

# **2014 15th International Carpathian Control Conference (ICCC 2014)**

**Velke Karlovice, Czech Republic  
28 – 30 May 2014**



**IEEE Catalog Number: CFP1442L-POD  
ISBN: 978-1-4799-3529-1**

# Plenary Keynotes

**Modelling, Control, and Optimisation of Membrane Processes** N/A  
*Miroslav Fikar*

**On Linguistic Control** N/A  
*Vilém Novák*

**Is it Possible for a Robot to Have Emotions?** N/A  
*Péter Korondi*

# Technical Papers

**On a State Feedback Anisotropy-based Control Problem for Linear Discrete-time Descriptor Systems** 1  
*Olga G. Andrianova*

**Client-Server Application for the Operator Panel Weintek and the Control System Siemens Simotion** 6  
*Jaroslav Antoš, Martin Bušek*

**.Net Micro Framework Gadgeteer Measurement Applications Development** 10  
*Marek Babiuch*

**One-way Delay Measurement System for Local Area Network Delay and Jitter Characterization** 14  
*Bálint Ferencz, Tamás Kovácsházy*

**An Application of Multivariate Planning Methods in Determining KPIs of Rock Disintegration Process** 19  
*Vladena Baranova, Lenka Landryová, Jozef Futó*

**Predictive Control of Non-Minimum Phase Systems** 23  
*Tomáš Barot, Marek Kubalčík*

**Fuzzy Tool for Conducting Information Security Risk Analysis** 28  
*Jiří Bartoš, Bogdan Walek, Cyril Klimeš, Radim Farana*

**Comparison of Two Approaches to a Positional Servo Control** 34  
*Igor Belai, Mikulas Huba*

**Robust Control Synthesis for a Class of Distributed Parameter Systems** 40  
*Cyril Belavý, Filip Vitáloš, Marcel Vlček, Dana Šišmišová, Marek Michalečko*

**Determination of Optimal Feedback Gain Matrix for a Class of Nonlinear Systems** 46  
*Nurdan Bilgin, Metin U. Salamci*

**Constrained Pole Assignment Control of a Two Tank System** 52  
*Pavol Bisták, Mikuláš Huba*

**Real Time Location System using Passive UHF RFID** 58  
*Dean Brennan, Jan Kolaja*

**Security Solutions of Intelligent Transportation System's Applications with using VANET Networks** 63  
*Emília Bubeníková, Ján Ďurech, Mária Franeková*

**The Problem of Measuring the Radial Cam Grinder BRV 300 - CNC** 69  
*Bušek Martin*

- Linearization and Identification a Mathematical Model of an Excavator** 73  
*Leszek Cedro*
- Trajectory Tracking with Variable Sampling using Fuzzy Logic Controller** 80  
*Ján Cigánek, Filip Noge, Štefan Kozák*
- Robotul Vertical Climber 2. Design and Implementation of Control Algorithm** 86  
*Josef Černohorský, Marcel Horák*
- Objectivization of Traditional Otoneurological Examinations Based on Kinect Sensor. Hautant's test based on Kinect** 91  
*Viliam Dolinay, Lucie Pivnickova, Vladimir Vasek*
- Necessary Optimality Conditions for Optimal Control of the Multistage Differential-Algebraic Systems** 95  
*Paweł Draż, Krystyn Styczeń*
- A Computationally Effective Method for Calculating the Exponential Fit** 101  
*Ivor Důlk, Tamás Kovácsházy*
- Fuzzy-Logic Control in Fast Technological Processes** 105  
*Radim Farana, Bogdan Walek, Michal Janošek, Jaroslav Žáček*
- Modelling, Control, and Optimisation of Membrane Processes** 109  
*Miroslav Fikar*
- Static Output Control Design Reflecting Fuzzy Subsystem Interactions in TS Fuzzy Models** 115  
*Anna Filasová, Vratislav Hladký, Dušan Krokavec*
- Measurement of the Volume of Material on the Conveyor Belt. Measuring of the Volume of Wood Chips During Transport on the Conveyor Belt Using a laser scanning** 121  
*David Fojtík*
- Multidrive Systems in Continual Rolling Mills** 125  
*Ivo Formánek, Radim Farana, Aleš Galuška*
- The Process of Tracking an Air Target by the Designed Scanning and Tracking Seeker** 129  
*Daniel Gapinski, Izabela Krzysztofik*
- Piezoelectric Generator for the Power Supply of the Monitoring System** 135  
*Dariusz Grzybek*
- Making an Environment Map Using Laser Rangefinder** 139  
*Oto Haffner, František Duchoň*
- Creating a 3D Parking Area Design via a Mobile Measurement Platform** 145  
*Ján Halgaš, Aleš Janota, Rastislav Pirník, Peter Holečko*
- Emotiv EPOC Neuroheadset in Brain – Computer Interface** 149  
*Karolína Holewa, Agata Nawrocka*
- Control of a General Distribution System** 153  
*Jiří Holík, Lenka Landryová*
- Large Scale Monitoring of Public Transport Accessibility in the Czech Republic** 157  
*Jiří Horák, Igor Ivan, David Fojtík, Jaroslav Burian*
- Gain Knowledge of Selected Properties of Artificial Muscles Using Tools of Matlab** 164  
*Stella Hrehova, Erika Fechova*
- Road Surface Measurement And Visualization Based On Data From The Laser Scanner** 168  
*Marián Hruboš, Aleš Janota, Rastislav Pirník*
- Parallel Digraphs-Building Algorithm for Polynomial Realisations** 174  
*Krzysztof Hryniów, Konrad Andrzej Markowski*

- Tuning of a Filtered Pole Assignment Controller for an Integral Plant** 180  
*Mikulas Huba*
- Discrete Gain-Scheduled Controller Design: Variable Weighting Approach** 186  
*Adrian Ilka, Vojtech Veselý*
- Characteristics of the Flow Control Valve with MSMA Actuator** 192  
*Dominik Ireneusz, Flaga Stanislaw*
- The Neural Network Analysis of Optical Glasses Transmittance** 196  
*Jančíková Zora, Minárik Stanislav, Bošák Ondrej, Košťál Pavel, Zimný Ondřej, Poulain Marcel, Legouera Messaoud, Soltani Mohamed Toufik*
- Modelling and Effective Controlling of Radial Electromagnetic Bearings** 201  
*Martin Jarčuška, Milan Žalman, Tatiana Mudráková, Pavol Varga*
- Rigorous Using of Calibration** 207  
*Milan Javůrek, Ivan Taufer*
- Case Study on an Event Model-based PID Control of a Thermal Process** 213  
*Ondřej Ježek*
- Rehabilitation Robotics and Wearable Sensors as Trends of Home Rehabilitation** 219  
*Boris Jobbágy, Ján Karchňák, Dušan Šimšík*
- Glass Window Vibrations Analysis used for Positioning of Piezoelectric Damping Elements** 223  
*Michal Kašpárek*
- A Steering Method for the Kinematic Car using C\*CS Paths** 227  
*Domokos Kiss, Gábor Tevesz*
- Design and Implementation of FPGA - Digital Based PID Controller** 233  
*Michal Kocur, Stefan Kozak, Branislav Dvorscak*
- Programmed Control of the Flat Track Anti-Tank Guided Missile** 237  
*Zbigniew Koruba, Lukasz Nocoń*
- Optimization of Burner's Range of Tunnel Furnace by Simulation** 243  
*Karol Kostúr*
- Mathematical Modeling Temperature's Fields in Overburden During Underground Coal Gasification** 248  
*Karol Kostúr*
- Modeling of Human Balance as an Inverted Pendulum** 254  
*Andrzej Kot, Agata Nawrocka*
- Control System of a Mobile Robot Manipulator** 258  
*Tomáš Kot, Václav Kryš, Vladimír Mostýn, Petr Novák*
- SCADA System Creation by using Java Applications and PLC** 264  
*Miroslav Köver-Dorčo*
- Switched System Controller Design: The Frequency Domain Approach** 268  
*Alena Kozáková, Vojtech Veselý, Róbert Krasňanský*
- Closing the Motion Control Loops via Industrial Ethernet Network** 273  
*Alois Krejčí, Tomáš Popule, Martin Goubej*
- Output PI Control of MIMO Linear Continuous-Time Systems** 279  
*Dušan Krokavec, Anna Filasová*
- Modelling of Automated Storage Systems Using Hierarchical Coloured Petri Nets** 285  
*Erik Kučera, Branislav Hruz*

- Anisotropy-based Analysis and Synthesis Problems for Input Disturbances with Nonzero Mean** 291  
*Arkadiy Yu. Kustov*
- Application of Optimization Method for Optimal Control of the Steelmaking Process** 296  
*Marek Laciak, Ján Kačur, Milan Durdán, Patrik Flegner*
- Comparison of Offline Identification Methods on Bounded Autoregressive Polynomial Models** 301  
*Alés Lebeda, Petr Pivonka*
- The Vision Analysis of a McKibben Pneumatic Artificial Muscle** 306  
*Wojciech Lepiarz*
- Some Problems in Control of the Quality of the Process of Rotary Drilling of Rocks by Using Suitable Visualization of Concurrent Vibrations** 310  
*Igor Leššo, Patrik Flegner, Pavel Horovčák, Beáta Stehlíková, Zuzana Sabová*
- Airport Effectiveness Modelling** 316  
*Letávková D., Matušková S., Vančura V.*
- Object Recognition for Industrial Image** 320  
*Lacezar Lincev, Jan Tomecek, Marek Babiuch*
- Laboratory Model Helicopter Control Using a Lowcost Arduino Hardware** 326  
*Tomáš Malatínek, Vladimír Popelka, Mikuláš Huba*
- Application of Haptic Omni Device to Determination of the Set Point Trajectory** 332  
*Dorota Marszałik*
- Conceptual Design of BCI in the Formal Basis of Hierarchical System** 336  
*Kanstantsin Miatliuk, Karolina Holewa, Agata Nawrocka*
- Control System of the Laboratory Stand for Continuous Casting of Aluminum** 342  
*Piotr Micek, Paweł Hammer*
- Determination of the Probabilistic Characteristics of the Coefficient of Restitution, with an Application of Acoustic Measurements** 346  
*Jerzy Michalczyk, Sebastian Pakuła*
- How to Predict Location and for What to Use It?** 351  
*Tomas Mikluscak, Alés Janota*
- Feature Space for Statistical Classification of Java Source Code Patterns** 357  
*Matej Mojzeš, Michal Rost, Josef Smolka, Miroslav Virius*
- Increasing Objects Localization Precision by Determination of Inertial Sensor Calibration Constants Using Differential Evolution Algorithm** 362  
*Tomáš Mravec, Peter Vestenický*
- Laguerre Network Implementation in Industrial Control Systems** 367  
*Mrosko, M., Škultéty, J., Miklovičová, E.*
- Remote Control Robot Using Android Mobile Device** 373  
*Jan Nádvorník, Pavel Smutný*
- Fuzzy Logic Controller for Rehabilitation Robot Manipulator** 379  
*Agata Nawrocka, Marcin Nawrocki, Andrzej Kot*
- Artificial Neural Networks for Identification in Real Time of the Robot Manipulator Model Parameters** 383  
*Marcin Nawrocki, Agata Nawrocka*
- SW Support for CCC and CQC Control Charts** 387  
*Darja Noskievičová, Miroslav Mahdal, Kateřina Brodecká*
- Theoretical Aspects of Control of the Tricept Type Parallel Kinematic Structure** 393  
*Milada Omachelová, Eva Kureková, Martin Halaj, Ilja Martišovits*

- Testing and Verification of Selected Technological Parameters of the PKS** 398  
*Iveta Onderová, Ľudovít Kolláth*
- Human Activity Recognition Using Neural Networks** 403  
*Stefan Oniga, József Sütő*
- Advanced Control with Economic - Ecological Optimization for Biomass-fired Boilers** 407  
*Cyril Oswald, Viktor Plaček, Bohumil Šulc*
- Aspects of Electromagnetic Interference in Low Frequencies Ranges. Electromagnetic Interference in the 50 Hz Frequency** 413  
*Jiri Otahal, Frantisek Hruska*
- Multicriterial Analysis of Factors Considering Intensity and Extent of Floods** 418  
*Alena Paulíková, Ondrej Železník*
- A Note on Time Series Data Analysis Using a Fractional Calculus Technique** 424  
*Marcela Pavlíčková, Ivo Petráš*
- Practical Aspects for Implementation of Fractional-Order Controllers** 428  
*Ivo Petráš*
- Dynamics of Pneumatic Muscle Actuator: Measurement and Modeling** 432  
*Ján Pitel, Mária Tóthová*
- Evaluation of Static Posturography via the Wii Balance Board** 437  
*Lucie Pivnickova, Viliam Dolinay, Vladimír Vasek*
- Automation of Measurement and Data Collection for Gas Filling Line** 442  
*Petr Podešva, David Fojtík, Jan Gebauer*
- Calibration of 2D Scanner with Nonlinearities** 446  
*Petr Podešva, David Fojtík*
- The System for Measuring Deformations During Welding** 450  
*Petr Podešva, David Fojtík*
- Recent Advances in Methods for Studying and Solving Partial Fractional Differential Equations** 454  
*Igor Podlubny, Tomas Skovranek, Bohdan Datsko*
- A Self Stabilizing Platform** 458  
*Vladimír Popelka*
- Autotuning for Delay Systems. An Algebraic Approach** 463  
*Roman Prokop, Jiří Korbek, Radek Matušů*
- Modelling and Effective Predictive Control of Gas Turbine Process** 469  
*Anton Pytel, Štefan Kozák*
- Evaluating User Reaction to User Interface Element Using Eye-Tracking Technology** 475  
*Michal Radecký, Pavel Smutný*
- Mojette Transform Implemented in LabVIEW** 481  
*Béla Rima, János Végh, József Vásárhelyi, Jan Turán*
- Composite Beam's Parameters Identification Based on Frequency Response** 485  
*Mateusz Romaszko, Jacek Snamina, Sebastian Pakuła*
- Switched System Robust Control: Pole-placement LMI Based Approach** 491  
*Danica Rosinová, Peter Valach*
- LMI Approximation of Pole-region for Discrete-time Linear Dynamic Systems** 497  
*Danica Rosinová, Ivan Holič*
- Simulation Model for Regular Operation of Section** 503  
*Michal Rusek, Filip Lorenz*

- Methodological Limitations of Modeling Languages BPMN and ARIS** 507  
*Václav Řepa, Ondrej Železník*
- Experiments of MR Fluid Behaviour in the Squeeze Mode Using the Vision Method** 513  
*Bogdan Sapiński, Wojciech Horak, Andrzej Sioma*
- Fault Detection Based on Linear Quadratic Control Performance in Nonlinear Systems** 517  
*Vladimír Serbák, Pavol Liščinský*
- Microcontroller Tracing in Hardware in the Loop Tests. Integrating Trace Port Measurement Capability into NI VeriStand** 522  
*Balázs Scherer, Gábor Horváth*
- Initial Conditions for a Recursive Constant and Variable Fractional-Order Derivative and Its Verification Based on Analog Model** 527  
*Dominik Sierociuk, Michal Macias*
- Optimal Control and Stabilization of the Observation-tracking Device Placed on a Deck of Unmanned Aerial Vehicle (UAV)** 533  
*Michal Sobolewski, Zbigniew Koruba*
- Experimental Performance Portrait Based Optimal Controller Tuning** 539  
*David Soós, Mikuláš Huba*
- Monitoring and Evidence of Cars in Private Objects** 545  
*Pavel Staša, Filip Beneš, Jiří Švub, Zdeněk Neustupa*
- The Analysis of Homing of Aerial Guided Bomb On the Ground Target By Means of Special Method of Control** 551  
*Konrad Stefański, Marta Grzyb, Łukasz Nocoń*
- Possibilities to Compare Vibration in Drilling Rocks** 557  
*Beáta Stehlíková, Patrik Flegner*
- Contributions to the Application of Popov and Circle Criterion for Stability Analysis** 562  
*Ivan Svarc*
- From Classical Transportation Problem to Crop Problems with Uncertainty** 566  
*Miloš Šeda*
- The Control Unit with Wireless Interfaces for CNC Model** 570  
*Jaromír Škuta*
- A Web Based Application Using Matlab Builder NE for The Analysis of Linear Systems** 574  
*Jolana Škutová*
- Simulation of Pipeline Transport Backfill Mixtures** 578  
*Marian Šofranko, Róbert Zeman*
- Programmable Logic Controllers and Transient Heat Models** 584  
*Ivo Špička, Milan Heger, Ondřej Zimný*
- Modelling and Simulation of an Active Damped Structure** 588  
*Pavel Šuránek, Miroslav Mahdal, Jiří Tůma*
- Comparing 2DOF PI and DO-FPI Controllers for the First-Order Plants** 592  
*Peter Ťapák, Mikuláš Huba*
- Availability Measurement of Experimental FSO System** 598  
*Matúš Tatarko, Ján Tóth, Ľuboš Ovseník, Ján Turán*
- Unmanned Aerial Vehicles Routing Problem** 602  
*Dušan Teichmann, Michal Dorda, Jakub Vítek, Vladimír Smrž, Vladimír Michalík*
- The Proposal of Web Service for Support of Specific Thermochemical Calculations** 608  
*Ján Terpák, Pavel Horovčák, Miloš Horváth, Monika Žecová*

- Real Time Control of a Fin Loading System** N/A  
*G. Serdar Tombul*
- Simulation of the Parametric Excitation of the Cantilever Beam Vibrations** 619  
*Jiří Tůma, Pavel Šuránek, Miroslav Mahdal, Marek Babiuch*
- A Laboratory Stand for Testing the ABS Unit Model** 625  
*Patrik Urban, Lenka Landryová*
- Modelling of the Anodizing Process of Aluminum Using Neural Networks** 629  
*Alena Vagaská, Peter Michal, Miroslav Gombár, Ján Kmec, Emil Spišák, Miroslav Badida*
- Long-run On-line Identification with Hybrid Regularized Exponential Forgetting Method** 635  
*Ján Vachálek, Michal Bartko, Ján Bizub*
- Mine Gas Monitoring Data Analysis** 641  
*Vančura V., Otte L., Danel R., Létavková D., Šeliga Z.*
- Control of a Heat Exchanger Using Takagi-Sugeno Fuzzy Model** 646  
*Anna Vasičkaninová, Monika Bakošová*
- Identification of Pneumatic Rotational Motor** 652  
*Miroslav Vavroušek*
- Sensor and Control Result** 656  
*Frantisek Vdolecek*
- Stable Model Predictive Controller Design** 660  
*Vojtech Veselý, Daniel Vozák*
- Dominance of Poles for Desired Model Method** 665  
*Miluse Viteckova, Antonin Vitecek*
- Neural Network Inference of Biomass Fuel Moisture During Combustion Process. Evaluating of Directly Unmeasurable Variables** 671  
*Stanislav Vrána, Bohumil Šulc*
- Adaptive Fuzzy Control of Thermal Comfort in Smart Houses** 675  
*Bogdan Walek, Michal Janošek, Jaroslav Žáček, Radim Farana*
- Magnetorheological Damper Control in an Energy–harvesting Vibration Reduction System** 679  
*Marcin Węgrzynowski*
- Electromechanical Transducers to Supply an Magnetorheological Rotary Damper: Laboratory Testing** 684  
*Marcin Węgrzynowski*
- Generating Trajectory for 5 DoF Serial Link CNC Machine with Kinematic Constraints** 689  
*Adam Wolniakowski, Piotr Koziol, Kanstanstin Miatliuk*
- Implementation of Multi-node Temperature Measurement System for Bee Colonies Online Monitoring** 695  
*Aleksejs Zacepins, Jurijs Meitalovs*
- Sensitivity Analysis of the MR Damper Model Parameters on the Vibration Transmissibility Characteristic** 699  
*Magdalena Zawartka*
- Programmable Control of Heating for Systems with Long Time Delays** 705  
*Jaroslav Žáček, Michal Janošek*
- The Modeling of Heat Conduction Using Integer-and Fractional-Order Derivatives** 710  
*Monika Žecová, Ján Terpák, Ľubomír Dorčák*