

# DEPARTMENT OF MECHATRONICS AND ELECTRONICS

## General Information

Department of Mechatronics and Electronics (DME) is a part of the Faculty of Electrical Engineering (FEE) at the University of Žilina. It is a workplace whose primary task is to train experts in the area of electronics, industry automation, power-electronic and mechatronic systems on all levels of university education. Great importance is scientific-research activity of the department which is realized by variety of projects funded from 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 the team is represented by full-time doctoral students with significant participation in scientific-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 was completed. Significant progress has been made in building of educational-research 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, Slovak Technical University in 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 at our department.

In the year 2016 the department involved eighteen members of educational staff, three research workers, seventeen full-time PhD students and three part-time PhD students. From the point of view of internal structure it has been divided into three sections. 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 section deals with special electronics focused on applications in medicine and mechatronic systems.

The department provides educational process at all three levels of the university study. The bachelor degree is covered by the accredited study program Electrical Engineering (specialization in Mechatronic Systems and Autotronics). Master degree includes the accredited study program Power Electronic Systems (in specializations Power Electronics, Mechatronic and Automotive Systems, and Autotronics and electro-mobility). In doctoral study the department staff participated in providing training courses in Power Electronics and Telecommunications and Automation.

Within the frame of pedagogical activities 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 other faculties of the University of Žilina. Such education has been dedicated for different study branches and specializations in the bachelor, master and doctoral studies, both in internal and external ones.

The department realised and provided research and development, expertises 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 the present time the department operates with eight laboratories dedicated for pedagogical operation, including final projects, final and master thesis. 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. These are 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 (until Aug., 2016) Dušan Koniar (from Sept., 2016)
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, Rastislav Havrila,
Lectors:	Jozef Lakatoš

### Section of Mechatronic Systems and Autotronics

Head of the Section:	Branislav Dobrucký (until Aug., 2016) Peter Drgoňa (from Sept., 2016)
Professors:	Branislav Dobrucký
Associate Professors:	Pavel Pavlásek, Peter Drgoňa
Research Fellows:	Marek Paškala, Peter Čuboň
Senior Lecturers (with PhD):	Ondrej Hock, Jozef Šedo
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):	Jozef Šedo (until August, 2016), Martin Galád, Roman Mažgút (until August, 2016), Tomáš Laškody (until August, 2016), Zuzana Loncová, Viliam Jaroš, Pavol Štefanec, Marek Píri, Boris Kozáček, Michal Prídala, Roman Koňarik, Michal Taraba (from September, 2016), Miroslav Pavelek (from September, 2016), Matúš Danko (from September, 2016), Tomáš Uriča (from September, 2016), Juraj Adamec (from September, 2016), Miriam Jarabicová (from October, 2016)
External (part-time):	Ivan Lovás, Andrej Kaňovský, Jaroslav Ilončiak, Marek Kováč (from September, 2016), 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>			
3B0302	Electronics I	3	2 - 0 - 3
3B0312	Power Supplies	3	2 - 0 - 1
3B0314	Logical Circuits	3	2 - 0 - 2
3B2300	Autotronics	3	3 - 0 - 3
3B5300	Introduction to Industry Automation and Mechatronics	3	1 - 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>			
310108	Microprocessors, Microcomputers and DSP	1	2 - 0 - 3
310109	Theory of Automatic Control 1	1	3 - 0 - 2
319100	Electromagnetic Compatibility in Electronics	1	3 - 1 - 1
319102	Computers in Industrial Automation 2	1	2 - 0 - 2

319103	Dynamics of Vehicle Movement	1	2 - 2 - 0
319105	Simulation Languages in Power Electronics	1	2 - 0 - 2
310110	Power Semiconductor Converters	2	3 - 1 - 2
310212	Traction Batteries and Recharging Infrastructure	2	2 - 0 - 2
310217	Design of ASIC	2	2 - 0 - 3
310219	Virtual Instrumentation	2	2 - 0 - 2
313202	Theory of Automatic Control 2	2	2 - 1 - 1
319200	Analysis and Synthesis of Power Electronic Circuits	2	2 - 3 - 0
319201	Mechatronic Systems	2	2 - 1 - 2
310307	Electromagnetic Compatibility	3	2 - 1 - 0
310310	Electromagnetic Compatibility in Electronics	3	3 - 1 - 1
312300	Processing of Biomedical Images	3	2 - 0 - 2
313015	Power Electronics Applications	3	3 - 0 - 1
319300	Design and Construction of Power Semiconductor Systems	3	2 - 3 - 1
319302	Diploma Project Power Electronic Systems	3	0 - 5 - 0
319303	Electric transfer of HEV and EV vehicles power	3	2 - 2 - 0
319304	Power Electronics Applications	3	3 - 0 - 1
319305	Logical Circuits	3	2 - 0 - 2
319306	Control systems of EV and HEV vehicles	3	2 - 0 - 3
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

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

## Research & Development

The department realised and provided research and development, expertise 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, there 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 converters for two-phase drives and experiments in the 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.

## Educational and research laboratories

### Laboratory of Power Electronics

Lessons of Power Electronics Systems.

### Laboratory of Industrial Automation

Lessons of Industrial Automation application.

Laboratory of microprocessors and DSP

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.

Laboratory of Autotronics and Electromobility

Lessons of electronic systems in vehicles with combustion engines and lessons of drive and control systems in electric vehicles.

Laboratory of Electronic Devices

Lessons of analog and digital electronic circuits.

Laboratory for Simulation Languages in Electrical Engineering

Lessons of simulation languages for electrical engineering.

## 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>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, Pavel Pavlásek, Peter Drgoňa, Anna Kondelová, Marek Paškala, Jozef Lakatoš, Roman Mažgút, Marek Píri

<b>1/0558/14: Research of methodology for optimization of lifetime of critical components in perspective electronic appliances through the use of system level simulation.</b>	
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:	Jozef Čuntala, Anna Simonová, Michal Praženica, Slavomír Kaščák, Roman Radvan, Tomáš Laškody, Martin Galád, Marek Píri

#### **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 Hrgaš
Co-operators:	Miroslav Hrianka, Dušan Koniar

#### **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 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:	Ondrej Hock, Pavel Pavlásek, Martin Galád, Pavol Štefanec, Viliam Jaroš, Boris Kozáček

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

#### **003STU-4/2014: Advanced methods of image processing used in visual systems and their**

<b>implementation to the educational process.</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, Anna Simonová, Zuzana Loncová

#### 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, Tomáš Laškody, Pavol Štefanec, Boris Kozáček, Ondrej Hock, Anna Simonová, Slavomír Kaščák, Anna Kondelová

<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, Roman Mažgút, Martin Galád, Viliam Jaroš, Marek Píri

<b>APVV-15-0571: Research of the Optimum Energy Flow Control in the Electric Vehicle System</b>	
Summary:	The project encompasses research into the multi energy storage system for a new generation of electric mobility applications focused on optimal use of energy stored in the primary electrochemical battery. The main criterion is thereby ensuring maximum range of the electric vehicle, at a given stored energy, which will be ensured by utilization of the recovery energy processes in changing the driving dynamics of the vehicles and optimum management of the bidirectional energy flow between the storages (batteries, supercapacitors) and traction drives. The main output of the project will be the simulator traction drive based on two-energy storage system designed to practical testing and optimization algorithms of the flow control and distribution of the power within the on-board network. Another output will be the software packets to manage and monitor on-board power system, including fault conditions and measurements of the relevant traction and energy quantities. The obtained results will be practically utilized in the design of the on-board power systems with optimal use of energy in the newly built university laboratory to teaching specialists in the field of electromobility.
Realization:	10/2016 – 09/2020
Coordinator:	Peter Drgoňa
Co-operators:	Branislav Dobrucký, Slavomír Kaščák, Michal Praženica, Michal Frivaldský, Roman Koňarik, Marek Paškala

<b>APVV-15-0396: Research of Perspective High Frequency Converter Systems with GaN Technology</b>	
Summary:	The project is focused on the issue of increasing the efficiency and power density of power semiconductor systems, while reducing the electromagnetic interference, which ultimately reduces negative environmental aspects of their application. Its main task is to research the phenomena related to applications of advanced semiconductor structures based on GaN transistors in power electronic systems, including research of commutation techniques applied in the switching frequency range of MHz units. Investigators will be outgoing from the results of the projects addressed at the national (ELTECO Ltd.), respectively international level (Panasonic Gmhb Lueneburg SNR). Another task of the project is to research phenomena affecting the efficiency of the practical application of those facilities. Specifically, the economic burden of production, reduction of CO2 and return on investment. The project also highlighted the issue of the reliability analysis and research methodology for the estimation of mean lifetime of power electronic systems based on GaN technology. At the same time, the project deals with draft measures on the possibility of extending the operation of such systems through multi-level multi-physics simulations. The main outcome of the project will be functional sample of the system meeting the declared goals, intended for direct use in industrial applications of electromobility application or respectively of wireless transmission of electricity. Another output will be a set of knowledge and measures for the optimal design of these systems, reducing the failure rate and lifetime extensions. Based on preliminary discussions with companies ELTECO Ltd.

	and Delta Electronics, it can be assumed rapid utilization of the results obtained in industrial practice.
Realization:	10/2016 – 09/2020
Coordinator:	Michal Frivaldský
Co-operators:	Pavol Špánik, Anna Kondelová, Anna Simonová, Ondrej Hock, Jozef Šedo, Peter Čuboň, Boris Kozáček, Michal Prídala

<b>APVV-15-0462: Research on Sophisticated Methods for Analysing the Dynamic Properties of Respiratory Epithelium's Microscopic Elements</b>	
Summary:	The project is focused on research of sophisticated methods based on image analysis, intended to improve the objectivity, efficiency and automation of diagnostic processes in medicine. Its main objective is to identify the dynamic properties of biological objects of interest, which are the cilia of respiratory epithelium. Movement of such objects will be captured using high-speed video microscopy, while recording and data analysis will be carried out by high-power computer system. The recorded data will be then processed by our software system designed for segmentation of the objects of interest. The main criterion for segmentation will be the identification of pathological structures that are, due to disease or structural changes, static and do not contribute to cilia's primary function in vivo. Identification and subsequent analysis of segmented regions will notably contribute to an accurate specification of patient's diagnosis, and thus to determination of early and effective therapy. Although the results of the project are intended to be applied in the medical field, the project is mainly about the research of optimal technical solutions for modern diagnostic methods in medicine also in terms of international research in this area. The dominant project outcome will be the device enabling the analysis of high-speed videos.
Realization:	10/2016 – 09/2020
Coordinator:	Libor Hargaš
Co-operators:	Dušan Koniar, Miroslav Hrianka, Anna Simonová, Pavel Pavlásek, Peter Čuboň, Zuzana Loncová

## Outputs of research projects

### **VEGA 1/0579/14: Research of topological structures of segments of power electronic system for wireless energy transfer**

Creating of optimal design methodology for system components of the wireless power transmission system primarily usable in electric vehicles charging stations and experimental verification of the methodology through physical model is the project result. Maximum efficiency of transfer of energy in the spatial arrangement of the charging system for practical applications was the primary optimization criterion.

### **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**

Creation of a tool which using multi-level simulation allows investigating the effect of different operating characteristics of the electronic systems on the critical elements is the project result. This is an investigation of the impact of different thermal, electrical, mechanical impacts and environmental influences on the life of electrolytic capacitors. For needs of accurate multiphysics modeling of processes it was necessary to create a

model electronic circuits (considering the nonlinear behavior), thermal model of capacitors and to ensure the flow of data between different software so that the obtained results were relevant to theory and practice. Functional, experimentally verified system of electrolytic capacitors life estimation in power systems of electronic devices is the project result. Operating variables that affect life of the capacitors are heat, electrical values, environmental influences (humidity, temperature ...) and mechanical stress.

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

Hardware module – composition, connection and verification of acquisition station for high-speed cinematography with acquisition computer and high-speed camera Basler A504kc and inverse light microscope

Usage: pharmacology and medical sciences, investigation of influence of the pharmacological drugs – inhibitors and activators of ciliary activity in respiratory tract

Software module Ciliary Analysis – a module for processing of high-speed video sequences in LabVIEW software tool; frequency measurements of motile cilia based on harmonic analysis; segmentation module for automatic finding of ciliary areas within an image; design and implementation of codec for NorPix sequence into LabVIEW

#### **KEGA 003STU-4/2014: Advanced methods of image processing used in visual systems and their implementation to the educational process**

Outcomes of University of Zilina in Zilina

- preparation of manuscript of textbook Visual systems for university students
- innovation of subjects Image Processing and Analysis, Computers in Industrial Automation 2 and Virtual instrumentation: lectures, topics for seminars and laboratory exercises
- design of teaching module for computer vision for contactless objects' classifying, measurement, bar code reading (QR, EAN), objects' recognition based on LabVIEW, creation of physical model of an assembly line with camera AVT Marlin F-046B
- creation of teaching modules in LabVIEW for subject Image Processing and Analysis: image segmentation / image interpolation / morphological operators / intensity transformations / objects' detection, etc.
- research of algorithms for segmentation of high-speed videos with biological samples – usage will be at Jessenius Medical Faculty of Comenius University in Martin – the Clinics of children and adolescents; experimental testing of complementary algorithms of image segmentation based on Hough Transformation, Pattern Matching, Geometrical Matching, Local Binary Pattern in cooperation with k-NN classifiers.
- module for monitoring an activity of a laboratory animal based on visual systems – applicable at Jessenius Medical Faculty of Comenius University in Martin – the Institute of pathological physiology; the outcome is published in current content journal Computer Methods and Programs in Biomedicine
- experimental measurement and modelling of 3D heads of children patients based on RGB-D sensing in order to automatize measuring of face features and defects – research work. Applicable at Jessenius Medical Faculty of Comenius University in Martin, the Clinics of

children and adolescents and potential cooperation with University of Rome “Sapienza”, Italy.

## Research for Practice; the Most Important Realized Outputs

### **VEGA 1/0579/14: Research of topological structures of segments of power electronic system for wireless energy transfer**

Application area:

1. Construction of contactless charging stations for electric vehicles.
2. System design of the wireless transfer of energy for charging of small appliances in industry, households, medicine.
3. Development of converters with high efficiency and high switching frequencies.
4. Development of control algorithms for energetic systems of intelligent transport, including automatic distribution of energy.
5. Solution of EMC of WET systems and their impact on biological objects.
6. Development of therapies and devices in medical practice.

### **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**

The tool for estimation of life of electrolytic capacitors is easily modifiable and can be adapted to the specific device and application area. The tool will be used in the development of prototypes of devices for lifetime estimation. The presented methodology enables to optimize the operating characteristics for acceptable lifetime of equipment. Multi-level simulation allows investigating the effect of the geometry of the coils on the transmission characteristics of WET systems.

## 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
- DELTA Electronics Slovakia, Nová Dubnica
- Siemens, s.r.o., Bratislava, 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
- A2B Žilina
- BH motorsport Turany
- SSE, a.s., Žilina
- Súkromná zvaračská škola, Žilina
- Department of El. Engineering, Mechatronics and Industrial Engineering, FEI TU Košice
- Institute of Automotive Mechatronics, 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
- GS1 Slovakia, Žilina
- EAN Slovakia, Žilina
- Htest Slovakia, Banská Bystrica
- 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
- BROSE Prievidza
- ON Semiconductor, Bratislava
- Národné centrum robotiky, Bratislava
- UFOX s.r.o., Bratislava
- JANEKO s.r.o., Bratislava
- NISSAN s.r.o., Bratislava
- REGIONIS s.r.o., Bratislava

#### International Co-operation Partners

- ST Microelectronics, Catania, Italy
- Panasonic Electronic Devices Co., Ltd., Kadoma, Japan
- Panasonic Electronic Devices Europe GmbH, Lüneburg, Germany
- National Instruments, s.r.o., Czech Republic
- XILINX, USA
- Humusoft s.r.o., Praha, Czech Republic
- FAIRCHILD Semiconductor - Power Franchise, EU
- QUALCOMM s.r.o., Rožňov pod Radhoštěm, Czech Republic
- ON Semiconductor, Rožňov pod Radhoštěm, Czech Republic

- Rockwell Automotion s.r.o., Praha, Czech Republic
- EQUINOCCIO Madrid, Spain

#### Non-contractual cooperation with academic institutions

- Università degli studi di Catania -Italy, DIEES
- Politecnico di Bari, Italy, DEE
- Technikum Wien, Austria
- Technical University RWTH Aachen, Germany
- Politechnika Radomska, Poland
- TU – VŠB, Ostrava, Czech Republic
- University Ioan Slavici, Timisoara, Romania
- The University of Strathclyde, Glasgow, United Kingdom
- Politechnika Lublin, Poland
- Lappeenranta University of Technology, Finland
- Aalto University – Espoo, Helsinki, Finland
- Západočeská univerzita v Plzni, Czech Republic
- Ternopil National Technical University, Ternopil, Ukraine

#### Visitors to the Department

Name	Institution	Length of stay
Dmitry Shepelev, PhD.	Moscow Energetic Institute, Russia	60 days
prof. Calogero Cavallaro	UNICT Catania, Italy	8 days
prof. Angelo Raciti	UNICT Catania, Italy	8 days
prof. Mario Cacciato	UNICT Catania, Italy	2 days
Mariusz Stępień, Ph.D., Eng.	Politechnika Śląska, Gliwice, Poland	1 day
prof. Toyohiko Hayashi	Niigata University, Japan	1 day

#### Visits to Foreign Institutions

Name	Institution	Length of stay
Michal Frivaldský	UNICT Catania, Italy	2 days
Michal Frivaldský	ST Microelectronics Catania, Italy	1 day
Peter Drgoňa	UNICT Catania, Italy	7 days
Marek Píri	UNICT Catania, Italy	3 months
Pavol Štefanec	Aalto University – Espoo (Helsinki), Finland	5 months
Branislav Dobrucký	Moscow Energetic Institute, Russia	30 days
Miroslav Hrianka	RWTH Aachen, Helmholtz Institute, Germany	3 days
Branislav Dobrucký	TransComp 2016, Zakopane, Poland	1 day
Roman Koňarik	TransComp 2016, Zakopane, Poland	1 day
Pavel Pavlásek	Európska komisia, Brusel, Belgium	5 days
Pavel Pavlásek	SLOT Consulting Company, Budapest, Hungary	2 days
Pavel Pavlásek	Heviz Airport, Heviz, Hungary	2 days
Pavol Špánik	IMCIC 2016, Florida, USA	7 days
Peter Drgoňa	IMCIC 2016, Florida, USA	10 days



Zuzana Loncová	ICSPS 2016, AUT University, Auckland, New Zealand	4 days
----------------	---	--------

## 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 Žilina
Lecturer:	Pavel Pavlásek, Miroslav Štaffen
Date:	10 <sup>th</sup> October 2016

<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 Žilina
Lecturer:	Pavel Pavlásek, Miroslav Štaffen
Date:	17 <sup>th</sup> October 2016

<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 Žilina
Lecturer:	Pavel Pavlásek, Miroslav Štaffen
Date:	24 <sup>th</sup> October 2016

<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 Žilina
Lecturer:	Pavel Pavlásek, Miroslav Štaffen
Date:	31 <sup>th</sup> October 2016

<b>Autotronics: Development of electronic parking brakes</b>	
Customer:	Continental Automotive Systems Slovakia, s.r.o. Zvolen , študenti IŠ EF ŽU
Lecturer:	Pavel Pavlásek, Ľubor Žák
Date:	2 <sup>nd</sup> May 2016

<b>Development of Single-Purpose Machines</b>	
Customer:	Schaeffler, students of master's degree of FEE University of Žilina
Lecturer:	Pavel Pavlásek, Ondrej Hvizdák
Date:	18 <sup>th</sup> April 2016

<b>Geomatics: Utilization of geographic data</b>	
Customer:	EMIS, s.r.o., Bratislava, students of master's degree of FEE University of Žilina
Lecturer:	Pavel Pavlásek, Miroslav Vanek
Date:	16 <sup>th</sup> May 2016

<b>Competition: The Technical Idea of the Year</b>	
Customer:	Secondary school students
Lecturer:	Michal Frivaldský, Peter Drgoňa, Ondrej Hock, Jozef Lakatoš
Date:	9 <sup>th</sup> June 2016

## Invited Lectures/Papers

<b>Recent Advances on Power Electronic Systems on DME</b>	
Lecturer:	Michal Frivaldský
Where:	UNICT, Catania, Italy
Date:	4 <sup>th</sup> – 5 <sup>th</sup> October 2016

<b>Comparison of two methods for determination of instantaneous state of dynamical system with LCLC circuit</b>	
Lecturer:	Branislav Dobrucký
Where:	International Conference on Applied Mathematics and Computer Science AMCS Roma, Italy
Date:	5 <sup>th</sup> November 2016

## Membership in International Institutions/Committees

<b>Individual membership of employees in scientific committees of international journals</b>	
Branislav Dobrucký	EPE journal, Brussels, Belgium
Branislav Dobrucký	IEEE Industrial Electronics and Power Electronics, USA
Michal Frivaldský	International Journal on Thermal Science, France
Michal Frivaldský	Transactions on Industrial Electronics, USA

<b>Individual membership of employees in the scientific committees of international conferences</b>	
Branislav Dobrucký	TransComp 2016 – THU Radom, Poland
Branislav Dobrucký	Power Electronics Ee 2016, University of Novi Sad, Serbia
Branislav Dobrucký	ELEKTRO 2016, international conference, Slovakia
Pavol Špánik	ELEKTRO 2016, international conference, Slovakia

<b>Individual membership of employees of international organizations</b>	
Branislav Dobrucký	IEEE IE Society - Senior Member, USA
Branislav Dobrucký	IEEE SMTC 2016 Evaluation Committee – competition, USA
Pavel Pavlásek	Brandon Hall Excellence in Learning Technology Awards, USA
Pavel Pavlásek	Expert of EC H2020 SMEINST, Belgium
Pavel Pavlásek	Member of European Committee expert team for science and research, Belgium
Pavol Špánik	IEEE IE Society - Senior Member, USA
Pavol Špánik	Scientific Board of FEI – TU Ostrava, Czech Republic
Pavol Špánik	Electronics Committee FEI – TU Ostrava, Czech Republic
Michal Frivaldský	IEEE IE Society, USA
Michal Frivaldský	IEEE SMTC 2016 Evaluation Committee – competition, USA
Peter Drgoňa	IEEE IE Society, USA
Libor Hargaš	IEEE IE Society, USA
Dušan Koniar	IEEE IE Society, USA
Slavomír Kaščák	IEEE IE Society, USA
Michal Praženica	IEEE IE Society, USA
Ondrej Hock	IEEE IE Society, USA
Marek Paškala	IEEE IE Society, USA

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 ALER 2015 Conference
Pavel Pavlásek	Commission of Transport and Road Administration Port (The Žilina Self-governing region)
Pavel Pavlásek	Commission of the Ministry of Education of Slovak Republic for Selection of Candidates for study in Slovak Republic within the Aid for Developing Countries and Compatriots
Pavol Špánik	Working Group „Industry Technologies“ at the Ministry of Education, Science, Research and Sport of the Slovak Republic
Pavol Špánik	Working Group „Electro-mobility“ at the Ministry of Economy of the Slovak Republic
Pavol Špánik	Grant Commission for Scientific Grant Agency of the Slovak Republic VEGA No 5 for electrical engineering and informatics
Libor Hargaš	National Robotics Centre, Bratislava
Dušan Koniar	National Robotics Centre, Bratislava

#### Membership in University Boards

Branislav Dobrucký	Editorial Board of the University of Žilina Scientific Journal – Communication – Scientific Letters
Branislav Dobrucký	Scientific Board of the FEE University of Žilina
Branislav Dobrucký	Electrical Engineering Committee, FEE University of Žilina
Pavol Špánik	Electrical Engineering Committee, FEE University of Žilina
Pavol Špánik	Power Engineering Committee, FEE University of Žilina
Pavol Špánik	Measurement Technique Committee, FEI TU Košice
Pavol Špánik	Board of directors of the University of Žilina
Pavol Špánik	Scientific Board of the University of Žilina
Pavol Špánik	Scientific Board of the FEE University of Žilina
Pavel Pavlásek	Technical Subjects Didactics Committee, UKF Nitra
Michal Frivaldský	Academic Senate of the FEE University of Žilina
Michal Frivaldský	Scientific Board of FEE University of Žilina
Libor Hargaš	Academic Senate of FEE University of Žilina
Michal Praženica	Academic Senate of the FEE University of Žilina
Dušan Koniar	Scientific Board of the FEE University of Žilina
Zuzana Loncová	Academic Senate of the FEE University of Žilina

#### Awards

Jozef Čuntala	Rector's Award – Comenius plaque
---------------	----------------------------------

## Publications

### Monographs – chapters in foreign monographs

[1]	FRIVALDSKÝ, Michal - ŠPÁNIK, Pavol - DRGOŇA, Peter - JAROŠ, Viliam - PÍRI, Marek: Analysis of Wireless Power System Efficiency in Dependency on Configuration of Resonant Tank, In: <i>Wireless Power Transfer - Fundamentals and Technologies, INTECH, 2016</i> , ISBN 978-953-51-2467-2, eISBN 978-953-51-2468-9, 22p. (in English)
[2]	JOŠKOVÁ, Marta - ŠÚTOVSKÁ, Martina - ĎURDÍK, Peter - KONIAR, Dušan - HARGAŠ, Libor - BÁNOVČIN, Peter - HRIANKA, Miroslav - KHAZAEI, Vahid - PAPPOVÁ, Lenka - FRAŇOVÁ, Soňa: The Role of Ion Channels to Regulate Airway Ciliary Beat Frequency During Allergic Inflammation, In: <i>Allergy and Respiration, Volume 921 of the series Advances in Experimental Medicine and Biology, SPRINGER, 2016</i> , pp. 27-35, ISBN 978-3-319-42003-5, ISSN 0065-2598. (in English)

### Current Content Journals

[1]	KONIAR, Dušan - HARGAŠ, Libor - LONCOVÁ, Zuzana - DUCHOŇ, František - BEŇO, Peter: Machine Vision Application in Animal Trajectory Tracking, In: <i>Computer methods and Programs in Biomedicine, Vol. 127, 2016</i> , ISSN 0169-2607, pp. 258-272. (in English)
-----	--

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

[1]	PÍRI, Marek - ŠPÁNIK, Pavol - FRIVALDSKÝ, Michal - KONDELOVÁ, Anna: Wireless (Power Transfer) Transmission of Electrical Energy (Electricity) Intended for Consumer Purposes up to 50 W, In: <i>Advances in Electrical and Electronic Engineering</i> , vol. 14, No. 1, 2016, pp.40-48, ISSN 1336-1376 (Print), ISSN 1804-3119 (Online). (in English)
[2]	CHERNOYAROV, Oleg, V. – DOBRUCKÝ, Branislav – SHEPELEV, D.N. – SHAKHTARIN, B.I.: Quasi-Optimal Reception of the Random Pulse with Arbitrary-Function Envelope and Unknown Time and Power Parameters, In: <i>Applied Mathematical Sciences</i> , HIKARI Ltd, Vol. 10, 2016, no. 53, pp. 2611 – 2626 ISSN 1312-885X, eISSN: 1314-7552, <a href="http://dx.doi.org/10.12988/ams.2016.67206">http://dx.doi.org/10.12988/ams.2016.67206</a> (in English)
[3]	DOBRUCKÝ, Branislav: Comparison of two methods for determination of instantaneous state of dynamical system with LCLC circuit, In: <i>International Journal of Circuits, Systems and Signal Processing</i> , Vol. 10, 2016, pp 384-389, ISSN: 1998-4464. (in English)

### Other Reviewed Foreign Journals

[1]	DOBRUCKÝ, Branislav - ŠTEFANEC, Pavol - BEŇOVÁ, Mariana - CHERNOYAROV, Oleg. V. - Pokorný, Michal: Analysis of Higher Order System with Impulse Exciting Functions in Z-Domain, In: <i>Circuits and Systems</i> , Vol.7, No. 11, 2016, pp. 3951-3970, DOI 10.4236/cs.2016.711328, ISSN 2153-1285. (in English)
[2]	FRIVALDSKÝ, Michal - KAŇOVSKÝ, Andrej - ŠPÁNIK, Pavol: Detection of Counterfeit Electrolytic Capacitors in Power Electrical Systems, In: <i>International Journal of Circuits and Electronics</i> , Vol. 1, 2016, CR, pp. 140-144, ISSN 2367-8879. (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]	ČUNTALA, Jozef - KONDELOVÁ, Anna - HOCK, Ondrej - PRÍDALA, Michal: Electro-Thermal Modeling
-----	---

	of Power LED Using COMSOL Environment, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 127-130, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[2]	DOBRUCKÝ, Branislav - ŠTEFANEC, Pavol - KOŇARIK, Roman - CHERNOYAROV, V. Oleg: Transient Analysis in Electrical Circuits Using Z-transformation, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 131-136, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[3]	FRIVALDSKÝ, Michal - DRGOŇA, Peter - KOZÁČEK, Boris - PÍRI, Marek - PRÍDALA, Michal: Critical Component's Figure of Merite Influence on Power Supply Unit Efficiency, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 147-151, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[4]	HOCK, Ondrej - DRGOŇA, Peter - JAROŠ, Viliam - HAVRILA, Rastislav: Transposition Method for Inverse Kinematics, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 152-155, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[5]	KAŠČÁK, Slavomír - MAŽGÚT, Roman - ČUBON, Peter - PRAŽENICA, Michal: Testing of Overcurrent Protection for the Battery Supplied System, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 168-171, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[6]	KAŠČÁK, Slavomír - LAŠKODY, Tomáš - PRAŽENICA, Michal - KOŇARIK, Roman: Current Control Contribution to a Single-phase Induction Motor Fed by Single-leg Voltage Source Inverter, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 172-175, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[7]	MAŽGÚT, Roman - GALÁD, Martin - KAŠČÁK, Slavomír - ŠPÁNIK, Pavol: Analysis of Multi-resonant LLC Converter, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 192-195, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[8]	PAŠKALA, Marek - PRÍDALA, Michal - PIPÍŠKA, Michal - HUDÁK, Peter: The Support System for Testing the Power Converters, the System of Water Cooling/ Heating, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 196-200, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[9]	FRIVALDSKÝ, Michal - PRÍDALA, Michal - KOŇARIK, Roman - KOZÁČEK, Boris: Dual Half Bridge DC-DC Converter with Reduced Circulating Current – Investigation of Diode vs. Synchronous Rectification, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 201-206, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[10]	ŠEDO, Jozef - KAŠČÁK, Slavomír: Control of Single-Phase Grid Connected Inverter System, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 207-212, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[11]	SIMONOVÁ, Anna - HARGAŠ, Libor - KONIAR, Dušan - LONCOVÁ, Zuzana - HRIANKA, Miroslav: Mathematical Analysis of Complete Operation Cycle of a System with Two-position Controller, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 213-215, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[12]	GALÁD, Martin - ŠPÁNIK, Pavol - CACCIATO, Mario - NOBILE, Giovanni: Comparison of Common and Combined State of Charge Estimation Methods for VRLA Batteries, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 220-225, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[13]	ŠPÁNIK, Pavol - FRIVALDSKÝ, Michal - PÍRI, Marek - JAROŠ, Viliam - KONDELOVÁ, Anna: Peak Efficiency and Peak Power Point of Wireless Power Transfer System for Electromobility Applications, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 226-230, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[14]	ŠPÁNIK, Pavol - FRIVALDSKÝ, Michal - DRGOŇA, Peter - JAROŠ, Viliam: Analysis of Proper Configuration of Wireless Power Transfer System for Electric Vehicle Charging, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 231-237, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)

[15]	BRANDT, Martin - KAŠČÁK, Slavomír: Failure Identification of Induction Motor using SFRA Method, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 269-272, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[16]	HARGAŠ, Libor - KONIAR, Dušan - LONCOVÁ, Zuzana - HRIANKA, Miroslav - SIMONOVÁ, Anna - JOSKOVÁ, Marta: Artefacts Detection for Video Sequences Analysis, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 514-517, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[17]	KONIAR, Dušan - HARGAŠ, Libor - LONCOVÁ, Zuzana - DUCHOŇ, František - BEŇO, Peter: Laboratory Animals Tracking in Videosequences, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 537-542, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[18]	ŠPÁNIKOVÁ, Gabriela - MURGAŠ, Dalibor - ŠPÁNIK, Pavol - FRIVALDSKÝ, Michal: Analysis of Critical Current Field Distribution in Tissues during Electrosurgical Procedures, In: <i>11th International Conference ELEKTRO 2016</i> , IEEE, IAS/IES, pp. 589-592, ISBN: 978-1-4673-8698-2, Catalog Number: CFP1648S-ART. (in English)
[19]	DOBRUCKÝ, Branislav - KOŇARIK, Roman - HARGAŠ, Libor - KONIAR, Dušan: Measurement of Multi-phase Clarke-Transformed Waveforms using LabVIEW Virtual Instrumentation, In: <i>12th International Siberian Conference on Control and Communications SIBCON 2016</i> , IEEE, Moscow, RU, IEEECN CFP16794-POD, ISBN 978-1-4673-8384-4. (in English)
[20]	KOZÁČEK, Boris - FRIVALDSKÝ, Michal - JAROŠ, Viliam: Improving Qualitative Parameters of LLC Converter Using a Perspective Semiconductor and Magnetic Components, In: <i>21th International Conference on Applied Electronics, APPEL 2016</i> , IEEE, Pilsen 2016, pp. 125-129, ISBN 978-80-261-0601-2, ISSN 1803-7232, IEEECN CFP1669A-PRT. (in English)
[21]	JAROŠ, Viliam - DRGOŇA, Peter - KOZÁČEK, Boris - PÍRI, Marek: Analytical Comparison of Topology Configuration of Wireless Power Transfer System, In: <i>21th International Conference on Applied Electronics, APPEL 2016</i> , IEEE, Pilsen 2016, pp. 107-110, ISBN 978-80-261-0601-2, ISSN 1803-7232, IEEECN CFP1669A-PRT. (in English)
[22]	FRIVALDSKÝ, Michal - ŠPÁNIK, Pavol - KOZÁČEK, Boris - JAROŠ, Viliam - KAŇOVSKÝ, Andrej: Design Methodology of High-Frequency Transformers in Order to Increase Qualitative Indexes of Converters, In: <i>2016 International Conference on Mechatronics, Control and Automation Engineering (MCAE2016)</i> , Bangkok, pp. 222-228, ISBN 978-94-6252-237-4, ISSN 2352-5401. (in English)
[23]	KAŠČÁK, Slavomír: Analysis of Bidirectional Converter with Coupled Inductor for Electric Drive Application, In: <i>2016 International Conference on Mechatronics, Control and Automation Engineering (MCAE2016)</i> , Bangkok, pp. 229-232, ISBN 978-94-6252-237-4, ISSN 2352-5401. (in English)
[24]	KOŇARIK, Roman - DOBRUCKÝ, Branislav - ŠTEFANEC, Pavol: Improved Two-Phase One-Leg Matrix Converter Using L-C Filter, In: <i>2016 International Conference on Mechatronics, Control and Automation Engineering (MCAE2016)</i> , Bangkok, pp. 233-236, ISBN 978-94-6252-237-4, ISSN 2352-5401. (in English)
[25]	ŠPÁNIK, Pavol - FRIVALDSKÝ, Michal - PÍRI, Marek - KINDL, Vladimir: Wireless Power Transfer System With Reduced Voltage Stress on Compensation Capacitors, In: <i>The 42nd Annual Conference of IEEE Industrial Electronics Society IECON 2016</i> , IT, 6p, ISBN: 978-1-5090-3474-1, IEEE Catalog Number: CFP16IEC-USB. (in English)
[26]	FRIVALDSKÝ, Michal - DOBRUCKÝ, Branislav - PRÍDALA, Michal: Analysis of LCLC DC-DC resonant converter in steady state operation, In: <i>The 42nd Annual Conference of IEEE Industrial Electronics Society IECON 2016</i> , IT, 6p, ISBN: 978-1-5090-3474-1, IEEE Catalog Number: CFP16IEC-USB. (in English)
[27]	BRANDT, Martin - GUTTEN, Miroslav - KAŠČÁK, Slavomír: Diagnostic of induction motor using SFRA method, In: <i>Proceedings of the International Conference 2016 on Diagnostics in Electrical Engineering (Dagnostika) CDEE 2016</i> , Plzeň, pp. 7-10, IEEE, ISBN 978-80-261-0635-7, ISBN:978-1-5090-6179-2. (in English)

Reviewed Conference Proceedings Abroad (if not included above)

[1]	LONCOVÁ, Zuzana - HARGAŠ, Libor - KONIAR, Dušan: Segmentation of Microscopic Medical Images Using Local Binary Patterns, In: <i>8th International Conference on Signal Processing Systems (ICSPS 2016)</i> , Auckland, New Zealand, 2016, pp. 36-40, ISBN 978-1-4503-4790-7. (in English)
[2]	LONCOVÁ, Zuzana: Segmentation Methods Used in Microscopic Medical Image Processing, In: <i>20th International Student Conference on Electrical Engineering POSTER 2016</i> , Prague, 1/2016, 5p, ISBN 978-80-01-05950-0. (in English)
[3]	GALÁD, Martin: Design of Control for Battery Storage Unit Converter, In: <i>20th International Student Conference on Electrical Engineering POSTER 2016</i> , Prague, 1/2016, 5p, ISBN 978-80-01-05950-0. (in English)
[4]	KANOVSÝ, Andrej - MAŽGÚT, Roman: Experimental Development System for High Frequency Switching Converters Design of Control for Battery Storage Unit Converter, In: <i>20th International Student Conference on Electrical Engineering POSTER 2016</i> , Prague, 1/2016, 4p, ISBN 978-80-01-05950-0. (in English)
[5]	KOŇARIK, Roman: Enhanced Two-Phase Single Leg Matrix Converter: Analysis, Modelling and Verification Design of Control for Battery Storage Unit Converter, In: <i>20th International Student Conference on Electrical Engineering POSTER 2016</i> , Prague, 1/2016, 6p, ISBN 978-80-01-05950-0. (in English)
[6]	PRÍDALA, Michal: Comparison of Diode vs. Synchronous Rectifier Used in Dual Half Bridge DC-DC Converter with Reduced Circulating Current, In: <i>20th International Student Conference on Electrical Engineering POSTER 2016</i> , Prague, 1/2016, 4p, ISBN 978-80-01-05950-0. (in English)
[7]	JAROŠ, Viliam: Topology analysis of wireless energy transfer system, In: <i>20th International Student Conference on Electrical Engineering POSTER 2016</i> , Prague, 1/2016, 7p, ISBN 978-80-01-05950-0. (in English)
[8]	KOZÁČEK, Boris: Evaluation method Figure of Merit for semiconductors and magnetics components and impact on the switching power supply efficiency, In: <i>20th International Student Conference on Electrical Engineering POSTER 2016</i> , Prague, 1/2016, 6p, ISBN 978-80-01-05950-0. (in English)
[9]	FRIVALDSKÝ, Michal - ŠPÁNIK, Pavol - DRGOŇA, Peter - PRÍDALA Michal: Multi-level Simulation Suited for Life-Time Estimation of Critical Power Electronic Devices, In: <i>XXIV Symposium Electromagnetic Phenomena in Nonlinear Circuits, EPCN, 2016</i> , Finland, pp. 47-48, ISBN 978-83-62712-04-05. (in English)
[10]	DRGOŇA, Peter - HRIANKA, Miroslav - LONCOVÁ, Zuzana: Modern Computer Aided Methods in Medical Diagnostics, In: <i>7<sup>th</sup> International Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC 2016)</i> Vol. II, USA, pp. 257-260, ISBN 978-1-941763-38-4. (in English)
[11]	ŠPÁNIKOVÁ, Gabriela - HALAŠOVÁ, Erika - ŠPÁNIK, Pavol - HARGAŠ, Libor: Computer Aided Identification of the Geometrical Parameters of Hepatic Tissue, In: <i>7<sup>th</sup> International Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC 2016)</i> Vol. II, USA, pp. 261-264, ISBN 978-1-941763-38-4. (in English)

Patents, Industrial Designs, Author's Certificates and Discoveries

[1]	DOBRUCKÝ, Branislav - KAČŠÁK, Slavomír - PRAŽENICA, Michal - KOSCELNÍK Juraj: Multi-tank Multi-resonant Converter with Symmetrical Output, U.V. 7364.
[2]	KAČŠÁK, Slavomír - ŠEDO, Jozef - LAŠKODY, Tomáš - PAŠKALA, Marek: Active Damping System of Crane Track Movement, U.V. 7414.
[3]	KAČŠÁK, Slavomír - PRAŽENICA, Michal - FRIVALDSKÝ, Michal - DRGOŇA, Peter - ŠPÁNIK, Pavol: Traction Drive Simulator, U.V. 7432.
[4]	DOBRUCKÝ, Branislav - PRAŽENICA, Michal - ŠTEFANEC, Pavol - LAŠKODY, Tomáš: Single Leg Matrix Converter for Supplying Two-phase Motor with Constant Frequency from Single-phase Grid, U.V. 7565.

[5]	PRAŽENICA, Michal - ŠTEFANEK, Pavol - LAŠKODY, Tomáš: Single Leg Matrix Converter for Supplying of Two-phase Motor with Variable Frequency from Single-phase Grid, U.V. 7552.
[6]	DRGOŇA, Peter - HANKO, Branislav: Electric Servo-system for Vacuum Actuator Replacement, U.V. 7471.

#### SCI Citations

[1]	DUDRÍK, J., ŠPÁNIK, P., TRIP, N.D.: Zero-Voltage and Zero-Current Switching Full Bridge DC-DC Converter with Auxiliary Transformer, In: IEEE transaction on POWER ELECTRONICS (a publication of the IEEE power electronics society), September 2006, Vol. 21, No. 5, ITPEE8, pp. 1328-1335. <i>Cited in:</i> VUKOSAVIC, SLOBODAN N.; PERIC, LJILJANA S.; SUSIC, STANIMIR D.: A Novel Power Converter Topology for Electrostatic Precipitators, In: IEEE TRANSACTIONS ON POWER ELECTRONICS Volume: 31 Issue: 1 Pages: 152-164 Published: JAN 2016, ISSN: 0885-8993, eISSN: 1941-0107
[2]	DUDRIK, J., SPANIK, P., TRIP, N.D.: Zero-Voltage and Zero-Current Switching Full Bridge DC-DC Converter with Auxiliary Transformer, In: IEEE transaction on POWER ELECTRONICS (a publication of the IEEE power electronics society), September 2006, Vol. 21, No. 5, ITPEE8, pp. 1328-1335. <i>Cited in:</i> YOUSSEF, Mohamed Z.; WORONOWICZ, Konrad; ADITYA, Kunwar; et al.: Design and Development of an Efficient Multilevel DC/AC Traction Inverter for Railway Transportation Electrification, In: IEEE TRANSACTIONS ON POWER ELECTRONICS Volume: 31, Issue: 4, pp. 3036-3042, 2016, ISSN: 0885-8993, eISSN: 1941-0107
[3]	HARGAS, L., KONIAR, D., STOFAN, S.: Sophisticated biomedical tissue measurement using image analysis and virtual instrumentation, In: LabVIEW. Practical applications and solutions, 2011, ISBN 978-953-307-650-8 <i>Cited in:</i> SUTOVA, M., CAPEK, P., KAZIMIEROVA, I., PAPPOVA, L., JOSKOVA, M., MATULOVA, M., FRANOVA, S., PAWLACZYK, I., GANCARZ, R.: Pharmacodynamic evaluation of RP3128, a novel and potent CRAC channel inhibitor in Guinea pig modes of allergic asthma, In: European Journal of Pharmacology, Vol. 772, No. 5, 2016, ISSN 0014-2999
[4]	KOSCELNIK, J., PRAZENICA, M., FRIVALDSKY, M., ONDIRKO S.: Design and Simulation of Multi-element Resonant LCTLC Converter with HF Transformer, In: 10th International Conference ELEKTRO 2014, Rajcke Teplice, Slovakia, 19-20 May, 2014, IEEE, pp. 307-311, Catalog number: CFP1448S-CDR, ISBN: 978-1-4799-3720-2 <i>Cited in:</i> OUTEIRO, Maria Teresa; BUJA, Giuseppe; CZARKOWSKI, Dariusz: Resonant Power Converters: IEEE Industrial Electronics Magazine, Vol. 10, Is. 2, Pages: 21-45, ISSN: 1932-4529
[5]	KOSCELNIK, J., FRIVALDSKY, M., PRAZENICA, M., MAZGUT, R.: A Review of Multi-elements Resonant Converters Topologies, In: 10th International Conference ELEKTRO 2014, Rajcke Teplice, Slovakia, 19-20 May, 2014, IEEE, pp. 312-317, Catalog number: CFP1448S-CDR, ISBN: 978-1-4799-3720-2 <i>Cited in:</i> OUTEIRO, Maria Teresa; BUJA, Giuseppe; CZARKOWSKI, Dariusz: Resonant Power Converters: IEEE Industrial Electronics Magazine, Vol. 10, Is. 2, Pages: 21-45, ISSN: 1932-4529
[6]	HARGAŠ L., KONIAR D., BOBEK V., et al.: Sophisticated Measurement of Non-electrical Parameters Using Image Analysis. In: Robotics in Education: 1st International Conference: RiE 2010, Bratislava, Slovakia, 16–17 September 2010. <i>Cited in:</i> Frantisek DUCHON, Jozef RODINA, Peter HUBINSKY, David RAU, Juraj KOSTROS: Generalized dynamic model and control of ambiguous mono axial vehicle robot, International Journal of Advanced Robotic Systems, Vol. 13, Iss. 5, 2016, ISSN 1729-8806



[7]	<p>MIKOVÁ L., KELEMEN M., KONIAR D.: Mathematical Model of Four Wheeled Mobile Robot and its Experimental Verification. Appl Mech Mater 2014; 611: 130–136.</p> <p><i>Cited in:</i> Frantisek DUCHON, Jozef RODINA, Peter HUBINSKY, David RAU, Juraj KOSTROS: Generalized dynamic model and control of ambiguous mono axial vehicle robot, International Journal of Advanced Robotic Systems, Vol. 13, Iss. 5, 2016, ISSN 1729-8806</p>
[8]	<p>GRMAN L., HRASKO M., KUČHTA J.: Single phase PWM rectifier in traction application, In: J Electr Eng, 2011, 62(4): 206–212</p> <p><i>Cited in:</i> FRIVALDSKÝ, Michal, ČUNTALA, Jozef, ŠPÁNIK, Pavol, KAŇOVSKÝ, Andrej: Investigation of thermal effects and lifetime estimation of electrolytic double layer capacitors during repeated charge and discharge cycles in dedicated application, In: Electrical Engineering - Archiv für Elektrotechnik, SPRINGER, Vol. 98, Issue 4, 2016, 15p, DOI 10.1007/s00202-016-0482-2, ISSN 0948-7921, ISSN(online) 1432-0487</p>
[9]	<p>RADVAN, R., DOBRUCKÝ, B., FRIVALDSKÝ, M., RAFAJDUS, P. Modelling and Design of HF 200 kHz Transformers for Hard - and Soft-Switching Application, In: Electronics and Electrical Engineering, Kaunas 2011, No.4 (110), pp.7-12, ISSN 1392-1215,</p> <p><i>Cited in:</i> BIELSKIS, Edvardas; BASKYS, Algirdas; SAPUROV, Martynas: Impact of Transformer Design on Flyback Converter Voltage Spikes, In: ELEKTRONIKA IR ELEKTROTECHNIKA, Volume: 22 Issue: 5 Pages: 58-61 Published: 2016</p>
[10]	<p>ŠUL, R., DOBRUCKÝ, B., ČERNAN, P.: Evaluation of Efficiency of Active Clamp Dual Flyback Inverter for Photovoltaic Systems using Simulation Method, In: Electronics and Electrical Engineering, Vol. 99, Kaunas 2010, No. 3, pp. 23-26, ISSN 1392-1215,</p> <p><i>Cited in:</i> BIELSKIS, Edvardas; BASKYS, Algirdas; SAPUROV, Martynas: Impact of Transformer Design on Flyback Converter Voltage Spikes, In: ELEKTRONIKA IR ELEKTROTECHNIKA, Volume: 22 Issue: 5 Pages: 58-61 Published: 2016</p>
[11]	<p>DUDRIK, J., SPANIK, P., TRIP, N.D.: Zero-Voltage and Zero-Current Switching Full Bridge DC-DC Converter with Auxiliary Transformer, In: IEEE transaction on POWER ELECTRONICS (a publication of the IEEE power electronics society), September 2006, Vol. 21, No. 5, ITPEE8, pp. 1328-1335.</p> <p><i>Cited in:</i> YEON, Cheol-O; LEE, Jae-Bum; LEE, Il-Oun; et al.: Wide ZVS Range Asymmetric Half-Bridge Converter With Clamp Switch and Diode for High Conversion Efficiency, In: IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, Volume: 63 Issue: 5, Pages: 2862-2870 2016, ISSN: 0278-0046, eISSN: 1557-9948</p>
[12]	<p>ŠPÁNIK, P., FRIVALDSKÝ, M., DRGOŇA, P., KANDRÁČ, J.: Efficiency Increase of Switched Mode Power Supply .through Optimization of Transistors Commutation Mode, In: Electronics and Electrical Engineering, Kaunas 2010, No. 9 (105), pp. 49 – 52, ISSN 1392-1215,</p> <p><i>Cited in:</i> STREIT, Lubos; JANIK, Dusan; TALLA, Jakub: Serial-Parallel IGBT Connection Method Based on Overvoltage Measurement, ELEKTRONIKA IR ELEKTROTECHNIKA, Volume: 22 Issue: 1 Pages: 53-56 Published: 2016, ISSN: 1392-1215</p>
[13]	<p>ŠPÁNIK, P., DRGOŇA, P., FRIVALDSKÝ, M., PRÍKOPOVÁ, A.: Design and Application of Full Digital Control System for LLC Multiresonant Converter, In: Electronics and Electrical Engineering, Kaunas 2010, No.10 (106), pp. 75 -78, ISSN 1392-1215,</p> <p><i>Cited in:</i> LESO, Martin; ZILKOVA, Jaroslava; PASTOR, Marek; et al.: Fuzzy Logic Control of Soft-Switching DC-DC Converter, In: ELEKTRONIKA IR ELEKTROTECHNIKA, Volume: 22 Issue: 5 Pages: 3-7 Published: 2016, ISSN: 1392-1215</p>

[14]	<p>PAVLANIN, R., DOBRUCKÝ, B., ŠPÁNIK, P.: Investigation of Compensation Effect of Shunt Active Ppwer Filter Working under the Non-Sinusoidal Voltage Conditions, In: International Review of Electrical Engineering (IREE) Vol. 4 N.5 September – October 2009, ISSN 1827-6660</p> <p><i>Cited in:</i>  GUTTEN, Miroslav; JANURA, Richard; SEBOK, Milan; et al.: Measurement of Short-Circuit Effects ON Transformer Winding with SFRA Method and Impact Test, In: Metrology and Measurement Systems Volume: 23, Issue: 4 Special Issue: SI Pages: 521-529 Published: DEC 2016, ISSN: 0860-8229 eISSN: 2300-1941</p>
[15]	<p>FRIVALDSKY, M., CUNTALA, J., SPANIK, P.: Simple and accurate thermal simulation model of supercapacitor suitable for development of module solutions, In: International Journal of Thermal Sciences, Elsevier, Vol. 84, October 2014, pp. 34–47, ISSN 1290-0729, DOI: 10.1016/j.ijthermalsci.2014.04.005</p> <p><i>Cited in:</i>  SARWAR, Wasim; MARINESCU, Monica; GREEN, Nick; et al.: Electrochemical double layer capacitor electro-thermal modelling, In: JOURNAL OF ENERGY STORAGE Volume: 5 Pages: 10-24 Published: FEB 2016, ISSN: 2352-152X</p>
[16]	<p>SPANIK, P., FRIVALDSKY, M., KANOVSKY, A.: Life Time of the Electrolytic Capacitors in Power Applications, In: 10th International Conference ELEKTRO 2014, Rajecke Teplice, Slovakia, 19-20 May, 2014, IEEE, pp. 233-237, Catalog number: CFP1448S-CDR, ISBN: 978-1-4799-3720-2,</p> <p><i>Cited in:</i>  ABEBE, Robert; VAKIL, Gaurang; LO CALZO, Giovanni; et al.: Integrated motor drives: state of the art and future trends, In: IET ELECTRIC POWER APPLICATIONS Volume: 10 Issue: 8 Pages: 757-771 Published: SEP 2016, ISSN: 1751-8660, eISSN: 1751-8679</p>
[17]	<p>SPANIK, P., FRIVALDSKY, M., KANOVSKY, A.: Life Time of the Electrolytic Capacitors in Power Applications, In: 10th International Conference ELEKTRO 2014, Rajecke Teplice, Slovakia, 19-20 May, 2014, IEEE, pp. 233-237, Catalog number: CFP1448S-CDR, ISBN: 978-1-4799-3720-2,</p> <p><i>Cited in:</i>  YAO, Kai; TANG, Weijie; BI, Xiaopeng; et al.: An Online Monitoring Scheme of DC-Link Capacitor's ESR and C for a Boost PFC Converter, In: IEEE TRANSACTIONS ON POWER ELECTRONICS Volume: 31 Issue: 8 Pages: 5944-5951 Published: AUG 2016, ISSN: 0885-8993, eISSN: 1941-0107</p>
[18]	<p>FRIVALDSKY, M., SPANIK, P., DRGONA, P., HOCK, O.: Influence of Transformer Core Geometry on the Qualitative Indexes of Front-end Converters, In: 10th International Conference ELEKTRO 2014, Rajecke Teplice, Slovakia, 19-20 May, 2014, IEEE, pp. 170-174, Catalog number: CFP1448S-CDR, ISBN: 978-1-4799-3720-2</p> <p><i>Cited in:</i>  CHEN, Ding; LIANG, Zhao; XIAO, Jie-kui; et al.: Synthesis of Co-substituted Mn-Zn ferrite nanoparticles by mechanochemistry approach, In: JOURNAL OF ELECTRO CERAMICS, Volume: 36 Issue: 1-4 Pages: 158-164 Published: JUN 2016, ISSN: 1385-3449 eISSN: 1573-8663</p>
[19]	<p>PIRI, M., JAROS, V., FRIVALDSKY, M.: Verification of a mutual inductance calculation between two helical coils, In: 16th International Scientific Conference on Electric Power Engineering (EPE 2015), May 2015, CZ, pp. 712-717, IEEE Catalog Number CFP1573X – USB, ISBN 978-1-4673-6787-5,</p> <p><i>Cited in:</i>  GUO, Jinpeng; TAN, Linlin; LIU, Han; et al.: Stabilization Control of Output Power in Double-Source Wireless Power Transfer Systems Without Direct Output Feedback, In: IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS Volume: 26 Issue: 11 Pages: 960-962 Published: NOV 2016, ISSN: 1531-1309 eISSN: 1558-1764</p>
[20]	<p>FEDOR, T., VITTEK, J., SINDLER, P.: Influence of variable moment of inertia in robot servo motor control, In: 10th International Conference ELEKTRO 2014, Rajecke Teplice, Slovakia, 19-20 May, 2014, IEEE, pp. 165-169, Catalog number: CFP1448S-CDR, ISBN: 978-1-4799-3720-2,</p> <p><i>Cited in:</i></p>

JARZEBOWICZ, Leszek; CISEK, Maciej; OPALINSKI, Artur: Angle Tracking Observer for Filtering Rotor Position Estimates in Sensorless Electric Drives, ELEKTRONIKA IR ELEKTROTECHNIKA Volume: 22 Issue: 5 Pages: 38-41 Published: 2016, ISSN: 1392-1215
--

#### Other Publications

[1]	JOŠKOVÁ, Marta - ĎURDÍK, Peter - KONIAR, Dušan - HARGAŠ, Libor - BÁNOVČIN, Peter - FRAŇOVÁ, Soňa: Modulation influence of anaesthesia to ciliary cinematics in human airways, In: 66. Česko-Slovenské farmakologické dny 2016, CZ, ISBN 978-80-260-9782-2. (in Slovak)
[2]	ĎURDÍK, Peter - MARUŠIAKOVÁ, Lucia - HARGAŠ, LIBOR - BACMAŇÁKOVÁ, Ivona - SŇAHNIČANOVÁ, Zuzana - BÁNOVČIN, Peter: Ciliopathies – new diagnostic approaches, In: 25. Martinské dni dýchania, 2016, ISBN 978-80-8187-015-6. (in Slovak)
[3]	JOŠKOVÁ, Marta - ĎURDÍK, Peter - KONIAR, Dušan - HARGAŠ, Libor - BÁNOVČIN, Peter - KHAZAEI, Vahid - FRAŇOVÁ, Soňa: Influence of anaesthetics to frequency of ciliary movement in human airways, In: 25. Martinské dni dýchania, 2016, ISBN 978-80-8187-015-6. (in Slovak)
[4]	MARUŠIAKOVÁ, Lucia - ĎURDÍK, Peter - BUGOVÁ, Gabriela - KONIAR, Dušan - HARGAŠ, Libor - BÁNOVČIN, Peter: Adenoid Hypertrophy and Ciliary Beat Frequency in Children, In: 29. Slovensko-Poľské Vojtekove-Rudnikove dni detskej pneumoftizeológie a imunoalergológie, Dolný Smokovec, Šrobárov ústav detskej tuberkulózy a respiračných chorôb, 2016. (in English)
[5]	HARGAŠ, Libor - KONIAR, Dušan - LONCOVÁ, Zuzana - SIMONOVÁ, Anna: Identification of Respiratory Epithelium's Cilia Using Local Binary Patterns, In: 29. Slovensko-Poľské Vojtekove-Rudnikove dni detskej pneumoftizeológie a imunoalergológie, Dolný Smokovec, Šrobárov ústav detskej tuberkulózy a respiračných chorôb, 2016. (in English)
[6]	KONIAR, Dušan - HARGAŠ, Libor - DUCHOŇ, František - BEŇO, Patrik - ĎURDÍK, Peter: Measurement of Facial Features in 3D Models of Head (as supporting methods for OSAS diagnostics), In: 29. Slovensko-Poľské Vojtekove-Rudnikove dni detskej pneumoftizeológie a imunoalergológie, Dolný Smokovec, Šrobárov ústav detskej tuberkulózy a respiračných chorôb, 2016. (in English)
[7]	LAŠKODY, Tomáš: Progressive Methods of Two Phase Motors Control, PhD thesis, 2016, (in English)
[8]	ŠEDO, Jozef: Electromagnetic Compatibility of the Systems with Photovoltaic sources, PhD thesis, 2016 (in Slovak)
[9]	ŠUŇAL, Martin: Static Power converters for Auxiliary Apparatus of City Rail Vehicles, PhD thesis, 2016 (in Slovak)
[10]	LOVÁS, Ivan: Control of Brushless Motors in Critical Regimes, PhD thesis, 2016 (in Slovak)
[11]	DOBRUCKÝ, Branislav: Ing. Jozef Dziak: Simulation of Nonlinear Circuits in Matlab, 5.2.10 Teoretická elektrotechnika, doc. Ing. Iveta Tomčíková, CSc., Katedra teoretickej a priemyselnej elektroniky, FEI TU Košice, 6/2016, expert's opinion (in Slovak)
[12]	DOBRUCKÝ, Branislav: M.Sc. Ismael Ali M. Godem: System Identification and Controller Optimization using Soft Computing Methods, 5.2.11 Silnoprúdová elektrotechnika, doc. Ing. Viliam Fedák, PhD., Katedra elektrotechniky a mechatroniky, FEI TU Košice, 6/2016, expert's opinion (in English)

## Contact Address

EN

Department of Mechatronics and Electronics  
Faculty of Electrical Engineering  
University of Žilina  
Univerzitná 1  
010 26 Žilina  
Slovak Republic  
Phone: +421 41 513 1600  
Fax: +421 41 513 1515  
E-mail: [kme@fel.uniza.sk](mailto:kme@fel.uniza.sk)  
www: <http://www.kme.uniza.sk/>

SK

Katedra mechatroniky a elektroniky  
Elektrotechnická fakulta  
Žilinská univerzita v Žiline  
Univerzitná 1  
010 26 Žilina  
Slovenská republika  
Telefón: +421 41 513 1600  
Fax: +421 41 513 1515  
E-mail: [kme@fel.uniza.sk](mailto:kme@fel.uniza.sk)  
www: <http://www.kme.uniza.sk/>