OF MECHATRONICS AND ELECTRONICS

## 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.

The 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.

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 within the frame of which the Department has cooperated with several prestigious Slovak institutions (The Technical University of Košice, STU Bratislava 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 2015 the Department involves seventeen members of educational staff, four research workers, twelve internal PhD students and four external PhD students. From the point of view of internal structure it has been divided into three divisions. The first one is focused on power- and applied electronics, the second one is operating in the field of mechatronics, autotronics, and industry automation. The third division deals with special electronics focused on applications in mechatronic systems and medicine.

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 and Autotronics). Master degree includes the accredited course of study for Power Electronic Systems (in specializations Power Electronics, Mechatronic and Automotive Systems, and Autotronics and Electromobility). In doctoral study the department staff participated in providing training courses in Powerline Electronics 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 analysing 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.

## Staff of the Department

Head of the Department:	Pavol Špánik
Vice-head of the Department:	Jozef Čuntala
Secretary:	Anna Kondelová
Administrative Support:	Andrea Prandová

## Sections of the Department

### Section of Electronics

Head of the Section:	Michal Frivaldský
Professors:	Pavol Špánik
Associate Professors:	Jozef Čuntala, Michal Frivaldský
Research Fellows:	Anna Kondelová
Senior Lecturers (with PhD):	Michal Praženica, Slavomír Kaščák, Roman Radvan, Rastislav Havrila,
Lectors:	Jozef Lakatoš

### Section of Mechatronic Systems and Autotronics

Head of the Section:	Branislav Dobrucký
Professors:	Branislav Dobrucký
Associate Professors:	Pavel Pavlásek, Peter Drgoňa
Research Fellows:	Marek Paškala, Ondrej Hock, Peter Čuboň
Lectors:	Peter Šindler

### Section of Special Electronics

Head of the Section:	Libor Hargaš
Associate Professors:	Libor Hargaš, Miroslav Hrianka, Dušan Koniar, Anna Simonová
Senior Lecturers (with PhD):	Rastislav Pavlanin

## Postgraduate Students

Internal (full-time):	Juraj Koscelník (until Aug., 2015), Martin Galád, Roman Mažgút, Tomáš
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	Laškody, Zuzana Loncová, Viliam Jaroš, Juraj Košťál (until Aug., 2015), Pavol Štefanec, Marek Píri, Boris Kozáček, Michal Prídala (from Sept., 2015), Ing.Roman Koňarik (from Sept., 2015), Jozef Šedo
External (part-time):	Ivan Lovás, Andrej Kaňovský, Erika Záhorcová Polčanová

## Education

### Courses in Bachelor and Master Degree Programmes

#### Bachelor Degree Programmes

Code	Title	Sem.	Hours/Week
			L-S-LE*
<b>Courses at the Faculty of Electrical Engineering</b>			
31212	Introduction to Industry Automation and Mechatronics	3	1 - 0 - 3
31302	Electronics I	3	2 - 0 - 3
31402	Automatic Regulation 1	4	2 - 2 - 0
31413	Electric Light and Heat	4	2 - 1 - 1
31414	Electromagnetic Compatibility	4	2 - 0 - 2
31415	Electronics II	4	2 - 0 - 3
31426	Measurement of Non-Electric Parameters	4	2 - 0 - 2
31427	Power Supplies	4	2 - 0 - 1
31430	Computers in Industrial Automation	4	2 - 0 - 2
31502	Power Electronics	5	3 - 1 - 2
31511	Microprocessor Technology	5	3 - 0 - 2
31524	Logical Circuits	5	3 - 0 - 2
31528	Multimedia Technology	5	2 - 0 - 1
31542	Image Processing and Analysis	5	2 - 0 - 2
31552	Computer and Office Technique	5	2 - 0 - 1
31556	Mechatronics	5	2 - 0 - 2
31557	Automatic Regulation 2	5	2 - 1 - 1
31563	Design of Electronic Devices	6	2 - 2 - 6
31628	Power Semiconductor Systems	6	6 - 0 - 4
31630	Bachelor Project Power Electronic Systems	6	0 - 0 - 6
31634	Bachelor Project Mechatronic Systems	6	0 - 0 - 6
<b>Courses at the Faculty of Mechanical Engineering</b>			
2B092	Drives of Mechatronic Systems	5	2 - 0 - 1
2B127	Electronics	6	2 - 0 - 2

\*(L) lessons - (S) seminars - (LE) laboratory exercises

#### Master Degree Programmes

Code	Title	Sem.	Hours/Week
			L-S-LE*
<b>Courses at the Faculty of Electrical Engineering</b>			
3I0108	Microprocessors, Microcomputers and DSP	1	2 - 0 - 3
3I0109	Theory of Automatic Control 1	1	3 - 0 - 2
3I0110	Power Semiconductor Converters	1	3 - 1 - 2
3I9100	Electromagnetic Compatibility in Electronics	1	3 - 1 - 1
3I9102	Computers in Industrial Automation 2	1	2 - 0 - 2
3I9103	Dynamics of vehicle movement	1	2 - 2 - 0
3I9105	Simulation languages in power electronics	1	2 - 0 - 2

32200	Analysis and Synthesis of Power Electronic Circuits	2	2 - 3 - 0
32211	Measurement and Digital Data Processing	2	2 - 2 - 0
32216	Microprocessors, Microcomputers and DSP	2	2 - 0 - 3
32233	Microprocessor and Microcomputer Systems	2	3 - 0 - 3
32236	Theory of Automatic Control 2	2	2 - 1 - 1
32325	Design of ASIC	2	1 - 0 - 3
32341	Virtual Instrumentation	2	2 - 0 - 2
32111	Information and Industrial Networks	3	2 - 0 - 2
32300	Power Electronics Applications in ET & EE	3	3 - 0 - 1
32324	Design and Construction of Power Semiconduct. Systems	3	2 - 3 - 0
32334	Semestral Project	3	0 - 4 - 0
32345	Semiconductor Sensors and Data Processing	3	2 - 2 - 0
31515	Mechatronic Systems	3	2 - 0 - 2
32402	Diploma Thesis Power Electronic Systems	4	0 - 2 - 0
32404	Diploma Seminar	4	0 - 2 - 0
32405	Discrete Control of Power Systems	4	4 - 2 - 2
32406	Dispatching Systems	4	4 - 0 - 4
32416	Industrial Informatics	4	4 - 0 - 4
<b>Courses at the Faculty of Mechanical Engineering</b>			
2N125	Electronic Control Elements	2	2 - 2 - 0
2N140	Converter Drives	3	2 - 2 - 0
2N141	Control Microcomputers	3	2 - 2 - 0

\*(L) lessons - (S) seminars - (LE) laboratory exercises

## 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 analysing of the failures using image analysis. Topology optimizing for power semiconductor converters and their electro-magnetic compatibility belongs to main activities of the Department.

### 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.

### 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.

### 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.

### 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 analyser, power supplies, converters and electrical motors.

### Laboratory of Power Electronics

Lessons of Power Electronics Systems.

### Laboratory of Industrial Automation

Lessons of Industrial Automation application.

Laboratory of Control Systems

Lessons of Control Systems and DSP programming.

Laboratory of Logic Circuits

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

Laboratory of Microelectronics

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

## Projects of International Programmes

### International Scientific and Technological Co-operation Projects (MVTs)

<b>RSF 14-49-00079: New methods and algorithms of combined signal and image processing with unknown parameters in promising radars and communication systems</b>	
Summary:	The project solves the issue at the Moscow Energy Institute at the National Research University within the Department of Radio Equipment and Antenna systems.
Realization:	09/2014 – 12/2016
Coordinator:	Yurij Kutojans, Univerzita Le Mans, France
Co-operators:	Branislav Dobrucký

## Projects of National Programmes

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

<b>VEGA 1/0184/13: Research of indirect computing algorithms and tools for evaluation of power loss in power electronic device's component with support of physical model simulation postprocessing</b>	
Summary:	Design and verification of methodology for evaluation of power losses of individual components of power electronic device, on the basis of dynamical measurement of surface thermal field, with use of thermal camera and comparison of thermal field of physical model with dynamical injection of power into individual component of this device.
Realization:	01/2013 – 12/2015
Coordinator:	Peter Drgoňa
Co-operators:	Čuntala Jozef, Kondelová Anna, Šindler Peter, Lakatoš Jozef, Hock Ondrej, Čuboň Peter, Pavlanin Rastislav

<b>VEGA 1/0579/14: Research of topological structures of segments of power electronic system for wireless energy transfer</b>	
Summary:	The basis of the project is optimization of the main circuit topology of power electronic converters, primarily designed to control of energy flow in wireless energy transfer systems, with anticipated application in charging stations for electric cars. It deals about systems with frequency from 500kHz to 1,5Mhz at kW power range. The research will be focused on achieving the maximum efficiency of converter, and thus whole system, at required switching frequency. Baseline platform will be the analysis of properties of optimal energy transfer process, aimed on determination of the switching frequency. On the base of this platform, the research of possibilities of efficiency improvement will be realized, as well as their implementation through suitable technologies. During research of the project, verified scientific procedures, based on computer simulations will be used, as in time domain, as well as in 3D analysis. Experimentally verified results will be used in process of further applied research.
Realization:	01/2014 – 12/2016
Coordinator:	Pavol Špánik
Co-operators:	Branislav Dobrucký, Pavlásek Pavel, Drgoňa Peter, Kondelová Anna, Paškala Marek, Lakatoš Jozef, Slavomír Kaščák, Roman Radvan, Koscelník Juraj, Mažgút Roman, Marek Píri



**VEGA 1/0558/14: Research of methodology for optimization of lifetime of critical components in perspective electronic appliances through the use of system level simulation.**

Summary:	The project fundamental is research of procedure serving for estimation and possible optimization of critical components lifetime in perspective electronic systems (photovoltaic, LED luminaries). Method is based on selection of suitable simulation instruments, by which the system of multilevel simulation can be realized. Basis of the proposal is simultaneous run of multiple simulation instruments, where each serves for individual investigation of the problem. Global result is subsequently represented as intersection of partial results. The investigation of operating condition itself (temperature, mechanical and electrical stresses, moisture, etc.), from the perspective of critical components aging (electrolytic capacitors, semiconductor devices), will be during multilevel simulation realized only by use of exact simulation models, with high degree of validity. The contribution of the project is in possible optimization of operation of electrical system, in order to increase the durability and economic return.
Realization:	01/2014 – 12/2016
Coordinator:	Michal Frivaldský
Co-operators:	Čuntala Jozef, Simonová Anna, Praženica Michal, Slavomír Kaščák, Roman Radvan, Šedo Jozef, Laškody Tomáš, Galád Martin, Marek Píri

**VEGA 1/0165/14: Pharmacological modulation of oscillation frequency of the respiratory epithelium cilia**

Summary:	Mucociliary apparatus of the respiratory epithelium plays an important role in the cleansing of the respiratory tract from excessive amounts of mucus and other pathogens. Slowdown of the cilia motion leads to stagnation of phlegm in the respiratory tract, secondary infections, which require further treatment. Although there is more specialized information about the role of anti-asthmatics, expectorants and antitussives in the treatment of respiratory diseases, it is unknown how much the drug can pharmacologically affect the function of cilia in pathological conditions, in particular during respiratory tract inflammation. The results of our project would in future be applied in clinical practice in choosing the appropriate drug for the treatment of inflammatory respiratory diseases, which in addition to its primary role (bronchodilation, anti-inflammatory, antitussive and expectorant effect) also supported the defensive function of the mucociliary transport.
Realization:	01/2014 – 12/2016
Coordinator:	Soňa Fraňová (Jessenius Faculty of Medicine in Martin, Comenius University)
Sub-Coordinator:	Libor Hargaš
Co-operators:	Hrianka Miroslav, Koniar Dušan

**VEGA 1/0928/15: Research of electronic control of power transmission and motion of road ICE- hybrid HEV and EV vehicles**

Summary:	The project deals with research in the area automotive electronics - Autotronics - identifying structures and advanced management methods of power transmission and motion ICE internal combustion vehicles, hybrid HEV and EV using their controllers and fieldbus (CAN) communication with them. Then there is the research of embedded processor systems for the electronic transmission control of performance of HEV and EV vehicles with central and distributed electric
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	propulsion systems, as well as research into the power structure for optimal energy management and vehicle research and development environment for programming autotronics systems. The research results will be used for the education of specialists for the automotive industry, where it appears at present scarcity.
Realization:	01/2015 – 12/2017
Coordinator:	Branislav Dobrucký
Co-operators:	Peter Drgoňa, Ondrej Hock, Pavel Pavlásek, Peter Čuboň, Martin Galád, Roman Koňarik, Pavol Štefanec

#### Projects Funded by the Cultural & Education Grant Agency (KEGA)

<b><i>KEGA 003STU-4/2014: Advanced methods of image processing used in visual systems and their implementation to the educational process.</i></b>	
Summary:	<p>Development of a new modern university textbooks and didactic tools requires innovative research in the scientific field. The effective usage of such research within the teaching process assumes a preparation on the methodology of this research in education process, creating of the modern didactic tools and teaching aids, and university textbooks. The aim of the project is research in the field of advanced image processing in visual systems and the usage of such research especially in subjects of 1st, 2nd and 3rd level of university education. The ambition of the project is to create such aids and textbooks, which can be used in several technical disciplines and study programs at Slovak universities. There is an assumption, that they will be also used in specialized secondary schools or in the professional public.</p> <p>The visual system as a sensory system is applied in a variety of technical areas, so this project has an interdisciplinary nature. With the development of visual systems hardware, it is needed to explore new and analyze existing image processing methods in these systems. The nature of the project presumes the employment of modern software and hardware resources into a teaching process. These resources will enable the students to better understand the possibilities of employment of visual systems in different technical areas. The content of the project is to explore advanced methods for filtering and image segmentation, identification of objects in the image, the reconstruction of 3D scenes from an image, and the detection of significant features in the image.</p> <p>The project will also focus on progressive trends in the visual systems, including high-speed imaging in mechatronic systems or 3D interpretation of the scene</p>
Realization:	01/2014 – 12/2016
Coordinator:	František Duchoň (Faculty of Electrical Engineering and Information technology, STU Bratislava)
Co-operators:	Libor Hargaš, Dušan Koniar

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

<b>APVV-0314-12: Research and Development of New Generation of Power Supplies Based on Converters with High Power Density, High Efficiency, Low EMI and Circular Energy</b>	
Summary:	Project is focused on research and development of new generation of switched mode power supplies, which are based on LLC, LLCLC and LCTL topology with high power density and multifunction output and with double half-bridge DC/DC

	converter characterized by low circulating energy and low EMI. Co-operation with Elteco.
Realization:	10/2013 – 09/2017
Coordinator:	Branislav Dobrucký
Co-operators:	Pavol Špánik, Peter Šindler, Peter Drgoňa, Michal Frivaldský, Michal Praženica, Juraj Koscelník

<b>APVV-0433-12: Research and Development of Intelligent System for Wireless Energy Transfer in Electromobility Application</b>	
Summary:	The project is focused on problem of systems for wireless energy transfer, representing progressive solution for supplying of mobile and industrial devices. Task of this project is research of major effects on efficiency of systems for wireless energy transfer, usable for realization of charging points in the area of electromobility.
Realization:	10/2013 – 09/2017
Coordinator:	Pavol Špánik
Co-operators:	Libor Hargaš, Peter Drgoňa, Michal Frivaldský, Dušan Koniar, Michal Praženica, Ondrej Hock, Marek Valčo, Jozef Šedo, Peter Čuboň

#### Projects of European Structural Funds

<b>ITMS 26110230089: Universities as engines of knowledge society development</b>	
Summary:	Reform of educational system and professional training, modern education for a knowledge society.
Realization:	05/2013 – 11/2015
Coordinator:	Helga Jančovičová, CVTI Bratislava
Co-operators:	Pavol Špánik

<b>ITMS 26110230079: Innovation and globalization of education – means for quality increasing at University of Žilina in European educational area</b>	
Summary:	Means for quality increasing in education
Realization:	02/2013 – 08/2015
Coordinator:	Renáta Švarcová, ŽU
Co-operators:	Branislav Dobrucký, Jozef Čuntala, Peter Drgoňa, Michal Frivaldský, Libor Hargaš, Dušan Koniar, Anna Simonova, Pavol Špánik, Miroslav Hrianka, Pavel Pavlásek

<b>ITMS 26110230107: Modern Methods of Teaching Control and Diagnostic Systems Used on Motor Vehicles</b>	
Summary:	Compliance of knowledge society and labour market needs with a university education in the field of automotive technology
Realization:	9/2013-11/2015
Coordinator:	Róbert Labuda (Faculty of Mechanical Engineering, University of Zilina )
Co-operators:	Peter Šindler

## Co-operation

### Co-operation Partners in Slovakia

- EVPÚ a.s. Nová Dubnica
- Panasonic Electronic Devices Slovakia, s.r.o., Trstená
- NES Nová Dubnica
- Bell Power Solution, Dubnica nad Váhom
- Siemens, s.r.o., Bratislava, Žilina
- Vedeckotechnologický park, Žilina
- LJF Martin, UK Bratislava
- ABB Slovakia, Bratislava
- 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
- ELTECO, a.s. Žilina
- SSE, a.s. Žilina
- Súkromná zvaračská 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
- CONTINENTAL Výskum a vývoj, s.r.o. Zvolen
- GRANIT, s.r.o. Žilina
- AAUTO, s.r.o. Žilina
- VIP AUTO, s.r.o. Žilina
- GS1 Slovakia, Žilina
- EAN Slovakia, Žilina
- Htest Slovakia, Banská Bystrica
- SSC, Bratislava
- NDS, Bratislava
- SEMIKRON s.r.o. Vrbové
- EMIS s.r.o. Bratislava
- Pneustyle s.r.o. Žilina
- AXONpro a.s. Bratislava
- Samsung Electronics Slovakia s.r.o. Galanta
- ŽOS Vrútky
- ŽOS Zvolen
- AEROMOBIL Nitra

## International Co-operation Partners

- Università degli studi di Catania -IT, DIEES, prof. Giuseppe Scarcella
- Panasonic Electronic Devices Co., Ltd., Kadoma, JPN
- Panasonic Electronic Devices Europe GmbH, Lüneburg, DE
- Politecnico di Bari – IT, DEE, prof. Francesco Cupertino
- National University of Ireland, Dublin – IRL, prof. Annroi de Paor
- Technikum Wien – AT, prof. Felix Himmelstoss
- National Instruments Czech Republic, s.r.o. – Peter Brieška
- Technical University RWTH Aachen – DE, prof. Blazek Vladimir
- Politechnika Radomska – PL, prof. Miroslav Luft, doc. Elzbieta Szychta
- XILINX USA, University program
- Humusoft s.r.o. Praha – CZ, Karel Bittner
- TU – VŠB Ostrava – CZ, prof. Pavel Brandstetter, prof. Petr Chlebiš, doc. Petr Palacký
- FAIRCHILD Semiconductor - Power Franchise - EU
- Freescale s.r.o., Rožňov pod Radhoštěm - CZ
- Rockwell Automotion s.r.o., Praha – CZ
- University Ioan Slavici, Timisoara, RO
- The University of Strathclyde, Glasgow, UK
- EQUINOCCIO Madrid, ES

## Visitors to the Department

Name	Institution	Length of stay
Artem Rozanov, PhD.	Moscow Energetic Institute, Russia	60 days
Professor Mario Cacciato, PhD.	UNICT Catania, Italy	6 days
Giacomo Scelba	UNICT Catania, Italy	6 days
Dr. hab. inž. Elzbieta Szychta, PhD.	Univerzity of Radom, Poland	2 days
Prof. Ing.Miroslav Luft, PhD.	Univerzity of Radom, Poland	2 days

## Visits to Foreign Institutions

Name	Institution	Length of stay
Doc. Ing.Michal Frivaldský, PhD.	Lappeenranta University of Technology, Finland	4 days
Doc. Ing.Michal Frivaldský, PhD.	UNICT Catania, Italy, 2 visits	7+4 days
Prof. Ing. Pavol Špánik, PhD.	UNICT Catania, Italy	4 days
Doc. Ing.Peter Drgoňa, PhD.	UNICT Catania, Italy	5 days
Ing. Slavomír Kaščák, PhD.	UNICT Catania, Italy	7 days
Ing. Martin Galád	UNICT Catania, Italy	4 month
Ing. Tomáš Laškody	UNICT Catania, Italy	6 month
Prof.Ing.Branislav	Moscow Energetic Institute, Russia	30 days

Dobrucký, PhD.		
Doc.Ing.Miroslav Hrianka, PhD.	RWTH Aachen, Helmholtz Institute, Germany	4 days
Prof.Ing.Branislav Dobrucký, PhD.	TransComp 2015, Zakopané, Poland	2 days
Doc. Ing. Pavel Pavlásek, PhD.	IATED, Barcelona, Spain	5 days

### Contracts (Business Activities)

<b>EF/3/2015: Research and development of HW and SW for KEY.VI</b>	
Customer:	rogainformatika s.r.o.
Coordinator:	Peter Drgoňa
Co-operators:	Šedo Jozef, Mažgút Roman

### Other Activities

#### Specialised Lectures and Courses Organized by the Department

<b>Identification of components and services</b>	
Customer:	EAN Slovakia, students of bachelor's degree of FEE University of Zilina (3Z1B20)
Lecturer:	Anna Simonová, Pavel Pavlásek, Miroslav Štaffen
Date:	10th March 2015

<b>Identifiers: Design and verification of the functionality of modules with barcodes in automatic control</b>	
Customer:	GS1 Slovakia, students of bachelor's degree of FEE University of Zilina (3Z1B21)
Lecturer:	Anna Simonová, Pavel Pavlásek, Miroslava Miklová
Date:	17th March 2015

<b>RFID identifiers: Standardization of systems, communication systems and product flows verification systems</b>	
Customer:	GS1 Slovakia, students of bachelor's degree of FEE University of Zilina (3Z1B22)
Lecturer:	Anna Simonová, Pavel Pavlásek, Miroslava Miklová
Date:	24th March 2015

<b>Design, measurement and operation verification of the unique identifier and its characteristics</b>	
Customer:	EAN Slovakia, students of bachelor's degree of FEE University of Zilina (3Z1B23)
Lecturer:	Anna Simonová, Pavel Pavlásek, Miroslav Štaffen
Date:	31th March 2015

<b>Autotronics: Development of electronic parking brakes</b>	
Customer:	Continental Automotive Systems Slovakia, s.r.o. Zvolen , študenti IŠ EF ŽU (3Z9M20)
Lecturer:	Pavel Pavlásek, Pavol Špánik, Milan Zachar
Date:	24th March 2015

<b>Digital Measuring Instruments: Power analyzers</b>	
Customer:	TESTE s.r.o. Bratislava, students of master's degree of FEE University of Zilina (3Z9M10)

Lecturer:	Pavel Pavlásek, Miroslav Kamenský
Date:	31th March 2015

<b>Digitization in practice I: Digital measurements and data processing - precision, accuracy, repeatability</b>	
Customer:	Elso Philips s.r.o., Trenčín, students of master's degree of FEE University of Zilina (3Z9M10)
Lecturer:	Pavel Pavlásek, Marián Hubinský
Date:	16th March 2015

<b>Digitization in practice II: Digital measurements and data processing - digital signal processing, decoding by SW, SE radio</b>	
Customer:	Elso Philips s.r.o., Trenčín, students of master's degree of FEE University of Zilina (3Z9M10)
Lecturer:	Pavel Pavlásek, Marián Hubinský
Date:	23rd March 2015

<b>Geomatics: Utilization of geographic data</b>	
Customer:	EMIS, s.r.o., Bratislava, students of master's degree of FEE University of Zilina (3Z9M10)
Lecturer:	Pavel Pavlásek, Miroslav Vanek, Matej Krajčovič
Date:	23rd April 2015

<b>Competition: The Technical Idea of the Year</b>	
Customer:	Secondary school students
Lecturer:	Michal Frivaldský, Peter Drgoňa, Ondrej Hock
Date:	10th June 2014

#### Invited Lectures/Papers

<b>Recent Advances on Power Electronic Systems on DME</b>	
Lecturer:	Pavol Špánik, Michal Frivaldský
Where:	UNICT, Catania, Italy
Date:	24th April 2015

#### Membership in International Institutions/Committees

Branislav Dobrucký	IEEE IE Society - Senior Member
	Reviewer for Publishing Company Elsevier, NL
	Reviewer for EPE journal, Brussels, BE
	Reviewer for IEEE Industrial Electronics
	IEEE SMTC 2015 Evaluation Committee – competition
Pavel Pavlásek	Editorial Board of the Inžinierske stavby/Inženýrské stavby Journal
	Brandon Hall Excellence in Learning Technology Awards
	Expert of EC H2020 SMEINST
	Member of European Committee expert team for science and research
Pavol Špánik	IEEE IE Society - Senior Member
	Scientific Board of FEI – TU Ostrava, CZ
	Electronics Committee FEI – TU Ostrava, CZ
Michal Frivaldský	IEEE IE Society

Peter Drgoňa	IEEE IE Society
Libor Hargaš	IEEE IE Society
Slavomír Kaščák	IEEE IE Society
Michal Praženica	IEEE IE Society
Ondrej Hock	IEEE IE Society
Martin Galád	IEEE IE Society Student member
Roman Mažgút	IEEE IE Society Student member
Tomáš Laškody	IEEE IE Society Student member
Zuzana Loncová	IEEE IE Society Student member
Viliam Jaroš	IEEE IE Society Student member
Pavol Štefanec	IEEE IE Society Student member
Marek Píri	IEEE IE Society Student member
Boris Kozáček	IEEE IE Society Student member

#### Membership in National Institutions/Committees

Branislav Dobrucký	Steering Programme Committee of TRANSCOM 2015 Conference
	Steering Programme Committee of ALER 2015 Conference
Pavel Pavlásek	Commission of Transport and Road Administration Port (The Žilina Self-governing region)
	Commission of the Ministry of Education of Slovak Republic for Selection of Candidates for study in Slovak Republik within the Aid for Developing Countries and Compatriots
Pavol Špánik	Working Group „Industry Technologies“ at Ministry of Education, Science, Research and Sport of the Slovak Republic
	Working Group „Electro-mobility“ at Ministry of Economy of the Slovak Republic
	Grant Commission for Scientific Grant Agency of the Slovak Republic VEGA No 5 for electrical engineering and informatics
Libor Hargaš	Editorial Board of the Mechatronika Journal, TU Košice

#### Membership in University Boards

Branislav Dobrucký	Editorial Board of ZU Scientific Journal – Communication – Scientific Letters
	Scientific Board of FEE University of Zilina
	Electrical Engineering Committee, FEE University of Zilina
Pavol Špánik	Senate of University of Zilina
	Academic Senate of FEE University of Zilina
	Electrical Engineering Committee, FEE University of Zilina
	Power Engineering Committee, FEE University of Zilina
	Measurement Technique Committee, FEI TU Košice
	Board of directors (Správna rada) of University of Zilina
	Scientific Board of University of Zilina
	Scientific Board of FEE University of Zilina
Pavel Pavlásek	Technical Subjects Didactics Committee, UKF Nitra
Michal Frivaldský	Academic Senate of FEE University of Zilina
Libor Hargaš	Academic Senate of FEE University of Zilina



## Awards

Juraj Koscelnik	Rector's Award for the best PhD thesis at FEE University of Zilina in 2015
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## Publications

### Current Content Journals

[1]	DOBRUCKY, Branislav - FRIVALDSKY, Michal - KOSCELNIK, Juraj: Analysis of non-linear inverter circuitry of LCTLC topologies, In: <i>COMPEL: The International Journal for Computation and Mathematics in Electrical and Electronic Engineering</i> , 2015, Vol. 34, Iss. 3, ISSN 0332-1649, p. 824 – 839. (in English)
[2]	FRIVALDSKY, Michal - DOBRUCKY, Branislav - PRAZENICA, Michal - KOSCELNIK, Juraj: Multi-tank resonant topologies as key design factors for reliability improvement of power converter for power energy applications. In: <i>Electrical Engineering - Archiv für Elektrotechnik</i> , SPRINGER, Vol. 97, Issue 4, 2015, DOI 10.1007/s00202-015-0336-3, ISSN 0948-7921, ISSN(online) 1432-0487, p. 287-302. (in English)

### Journals indexed in a world-wide database (Thomson Scientific Master Journal List or SCOPUS)

[1]	DOBRUCKY, Branislav - LASKODY, Tomas - PRAZENICA, Michal: A Novel Supply System for Two-Phase Induction Motor by Single Leg Matrix Converter, In: <i>Elektronika ir Elektrotechnika</i> , Vol. 21, No. 4, 2015, ISSN 1392-1215, p. 13 -16, Thomson. (in English)
[2]	HARGAS, Libor – KONIAR, Dusan - SIMONOVA, Anna - HRIANKA, Miroslav - LONCOVA, Zuzana: Signal Conditioning in Process of High Speed Imaging, In: <i>Advances in Electrical and Electronic Engineering</i> , Vol. 13, No.5, ISSN 1336-1376, eISSN 1804-3119, p. 567–574, Scopus. (in English)

### Other Reviewed Foreign Journals

[1]	HARGAS, Libor – KONIAR, Dusan - HRIANKA, Miroslav - SIMONOVA, Anna - LONCOVA, Zuzana: Diagnostic of Respiratory Diseases Based on Virtual Instrumentation, In: <i>ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering</i> (Fascicule 1), Hunedoara – Romania, 1/2015, ISSN 2067-3809, p. 105 – 108, EBSCO, Index Copernicus. (in English)
[2]	LASKODY, Tomas - PRAZENICA, Michal - MAZGUT, Roman - STEFANEC, Pavol: Two-Phase Matrix Converter with Two Legs Controlled by Space Vector Pulse Width Modulation, In: <i>ANNALS of Faculty Engineering Hunedoara – International Journal of Engineering</i> , Tome XIII [2015] – Fascicule 1 [February], ISSN 1584-2665, ISSN 1584-2673, p. 45 - 48, EBSCO, Index Copernicus. (in English)
[3]	DOBRUCKY, Branislav – SINDLER Peter – CUNTALA, Jozef – KONDELOVA, Anna: Increasing of Reliability of FPGA Implemented Microcontroller Using the Error Self Correcting Techniques In: <i>Journal of Communication and Computer</i> , David Publishing, Vol. 12 (2015), ISSN 1548-7709, p. 219-227. (in English)
[4]	KASCAK, Slavomir – MAZGUT, Roman: Sensorless Control of Two-Phase Induction Machine using MRAS Techniques, In: <i>TRANSACTIONS ON ELECTRICAL ENGINEERING</i> , Vol.4, No. 4, 2015, ISSN 1805-3386, p. 108-111. (in English)
[5]	KOSCELNIK, Juraj - MAZGUT, Roman - KASCAK, Slavomir - PRAZENICA, Michal: Review of Selected Multi-Element Resonant Topologies, In: <i>TRANSACTIONS ON ELECTRICAL ENGINEERING</i> , Vol.4, No. 4, 2015, ISSN 1805-3386, p. 86-90. (in English)

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

[1]	DOBRUCKY, Branislav - CHERNOYAROV, Oleg V. - MAKAROV, Artem A. - SHEPELEV, Dmitry N.: Practical realization of the stationary noise cancellation algorithm in the speech signals on the basis of SMV-canceller, In: <i>Proceedings of 4th Conference on Electronics, Communications and Networks</i> , Taylor & Francis Group, London, 2015, ISBN 978-1-138-02830-2, p. 729-734, IEEE, Ei Compendex (in English)
[2]	KANOVSKY, Andrej - SPANIK, Pavol – FRIVALDSKY, Michal: Detection of electronic counterfeit components, In: <i>16th International Scientific Conference on Electric Power Engineering (EPE 2015)</i> , May 2015, CZ, IEEE Catalog Number CFP1573X – USB, ISBN 978-1-4673-6787-5, p. 701-705, Thomson (in English)
[3]	HOCK, Ondrej – DRGONA, Peter – FRIVALDSKY, Michal – HAVRILA, Rastislav: Simulation of manipulator positioning methodology using inverse kinematics, In: <i>16th International Scientific Conference on Electric Power Engineering (EPE 2015)</i> , May 2015, CZ, IEEE Catalog Number CFP1573X – USB, ISBN 978-1-4673-6787-5, p. 706-711, Thomson (in English)
[4]	PIRI, Marek – JAROS, Viliam - FRIVALDSKY, Michal: Verification of a mutual inductance calculation between two helical coils, In: <i>16th International Scientific Conference on Electric Power Engineering (EPE 2015)</i> , May 2015, CZ, IEEE Catalog Number CFP1573X – USB, ISBN 978-1-4673-6787-5, p. 712-717, Thomson (in English)
[5]	KOZACEK, Boris – KOSTAL, Juraj - FRIVALDSKY, Michal: Analysis of Figure of Merit – power transistor’s qualitative parameter, In: <i>16th International Scientific Conference on Electric Power Engineering (EPE 2015)</i> , May 2015, CZ, IEEE Catalog Number CFP1573X – USB, ISBN 978-1-4673-6787-5, p. 718-722, Thomson (in English)
[6]	FRIVALDSKY, Michal - SPANIK, Pavol - KOZACEK, Boris - PIRI, Marek: Evaluation of Power Transistors Figure of Merit for Hard Switching Commutation Mode through Experimental Analysis, In: <i>Progress In Electromagnetics Research Symposium - PIERS 2015</i> , CZ, ISSN 1559-9450, p.1303-1308, Thomson
[7]	KOSCELNIK, Juraj - DOBRUCKY, Branislav - FRIVALDSKY, Michal - PRAZENICA, Michal: Analysis of Multi-resonant Circuit in Overloading States, In: <i>Progress In Electromagnetics Research Symposium - PIERS 2015</i> , CZ, ISSN 1559-9450, p.2750-2754, Thomson (in English)
[8]	FRIVALDSKY, Michal - SPANIK, Pavol - PIRI, Marek – JAROS, Viliam: Mutual Inductance of Two Helical Coils — Theory, Calculation, Verification, In: <i>Progress In Electromagnetics Research Symposium - PIERS 2015</i> , CZ, ISSN 1559-9450, p.2755-2762, Thomson (in English)
[9]	PAVLASEK, Pavel: Curricular Innovation in Beginning Teachers Qualification: Archetypal Insights to Increase the Quality of Supplementary Education, In: <i>EDULEARN15, 7th International Conference on Education and New Learning Technologies</i> , Barcelona 2015, USB, ISBN: 978-84-606-8243-1, ISSN: 2340-1117, p. 6580-6589, Thomson (in English)
[10]	HARGAS, Libor – KONIAR, Dusan – LONCOVA, Zuzana – HRIANKA, Miroslav –HURTUKOVA, Zuzana - SIMONOVA, Anna: Regular Shapes Detection for Analysis of Biomedical Image Sequences, In: <i>20th International Conference on Applied Electronics, APPEL 2015</i> , IEEE, Pilsen 2015, ISBN 978-80-261-0385-1, ISSN 1803-7232, p. 49-52, Thomson (in English)
[11]	KOZACEK, Boris - KOSTAL, Juraj - FRIVALDSKY, Michal - PIRI, Marek: Figure of Merit of Semiconductor Structures, Determination of the Impact on the System Efficiency of LLC Converter, In: <i>20th International Conference on Applied Electronics, APPEL 2015</i> , IEEE, Pilsen 2015, ISBN 978-80-261-0385-1, ISSN 1803-7232, p. 115-120, Thomson (in English)
[12]	STEFANEC, Pavol – BENOVA, Mariana - DOBRUCKY, Branislav - CHERNOYAROV, Oleg V.: Generating and Mathematical Modelling of Discontinuous Impulse Waveforms, In: <i>2015 International Conference on Modelling, Simulation and Applied Mathematics (MSAM 2015)</i> , p. 330-335, DOI: doi:10.2991/msam-15.2015.76, ISBN: 978-94-6252-104-9, ISSN: 2352-5401, p. 330-335. (in English)
[13]	PRAZENICA, Michal – KASCAK, Slavomir - KOSCELNIK, Juraj – LOVAS, Ivan: Modelling of Dynamical

	Properties of a Resonant Converter under Step Frequency- and Loaded Converter Changes, In: <i>2015 International Conference on Modelling, Simulation and Applied Mathematics (MSAM 2015)</i> , DOI: doi:10.2991/msam-15.2015.76, ISBN: 978-94-6252-104-9, ISSN: 2352-5401, p. 140-143. (in English)
[14]	LONCOVA, Zuzana - HARGAS, Libor – KONIAR, Dusan – HRIANKA, Miroslav - SIMONOVA, Anna: Parameters Measurements of the Object in a Video Sequence, In: <i>IFAC Conference on Programmable Devices and Embedded Systems PDeS 2015</i> , ELSEVIER, IEEE, p. 225-228, ISSN 2405-8963, p. 225-228, Scopus (in English)
[15]	STEFANEC, Pavol - DOBRUCKY, Branislav: One Leg MxC Analysis and Modelling, In: <i>2015 International Conference on Electrical Drives and Power Electronics EDPE 2015</i> , IEEE Catalog Number CFP15EDQ-USB, ISBN 978-1-4673-9661-5, p. 60-64.
[16]	GALAD, Martin – MAZGUT, Roman - SPANIK, Pavol: Comparison of Parameter and Efficiency of Transformerless Inverter Topologies, In: <i>2015 International Conference on Electrical Drives and Power Electronics EDPE 2015</i> , IEEE Catalog Number CFP15EDQ-USB, ISBN 978-1-4673-9661-5, p. 64-68. (in English)
[17]	LASKODY, Tomas - DOBRUCKY, Branislav - STEFANEC, Pavol – PRAZENICA, Michal: Comparison of a Single-Phase Induction Motor Drive Fed by VSI and MxC with Option of Speed Reduction, In: <i>2015 International Conference on Electrical Drives and Power Electronics EDPE 2015</i> , IEEE Catalog Number CFP15EDQ-USB, ISBN 978-1-4673-9661-5, p. 368-372. (in English)
[18]	MAZGUT, Roman – KASCAK, Slavomir – DRGONA, Peter – RADVAN, Roman – CUBON, Peter: Supply Structure with an Additional Energy Storage for Electric Vehicle, In: <i>2015 International Conference on Electrical Drives and Power Electronics EDPE 2015</i> , IEEE Catalog Number CFP15EDQ-USB, ISBN 978-1-4673-9661-5, p. 409-412. (in English)
[19]	KACSOR, Gabriel – HAVRILA, Rastislav – BUDAY, Jozef – BEDNAR, Jozef: The Performance of the New Generation Dynamic Mode Current Source Power Supplies with Energy Recuperation Ability to the DC – Link, In: <i>2015 International Conference on Electrical Drives and Power Electronics EDPE 2015</i> , IEEE Catalog Number CFP15EDQ-USB, ISBN 978-1-4673-9661-5, p. 437-442. (in English)
[20]	BEDNAR, Jozef - KACSOR, Gabriel – HAVRILA, Rastislav – ILONCIAK, Jaroslav – SUNAL, Michal: Simulation of Thermal Cycling and Lifetime Estimation of Transistor used in Output DC-DC Converter for Synchrotron Magnet Power Supply, In: <i>2015 International Conference on Electrical Drives and Power Electronics EDPE 2015</i> , IEEE Catalog Number CFP15EDQ-USB, ISBN 978-1-4673-9661-5, p. 153-156. (in English)

#### Reviewed Conference Proceedings Abroad (if not included above)

[1]	STEFANEC, Pavol - DOBRUCKY, Branislav – PASKALA, Marek – SUSLIK, Branislav: PLC Control System Design for Vehicle Tire Moulds Preheating, In: <i>2nd International Conference „NEW TECHNOLOGIES NT-2015 „Development and Application NT 2015</i> , ISSN 2303-5668, p. 373-379. (in English)
[2]	DOBRUCKY, Branislav – LASKODY, Tomas - PRAZENICA, Michal - STEFANEC, Pavol: Analysis, Modelling and Simulation of a New Type of One Leg Matrix Converter In: <i>International Conference on Innovative Technologies - IN-TECH 2015</i> , Dubrovnik, ISSN 1849-0662, p. 108-111. (in English)
[3]	SPANIK, Pavol – DRGONA, Peter – FRIVALDSKY, Michal: Self-Current Sense Digital Control System for Resonant Converter, In: <i>International Conference on Innovative Technologies - IN-TECH 2015</i> , Dubrovnik, ISSN 1849-0662, p. 100-103. (in English)
[4]	CUNTALA, Jozef - FRIVALDSKY, Michal – KONDELOVA, Anna: Thermal Simulation of Aluminium Electrolytic Capacitor at Periodic Charge and Discharge Impulses, In: <i>Technical Computing Bratislava 2014 Proceedings, 2015</i> , LAP LAMBERT Academic Publishing, ISBN 978-3-659-40792-5, p. 82-104. (in English)
[5]	STEFANEC, Pavol - DOBRUCKY, Branislav – JAROS, Viliam: Impulse Switching Functions of Power Converters with Rectangular and Half-Sinusoidal Output Voltages, In: <i>Technical Computing</i>

	<i>Bratislava 2014 Proceedings, 2015</i> , LAP LAMBERT Academic Publishing, ISBN 978-3-659-40792-5, p. 199-210. (in English)
[6]	MAZGUT, Roman – CUBON, Peter – RADVAN, Roman: Possibilities optimizing energy consumption of electric vehicle, In: <i>19th International Student Conference on Electrical Engineering POSTER 2015</i> , ISBN 978-80-01-05728-5. (in English)
[7]	STEFANEC, Pavol: Analyses of Impulse Switching Functions of Power Inverters, In: <i>19th International Student Conference on Electrical Engineering POSTER 2015</i> , ISBN 978-80-01-05728-5. (in English)
[8]	KOSTAL, Juraj: Calibration in Touch Screens System, In: <i>19th International Student Conference on Electrical Engineering POSTER 2015</i> , ISBN 978-80-01-05728-5. (in English)
[9]	KOSCELNIK, Juraj: Analysis and Design of Multi-element Circuit, In: <i>19th International Student Conference on Electrical Engineering POSTER 2015</i> , ISBN 978-80-01-05728-5. (in English)
[10]	KOZACEK, Boris: Analysis of Figure of Merit and Power Losses - power transistor's qualitative parameter for hard switching, In: <i>19th International Student Conference on Electrical Engineering POSTER 2015</i> , ISBN 978-80-01-05728-5. (in English)
[11]	PIRI, Marek – JAROS, Viliam: Comparison of measured and calculated value of mutual inductance of two helical coils, In: <i>19th International Student Conference on Electrical Engineering POSTER 2015</i> , ISBN 978-80-01-05728-5. (in English)
[12]	STEFANEC, Pavol - PASKALA, Marek – DOBRUCKY, Branislav - SUSLIK, Branislav: Control System for Preheating of Moulds with using PLC, In: <i>International Conference on Industrial Technology and Management Science (ITMS 2015)</i> , ISBN: 978-94-6252-123-0, ISSN: 2352-538x, p. 1647- 1652. (in English)
[13]	CUNTALA, Jozef - FRIVALDSKY, Michal – KONDELOVA, Anna: Thermal Simulation of Power LED Diode in COMSOL Environment, In: <i>Technical Computing Prague 2015</i> , ISBN 978-80-7080-936-5, ISSN 2336-1662, p. 13. (in English)
[14]	SINDLER, Peter - DOBRUCKY, Branislav - CUNTALA, Jozef – LOVAS, Ivan: Using the Self Error Correcting Function to Increasing of Reliability of FPGA Implemented Microcontroller, In: <i>6th International Multi-Conference on Complexity, Informatics, and Cybernetics - IMCIC</i> , IIS Institute, Orlando, USA, 2015, ISBN 978-1-941 763-16-2, p. 81-86. (in English)
[15]	HOCK, Ondrej – DRGONA, Peter - SPANIK, Pavol – HAVRILA, Rastislav: Simulation Model of Robot Adjustable Arm, In: <i>6th International Multi-Conference on Complexity, Informatics, and Cybernetics - IMCIC</i> , IIS Institute, Orlando, USA, 2015, ISBN 978-1-941 763-16-2, p. 92-95. (in English)
[16]	SPANIK, Pavol – HOCK, Ondrej - FRIVALDSKY, Michal: Using the Method of Pseudoinverse for Inverse Kinematics Calculation of Adjustable Arm, In: <i>6th International Multi-Conference on Complexity, Informatics, and Cybernetics - IMCIC</i> , IIS Institute, Orlando, USA, 2015, ISBN 978-1-941 763-16-2, p. 110-113. (in English)

#### Reviewed Conference Proceedings in Slovakia

[1]	DOBRUCKY, Branislav – CHERNOYAROV, Oleg V. – MARCOKOVA, Mariana: Computation of the Total Harmonic Distortion of Impulse System Quantities using Infinite Series, In: <i>14th Conference on Applied Mathematics APLIMAT</i> , SR, ISBN 978-80-227-4314-3, p. 213-220. (in English)
[2]	HOCK, Ondrej – HAVRILA, Rastislav: Use of transposition method for computation of inverse kinematics of positioning arm Využitie metódy transpozície pre výpočet inverznej kinematiky polohovateľného ramena, In: <i>New possibilities at prevention, diagnosis and therapy of cancer diseases</i> , 2015, Martin SR, ISBN 978-80-89544-89-9, p. 52-59. (in Slovak)
[3]	KACSOR, Gabriel – HAVRILA, Rastislav – BUDAY, Jozef – FRANKO, M. – SUNAL, Michal – BEDNAR, Jozef - ILONCIK, Jaroslav: Research and development of electrical topology of current source modules of supplying magnets in particle, In: <i>New possibilities at prevention, diagnosis and therapy of cancer diseases</i> , 2015, Martin SR, ISBN 978-80-89544-89-9, p. 84-94. (in Slovak)
[4]	KACSOR, Gabriel – HAVRILA, Rastislav – BUDAY, Jozef – FRANKO, M. – SUNAL, Michal – BEDNAR, Jozef - ILONCIK, Jaroslav: New generation of dynamic current sources for supply of

	superconducting magnets with energy regeneration into the DC link source, In: <i>New possibilities at prevention, diagnosis and therapy of cancer diseases</i> , 2015, Martin SR, ISBN 978-80-89544-89-9, p. 95-107. (in Slovak)
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#### Patents, Industrial Designs, Author's Certificates and Discoveries

[1]	HARGAŠ, Libor – ŠINDLER, Peter: The device for diagnostics of static parameters of overline wire, U.V. c. 7127.
[2]	MIKULOVSKÝ, Jaroslav – DOBRUCKÝ, Branislav – ŠPÁNIK, Pavol – LESINSKY, Ján: ICE engines with four-stroke and two-stroke working process effectively utilizing hybrid technology , U.V. c. 7288

#### SCI Citations

[1]	HARGAS, Libor – KONIAR, Dusan – HRIANKA, Miroslav: Tissue Analysis by Virtual Implementation, In: <i>Sensors &amp; Transducers Journal</i> , Vol. 75, Issue. 1, 2007, ISSN 1726-5479, p. 914-919. Citation: Kelemen, M., Virgala, I., Prada, E., Liptak, T.: Experimental verification of the shape memory alloy (SMA) spring actuator for application on in-pipe machine, In: <i>METALURGIJA</i> , 2015, Vol. 54, Issue. 1, ISSN 0543-5846, p. 173-176.
[2]	FRIVALDSKY, Michal - CUNTALA, Jozef - SPANIK, Pavol: Simple and accurate thermal simulation model of supercapacitor suitable for development of module solutions, In: <i>International Journal of Thermal Sciences</i> , Elsevier, Vol. 84, October 2014, ISSN 1290-0729, DOI: 10.1016/j.ijthermalsci.2014.04.005, p. 34–47, Thomson. Citation: Voicu, I; Louahlia, H; Gualous, H; Gallay, R: Thermal management and forced air-cooling of supercapacitors stack, <i>APPLIED THERMAL ENGINEERING</i> , Volume: 85, DOI: 10.1016/j.applthermaleng.2015.04.003, JUN 25 2015, ISSN: 1359-4311, p. 89-99,
[3]	FRIVALDSKY, Michal – DRGONA, Peter - SPANIK, Pavol: Experimental Analysis and Optimization of Key Parameters of ZVS Mode and its Application in the Proposed LLC Converter Designed for Distributed Power System Application, In: <i>International Journal of Electrical Power Energy Systems</i> , 2013/47, ISSN 0142-0615, p. 448-456. Citation: Zeng, J; Li, XS; Liu, JF: A Controllable LCL-T Resonant AC/DC Converter for High Frequency Power Distribution Systems, <i>JOURNAL OF POWER ELECTRONICS</i> , Volume: 15, Issue: 4, DOI: 10.6113/JPE.2015.15.4.876, JUL 2015, ISSN: 1598-2092, p. 876-885,
[4]	DUDRIK, Jaroslav - SPANIK, Pavol – TRIP, Nistor Daniel: Zero-Voltage and Zero-Current Switching Full Bridge DC-DC Converter with Auxiliary Transformer, In: <i>IEEE transaction on POWER ELECTRONICS (a publication of the IEEE power electronics society)</i> , September 2006, Vol. 21, No. 5, ITPEE8, p. 1328-1335. Citation: Baars, NH; Everts, J; Huisman, H; Duarte, JL; Lomonova, EA : A 80-kW Isolated DC-DC Converter for Railway Applications, <i>IEEE TRANSACTIONS ON POWER ELECTRONICS</i> , Volume: 30, Issue: 12, DOI: 10.1109/TPEL.2015.2396006, 2015, ISSN: 0885-8993, p. 6639-6647.
[5]	HARGAS, Libor – KONIAR, Dusan – STOFAN, Stanislav: Sophisticated biomedical tissue measurement using image analysis and virtual instrumentation, In: <i>LabVIEW, Practical applications and solutions</i> , 2011, ISBN 978-953-307-650-8, p. 155-180. Citation: Sutovska, M., Capek, P., Kazimierova, I., Pappova, L., Joskova, M., Matulova, M., Franova, S., Pawlaczyk, I., Gancarz, R.: Echinacea complex – Chemical view and anti-asthmatic profile, In: <i>Journal of Ethnopharmacology</i> , Vol. 175/ 4, 2015, ISSN 0378-8741, p. 163-171.

[6]	<p>HARGAS, Libor – KONIAR, Dusan – STOFAN, Stanislav: Sophisticated biomedical tissue measurement using image analysis and virtual instrumentation, In: <i>LabVIEW, Practical applications and solutions</i>, 2011, ISBN 978-953-307-650-8, p. 155-180.</p> <p>Citation: Sutovska, M., Kocmalova, M., Joskova, M., Adamkov, M., Franova, S.: The effect of long-term administered CRAC channels blocker on the function of respiratory epithelium in guinea pig allergic asthma model, In: <i>General Physiology and biophysics</i>, Vol. 34, Issue 2, pp. 167-176, ISSN 0231-5882</p>
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