JOHN ATANASOFF SOCIETY OF AUTOMATICS AND INFORMATICS

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Organized by

STATE AGENCY FOR INFORMATION TECHNOLOGY AND COMMUNICATIONS OF REPUBLIC BULGARIA

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TECHNICAL UNIVERSITY - SOFIA, DEP. COMPUTER SYSTEMS

VARNA FREE UNIVERSITY “CHERNORIZETZ HRABAR”
14.00 – 20.00  SCHOOL FOR YOUNG SCIENTISTS
“INNOVATIONS AND BUSINESS PROCESS MANAGEMENT”
Place: Hall 3
Chairman: P. Ruskov

Petko Ruskov
Business Process Management Innovation
Rumen Draganov
Innovation Process in the Field of Market Communication and Marketing in Tourism
Andrey Bachvarov
Software Management and Optimization of Supply Chains
Andrey Ruskov, Kancho Ivanov
Business Process Application in IT Education
Irena Pavlova
Innovative Processes for Business Software Development
Sia Tsolova
Business Processes at Information System in Education
Rositsa Toncheva, Snejina Lazarova
Business Pattern for Students Company Based on Learning by Doing Methodology
Milka Semova
What Factors Make Enterprise-Clusters Successful? A Comparison Between Timber and Furniture Cluster in Upper Austria and Rhodopi Furniture Association in Velingrad, Bulgaria
Georgi Kadrev
Imagga - Internet Platform Based on Visual Image Similarity
Ognyan Chipev
Business Process Optimization
Ts. Kovacheva
Optimizing Formalized Processes for Software Development by Adapting the Practices of Agile Methodologies
K. Kraichev
Program Code Transformation Innovation Approach
H. Haralambiev, A. N. Zhelyazkov
Modern Approaches in Source Code Pattern Recognition and Automatic Generation of Testing Data Sets
Thursday, October 1st
National House of Science and Technique
Sofia, 108 Rakovski Str.

8.30 – 16.00 Conference Registration

10.00 – 10.30 WELCOME AND OPENING CEREMONY
   Place: Hall 4

10.30 – 12.30 PLENARY SESSION
   Place: Hall 4
   Chairman: I. Popev

Y. Popkov
Multiplicative Methods for Solving Entropy-Linear Programs and their Applications
L. J. M. Rothkrantz
Visual Speech
M. Hadjiski, V. Andreev
Practice and Challenges of Process Control

14.00 – 15.30 SESSION “AN AUSPICIOUS BEGINNING”
   Place: Hall 1
   Chairman: P. Kenderov
   Secretary: P. Koprinkova - Hristova

G. Atanasov, M. Stancheva, Z. Dzhenkova
Notes and Keyboard
A. Angelov, P. Nedelchev, B. Borisov
Educational Application “Maniche”
K. Velcheva, V. Velcheva, St. Stanev
Virtual Model of Main Frame Computer ES 1020B from Computer Museum of Mathematics and Informatics Faculty in Shumen University
K. Srebrev
Photobox

15.30 – 16.00 Coffee break
16.00 – 17.30 SESSION “CONTROL THEORY”
   Place: Hall 1
   Chairman: P. Petkov
   Secretary: E. Garipov

K. Perev
H∞ Control for Plants with Pure Time Delay

E. Nikolov, N. Nikolova
Robust Stability Margin and Robust Performance Margin

A. Yonchev
Perturbation Analysis of the Lyapunov Descriptor Matrix Inequalities

N. Atanasov
Recursive Calculation of RIV-Estimates by Identification for Pole Placement

S. Stanchev
A Method for Design of Adaptive Stabilizers for Rebuilding its Stability to Sliding Type

E. Marinov, Zh. Zhekov
Adaptive Sensorless Control of AC Drive

14.00 – 15.30 Symposium ROBOTICS AND AUTOMATION
   Place: Hall 2
   Chairman: V. Zamanov
   Secretary: P. Avramov

P. Venkov
SLAM of Indoor Environment by a Mobile Robot

M. Mladenov, M. Mustafa
Rescuer Technology for Mobile Robot Localization

P. Avramov, V. Zamanov
Application of MEMS Inertial Sensors in Control of Manipulation Robots

T. Boiadjiev, G. Boiadjiev, K. Zagurski, V. Vitkov, K. Delchev
Robotized System for Bone Drilling in Surgery: Technical Data and Functional Abilities

G. Todorov, K. Kamberov, V. Pejkov
Possibilities for Controlled Resonance Application in Impact Mechanisms of Demolition and Rotary Hammers – Part I

G. Todorov, K. Kamberov, V. Pejkov
Possibilities for Controlled Resonance Application in Impact Mechanisms of Demolition and Rotary Hammers – Part II

15.30 – 16.00 Coffee break
Thursday, October 1st
National House of Science and Technique
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16.00 – 17.30 Symposium ROBOTICS AND AUTOMATION
   Place: Hall 2
   Chairman: D. Karastoyanov
   Secretary: R. Krasteva

D. Karastoyanov, T. Penchev
New Methods for Renovating of Shafts for Folio Extrusion

I. Altaparmakov, D. Karastoyanov
MOAST – Mobility Open Architecture Simulation and Tools

R. Krasteva, D. Buchvarov, V. Georchev, A. Boneva, Y. Doshev
Connecting Wireless Sensor Networks to the Internet Using 6LoWPAN Implementation

T. Penchev, D. Karastoyanov
High Speed Hammer with Rocket Engine. “Combined Hit” Effect

T. Penchev, P. Bodurov, D. Karastoyanov
Rebound Force Calculation in the Case of Hot Forging by Rocket Engine Proppeled Hammer

Plenary Discussion

14.00 – 15.30 Symposium BUSINESS DECISIONS
   Place: Hall 3
   Chairman: T. Stoilov
   Secretary: N. Nikolova

I. Radeva, T. Atanasova, T. Naneva
Fuzzy Estimation of Investment Preferences within Horizontal Integration

N. D. Nikolova, D. Toneva, K. Tenekedjie
Using Ribbon Risk Analysis to Quantify the Uncertainty in a Price Selection Problem

A. Antonov, V. Nikolov
Decision Making System for Clustering of Spread Curves

15.30 – 16.00 Coffee break
Thursday, October 1st  
National House of Science and Technique  
Sofia, 108 Rakovski Str.

16.00 – 17.30 Symposium BUSINESS DECISIONS  
Place: Hall 3  
Chairman: T. Stoilov  
Secretary: N. Nikolova

T. Stoilov, K. Stoilova  
**Analytical Solution of Portfolio BI-Level Problem**

L. Sotirov, S. Sotirova  
**One Analytical Solution to General Second Problem of Markowitz for Portfolio Selection Under Risk**

B. Stoyanov, A. Antonov  
**Decision Making when Estimating Credit Risk**

G. Mengov  
**Levels of Decision Analysis**

17.30 – 18.30 Discussion AUTOMATICS AND INFORMATICS – RESEARCH AND BUSINESS  
Place: Hall 3  
Chairman: B. Vanev

14.00 – 15.30 Session APPLIED ONTOLOGIES  
Place: Hall 105A  
Chairman: M. Hadjiski  
Secretary: N. Christova

G. Angelova  
**Challenges to the Semantic Systems**

M. Hadjiski, V. Boishina  
**Robust Multi-Agent Ontological System for Uncertainty Handing for SITO Plant Control**

S. Koynov  
**Applications of Functional Ontologies in Power-Unit Diagnostics**

N. Christova, S. Koynov  
**Modeling the Information Structure of Organizations Based on Functional Ontologies**

N. Christova, Ts. Yanakieva  
**Ontology-Based Approach in Business Organization Modeling**

V. Terzieva, N. Trojanova, R. Andreev  
**Collaboration in e-Learning Systems**

15.30 – 16.00 Coffee break
Thursday, October 1st  
National House of Science and Technique  
Sofia, 108 Rakovski Str.

16.00 – 17.30 Session ARTIFICIAL INTELLIGENCE  
Place: Hall 105A  
Chairman: L. Dakovski  
Secretary: D. Petrov

S. Arsov, E. Arsova  
Experimental Investigation of Modeling Formalism Entity-Relationship-Attributes  
Effectiveness

D. Budakova, M. Ilieva, L. Dakovski, O. Obretenov, V. Georgiev  
Program System for Deriving and Accumulating Knowledge

E. Gegov, B. Vachova  
Logical Method for Creation of Knowledge Base Using Experts Investigation

G. Pavlov  
Fine-Grained Access Control on Shared Knowledge

D. Petrov, M. Petrov  
Application of the Wavelet Naxima in the S-problem of Signals with Isolated Periculiarities

Friday, October 2nd  
National House of Science and Technique  
Sofia, 108 Rakovski Str.

9.30 – 11.00 PLENARY SESSION  
Place: Hall 3  
Chairman: M. Hadjiski

G. Osipov  
Controllable Intelligent Dynamic Systems

E. Nikolov  
Computer Nanoviruses

11.00 – 11.30 Coffee break
Friday, October 2nd
National House of Science and Technique
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11.30 – 13.00 SESSION
“MODELING AND CONTROL OF BIOTECHNOLOGICAL PROCESSES”
Place: Hall 1
Chairmen: S. Tzonkov, I. Simeonov
Secretary: T. Ilkova

S. Popova, M. Angelov, G. Kostov, P. Koprinkova-Hristova
Hybrid Modelling of Yogurt Starter Culture Batch Fermentation

B. Kalchev, S. Popova, I. Simeonov
Comparative Study of Two Kalman-based Estimators for a Simple Anaerobic Digestion Model

T. Ilkova, M. Petrov
Model Predictive Control of Whey Fermentation by Strain Kluyveromyces marxianus var.lactis MC5

Y. Pavlov
Control and Stabilization of Cultivation Processes: Peculiarities and Solutions

M. Angelova, T. Pencheva
Application of Linear Digital Filters to Fermentation Processes Modelling

14.00 – 15.30 SESSION “OPTIMIZATION METHODS AND SYSTEMS”
Place: Hall 1
Chairman: I. Popchev
Secretary: G. Ilieva

K. Penev
Adaptive Intelligence – Essential Aspects

G. Ilieva
Bidding Strategy Selection Using a Fuzzy Multicriteria Algorithm

E. Vandeva, M. Vassileva
GA-Based Multiobjective Optimization Techniques

A. Hossain, G. Gatev
A Method and Algorithm for Solving Interval Maximum Expected Flow Problem

I. Mustakerov, D. Borissova
LINDO API Using for Development of Customized Applied Optimization Software

A. Penzov, L. S-Kalos, I. Dimov, L. Szücsi, V. Koylazov, N. Mitev, G. Sirakova
Generalized Discrepancy of Points Distributed on Hemisphere by Uniform Separation Techniques
Friday, October 2nd  
National House of Science and Technique  
Sofia, 108 Rakovski Str.

11.30 – 13.00 SESSION “NETWORKS. INTERNET”  
Place: Hall 2  
Chairman: T. Stoilov  
Secretary: E. Trichkova

Zl. Ilcheva, V. Ilchev  
**Watermarking for Digital Multimedia Authentication**  
D. Pilev, A. Georgieva

N. Stoyanov, P. Demirov, V. Alexandrova

Architecture of Risk Assessment and Analysis System for Information Security in C4I Systems  
E. Ivanova

Application of LDAP Protocol for Authenticating Users in a Proxy Service for Protection  
A. Milev

A Simulation Model of Optical CDMA System Using EDW Codes  
E. Gospodinova

Simulation Modeling of Self-similar Network Traffic with Marginal Probability Distribution  
E. Trichkova

Modelling and Execution of Business Processes in VISP

14.00 – 15.30 Symposium “MONITORING AND CONTROL OF ECOLOGICAL PLANTS AND SYSTEMS”  
Place: Hall 2  
Chairman: K. Boshnakov  
Secretary: A. Grancharova

K. Boshnakov

Control Strategies for Wastewater Treatment Systems  
M. Hadjiiski, K. Boshnakov

Nonlinear Model Based Predictive Control of Wastewater Treatment Plant Incorporating Logical Rules  
I. Baruch, C.-R. M.-Gaspar, J. B.-Cortes, B. Nenkova

Recurrent Neural Identification and Control of an Unknown Hydrocarbon Biodegradation Bioprocess  
A. Grancharova, D. Nedialkov, J. Kocijan, H. Hristova, A. Krastev

Application of Gaussian Processes to the Prediction of Ozone Concentration in the Air of Bourgas  
D. Nedialkov, A. Grancharova, H. Hristova, A. Krastev

Linear Regression Models for Prediction of Ozone Concentration in the Air of Bourgas

15.30 – 16.00 Coffee break
16.00 – 17.00 Symposium “MONITORING AND CONTROL OF ECOLOGICAL PLANTS AND SYSTEMS”

Place: Hall 2
Chairman: K. Boshnakov
Secretary: A. Grancharova

M. Todorova, K. Boshnakov
Diagnostic System for Abnormal Phenomena in Wastewater Treatment
P. Daskalov

Dynamic Temperature-Humidity Microclimate Processes Identification in Pig Building
N. Deliiski, L. Dzurenda, S. Sokolovski, R. Tumbarkov

Mathematical Description of the Equilibrium Moisture Content of the Wood
N. Deliiski

Computation and 2-& 3D Visualization of Nonstationary Temperature Fields in the Wood

11.30 – 13.00 SESSION “DIAGNOSTICS”

Place: Hall 3
Chairman: H. Hristov
Secretary: E. Djambazova

R. Ivanov
Algorithm for Color Recognition, Adapted for Platforms with Limited Resources
H. Hristov, G. Popov

Modeling Diversity as Fault-Tolerance Tool
E. Djambazova

Node Reliability of a Fault-Tolerant Distributed Process Control System-Simulation Results
P. Radoyska, B. Todorov

Simulation Based VLSI Test and Diagnostics Distributed Learning
V. Tselkov, N. Stoyanov

Interaction Modeling Between Users in General Model for Access Control
G. Krastev, Tz. Georgiev, B. Hristov, H. Avakian

Mobile Research Laboratory
S. Ossikovska

Physical Modeling for Assessment of Reliability of Devices and Systems
Friday, October 2nd
National House of Science and Technique
Sofia, 108 Rakovski Str.

14.00 – 15.30 Session “COMPUTER SYSTEMS”
Place: Hall 3
Chairman: P. Borovska
Secretary: G. Vragov

V. Lazarov, Z. Zlatev, Ph. Philipov, M. Ivanova
Analytic Evaluation of Heterogeneous Shared-memory Multiprocessors
K. Dimitrov, K. Kanev, S. Kimura
Product Recommendations in Mobile Environments
N. Landzhev, P. Borovska, M. Lazarova
Exploring the Potential of GPU Processors for Fluid Simulations
A. Milev, S. Vasileva
Modeling of Two-version Algorithms for Two-phase Locking in Distributed Databases
I. Atanassov
An Approach for File System Free Space Management
G. Vragov
Archive of Medicine Files in Medical Centres

11.30 – 13.00 First International Mini-Symposium “INDUSTRIAL INFORMATICS”
Place: Hall 105A
Chairman: K. Velev
Secretary: I. Batchkova

I. Batchkova, I. Antonova, D. Gocheva, K. Velev
UML Based Reference Architecture of Engineering Support System for Modeling and Control of EBMR Processes
G. Elenkov, I. Ivanov, I. Gerdjikov, V. Metodieiev
Principles of Fault Tolerance of Computer Networks and High Performance Server Systems
D. Gocheva, I. Batchkova, M. Dobrev, K. Velev
Domain Ontology Development for Engineering Support Systems
I. Antonova
Applications of UML and SysML for Modeling of IEC-61499 Based Control Systems
D. Ivanova, I. Batchkova, G. Frey, K. Velev
Formal Verification of Vacuum Control System at EBMR Plant
Friday, October 2nd
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Sofia, 108 Rakovski Str.

14.00 – 15.30 First International Mini-Symposium “INDUSTRIAL INFORMATICS”
Place: Hall 105A
Chairman: K. Velev
Secretary: I. Batchkova

P. Vasilev
Development of a Communicational Module between Distributed Control System MIC-5000 CE and MATLAB
G. Stambolov, I. Batchkova, H. Karamishev, G. Popov
Coordinated Distributed Motion Control of Cutting Processes Based on IEC-61499 Standard
H. Shaban
Development of Open Integrated Tools for Information and Knowledge Processing Using Eclipse
A. Efremov, F. Tomova, D. Mihaylova
Development of a System for Demand Analysis and Sales Forecast

Friday, October 2nd
Technical University of Sofia,
8, Kliment Ohridski Blvd., bl.2, hall 2114 b

11.30 – 13.30 WORKSHOP “COMPUTER AIDED EDUCATION IN SYSTEMS AND CONTROL”
Place: Hall 2114 b
Chairmen: P. Petkov, E. Garipov

O. Ognjnova, E. Haralanova, T. Puleva
Wind Energy Conversion System Modeling
O. Ognjnova, E. Haralanova
Speed Control of Wind Energy Conversion System
O. Ognjnova, E. Haralanova, P. Petkov
Robust Control of Wind Turbine
Ts. Slavov, E. Garipov
Parameter Estimation of Time-Variant Plants in Real Time
G. Rouzhkov, E. Garipov, I. Tiyanov, Ts. Slavov
Multi-Model Adaptive Control by PLC
G. Rouzhkov, T. Puleva, I. Tiyanov
Hybrid Instrumental Environment for Hydro Generator Nonlinear Modeling and Control
A. Ichtiev
Active/Semiactive Multiple-Model Structural Control
A. Markovski, Hr. Andreeva
Laboratory Installations Control by LabView
14.00 – 16.00 WORKSHOP “COMPUTER AIDED TECHNOLOGY IN SYSTEMS AND CONTROL”

Place: Hall 2114 b
Chairmen: P. Petkov, E. Garipov

S. Ahmed, M. Petrov, A. Ishtev
Model Predictive Control of a Laboratory Model – Coupled Water Tanks
M. Petrov, S. Ahmed, A. Taneva, A. Ichtev
Model Predictive Controller Applied to Level Control
K. Perev
Inverted Pendulum Control in Upper Unstable Equilibrium Position
A. Yonchev
LMI Based Control of Cart-Inverted Pendulum System
G. Rouzhekov, S. Kalinkov, P. Petkov
H ∞ Control of Transmanipulator
G. Rouzhekov, D. Penev, S. Kalinkov
Model Predictive Control of Horizontal Movement of Automated Storage/Retrieval Machine
K. Shiev, A. Topalov, N. Shakev, S. Ahmed
Laboratory Stand for Rapid Prototyping of Real Time Control Systems
N. Shakev, A. Topalov, S. Nikolova, D. Seyzinski
Dynamic Modelling and Attitude Stabilization of a Quad-Rotor Miniature Helicopter

Friday, October 2nd
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17.00 – 17.30 Closing of the Conference
Place: Hall 2