

SAUM 2014 CONFERENCE

**PROGRAM**

SESSIONS OVERVIEW

Wednesday, November 12, 2014		
<i>Time</i>	<i>Activities</i>	<i>Place</i>
10:00 – 11:00	Registration	
11:00 – 11:30	Opening Ceremony	Room 1
11:30 – 12:00	Plenary Session I	Room 1
12:00 – 13:00	Cocktail	
13:00 – 14:00	Plenary Session II	Room 1
14:00 – 14:15	Mitsubishi Presentation	Room 1
14:15 – 15:45	<b>Session A:</b> Measurements and Instrumentation I	Room 1
14:15 – 15:45	<b>Session B:</b> Robotics	Room 2
14:15 – 15:45	<b>Session C:</b> System Identification and Modeling I	Room 3
16:00 – 19:00	<b>IPA Adria-Hub Workshop</b>	Room 1
16:00 – 17:30	<b>Session D:</b> Information and Communication Technologies I	Room 2
16:00 – 17:30	<b>Session E:</b> Industrial and Process Control I	Room 3
20:00	Conference Dinner	

Thursday, November 13, 2014		
<i>Time</i>	<i>Activities</i>	<i>Place</i>
10:00 – 11:30	<b>Session F:</b> Nonlinear Systems	Room 1
10:00 – 11:30	<b>Session G:</b> Intelligent control	Room 2
10:00 – 11:30	<b>Session H:</b> Mechatronics and Robotics	Room 3
10:00 – 18:00	<b>NORBAS Workshop</b>	Room 4
12:15 – 12:30	Presentation of Tempus Project NeReLa	Room 2
12:30 – 13:00	Plenary Session III	Room 1
14:00 – 15:30	<b>Session I:</b> System Identification and Modeling II	Room 1
14:00 – 15:30	<b>Session J:</b> Measurements and Instrumentation II	Room 2
15:45 – 17:15	<b>Session K:</b> Industrial and Process Control II	Room 1
15:45 – 17:15	<b>Session L:</b> Information and Communication Technologies II	Room 2

Friday, November 14, 2014		
<i>Time</i>	<i>Activities</i>	<i>Place</i>
10:00 – 11:30	<b>Session M:</b> System Identification and Modeling III	Room 1
10:00 – 11:30	<b>Session N:</b> Telecommunications	Room 2
10:00 – 11:30	<b>Session O:</b> Hydraulic systems	Room 4
12:00 – 13:00	<b>Session P:</b> Applied Mathematics	Room 1
12:00 – 13:00	<b>Session R:</b> Management and Control	Room 2
13:00	Closing Ceremony	Room 1

# CONTENTS

## PLENARY SESSION I

Invited paper
L. Zentner, M. Issa, S. Hügl, S. Griebel, T. S. Rau, O. Majdani
<b>Compliant Mechanism with Hydraulic Activation Used for Implants and Medical Instruments</b>

## PLENARY SESSION II

Invited paper
M. W. Zehn, D. Marinković
<b>Fast and Highly Efficient Formalisms for Structural Dynamics Simulations</b>
Invited paper
L. Dimitrov, S. Spasov
<b>Waste Elimination in Manufacturing. Human factor</b>

## PLENARY SESSION III

Invited paper
K. Kostadinov
<b>Hydro-MiNTS Approach for Development of Integrated Microrobotic System for Innovative Micro &amp; Nano Biomedical Applications</b>

## Session A: MEASUREMENTS AND INSTRUMENTATION I

*Chairperson: D. Denić*

Session A	A1 • Regular paper
N. Stoimenov, D. Karastoyanov, A. Vukov, T. Neshkov, L. Klochkov, S. Gyoshev	
<b>Thermographic Study of Rolls on Roller Batteries</b>	
Session A	A2 • Regular paper
J. Djordjević-Kozarov, D. Mitić, V. Vujičić, P. Sovilj, D. Radenković	
<b>Digital Stochastic Measurement of EOG Signal with Various ADC Sampling Frequencies: a Comparative Review</b>	
Session A	A3 • Regular paper
D. B. Jovanović	
<b>Reconstruction of Isodyne or Airy Stress Surfaces Based on Experimental Data</b>	
Session A	A4 • Regular paper
D. B. Jovanović	
<b>Electronic Techniques in Experimental Optical Stress Analysis</b>	
Session A	A5 • Regular paper
M. N. Todorović, D. S. Živković, M. V. Mančić	
<b>Measurement Analysis that Defines the Hot-Water Boiler Burner Operation</b>	

## **Session B: ROBOTICS**

*Chairperson: G. S. Djordjević*

Session B	B1 • Regular paper
M. Kyrarini, S. Slavnić, D. Ristić-Durrant <b>Control of the Mobile Platform of the CORBYS Mobile Robotic Gait Rehabilitation System</b>	
Session B	B2 • Regular paper
A. Leu, D. Ristić-Durrant, A. Gräser <b>CORBYS Cognitive Control Architecture for Supporting the Integration of Large Scale Robotics Research Projects</b>	
Session B	B3 • Regular paper
A. Badii, A. Khan, R. Raval, A. Jaidi, N. Viswanathan <b>A Modular Situation Assessment Architecture for Cognitive Robot Control through Multi-Modal Sensing of Dynamic Environments</b>	
Session B	B4 • Regular paper
N. Nedić, V. Stojanović, D. Pršić, Lj. Dubonjić <b>Intelligent Cascade Control of Hydraulically Driven Parallel Robot Platform</b>	
Session B	B5 • Regular paper
D. Petković, N. D. Pavlović <b>Sensitivity Analysis of Compliant Robotic Finger Joints by Adaptive Neuro Fuzzy Methodology</b>	

## **Session C: SYSTEM IDENTIFICATION AND MODELING I**

*Chairperson: B. Danković*

Session C	C1 • Regular paper
M. V. Mančić, D. S. Živković, M. N. Todorović, M. S. Jovanović <b>Mathematical Models for Evaluating Evaporation Rates from Free Water Surface of Indoor Swimming Pools</b>	
Session C	C2 • Regular paper
M. Petkovski, B. Gegov, C. Mitrovski <b>On the Implementation of Photovoltaic Module Model to Ni sbRIO Platform For Hardware in the Loop Simulations Purposes</b>	
Session C	C3 • Regular paper
P. Janković, V. Blagojević <b>The Influence of Process Parameters in the Modeling of Abrasive Water Jet Cutting</b>	
Session C	C4 • Regular paper
S. S. Randjelović, S. D. Nikolić, M. M. Milutinović <b>Cooling System Modeling for Injection Thermoplastic in Nonsymmetry Tool</b>	
Session C	C5 • Regular paper
V. S. Đorđević, V. Ž. Filipović <b>Practical Consideration for Identification of Decentralised Control Systems</b>	
Session C	C6 • Regular paper
M. Novaković, D. Šešlija, S. Čajetinac <b>Modeling and Simulation of a Pneumatic Pressure Amplifier</b>	

## **Session D: INFORMATION AND COMMUNICATION TECHNOLOGIES I**

*Chairperson: Z. Nikolić*

Session D	D1 • Regular paper
A. S. Milinković, S. A. Milinković <b>Interoperability of Wireless Sensor Networks Part One: An Overview of Protocol Standards and Specifications</b>	
Session D	D2 • Regular paper
A. S. Milinković, S. A. Milinković <b>Interoperability of Wireless Sensor Networks Part Two: Middleware, Application Gateways and Unified API</b>	
Session D	D3 • Regular paper
Z. Perić, B. Denić, L. Velimirović <b>Construction of Three-Level Scalar Quantizer with Extended Huffman Coding for Gaussian Source</b>	
Session D	D4 • Regular paper
Z. Perić, N. Milošević, A. Jovanović, Z. Nikolić <b>Design of Piecewise Uniform PAM Constellation</b>	
Session D	D5 • Regular paper
D. R. Vuković <b>Security Issues of Passive RFID Tags Used in Internet of Things (IoT)</b>	
Session D	D6 • Regular paper
B. Djordjević, B. Andjelković <b>Digital Image Parameter Enhancement with Homomorphic Filtering</b>	

## **Session E: INDUSTRIAL AND PROCESS CONTROL I**

*Chairperson: V. Nikolić*

Session E	E1 • Regular paper
P. M. Milosavljević, M. N. Todorović, D. Lj. Pavlović <b>Automatic Control System Application in Water Treatment Process</b>	
Session E	E2 • Regular paper
M. Madić, M. Radovanović, V. Blagojević, M. Kovačević <b>Off-Line Control of CO<sub>2</sub> Laser Cutting Process using Software Prototype</b>	
Session E	E3 • Regular paper
D. S. Jovanović, S. V. Jovanović, M. S. Jovanović, S. J. Đukić <b>Implementation of PIC Controller in Air Purifying Systems</b>	
Session E	E4 • Regular paper
Z. Ičić, S. Stankov, N. Danković, D. Mitić, S. Arsić <b>The Control System of Electric Hot Water Boilers</b>	

### **Session F: NONLINEAR SYSTEMS**

*Chairperson: N. D. Pavlović*

Session F	F1 • Regular paper
V.A. Nguyen, M. Zehn, D. Marinković <b>Efficient Integration of Non-linear Material Behaviour in a Co-rotational Finite Element Formulation</b>	
Session F	F2 • Regular paper
V. Pshikhopov, A. Kulchenko, M. Medvedev, V. Kostukov, V. Chufistov <b>Simulation of Single-Rotor Helicopter Flight Along Complex Paths</b>	
Session F	F3 • Regular paper
B. Veselić <b>Optimal Integral Sliding Manifold for Linear Systems Subjected to a Class of Unmatched Disturbances</b>	
Session F	F4 • Regular paper
V. A. Blagojević, P. L.J. Janković, S. Randelović <b>Application of Digital Sliding Modes to Synchronization of the Work of Two Hydraulic Cylinders</b>	
Session F	F5 • Regular paper
M. M. Stojiljković, V. A. Blagojević <b>Application of Digital Sliding Modes to Control of Semi-Rotary Pneumatic Drives Utilizing Load Torque and By-Pass Valve</b>	
Session F	F6 • Regular paper
M. Almawlawe, D. Mitić, M. Milojković, D. Antić, Z. Ičić <b>Quasi-Sliding Mode Based Generalized Minimum Variance Control of DC-DC Boost Converter</b>	

### **Session G: INTELLIGENT CONTROL**

*Chairperson: Ž. Čojbašić*

Session G	G1 • Regular paper
T. P. Titova, V. G. Nachev, Ch. Iv. Damyanov <b>Determining Food Quality Based on Their Colors Characteristics</b>	
Session G	G2 • Regular paper
V. G. Nachev, T. P. Titova, Ch. Iv. Damyanov <b>Instrumental Information Fusion in Expert Systems for Food Classification</b>	
Session G	G3 • Regular paper
M. Milovanović, D. Antić, S. Perić, S. S. Nikolić, M. Milojković, N. Danković <b>Artificial Approach for Achieving Two Position Levitation Motion of Magnetic Levitation System</b>	
Session G	G4 • Regular paper
S. S. Nikolić, D. Trajković, D. Antić, V. Nikolić, S. Perić, M. Milovanović <b>Fuzzy Control Applied on the Three Parallel Pumps Modelled by Bond Graphs</b>	

## **Session H: MECHATRONICS AND ROBOTICS II**

***Chairperson: N. T. Pavlović***

Session H	H1 • Regular paper
M. Božić, M. Božić, M. Petković, V. Sibinović, D. Todorović, G. S. Đorđević <b>Instrumentation Treadmill for Study of WHEG's Dynamics</b>	
Session H	H2 • Regular paper
V. Ivanov <b>Development of a Statistical Model to Describe the Dynamic Behavior of Timing Belt Drives</b>	
Session H	H3 • Regular paper
D. Marinković, P. Milić, Z. Marinković <b>Active Vibration Suppression of a Tower Crane Truss Structure</b>	
Session H	H4 • Regular paper
M. Y. Stoychitch <b>Design and Implementation of a Digital Control System for Tracking a Trajectory with Controlled Jerk</b>	
Session H	H5 • Regular paper
E. Petrović, P. Rajković, V. Nikolić <b>Particle Swarm Optimization for Computation the Shortest Distance Between Two Objects</b>	

## **Session I: SYSTEM IDENTIFICATION AND MODELING II**

***Chairperson: M. Milojković***

Session I	I1 • Regular paper
P. M. Milosavljević, D. Lj. Pavlović, M. N. Todorović <b>Comparative Review of CFD Software Packages</b>	
Session I	I2 • Regular paper
I. Babić, S. Tešanović, P. Mandić, M. R. Ristanović, D. V. Lazić <b>Discrete Modeling and Control of Winter Regime of an Air Conditioning System</b>	
Session I	I3 • Regular paper
M. V. Mrvić, M. M. Potrebić, D. V. Tošić, Z. Ž. Cvetković <b>E-Plane Microwave Resonator for Realization of Waveguide Filters</b>	
Session I	I4 • Regular paper
P. M. Živković, M. A. Tomić, I. T. Ćirić <b>Wind Energy in Southeast Serbia</b>	
Session I	I5 • Regular paper
M. Tomić, M. Milošević, V. Pavlović, A. Milojević, G. S. Đorđević <b>Control of the Ball and Plate System in Virtual Environment</b>	
Session I	I6 • Regular paper
G. Georgiev <b>Comparative Analysis of Sanitary Clamps with One Screw Innovative Patented Product – Easyclick</b>	
Session I	I7 • Regular paper
M. Radić, Z. Stajić, N. Floranović <b>Effects of Grid Voltage Variations on Wind Turbine's Optimal CVT Ratio</b>	

## **Session J: MEASUREMENTS AND INSTRUMENTATION II**

***Chairperson: D. Radenković***

Session J	J1 • Regular paper
M. Arsić, M. Jovanović, V. Tomić, D. Marković, G. Radoičić <b>Calibration of the New Technical Solution for Contact Measurement of the Rotation Speed</b>	
Session J	J2 • Regular paper
J. Lukić, D. Živanović, D. Denić <b>Linearization Method for Angular Position Sensors</b>	
Session J	J3 • Regular paper
M. Jovanović, G. Radoičić, I. Savić <b>Experimental Identification of Dynamic Parameters of Special Vehicle Superstructure</b>	
Session J	J4 • Regular paper
D. B. Denić, A.V. Jocić, J. R. Lukić, G. S. Miljković, M. R. Dinčić, M. Z. Arsić <b>Method for Checking the Correctness of the Pseudorandom Position Encoder Disc</b>	
Session J	J5 • Regular paper
J. Manojlović, D. Lazarević, P. Janković, A. Lazarević <b>Force Transducers - Division and Practical (Industrial) Solutions</b>	
Session J	J6 • Regular paper
N. Ivković, D. Stamenković <b>Design of Reference Magnets for Testing Magnetic Sensors</b>	

## **Session K: INDUSTRIAL AND PROCESS CONTROL II**

***Chairperson: N. Nedić***

Session K	K1 • Regular paper
S. Čajetinac, D. Šešlija, M. Novaković <b>Compressed Air Saving Using the Pneumatic Spring and PWM Control</b>	
Session K	K2 • Regular paper
T. Neshkov, A. Bocevaska <b>Role of Sensors in Intelligent Manufacturing Systems</b>	
Session K	K3 • Regular paper
S. Lj. Prodanović, N. N. Nedić, V. S. Brašić <b>Some Considerations of Mutual Coupling in Multivariable Processes</b>	
Session K	K4 • Regular paper
N. Radenković <b>Automotive Control Unit Adaptation for Calibration Purposes</b>	

## **Session L: INFORMATION AND COMMUNICATION TECHNOLOGIES II**

*Chairperson: Z. Perić*

Session L	L1 • Regular paper
D. Maksović, D. Rančić, B. Predić <b>Combination of LOD techniques for presentation of vegetation in video games</b>	
Session L	L2 • Regular paper
T. K. Vasileva, S. A. Stefanova <b>Integration between Technical University and Technological School</b>	
Session L	L3 • Regular paper
P. J. Rajković, D. S. Janković, A. M. Milenković <b>Improved Code Generation Tool for Faster Information System Development</b>	
Session L	L4 • Regular paper
D. Rančić, J. Achkoski, V. Trajkovik, D. Ananieva, U. Siart <b>Service – Oriented Architecture Model for Smart Field Artillery Information System in Military Environment</b>	
Session L	L5 • Regular paper
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## **Session M: SYSTEM IDENTIFICATION AND MODELING III**

*Chairperson: G. Ilić*

Session M	M1 • Regular paper
I. Pavlović, I. Ćirić, R. Pavlović, V. Nikolić <b>Neural Network Application in Numerical Results for Dynamic Stability Analysis of Viscoelastic Double Beam System</b>	
Session M	M2 • Regular paper
V. Ž. Filipović, V. S. Đorđević <b>Recursive Estimation of the Takagi-Sugeno Models II: Estimation of Hammerstein Models</b>	
Session M	M3 • Regular paper
M. LJ. Milić, D. P. Milovanović <b>A Spice-Based Method for Determining AC Characteristics of Black-Box SC Filter Systems Using Time-Domain Analysis Data</b>	
Session M	M4 • Regular paper
S. B. Stojanović, D. LJ. Debeljković, D. S. Antić <b>Robust Finite-Time Stability of Uncertain Singular Time Delay Systems</b>	
Session M	M5 • Regular paper
S. B. Stojanović, D. LJ. Debeljković, D. S. Antić <b>New Finite-Time Stability Criteria for Discrete Time Singular Systems with Time-Delay</b>	
Session M	M6 • Regular paper
Z. Ž. Cvetković, M. M. Potrebić <b>Stability Analysis of Plan-Parallel Systems for Uniform Electrostatic Field Generation</b>	
Session M	M7 • Regular paper
B. Andjelković, B. Djordjević, N. Jovanović <b>About Methods for Stress Concentration Factor Prediction in Welded Joints</b>	



## **Session N: TELECOMMUNICATIONS**

*Chairperson: A. Jovanović*

Session N	N1 • Regular paper
Z. Perić, M. Tančić, A. Jocić, B. Došović <b>The Analysis Support Region Influence on Performance of Differential Pulse Code Modulation System with Quasi-logarithmic Quantizer</b>	
Session N	N2 • Regular paper
B. P. Stošić, D. N. Milić, V. D. Pavlović <b>New CIC Filter Functions: Design and Comparison with Classical CIC Filters</b>	
Session N	N3 • Regular paper
M. Petković, G. T. Djordjević <b>Outage Performance of SSC Receiver in FSO System with Gamma-Gamma Atmospheric Turbulence</b>	
Session N	N4 • Regular paper
N. Simić, M. Veljković, D. Milović <b>First-Order Statistics Analysis of SC Macrodiversity over Gama Shadowed Nakagami-m Fading Channels</b>	

## **Session O: HYDRAULIC SYSTEMS**

*Chairperson: M. M. Stojiljković*

Session O	O1 • Regular paper
D. Janošević, I. Savić, V. Jovanović, J. Pavlović <b>Regulation for Hydrostatic Transmission of Machines and Vehicles</b>	
Session O	O2 • Regular paper
J. Pavlović, D. Janošević, V. Jovanović, I. Savić <b>Motion Regulation of the Wheel Loaders</b>	
Session O	O3 • Regular paper
V. Jovanović, D. Janošević, J. Pavlović, N. Petrović <b>Control of Slewing Platform Drive of Mobile Machines</b>	
Session O	O4 • Regular paper
J. D. Nikodijević, Ž. M. Stamenković, M. M. Kocić, M. D. Nikodijević <b>Control of Flow and Heat Transfer Using Suction, Magnetic and Electric Fields</b>	
Session O	O5 • Regular paper
B. Bogdanović, D. Milenković, J. Bogdanović-Jovanović, Ž. M. Stamenković <b>Optimization of Axial Pico Hydro Turbine</b>	

### **Session P: APPLIED MATHEMATICS**

***Chairperson: S. S. Nikolić***

Session P	P1 • Regular paper
D. Lj. Petković, M. J. Madić, G. M. Radenković <b>Material Selection for Micro-Electromechanical Systems Using MADM Approach</b>	
Session P	P2 • Regular paper
P. M. Rajković, M. S. Stanković, S. D. Marinković <b>Polynomials of Mittag-Leffler Type with an Additional Parameter</b>	
Session P	P3 • Regular paper
Lj. D. Petković <b>On Multipoint Methods of Jarrat's Type for Solving Nonlinear Equations and Systems of Nonlinear Equations</b>	

### **Session R: MANAGEMENT AND CONTROL**

***Chairperson: V. A. Blagojević***

Session R	R1 • Regular paper
I. D. Radojković, P. M. Milosavljević <b>Methodological Framework for Risk Management in Automobile Insurance on the Territory of the Town of Nis</b>	
Session R	R2 • Regular paper
N. V. Floranović, M. Radić, Z. P. Stajić <b>Smart Metering and Power Loggers as Key Element of Effective Energy Efficiency Improvement</b>	
Session R	R3 • Regular paper
D. M. Mitrović, B. D. Blagojević, B. V. Stojanović, J. N. Janevski, M. G. Ignjatović, M. M. Stojiljković <b>Application of Remote Control and Data Acquisition in District Heating System</b>	

## IPA ADRIA-HUB WORKSHOP

*Workshop Chairperson: M. Milojković*

16:00 – 16:15	M. Milojković, <b>Opening Presentation</b>
16:15 – 18:30	Invited Lecture K. Krsmanović <b>Industrial Design and Digital Fabrication</b>
18:30 – 18:45	Regular paper M. Milojković, M. Milovanović, D. Mitić, S. Perić, M. Spasić, S. Nikolić <b>Improving Woodworking Industry Through Implementation of IPA Project ADRIA HUB</b>
18:45 – 19:00	Regular paper N. Nedić, Lj. Lukić, D. Pršić, Lj. Dubonjić, V. Brašić <b>Automatic Machines with Multiple Axes Wood Processing in Small and Medium Enterprises</b>

## NORBAS WORKSHOP

*Workshop Chairpersons: T. R. Jørgensen, G. T. Djordjević, M. Ljubičić*

10:00 – 11:00	T. R. Jørgensen, <b>Dialogue on innovation and cooperation</b>
11:00 – 11:30	<b>Presentation of industrial companies</b> M. Blagojević, <b>Sentronis</b>
11:30 – 12:30	Invited Lecture (together with other SAUM participants) T. R. Jørgensen <b>Ways to Enhance Innovation</b>
12:30 – 13:30	Lunch
13:30 – 14:30	<b>Presentation of industrial companies</b> Z. Stajić, <b>Alfatec</b> M. Gocić, <b>Photon Optronics</b>
14:30 – 15:30	<b>Presentation of laboratory exercises and students works</b> G. T. Djordjević, D. Milić, N. Milošević, M. Milojković, S. Nikolić, students
15:30 – 15:45	Coffee Break
15:45 – 17:15	<b>Presentation of scientific cooperation within NORBAS</b> D. Vuković, WEB Services M. Velotić, Digital Signal Processing N. Zdravković, Telecommunications M. Spasić, Control Systems
17:15 – 17:45	M. Ljubičić, <b>How to Achieve University-Industry Cooperation</b> (in the Balkans)
17:45 – 18:15	Final Discussion moderated by Tore Jørgensen