



**Department of Process Control**  
Faculty of Mechanical Engineering and Robotics  
AGH - University of Science and Technology

**14<sup>th</sup> INTERNATIONAL CARPATHIAN  
CONTROL CONFERENCE  
PROGRAMME**

Co-Organizers:

**Institute of Control and Informatization of Production Processes**  
Faculty of Mining, Ecology, Process Control and Geotechnology  
Technical University of Košice  
**SLOVAK REPUBLIC**

**Department of Control Systems and Instrumentation**  
Faculty of Mechanical Engineering  
VŠB -Technical University of Ostrava  
**CZECH REPUBLIC**

**Department of Automation and Communication Technology**  
University of Miskolc  
**HUNGARY**

**Department of Automatic Control**  
Faculty of Automation, Computers and Electronics  
University of Craiova  
**ROMANIA**

**Rytko, Poland**  
**May, 26-29, 2013**





# International Carpathian Control Conference - Rytro 2013

Time	Sunday, May 26 <sup>th</sup>	Monday, May 27 <sup>th</sup>	Tuesday, May 28 <sup>th</sup>	Wednesday, May 29 <sup>th</sup>
7 <sup>00</sup> - 8 <sup>00</sup>		Breakfast 7:00 - 9:00	Breakfast 7:00 - 9:00	Breakfast 7:00 - 9:00
8 <sup>00</sup> - 9 <sup>00</sup>				
9 <sup>00</sup> - 10 <sup>00</sup>		Section 3 9:00 - 10:30	Section 3 9:00 - 10:30	
10 <sup>00</sup> - 11 <sup>00</sup>		Coffee Break 10:30 - 11:00	Coffee Break 10:30 - 11:00	
11 <sup>00</sup> - 12 <sup>00</sup>		Section 2 11:00 - 12:15	Section 2 11:00 - 12:15	
12 <sup>00</sup> - 13 <sup>00</sup>				
13 <sup>00</sup> - 14 <sup>00</sup>	Lunch 12:30 - 14:30	Lunch 12:30 - 14:00	Lunch 12:30 - 13:30	
14 <sup>00</sup> - 15 <sup>00</sup>		Section 2 14:00 - 15:30	Excursion 13:30 - 18:30	
15 <sup>00</sup> - 16 <sup>00</sup>	Registration 11:00 - 16:00	Section 7,8 14:00 - 15:30		
16 <sup>00</sup> - 17 <sup>00</sup>	Opening Ceremony 15:00 - 16:00	Coffee Break 15:30 - 16:00		
17 <sup>00</sup> - 18 <sup>00</sup>	Coffee Break 16:00 - 16:30	Poster Session 16:00 - 18:00		
18 <sup>00</sup> - 19 <sup>00</sup>	Section 11 16:30 - 18:00			
19 <sup>00</sup> -	Dinner - Welcome Party 19:30 -	Dinner - Bonfire 19:30 -	Dinner - 19:30 - 21:00	

**Sunday, May 26th, 2013.**

- 11<sup>00</sup> – 16<sup>00</sup> Registration
- 12<sup>30</sup> – 14<sup>30</sup> Lunch
- 15<sup>00</sup> – 16<sup>00</sup> Opening Ceremony
- Plenary lecture
- Stephen P. **BANKS***  
The Global Theory of Nonlinear Systems
- 16<sup>00</sup> – 16<sup>30</sup> Coffee break
- 16<sup>30</sup> – 18<sup>00</sup> Section 11. Fractional Calculus and Its Applications  
(Chairmen: *Zbigniew **KULESZA**, Petr **NOSKIEVIC***)
- Dorota **MOZYRSKA**, Ewa **PAWŁUSZEWICZ***  
Remarks on Observability of H-difference Linear Control Systems with Two Fractional Orders
- Ivo **PETRAŠ***  
An Adaptive Fractional Order Controller
- Dominik **SIEROCIUK**, Michał **MACIAS***  
Comparison of Variable Fractional Order PID Controller for Different Types of Variable Order Derivatives
- Michał **MACIAS**, Dominik **SIEROCIUK***  
Modeling of Electrical Drive System with Flexible Shaft Based on Fractional Calculus
- Wojciech **LEPIARZ**, Janusz **KOWAL***  
The Modeling of Multibody Dynamic Systems with Fractional-Order Elements
- Dominik **SIEROCIUK**, Michał **MACIAS**, Wiktor **MALESZA***  
On a New Definition of Fractional Variable-Order Derivative
- 16<sup>30</sup> – 18<sup>00</sup> Section 3. Theory and application of control systems  
(Chairmen: *Stephen P. **BANKS**, Dan **POPESCU***)
- Andrzej **URBANIAK***  
Control Algorithms of Infiltration Water Intake Under Uncertainty
- Andrzej **BARTOSZEWICZ**, Piotr **LEŚNIEWSKI***  
Variable Structure Flow Controller for Connection-Oriented Communication Networks
- Carmen **HO**, Zi-Qiang **LANG**, Bogdan **SAPIŃSKI**, Stephen **BILLINGS***  
Simulation Results of a Vibration Isolation System with Nonlinear Damping Implemented by an MR Damper
- Dusan **KROKAVEC**, Anna **FILASOVÁ***  
Fault Detection in Linear Systems with Distributed Time Delays
- Anna **FILASOVÁ**, Dusan **KROKAVEC***  
On the Takagi-Sugeno Model-Based State Estimation for One Class of Bilinear Systems
- Francesco **CARRAVETTA***  
Quadratic Embedding into Algebras and Global Stabilization for a Class of Nonlinear Control Systems
- 19<sup>30</sup> – 23<sup>00</sup> Welcome Party

**Monday, May 27th, 2013.**

7<sup>00</sup> – 9<sup>00</sup> Breakfast

9<sup>00</sup> – 10<sup>30</sup> Section 3. Theory and application of control systems  
(Chairmen: *Ewa PAWŁUSZEWICZ, Dusan KROKAVEC*)

*Vojtech VESELY, Adrian ILKA*

Gain Scheduled Controller Design for MIMO Systems

*Tomas DUDA, Antonín VÍTEČEK*

Robust Control Algorithms and the State Variable Aggregation Method

*Dariusz GRZYBEK*

LQG Control for the Smart Truss

*Mateusz ROMASZKO*

Free Vibration Control of an Cantilever MR Fluid Based Sandwich Beam

*Santos M. OROZCO-SOTO, Julio C. RAMOS-FERNÁNDEZ, Abel GARCÍA-BARRIENTOS*

Fuzzy Sliding Mode Control for Trajectory Tracking and Force Compensation of a Robotic Haptic Interface

9<sup>00</sup> – 10<sup>30</sup> Section 4. Automation, mechatronics, robotics  
(Chairmen: *Miluse VÍTEČKOVÁ, Imrich KOSTIAL*)

*Zdzisław GOSIEWSKI, Zbigniew KULESZA*

Virtual Recolocation of Sensors and Actuators for a Flexible Rotor Supported by Active Magnetic Bearings

*Vladena BARANOVA, Lenka LANDRYOVÁ, Jozef FUTO*

Process Capability Index as an Indicator of Input Signal Quality of the Rock Disintegration Process

*Petr NOSKIEVIC*

Control of the Hydraulic Drive using Embedded Control System

*Kanstantsin MIATLIUK*

Conceptual Model for Mechatronic Design in the Basis of Hierarchical Systems Technology

*Pavel ŠURÁNEK, Miroslav MAHDAL, Jiří TŮMA, Jaromír ZAVADIL*

Modal Analysis of the Cantilever Beam

10<sup>30</sup> – 11<sup>00</sup> Coffee break

11<sup>00</sup> – 12<sup>15</sup> Section 2. Identification, modeling and simulation of processes and systems  
(Chairmen: *Karol KOSTŮR, Henryk RUSINOWSKI*)

*Piotr LICHOTA, Maciej LASEK*

Maximum Likelihood Estimation. A Method for Flight Dynamics – Angle of Attack Estimation

*Radim FARANA, Radek SVOBODA*

Operational Recommendations for Pyrolysis Unit Cooler Based on Mathematical Model

*Jiří TŮMA*

Calculation Algorithm for the Vold-Kalman Multi-Order Tracking Filter

*Łukasz JASTRZĘBSKI, Marcin WĘGRZYNOWSKI*

Experimental and Numerical Studies of Magnetorheological Damper Control Coil Type RD-8040-3

*Aleksei TEPLJAKOV, Eduard PETLENKOV, Juri BELIKOV*

Efficient Analog Implementation of Fractional-Order Controllers

11<sup>00</sup> – 12<sup>15</sup> Section 6. Information systems (SCADA/HMI, GIS, MES) and their Internet support  
(Chairmen: *Krzysztof PIETRUSEWICZ, József VÁSÁRHELYI*)

*Krzysztof HRYNIÓW*

Parallel Pattern Mining on Graphics Processing Units

*Martin* **STRÍBNÝ**, *Pavel* **SMUTNÝ**

Using HTML5 Web Interface for Visualization and Control System

*Tamas* **KOVACSHAZY**, *Balint* **FERENCZ**

Test Environment for the Evaluation of IEEE 1588 Solutions Including High Precision PPS Output Performance Measurements

*Krzysztof* **PIETRUSEWICZ**, *Pawel* **WASZCZUK**

Rapid Prototyping in Development of Numerically Controlled Machine Tool Feed Drive Module Control System

12<sup>30</sup> – 14<sup>00</sup> Lunch

14<sup>00</sup> – 15<sup>30</sup> Section 2. Identification, modeling and simulation of processes and systems  
(Chairmen: *Radim* **FARANA**, *Jacek* **SNAMINA**)

*Imrich* **KOSTIAL**, *Martin* **TRUCHLY**, *Jan* **MIKULA**, *Katarina* **MIKULOVA POLCOVA**, *Jan* **SPISAK**

Simulation Mathematical Model for Granular Material Thermal Treatment

*Karol* **KOSTÚR**

The Development of Control System for Preheating Furnace by Simulation Model

*Karol* **KOSTÚR**

Simulation Analysis of Shape Gasifying Front

*Imrich* **KOSTIAL**, *Dusan* **NASCAK**, *Jan* **KEREKANIC**, *Peter* **KOSINAR**

Mathematical Model for the Rotary Furnace Predictive Control

*Adam* **MILEJSKI**, *Henryk* **RUSINOWSKI**

Heat Transfer Mathematical Modelling in the Cooling Systems of Impure Process Gases in Copper Metallurgy

14<sup>00</sup> – 15<sup>30</sup> Section 7, 8. Engineering application of informatics, Quality control systems (TQM)  
(Chairmen: *Ivo* **PETRAŠ**, *Antonin* **VÍTEČEK**)

*Tomáš* **BUBLÍK**, *Miroslav* **VIRIUS**

Source Code Recognition by Graph Algorithm

*János* **VÉGH**, *József* **VÁSÁRHELYI**, *János* **TURÁN**, *Dániel* **DRÓTOS**

The von Neumann Computer Model on the Mirror of New Technologies

*Jaromír* **ZAVADIL**, *Jiří* **TŮMA**, *Miroslav* **MAHDAL**, *Jaroslav* **LOS**

Two Dimensional Fourier Transform using MATLAB

*Roman* **DANEL**, *Lukas* **OTTE**, *Vladislav* **VANCURA**, *Zdenek* **NEUSTUPA**, *Zdenek* **SELIGA**

Software Support of Quality Control of Coal and Coke Production in OKD, Joint Stock Company

*Darja* **NOSKIEVIČOVÁ**

Capability Analysis for Leagile Manufacturing Processes

15<sup>30</sup> – 16<sup>00</sup> Coffee break

16<sup>00</sup> – 18<sup>00</sup> Poster Session  
(Chairmen: *Andrzej* **URBANIAK**, *József* **VÁSÁRHELYI**)

*Miroslav* **MAHDAL**, *Jaroslav* **LOS**, *Jaromír* **ZAVADIL**

Verification Method of Rotors Instability Measurement

*József* **VÁSÁRHELYI**, *Ján* **TURÁN**, *Luboš* **OVSENÍK**, *János* **VÉGH**

Water Pollution Petrochemical Products Monitoring System Using Optical Fibre Refractometer

*Constantin* **MARIN**, *Dan* **SELISTEANU**, *Dorin* **SENDRESCU**

State Blocking Systems: Modeling and Behavior

*Ján* **PITEĽ**, *Mária* **TÓTHOVÁ**

Dynamic Modeling of PAM Based Actuator Using Modified Hill's Muscle Model

*Pavel* **ŠURÁNEK**, *Jiří* **TŮMA**, *Miroslav* **MAHDAL**

Comparising of Antialiasing Filters in A / D Converters

*Igor* **LEŠO**, *Patrik* **FLEGNER**, *Katarina* **FERIANČIKOVÁ**, *Zuzana* **SABOVA**

Some Problems in Application of the Theory of Abstract Spaces

- Ivor* **DÜLK**, *Tamás* **KOVÁCSHÁZY**  
Thermal Analysis of Solenoid Actuators
- Henryk* **RUSINOWSKI**, *Zbigniew* **BULIŃSKI**, *Adam* **MILEJSKI**  
Mathematical Modelling of Selected Processes Utilizing Combustible Process Gases
- Radek* **VALÁŠEK**, *Viktor* **PAVLISKA**, *Irina* **PERFILIEVA**, *Radim* **FARANA**  
Application of Fuzzy Transform for Noise Reduction in Helicopter Model Identification
- Bogdan* **SAPIŃSKI**, *Marcin* **WEGRZYNOWSKI**  
Reduction of Cogging Force in an Electromechanical Transducer Powering an MR Linear Damper
- Michal* **OSTASZEWSKI**, *Franciszek* **SIEMIENIAKO**  
Identification of In-Line Electric Actuator
- Piotr* **PALKA**, *Marcin* **MASŁANKA**  
Inverse LuGre Model for MR Dampers
- Marek* **LACIAK**, *Marian* **ŠOFRANKO**  
Designing of the Technological Line in the SCADA System Promotic
- Milan* **DURDAN**, *Jan* **KACUR**  
Indirect Temperatures Measurement in the UCG Process
- Lukáš* **KUBÁČ**, *Filip* **BENEŠ**, *Vladimír* **KEBO**, *Pavel* **STAŠA**  
RFID and Augmented Reality
- Petr* **STANÍČEK**, *Lukas* **RICHTR**, *Radim* **FARANA**  
Rating Web Sites Combining of Heuristic Methods with Numerical Linear Algebra
- Milan* **DURDAN**, *Marcela* **MALINDZAKOVA**, *Jozef* **FUTO**, *Jan* **KACUR**  
The Impact of the Sampling Frequency at Indirect Measurement
- Joanna Ewa* **ORZECHOWSKA**, *Andrzej* **BARTOSZEWICZ**, *Keith* **BURNHAM**, *Dobrila* **PETROVIC**  
Inventory Replenishment Control: A Predictive Approach
- Lubomír* **DORČÁK**, *Emmanuel* **GONZALEZ**, *Ján* **TERPÁK**, *Ivo* **PETRÁŠ**, *Juraj* **VALSA**, *Monika* **ŽECOVÁ**  
Application of PID Retuning Method for Laboratory Feedback Control System Incorporating Fractional-Order Dynamics
- Emmanuel* **GONZALEZ**, *Lubomír* **DORČÁK**, *Ivo* **PETRÁŠ**, *Ján* **TERPÁK**  
On the Mathematical Properties of Generalized Fractional-Order Two-Port Networks Using Hybrid Parameters
- S. Hassan* **HOSSEINIA**, *Ines* **TEJADO**, *Blas M* **VINAGRE**  
Fractional Order Hybrid Systems and Their Stability
- Andrzej* **KOT**  
Bi-axial Inverted Pendulum Modelling
- Andrzej* **SIOMA**  
The Estimation of Resolution in 3D Range Image System
- Milan* **DURDAN**, *Jan* **KACUR**, *Marek* **LACIAK**  
The Proposal of the Monitoring System of the Annealing Process in the SCADA system
- Jan* **KACUR**, *Milan* **DURDAN**, *Marek* **LACIAK**  
Utilization of the PLC as a Web Server for Remote Monitoring of the Technological Process
- Milan* **DURDAN**, *Jan* **KACUR**, *Marek* **LACIAK**  
Program Control of the Annealing Process with Utilization of the Indirect Measurement
- Karolina* **HOLEWA**, *Agata* **NAWROCKA**  
Brain – Computer Interface based on Steady - State Visual Evoked Potentials (SSVEP)
- Monika* **ŽECOVÁ**, *Ján* **TERPÁK**, *Lubomír* **DORČÁK**  
Usage of the Heat Conduction Model for the Experimental Determination of Thermal Diffusivity
- Pavel* **HOROVCÁK**, *Jan* **TERPAK**, *Beata* **STEHLIKOVA**  
Generation a Form's Input Elements Select and Radio Type Using Web Service
- Jan* **TERPAK**, *Pavel* **HOROVCÁK**, *Lubomir* **DORCAK**, *Monika* **ZECOVA**  
Graphic Presentation of Selected Thermochemical Properties of Substances in Matlab Using SOA
- Dusan* **DORCAK**  
The Logistics Information System in Production Company
- Štefan* **BUCZ**, *Alena* **KOZÁKOVÁ**, *Vojtech* **VESELÝ**  
A New Robust PID Controller Design Technique Using Bode-Interpolation

*Štefan* **BUCZ**, *Alena* **KOZÁKOVÁ**, *Vojtech* **VESELÝ**  
PID Tuning Using B-parabolas: A Tool to Translate Time Domain Performance  
Specification into Frequency Domain Performance Measures

19<sup>30</sup> – 23<sup>00</sup> Bonfire

**Tuesday, May 28th, 2013.**

7<sup>00</sup> – 9<sup>00</sup> Breakfast

9<sup>00</sup> – 10<sup>30</sup> Section 3. Theory and application of control systems  
(Chairmen: *Zbigniew* **KULESZA**, *Andrzej* **BARTOSZEWICZ**)

*Vladimír* **SERBÁK**, *Pavol* **LIŠČINSKÝ**  
Control of Discrete-Time Linear Systems Constrained in Output by Equality  
Constraints

*Jozef* **ŠKULTÉTY**, *Eva* **MIKLOVIČOVÁ**, *Ruth* **BARS**  
Analysis of Model Reference Control Based on Modified Laguerre Network with  
Integrator

*Miluse* **VÍTEČKOVÁ**, *Antonin* **VÍTEČEK**  
Ultimate Parameters in Control Technology

*Miluse* **VÍTEČKOVÁ**, *Antonin* **VÍTEČEK**  
Simple Digital Controller Tuning

*Marie* **HAVLIKOVA**, *Miroslav* **JIRGL**  
Reliability Analysis in Systems MMS

10<sup>30</sup> – 11<sup>00</sup> Coffee break

11<sup>00</sup> – 12<sup>15</sup> Section 1. Measurement, sensors, monitoring and diagnostic systems  
(Chairmen: *Jiří* **TŮMA**, *Krzysztof* **PIETRUSEWICZ**)

*Chingiz* **HAJIYEV**, *Ahmet* **SOFYALI**  
Two-Stage Estimation of Spacecraft Position and Velocity Via Single Station Antenna  
Tracking Data

*Zbigniew* **KULESZA**  
Multisine Excitation Technique for Rotor Crack Detection

*Sona* **SEDIVA**, *Marie* **HAVLIKOVA**  
Comparison of GUM and Monte Carlo Method for Evaluation Measurement  
Uncertainty of Indirect Measurements

*Paweł* **MARTYNOWICZ**  
Wind Turbine's Tower-Nacelle Model with MR Tuned Mass Damper - Experimental  
Setup

*Radek* **ŠTOHL**, *Karel* **STIBOR**  
Safety Through Common Industrial Protocol

12<sup>30</sup> – 13<sup>30</sup> Lunch

13<sup>30</sup> – 18<sup>30</sup> Excursion

19<sup>00</sup> – 21<sup>00</sup> Dinner

**Wednesday, May 29th, 2013.**

7<sup>00</sup> – 9<sup>00</sup> Breakfast

# Rytro

