

18th MECHATRONIKA 2018

December 5 – 7, 2018, Brno, Czech Republic
Program

V.5

Wednesday, December 5

Opening of Conference 14:00

Tomáš Březina, chairman, Brno University of Technology, Czech Republic
Dušan Maga, vice-chairman, Czech Technical University in Prague, Czech Republic
Alexandr Štefek, vice-chairman, University of Defence, Brno, Czech Republic
Jiří Hlinka, Vice-Dean, Faculty of Mechanical Engineering, BUT

Session 1 (14:30-16:00) - Mechatronics I (chairmen Maga, Březina)

- 14:30 Petr Hadraba, Zdenek Hadas: Virtual Twin of The Multi-spindle Lathe for The Chatter Time-domain Analysis
- 14:45 Hiroyuki Nabae: Simulation Approach to Effect of Elasticity on Actuation Time of Displacement-amplified Electromagnetic Actuator
- 15:00 Amir Samiee, Nicolas Tiefnig, Jidu P. Sahu, Michael Wagner, Andreas Baumgartner, László Juhász: Model-Driven-Engineering in Education
- 15:15 Thomas Hieninger, Florian Goppelt, Ronald Schmidt-Vollus: On-Line Self-Tuning for Centrifugal Pumps Driven in Parallel Mode Using Dynamic Optimization
- 15:30 Martin Dosedel, Zdenek Havranek: Design and performance evaluation of smart vibration sensor for industrial applications with built-in MEMS accelerometers
- 15:45 Ian Mangion, Jean Paul Azzopardi, Carl Caruana, Mario Farrugia, Robert Ghirlando: Electronic Ignition Based on In-Cylinder Pressure from a Pressure Sensor Glow Plug

Welcome drink 16:00

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Poster Session (16:00-18:00) (chairmen Singule, Věchet)

- Akeel Othman, Dusan Maga: Indoor Photovoltaic Energy Harvester with Rechargeable Battery for Wireless Sensor Node
- Petr Strecha, Petr Makula: Comparison of Particle Filter Resampling Methods in Aircraft Positioning
- Patrik Kutilek, Katerina Benediktova, Jan Svoboda, Petr Volf, Jana Adamkova, Vaclav Krivanek, Jan Hejda, Eva Kutilkova, Ana Carolina D'Angeles M. de Brito: Processing Methods of Camera Record of Animal Movement
- Minh Tuan Bui, Radek Duskocil, Vaclav Krivanek: Distance and angle measurement using monocular vision
- Maciej Grabowski, Artur Jędrusyna: A Portable Colloidal Silver Generator with an Integrated Sprayer
- Lubomír Drápal, Jan Vopařil: Design Concept of a Crankshaft for Reduction of Main Bearings Power Losses and a Deep Skirt Engine Block Load
- Vladimír Fuis: Sensitivity Analysis of the Material Parameters Obtained from the Measurements
- Eduard Nemlaha, Bohuslava Juhásová: System for Elimination of Faults in Fuel Filling
- Krzysztof Przystupa: Reliability Assessment Method of Device under Incomplete Observation of Failure
- Irina Makarova, Ksenia Shubenkova, Anton Pashkevich: Development of an Intelligent Human Resource Management System in the Era of Digitalization and Talentism
- Zdenek Frank, Karel Hruška: Design, Construction and Measurement of an Educational Synchronous Machinery

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- Marek Toman, Radoslav Cipin, Pavel Vorel: Thermal Networks Respecting Asymmetric Cooling of Electrical Machine Parts
- Petr Marcon, Christian Diedrich, Frantisek Zezulka, Tizian Schröder, Alexander Belyaev, Jakub Arm, Tomas Benes, Zdenek Bradac, Ivo Vesely: The Asset Administration Shell of Operator in the Platform of Industry 4.0
- Tomas Marek, Jan Berthold, Michal Holub, Joachim Regel: A quasi-online geometric errors compensation method on CNC machine tool
- Miguel Tabone, Jean Paul Azzopardi, Mario Farrugia: Emulation of Vehicle Speed and Impact on Vehicle Event Data Recorder
- Radek Bysticky, Michal Dub, Milos Andrlc: GPS Applicability for UAV Wind Measurement
- Aleksandr Andreev, Olga Peregudova, Katherine Sutyorkina: Trajectory Tracking Control of Robot Manipulators with Revolute Joints using Only Position Measurements
- Radek Mařík: Thresholding Using Extreme Value Theory Threshold Models
- Lukas Veg, Jan Laksar: Thermal Model of High-Speed Synchronous Motor Created in MATLAB for Fast Temperature Check
- Radek Cermak, Roman Pechanek: Thermal Study of Permanent Magnet Direct Drive Wheel Motor
- Karel Hruska, Jan Laksar, Jan Sobra: The Determination of Iron Core Loss Characteristics of Special Electrical Steel Types
- Štěpán Janouš, Jakub Talla, Václav Šmíd, Zdeněk Peroutka: Model Predictive Control of Dual Induction Motor Single Inverter Drive
- Radek Vlach, Filip Musil: Coupled Modeling of Permanent Magnet Generator Cooling using CFD
- Jiri Hajek, Zbynek Kocur, Jiri Vodrazka, Tomas Zitta: Remote Controlled Emulator of Communication Channel for Industrial Testing
- Zhiqiang Huo, Yu Zhang, Lei Shu, Yunrong Lv, Shuiquan Lin: Bearing Fault Diagnosis using Multi-sensor Fusion based on weighted D-S Evidence Theory
- Tomas Zitta, Marek Neruda, Lukas Vojtech, Martina Matejkova, Matej Jehlicka, Lukas Hach, Jan Moravec: Penetration Testing of Intrusion Detection and Prevention System in Low-Performance Embedded IoT Device
- Daniel Zuth, Tomáš Marada: Comparison of Faults Classification in Vibrodiagnostics from Time and Frequency Domain Data
- Rostislav Huzlik, Vladimir Haban, Martin Kroupa, Martin Hudec: Evaluation of pressure pulsation frequency by motor current signature analysis
- Lukasz Fraczkak, Barbara Bryl-Nagórska, Paweł Żak: A simulation of snake-like robot module bending by transverse artificial muscles
- Roland Reginald Zana, Ambrus Zelei: Swept Laser Based 3D Pose Detection of the Swinging Robot Acroboter
- Pei-Chun Lin, Yen-Feng Cheng, Kuo-Shen Chen: Design and Realization of a Novel Elastomer Characterization System for Precision Positioning Application
- Vaclav Sova, Martin Brabc, Robert Grepl: FPGA Implementation of Multiplierless Low-Pass FIR Differentiator
- Tomáš Richta, Fernando Macías, Adrian Rutle, Vladimír Janoušek: Domain Specific Modeling for Reconfigurable Distributed Embedded Control Systems
- Ivo Pazdera, Petr Prochazka, Radoslav Cipin, Jiri Ctibor: Synchronous Machine Model and Equivalent Circuits Based on Hybrid Parameters of Two-Port Network
- Ondrej Andrs, Michal Maliszewski: Optimization of the DC Motor State Space Controller for FPGA

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Thursday, December 6

Session 2 (9:00-10:30) - Power Electronics (chairman Vorel)

- 9:00 Martin Pittermann, Jiri Fort, Jan Diesl, Vladimir Pavlicek: Converters for Switched Reluctance Motor - Topology Comparison
- 9:15 Luboš Streit, Jakub Talla, Martin Janda: Tram LC Filter Stabilization by Supercapacitor Storage System
- 9:30 Vojtech Blahnik, Tomas Kosan, Jakub Talla: Electromagnetic interference of single-phase AC-DC traction converter
- 9:45 Oleg Sivkov, Martin Novak, Jaroslav Novak: Comparison between Si IGBT and SiC MOSFET Inverters for AC Motor Drive
- 10:00 Pavel Vorel, Jan Martiš, Petr Huták: Battery Supplied Arc Welder
- 10:15 Jan Martiš, Pavel Vorel: Wireless Power Transfer 2.5 kW with Simple Control and High Efficiency

Session 3 (9:00-10:30) - Modeling and Simulation (chairman Pechánek)

- 9:00 Ludek Janak, Zdenek Hadas: Feasibility Study of Micro Thermoelectric Power Supply for Aircraft Sensor Node
- 9:15 Dariusz Horla: On applying a generalized Padé approximation to stability analysis - experimental results
- 9:30 Roman Pechanek, Vladimir Kindl, Jiri Franc: Different Approach in Thermal Modeling of Permanent Magnet Synchronous Motor
- 9:45 Florian Goppelt, Thomas Hieninger, Ronald Schmidt-Vollus: Modeling Centrifugal Pump Systems from a System - Theoretical Point of View
- 10:00 Zdeněk Machů, Oldřich Ševeček, Zdeněk Majer, Zdeněk Hadaš, Michal Kotoul: Optimization of the electro-mechanical response of the multilayer piezoelectric energy harvester
- 10:15 Bo Zhang, Tao Dong, Nuno Pires, Zhaochu Yang: Modeling and Simulation of Facility Planning Problem Based on Improved SLP Method

Coffee break

Session 4 (11:00-12:30) - Electric Machines and Drives (chairman Hruška)

- 11:00 Jan Sobra, Tomas Kavalir, Michal Krizek, Bohumil Skala: Experimental Verification of the Finite Element Analysis of an Induction Machine with Implemented Static Eccentricity Fault
- 11:15 Jan Laksar, Lukas Veg: Reduced Schwarz-Christoffel Conformal Mapping in Surface-Mounted PMSM
- 11:30 Vladimir Pavlicek, Martin Pittermann, Jiri Fort: Development of the Measuring Device for Standstill Frequency Response (SSFR) Testing for Electric Machine
- 11:45 Zdenek Novak, Martin Novak: Design of High-Speed Permanent Magnet Synchronous Motor for Advanced and Sensorless Control Techniques Validation
- 12:00 Radoslav Cipin, Marek Toman, Petr Prochazka, Ivo Pazdera: Nonlinear Equivalent Circuit of Induction Machine
- 12:15 Ladislav Knebl, Cestmir Ondrusek, Jiri Kurfurst: Ferrite Assisted Synchronous Reluctance Motor Design, Manufacturing and Material Influence on Motor Characteristics

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Session 5 (11:00-12:30) - Control Systems (chairman Kovář)

- 11:00 Joanna Zietkiewicz: Nonlinear Predictive Control with Constraint Propagation Strategy
- 11:15 Bartłomiej Wicher, Stefan Brock: Tuning Optimization of Extended State Observer for Two Mass System with Elastic Joint and Backlash
- 11:30 Luke Spiteri, Mario Farrugia: FeedForward Control of a TurboCharger Hot Gas Test Stand
- 11:45 Matej Rajchl, Martin Brabc: Inverse Model Approximation Using Iterative Method and Neural Networks with Practical Application for Unstable Nonlinear System Control
- 12:00 Tien Sy Le, Holger Schlegel, Welf-Guntram Drossel, Matthias Putz: Fitnessindex Based Fault-Tolerant Control
- 12:15 Nadia Sultan, Muhammad Najam ul Islam, Asif Mahmood Mughal: Postural Control During Standing Posture For Small Perturbations With Feedback Linearization

Lunch + coffee

Session 6 (14:00-15:30) - Electric Drives Control (chairman Talla)

- 14:00 Adrian Wójcik, Tomasz Pajchrowski: Torque Ripple Compensation in PMSM Direct Drive with Position-based Iterative Learning Control
- 14:15 Tomas Kosan, Jakub Talla, Stepan Janous, Vojtech Blahník: FPGA-Based Accelerator for Model Predictive Control of Induction Motor Drive
- 14:30 Martin Votava, Tomas Glasberger, Zdenek Peroutka: Predictive Real Time Minimization of Power Losses with Improved Space Vector Preselection Algorithm
- 14:45 Péter Stumpf, Ádám Lajos Váradi: Investigation of estimator algorithms for high speed drive systems
- 15:00 Jakub Talla, Tomáš Košan, Vojtěch Blahník: FOC-based Speed Control Algorithms of Induction Motor Drive with System Parameter Mismatch
- 15:15 Martin Pittermann, Jiri Fort, Jan Diesl, Vladimir Pavlicek: Optimal SRM-Control Algorithm to Achieve Maximum Torque and Real Converter Limits

Session 7 (14:00-15:30) - Mechatronics II (chairman Hadaš)

- 14:00 Jiri Ctibor, Ivo Pazdera, Jan Knobloch: One-axis Radial Active Magnetic Bearing Simulink Model with Respect of Nonlinear Ferromagnetics
- 14:15 Radomir Prusa, Rostislav Huzlik, Vladimir Haban: Design of Passive Magnetic Axial Bearing for Seal-less Pump
- 14:30 Karel Kalista: A proposal of the methodology for dynamic force coefficients identification of labyrinth seal with use of active magnetic bearings
- 14:45 George Juraj Stein, Andrej Krafčík, Peter Tobolka, Ivan Frollo: Attenuation of Beam Transversal Vibrations by Electro-magnetic Means
- 15:00 Andrzej Andrzejewski: Investigation into the Moment of Inertia Estimation Process Occurring in Electric Drive of a Mechatronic System
- 15:15 Jiri Tuma, Michal Holub, Rostislav Huzlik, Jan Pavlik: Calculation of Component Durability Based On Simulation Model

Coffee break

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Session 8 (16:00-17:00) - Robotics I (chairman Chen)

16:00 Nikolay Krinitsyn, Atrem Babaev, Evgeniy Stolov: Robotized System for Processing of Helical Surfaces

16:15 Jaroslav Mlýnek, Michal Petrů, Tomáš Martinec: Optimization of Industrial Robot Trajectory in Composite Production

16:30 Paweł Żak: Master Manipulator Orientation Determination Method Using Extended Kalman Filter

16:45 Dmitrii Yu. Kolpashchikov, Nikita V. Laptev, Viacheslav V. Danilov, Igor P. Skirnevskiy, Roman A. Manakov, Olga M. Gerget: FABRIK-Based Inverse Kinematics for Multi-Section Continuum Robots

Conference Dinner 18:00

Jazz Concert 18:15 - 19:00

Dinner 19:00 - 22:00

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Friday, December 7

Session 9 (9:00-10:30) - Sensors and Measurement (chairman Dub)

- 9:00 Joo-Young Ryu, So-Young Lee, Ngoc-Loi Dang, Jeong-Tae Kim: Impedance-based Tension Force Measurement Technique for Cable Structure
- 9:15 Jawad Masood, Bruno Martinez-Bargiela, Ruben Paz-Cibeira, David Gomez-Loureda, Maria del Carmen Fernandez-Gonzalez, Angel Dacal-Nieto, Victor Alonso-Ramos: Testing of Autonomous High Precision Panel Assembly Process
- 9:30 Gabriel Gašpar, Juraj Dudak, Pavol Tanuska, Tomas Meravy: Implementation of nSoric measuring system on a PLC
- 9:45 Moritz Scharff, Richard A. Rivera Campos, Lukas Merker, Jorge H. Alencastre, Carsten Behn, Klaus Zimmermann: Flow Detection using an Artificial Vibrissa-Like Sensor – Simulations and Experiments
- 10:00 Ondrej Rubes, Pavel Tofel, Robert Macku, Pavel Skarvada, Filip Ksica, Zdenek Hadas: Piezoelectric Micro-fiber Composite Structure for Sensing and Energy Harvesting Applications
- 10:15 Tomas Spacil, Matej Rajchl: Compensation of Linear Acceleration in Single-Mass MEMS Gyroscope

Session 10 (9:00-10:30) - Biomedical and Biomechanical Engineering (chairman Křivánek)

- 9:00 Te-Hsin Chang, Hiroyuki Nabae, Gen Endo, Koichi Suzumori, Kazutoshi Hatakeyama, Satoaki Chida, Yoichi Shimada: Design of a Wearable Deep Vein Thrombosis Prevention Device Using Thin McKibben Muscles
- 9:15 Patrik Kutilek, Ivan Vareka, Vaclav Krivanek, Petr Molnar, Zdenek Svoboda, Ondrej Nemecek, Slavka Viteckova: Gait Evaluation in Patients with Transtibial Prosthesis using Force Platforms
- 9:30 Pavel Hnyk, Lukas Kvarda, Lukas Vojtech, Marek Neruda, Tomas Zitta: Electrode Shapes and Frequency Band Analysis for Human Body Communication
- 9:45 Veronika Novotna, Dalibor Cervinka: Current Distribution in the Tissue during Electroporation Process
- 10:00 Jaroslav Kovář, Vladimír Fuis: Comparing the Results of Probability of Ceramic Head Fracture According to Weibull's Theory with Inclusion of One or Three Principal Stresses

Coffee break

Session 11 (11:00-12:00) - Robotics II (chairman Krejsa)

- 11:00 Nikolay Krinitsyn, Vladimir Kurochkin, Ivan Shcherbakov, Maksim Murin, Evgeniy Stolov, Denis Rakov: Ultrasonic-Based Solution for Mapping Task
- 11:15 Konrad Urbanski: Control of the Quadcopter Position Using Visual Feedback
- 11:30 Mehmet Ugur Soydemir, İshak Alkuş, Parvin Bulucu, Aykut Kocaoğlu, Cüneyt Güzeliş, Savaş Şahin: Data Dependent Stable Robust Adaptive Controller Design for Altitude Control of Quadroter Model
- 11:45 Jiri Krejsa, Stanislav Vechet: Fusion of Local and Global Sensory Information in Mobile Robot Outdoor Localization Task

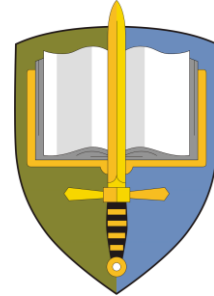
Closing ceremony (12:00-12:30)

Lunch

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