

Mechatronics 2013

Time table

Events of first two days will take place at the Faculty of Electrical Engineering and Communication in the main lecture hall and surrounding area, with following exceptions:

- Special session on Mechatronics education will take place at the Faculty of Mechanical Engineering, building A2, room 617
- Conference banquet will take place at Rector's Office Building, Antonínská 1

On Wednesday there are parallel sessions, taking place in main lecture hall and room SD299.

Internet access:

There is wireless network available for participants during the whole conference, with following sign-in data:

Network: **vutbrno**

Login: **m2013**

Password: **mechatronics**

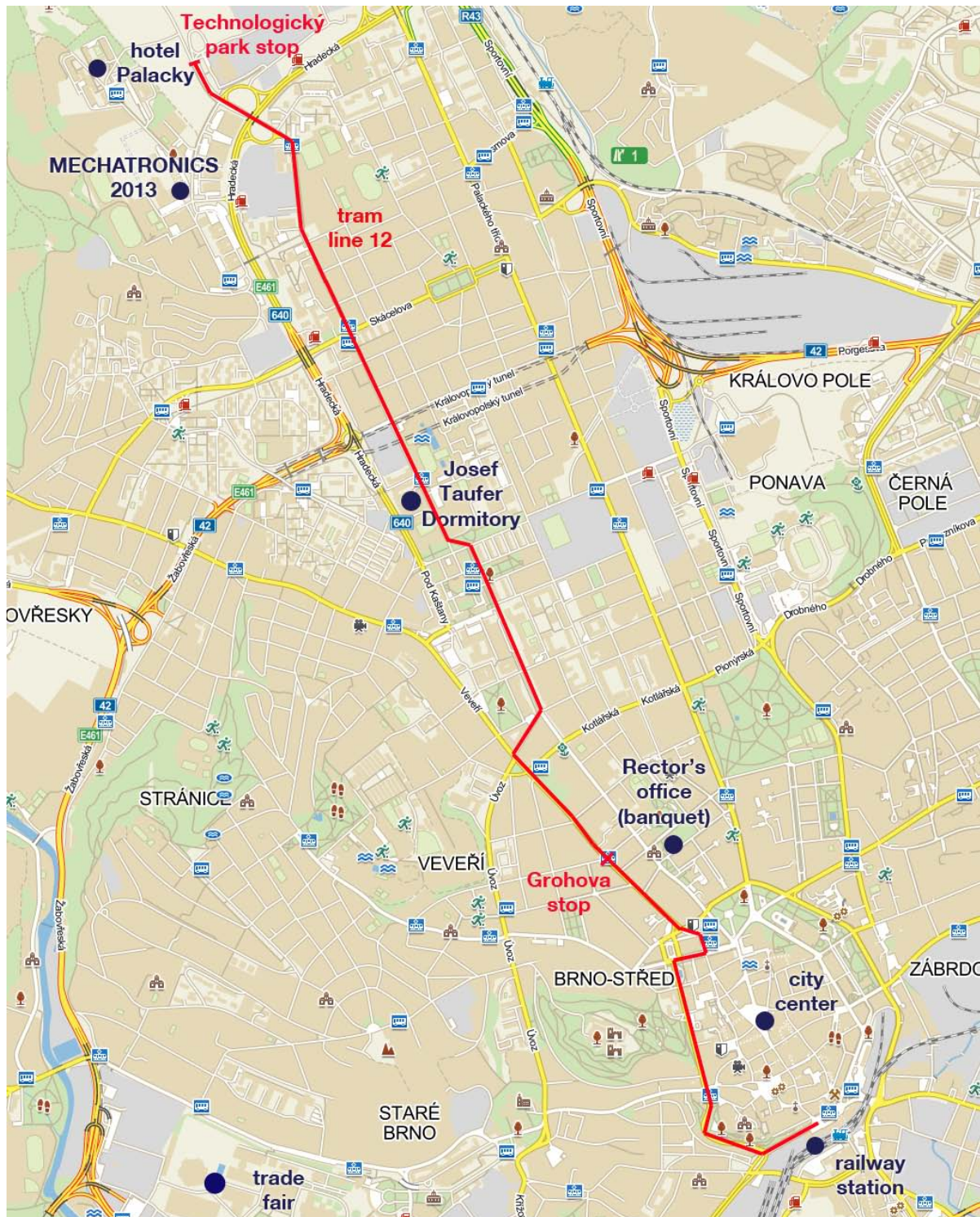
Transport

When going from the railway station, use tram line number 12 (see the map below), to the final stop called *Technologický park*. It's only few minutes' walk from the tram stop.

When going by car, set *Technická 12* to your GPS navigation. Parking is available for participants.

Transportation to conference banquet is easiest by tram line number 12, get out at *Grohova* tram stop and walk few minutes to *Antonínská* street.

When going to International Trade Fair, there are multiple options, e.g. use tram number 12 to get to main railway station (*Hlavní nádraží*) and then tram number 1 (*Výstaviště* stop). Journey takes about 30 minutes.



Monday, October 7th

10:00 - 12:00	Conference registration
12:00 - 12:30	Welcome and Opening of the Conference
12:30 - 13:00	National Instruments company presentation R. Vala : Mechatronics design tools for the new era
13:00 - 14:00	Lunch
14:00 - 16:00 Session 1	Design, Modeling and Simulation of Mechatronic Systems Chair: Prof. R. Jablonski, Prof. V. Čech
14:00 - 14:15	T. Březina, L. Březina, J. Marek, Z. Hadas, J. Vetiska: Simulation Assessment of Suspension of Tool Vibrations during Machining
14:15 - 14:30	M. Iskandirova, P. Blecha, M. Holub, F. Bradáč: Eco-design of Mechatronic Systems
14:30 - 14:45	J. Augste, M. Holub, R. Knoflíček, T. Novotný, J. Vyroubal: Monitoring of Energy Flows in the Production Machines
14:45 - 15:00	I.Dudarev, V.Wittstok, F.Pürzel, P.Blecha: Visualization of Energy Flows Using a Particle System
15:00 - 15:15	P. Vavruska: Feed-Rate Control along Multi-Axis Toolpaths
15:15 - 15:30	V. Cech, M. Cervenka: The Manipulator of the Passive Optoelectronic Rangefinder as a Controlled System of Servomechanisms
15:30 - 15:45	P. Axman, R. Král, V. Axman, J. Berjak: Practical Problems during Fuel Pump Development for Aerospace Industry
15:45 - 16:00	M. Dub, A. Stefek: Using PSO Method for System Identification
16:00 - 16:30	Coffee break
16:30 - 18:00 Session 2	Robotics Chair: Prof. K.S.Chen, Prof. J. Krejsa
16:30 - 16:45	Y. T. Fu, K.S.Chen: A Novel Indoor Localization Scheme by Integrating Wiimote Sensing and a Controllable IR-LED Array
16:45 - 17:00	P. Shakouri, A. Ordys, G. Collier: Robotic Implementation of the Adaptive Cruise Control- Comparison of Three Control Methods
17:00 - 17:15	Vu Trieu Minh : Trajectory Generation for Autonomous Vehicles
17:15 - 17:30	M. Dovica, T. Kelemenová, M. Kelemen, T. Lukac: Robot with Adjustable Undercarriage – the Design and the Simulation
17:30 - 17:45	M. Bodnicki, D. Kamiński: In-pipe Microrobot Driven by SMA Elements
17:45 - 18:00	J. Wierciak, K. Bagiński, D. Jasińska-Choromańska, T. Strojnowski: Orthotic Robot as a Self Optimizing System
18:00 - 20:00	Poster session – Welcome party Welcome party and Poster session will take place at the same time, so that participants can discuss exhibited posters over a nice glass of wine in friendly atmosphere. Posters will be exhibited for the whole duration of the Conference. The list of posters is attached at the end of this document.

Tuesday, October 8th

<p>Free Morning</p> <p>International Engineering Fair Brno</p> <p>individual attendance, tickets are available for all participants</p>	<p>11:00 - 12:00 Spec. Czech session: <i>Mechatronics Education in Czech Republic Schools</i></p> <p>Chair: Prof. D. Maga, Dr. Z. Hadaš</p> <p>R. Grepl: Model Based Design of a Self-Balancing Vehicle: a Mechatronic System Design Case Study</p> <p>O. Andrs, et.al.: Model-Based Design of Mobile Platform with Integrated Actuator – Design with Respect to Mechatronic Education</p> <p>D. Klimes, et.al: The Design and Use of 3DOF Manipulator as a Platform for Education in Mechatronics</p> <p>G. Gaspar, S. Pavlikova, P. Fabo, P. Pavlík: Jasper - a Platform for Teaching Mechatronics</p>
<p>12:30 - 13:00</p>	<p>Invited lecture</p> <p>M. Hoffmann, P. Hušek, H.-J. Koriath, V. Kučera, U. Priber:</p> <p>Self-learning Control for Servo Drives in Forming Technologies</p>
<p>13:00 - 14:00</p>	<p>Lunch</p>
<p>14:00 - 16:00</p> <p>Session 3</p>	<p>Control and Automation</p> <p>Chair: Prof. J. Kurek, Prof. T. Březina</p>
<p>14:00 - 14:15</p>	<p>A. Petrovas, R. Rinkevičienė: Hybrid Fuzzy - State Variable Feedback Controller of Inverted Pendulum</p>
<p>14:15 - 14:30</p>	<p>V. Lamberský, R. Grepl: Benchmarking Various Rapid Control Prototyping Targets Supported in Matlab/Simulink Development Environment</p>
<p>14:30 - 14:45</p>	<p>J. Quellmalz, M. Rehm, H. Schlegel, W.-G. Drossel: A Model Comparison Performance Index for Servo Drive Control</p>
<p>14:45 - 15:00</p>	<p>M. Rehm, J. Quellmalz, H. Schlegel, W.-G. Drossel: Control Structures for Opposed Driving, Coupled Linear Drives</p>
<p>15:00 - 15:15</p>	<p>J. Możaryn, K. Malinowski: Tuning Rules Selection and Iterative Modification of PID Control System Parameters</p>
<p>15:15 - 15:30</p>	<p>T. Pajchrowski: Application of Artificial Neural Network for Speed Control of Servodrive with Variable Parameters</p>
<p>15:30 - 15:45</p>	<p>S. Brock: Hybrid PI Sliding Mode Position and Speed Controller for Direct Drive</p>
<p>15:45 - 16:00</p>	<p>L. Ertl, M. Jasansky: Design of Engine Control System for Small Helicopter</p>
<p>16:00 - 16:30</p>	<p>Coffee break</p>
<p>16:30 - 18:00</p> <p>Session 4</p>	<p>Electrical Machines, Drives & Power Electronics</p> <p>Chair: Prof. V. Singule, Dr. K. Hruška</p>
<p>16:30 - 16:45</p>	<p>A. Diker, D. Korkmaz, Ö.F. Alçın, U. Budak, M. Gedikpınar: Design and Implementation of A Single-Stage Full-Bridge DC/DC Converter with ZVS Mode</p>
<p>16:45 - 17:00</p>	<p>R. Pechanek, V. Kindl, K. Hruska: Air Gap Heat Transmission and Its Consideration in FEM Analyses</p>
<p>17:00 - 17:15</p>	<p>Z. Hadas, R. Huzlík: FEM Model of Electro-Magnetic Vibration Energy Harvester</p>
<p>17:15 - 17:30</p>	<p>B. Fabianski, K. Zawirski: Switched Reluctance Motor Drive Embedded Control System</p>
<p>17:30 - 17:45</p>	<p>R. Cipin, C. Ondrusek, R. Huzlík: Fractional-order Model of DC Motor</p>
<p>19:00 - 22:00</p>	<p>Conference banquet</p> <p>Banquet takes place in Rector's Office Building, Antonínská 1, Brno</p>

Wednesday, October 9th

8:30 - 10:00 Session 5	Measurement and Diagnostics Chair: Dr. V. Křivánek, Dr. L. Houfek	
08:30 - 08:45	M. Szumilas, E. Ślubowska, K. Lewenstein: System for Multipoint Measurements of Slowly Varying Magnetic Fields	
08:45 - 09:00	R. Duskocil, V. Krivanek, A. Stefek: Contribution to Determination of Target Angular Position by Single Visual Camera at Indoor Close Environs	
09:00 - 09:15	M. Kawecki, B. Putz: Real-time Edge Detection Using Dynamic Structuring Element	
09:15 - 09:30	M. Sieniło, S. Żebrowska-Łucyk: A Method for Measuring Size and Form Deviations of Rotary Components with Variable Curvature on FMM	
09:30 - 09:45	Ryszard Jablonski, Pawel Fotowicz: A New Approach to the Uncertainty in Diameter Measurement Using Laser Scanning Instrument	
9:45 - 10:15	Coffee break	
10:15 - 11:45 Session 6	A: Design, Modeling and Simulation of Mechatronic Systems Chair: Prof. R. Grepl, Prof. M. Bodnicki	B: Biomedical and Biomechanical Engineering Chair: Prof. J. Burša, Prof. D. Jasińska-Choromańska
10:15 - 10:30	P. Horváth: Towards to Haptic Keyboard: Modeling the Piano Action	T. Ripel, J. Krejsa, J. Hrbáček: Patient Activity Measurement in Active Elbow Orthosis
10:30 - 10:45	J. Kaleta, K. Kot, D. Lewandowski, K. Niemiec, P. Wiewiorski: Evaluation of Possibilities of Electroactive Polymers Application in Bio-inspired Adaptronic System	M. Władziński, K. Wildner, S. Cygan, B. Grobelski, D. Pawelczak, T. Pałko: A New Method for Tissue Impedance Spectrometry and its Initial Application in vivo
10:45 - 11:00	L. Janak, Z. Ancik, Z. Hadas: Simulation Modelling of MEMS Thermoelectric Generators for Mechatronic Applications	F. Horvát, M. Čekan, L. Šoltés, B. Hučko: Experimental Device for Reconstructing Spinal Deviations in to a 3D Model
11:00 - 11:15	V. Sova, R. Grepl: Hardware in the Loop Simulation Model of BLDC Motor Taking Advantage of FPGA and CPU Simultaneous Implementation	A. Siewnicka, K. Janiszowski, M. Gawlikowski: A Physical Model of the Human Circulatory System for the Modeling, Control and Diagnostic of Cardiac Support Processes
11:15 - 11:30	A. Bílkovský, Z. Šika: Off- Road Vehicle with Controlled Suspension in Soft Unprepared Terrain	M. Pieniak, K. Cieślícki: Properties of Ankle-Brachial-Index (ABI) in the Light of Numerical Simulation of Pulse Wave Propagation
11:30 - 11:45	G. J. Stein, R. Chmúrny: Damping of Machine Frame Vibrations by an Electro-magnetic Actuator	M. Zawiski, R. Paśniczek: Active Artificial Lower Limb
11:45 - 12:00	Closing of Conference	
12:00 - 13:00	Lunch	

Poster session

Poster session takes place in areas around the main lecture hall. The session starts on Monday, October 7th, authors are kindly asked to be at their posters during the Welcome party.

1. Design, Modeling and Simulation of Mechatronic Systems, Control and Automation		
ID	Paper title	Authors
3017	Virtual Commissioning of Mechatronic Systems with the Use of Simulation	J. Hloska, M. Kubín
3018	Prediction of Machining Accuracy for Vertical Lathes	M. Holub, M. Michalíček, J. Vetiška, J. Marek
3022	Gubanov model for vacuum packed particles	R. Zalewski, P. Chodkiewicz
3025	Thick Film Polymer Composites with Graphene Nanoplatelets for Use in Printed Electronics	D. Janczak, M. Słoma, G. Wróblewski, A. Młożniak, M. Jakubowska
3027	Safety Module for the System of Verticalization and Aiding Motion of the Disabled	D. Jasińska-Choromańska, B. Kabziński, M. Matyjewicz-Maciejewicz, D. Kołodziej
3028	Electromagnetic Coil Gun – Construction and Basic Simulation	B. Skala, V. Kindl
3034	Generating Code Consistent with Simulink Simulation for Aperiodic Execution on a Target Hardware Powered by a Free RTOS	V. Lamberský, J. Križan, A. Andreev
3040	Overview of Computational Models Used for Mixed Lubrication	O. Maršálek, P. Novotný, P. Raffai, L. Drápal, V. Pištěk
3042	Heating of Mould in Manufacture of Artificial Leathers in Automotive Industry	J. Mlynek, T. Martinec, R. Srb
3055	Influence of Underpressure on Acoustic Properties of Semi-intelligent Vacuum Packed Particles	M. Rutkowski
3069	Determination of Parameters of Second Order Integration Model for Weighing Scales	R. Ugodziński, R. Szewczyk
3072	Model Based Design of Power HIL System for Aerospace Applications	J. Vejlupek, J. Chalupa, R. Grepl
3084	Parameter Identification of Rheological Models Using Optimization Algorithms	V. Pištěk, P. Novotný, T. Mauder, L. Klimeš
3085	Cam Ring Force Simulation for Variable Roller Pump	P. Zavadinka, R. Grepl
3090	Benefits of a Parallelization of a Stand-Alone Desktop .NET Application Threaded Instance Methods	I. Košťál
3094	Morphing Structure with a Magnetorheological Material – Preliminary Approach	P. Skalski
3099	Transport Duty Cycle Simulation of Electro-Hydro-Mechanical Drive Unit for Mixing Drum	P. Kriššák, J. Jakubovič, P. Zavadinka
3104	Investigation on the Jump Phenomenon of Linear Compressor	H.M. Zou, M.S. Tang, Sh.Q. Shao, Ch.Q. Tian, Y.Y. Yan
3108	Software Tool for Calibration of Hydraulic Models of Water-supply Networks	J. Kovar, J. Rucka
3031	Pulse Response Identification of Inertial Model for Astatic System	J. E. Kurek
3075	The Robust Remote Control of the Manipulator	V. Ondroušek, M. Vytečka, J. Kolomazník, M. Hammerschmiedt
3106	Distributed Control System of Solar Domestic Hot Water Heating Using Open-source	G. Gaspar, S. Pavlíkova, R. Masarova
2. Electrical Machines, Drives & Power Electronics		
3041	The Comparison of the Permanent Magnet Position in Synchronous Machine	P. Svetlik
3054	Problems of FEM Analysis of Magnetic Circuit	J. Roupec, M. Kubík, I. Mazůrek, Z. Strecker
3059	FEM Model of Induction Machine's Air Gap Force Distribution	J. Sobra, V. Kindl
3074	Current-voltage Characteristics and IR Imaging of Organic Light-emitting Diodes	G. Kozioł, J. Gromek, A. Arazna, K. Janeczek, K. Futera, W. Steplewski
3091	Energetic Properties of a New, Iron Powder Based Switched Reluctance Motor Drive	B. Fabianski
3078	Complex Model of Asynchronous Machine as Traction Machine in Mining	R. Vlach
3115	Sensitivity Analysis of the Induction Machine Torque to the Substituting Circuit Elements	M. Patocka, R. Belousek

3. Measurement and Diagnostics		
3026	A Simple Acoustic Generator for Boiler Cleaning Applications	A. Jedrusyna, A. Noga
3037	Effects of Misalignments of MEMS Accelerometers in Tilt Measurements	S. Łuczak
3044	Method for Determining Direction, Velocity and Position of a Flying Ball	A. Nagy
3048	Silicon PIN Photodiode-Based Radiation Detector for Mobile Robots	O. Petruk, R. Szewczyk
3061	Three-dimensional Meshless Modelling of Functionally Graded Piezoelectric Sensor	P. Stanak, J. Sladek, V. Sladek, A. Tadeu
3065	Signal Processing in DiaSter System for Simulation and Diagnostic Purposes	M. Syfert, P. Wnuk
3081	X Band Power Generator	R. Krizan, L. Drazan
3101	Investigation Method for the Magnetoelastic Characteristics of Construction Steels in Nondestructive Testing	D. Jackiewicz, R. Szewczyk, J. Salach, A. Bienkowski, K. Wolski
3105	Coupled Thermal-Structural Transient Analysis of Pressure Sensors	R. Vlach
3117	Device for Measuring of Active Power and Energy at Machine Tools	R. Huzlík, P. Blecha, A. Vašíček, P. Houška, M. Holub
4. Robotics		
3002	Effect of Gear Ratio on Energy Consumption of Actuators Used in Orthotic Robot	K. Bagiński, J. Wierciak
3003	Precise Model of Multicopter for Development of Algorithms for Autonomous Flight	R. Baranek, F. Solc
3008	Adaptive Cruise Control for a Robotic Vehicle Using Fuzzy Logic	A. Hassan, G. Collier
3013	Project of Autonomous Control System in HUSAR Lunar Mining Rover	P. Węclewski, G. Bujko, P. Etz, Ł. Godziejewski, J. Kaplińska, P. Kicman, M. Wiśniowski
3015	Object Classification Using Dempster–Shafer Theory	B. Harasymowicz-Boggio, B. Siemiątkowska
3071	Hybrid Navigation Method for Dynamic Indoor Environment Based on Mixed Potential Fields	S. Vechet, K. S. Chen, J. Krejsa
3076	Human-machine Interface for Mobile Robot Based on Natural Language Processing	P. Mašek, M. Růžicka
3077	Real Time Object Tracking Based on Computer Vision	M. Růžicka, P. Mašek
3086	Searching for Features in Laser Rangefinder Scan via Combination of Local Curvature Scale and Human Obstacles Detection	J. Krejsa, S. Vechet
5. Biomedical and Biomechanical Engineering		
3009	Application of Indices Characterizing the Shape of a Signal for Automatic Identification of Artifacts in Impedance Cardiography	P. Piskulak, G. Cybulski, W. Niewiadomski
3016	Predictive Algorithm For The Insulin Dose Selection With Continuous Glucose Monitoring System	H.J. Hawłas, K. Lewenstein
3024	Automatic Analysis of Recurrence Plot for the needs of the Analysis of Infrasonic Signals from the Human Heart	M. Jamrozy, K. Lewenstein, T. Leyko
3030	Evaluation of the Empirical Mode Decomposition Method as a Tool for Preprocessing Ultrasonic Cardiological Data	T. Kubik, K. Kałużyński, S. Cygan, K. Mikołajczyk
3033	Evaluation of Bilateral Asymmetry of the Muscular Forces using OpenSim Software and Bilateral Cyclograms	P. Kutilek, Z. Svoboda, P. Smrcka
3087	Evaluation and Testing of Novel Ocular Tactile Tonometry Device	E. T. Enikov, P. P. Polyvás, R. Jančo, M. Madarász
3088	Calculation of the Bio-ceramic Material Parameters	V. Fuis, P. Janicek
3110	Effect of Contact Condition on Film Thickness Formation in Artificial Joints	T. Návrát, M. Vrbka, J. Laštůvka, I. Křupka, M. Hartl, J. Gallo