

## **International Program Committee (IPC)**

**Honorary Chairs:** Sgurev, V.  
Boyakov, K.

**Chairs:** Batchkova, I. Boshnakov K.

**Vice chair:** Stoilova, K.

**Vice chair:** Aleksiev, K.

**Vice chair for Industry:** Andreev, V.

### **Members:**

Atanasov, A	(BG)	Kocijan, J.	(SI)	Ruskov, P.	(BG)
Atanasov, K.	(BG)	Koprinkova, P.	(BG)	Simeonov, I.	(BG)
Dakovski, L.	(BG)	Liutov, N.	(BG)	Smrikarov, A.	(BG)
Damyantov, Ch.	(BG)	Madjarov, M.	(BG)	Spasov, G.	(BG)
Dotsinski, I.	(BG)	Marinov, E.	(BG)	Stoilov, T.	(BG)
Elenkov, G.	(BG)	Mihaylova, L.	(GB)	Stoyanov, S.	(BG)
Farhi, O.	(BG)	Mladenov, M.	(BG)	Tasheva, D.	(BG)
Filipov, F.	(BG)	Nenov, T.	(BG)	Tenekedjiev, K.	(BG)
Frey, G.	(GE)	Nikolov, E.	(BG)	Todorova, M.	(BG)
Garipov, E.	(BG)	Perev, K.	(BG)	Topalov, A.	(BG)
Georgieva, P.	(PT)	Petkov, P.	(BG)	Tzotchev, V.	(BG)
Grancharova, A.	(BG)	Petrov, M.	(BG)	Vachkov, G.	(FJ)
Hadjiiski, M.	(BG)	Popchev, I.	(BG)	Velev, K.	(BG)
Hristov, N.	(FR)	Puleva, T.	(BG)	Vesely, V.	(SK)
Ilarionov, R.	(BG)	Rujekov, G.	(BG)	Yordanova, S.	(BG)
Ishtev, K..	(BG)	Rumenin, Ch.	(BG)		

## **National Organizing Committee (NOC)**

**Chair:** Hristova, N.

**Vice co-chair:** Gocheva, D.  
Dimitrov, S.

### **Members:**

Antonova, I.  
Mishkov, R.  
Ivanova, D.  
Monova, E.

Nikolova, N.  
Yonchev, A.  
Dobrudjaliev, D.

**Secretary:** Dimitrova, E.

# CONTENTS

## PLENARY REPORTS

A. Topalov

*Center for Robotics and Automation at the Technical University of Sofia,  
Plovdiv branch - a year and a half after its creation*

M. Mladenov

*Complex assessment of food products quality* 1

## SCIENTIFIC SESSIONS

### Session A1.1: Control theory (1)

T. Slavov, J. Krlev, P. Petkov

*Design and implementation of  $\mu$ -controller for two-wheeled robot control* 11

E. Nikolov, N. Nikolova, B. Grasiani

*Survey of repetitive gain scheduling control systems - Part I (synthesis)* 15

E. Nikolov, N. Nikolova, B. Grasiani

*Survey of repetitive gain scheduling control systems - Part II (analysis)* 19

K. Kolchakov, V. Monov

*Comparative analysis of a class of algorithms for traffic management in  
a crossbar commutator* 23

### Session A1.2: Control theory (2)

K. Perev

*Galerkin projection and output normal form for model order reduction* 27

A. Grancharova

*Distributed min-max model predictive control of linear systems with  
parametric uncertainty* 31

D. Chantov

*Hybrid synchronization between 5-th order hyperchaotic CHUA systems* 35

E. Marinov, Ts. Todorov

*Adaptive control of BLDC motor* 39

### Session A1.3: Process control (1)

M. Hadjiski, N. Deliiski

*Re-optimization of the wood thermal treatment near optimal control  
system* 43

N. Valov, D. Ivanova, I. Valova

*Remote access and control of drying processes via internet* 47

N. Deliiski, V. Brezin, I. Radkova <i>An approach for computation of the specific mass energy consumption needed for defrosting of wood chips</i>	51
<b>Session A2.1: Process control (2)</b>	
M. Hadjiiski, K. Boshnakov <i>Integrated control of copper production converter. Part 1: Peculiarities of the converting process</i>	55
M. Hadjiiski, K. Boshnakov <i>Integrated control of copper production converter. Part 2: Control system</i>	59
D. Tasheva, Z. Iliev, R. Alexandrov, R. Russinov <i>Control of draining installations in the mine "Erma river"</i>	63
D. Tasheva, Z. Iliev, R. Alexandrov, R. Russinov <i>Technical structure of the automated mine drainage system in the mine "Erma river"</i>	67
<b>Session A2.2: Intelligent control of power plant systems</b>	
I. S. Baruch, E. P. Reynaud, B. Nenkova <i>Recurrent neural adaptive control of nonlinear oscillatory systems using a complex-valued Levenberg - Marquardt learning algorithm</i>	71
V. Stoyanov, G. Vachkov <i>Fuzzy modeling of photovoltaic systems by use of incomplete fuzzy rule base with RBF activation functions</i>	75
G. Rujekov, T. Puleva <i>Experimental test bench for wind modeling</i>	79
St. Enev <i>A suboptimal minimum-energy control scheme for process control – PLC implementation and experimental results</i>	83
<b>Session A2.3: Measurement and analysis of clinical data</b>	
Tz. Ivanova, I. Antonova, I. Batchkova <i>Model driven development of Holter monitoring system</i>	87
G. Georgieva-Tsaneva, M. Gospodinov, E. Gospodinova, K. Cheshmedjiev <i>Automated wavelet analysis of digital ECG data</i>	91
E. Gospodinova, M. Gospodinov, G. Georgieva-Tsaneva, K. Cheshmedjiev <i>Spectral analysis of heart rate variability</i>	95
S. Radeva, A. Bozhanova, D. Radev, D. Stanovski <i>Human – computer interface for estimation of basic emotional states via recorded electrophysiological signals</i>	99
<b>Session A2.4: Measurement and quality assessment</b>	
T. Titova, V. Nachev, Ch. Damyanov <i>Integrated quality evaluation of food using multisensory data fusion</i>	103

D. Tsankova, S. Lekova		
	<i>UV-VIS spectroscopy and statistical cluster analysis in distinguishing different types of honey</i>	107
L. H. Lahtchev		
	<i>Information approach to computer based frequency quantified pressure signal of duo control electric sphygmomanometer</i>	111
E. Petrov, A. Dyankov		
	<i>Control units and human machine interface of a flowmeter test bench</i>	115
 <b>Session B1.1: Modeling and optimization of organization systems</b>		
V. Sgurev, S. Drangajov		
	<i>Optimal control of the flow of risk on networks</i>	119
P. Nikollov, A. Efremov		
	<i>Application of cluster analysis in systems for strategy optimization</i>	123
L. Kirilov, V. Guliashki		
	<i>Generating feasible schedules for flexible job shop problems</i>	127
D. Budakova		
	<i>Bayesian network prediction model for the economic processes</i>	131
 <b>Session B1.2: Analysis and control of organizational systems</b>		
S. Vasileva, A. Milev		
	<i>Simulation studies of distributed two-phase locking in distributed database management systems</i>	135
D. Gocheva		
	<i>Design of ontology based information system for organizing of scientific conferences (conference management system)</i>	139
V. Alexieva		
	<i>A modified uplink scheduler for improvement of the QoS for LTE based on user satisfaction</i>	143
V. Tsenev		
	<i>Lean manufacturing applying for increasing the efficiency of robot electronic production in the condition of total quality managing (TQM)</i>	147
 <b>Session B1.3: Software engineering (1)</b>		
R. Rejmer, V. Sirkova, D. Budakova		
	<i>A study of the effectiveness of the hierarchical temporal memory technology by a NuPIC-based programming system for recognition of animals</i>	151
H. Valchanov		
	<i>A hybrid multithreaded library</i>	157
K. Shvertner		
	<i>Organizational change management in cloud services implementation</i>	161

V. Kuzmanova, A. Atanassov	
<i>Comparative analysis of software products for requirements management</i>	165

## **Session B2.1: Software engineering (2)**

M. Petrov	
<i>Multiscale spectral methods for data indexing in a radon space</i>	169
V. Bakoev, N. Boyanov	
<i>Hardware aided pseudo-random number generator as module for embedded devices</i>	173
P. Stoyanov	
<i>Simulating networks in GNS and applying results to solving real time problems: A case study</i>	177
V. Ivanov	
<i>Use of the fine grain FPGA structure to generate the UART clock</i>	181

## **Session B2.2: Information technologies (1)**

A. Ouzounov	
<i>Mean-delta features for telephone speech endpoint detection</i>	185
V. Ivanov T.Balabanov	
<i>Device for improving the parameters of intersections regulated by traffic lights</i>	189
A. Marinchev	
<i>Configuration of technical equipment for use as distributed I/O in automatic control system</i>	191
Y. Yanev, N. Petkov, O. Farhi	
<i>Embedded system for data processing from gyroscope sensor</i>	195

## **Session B2.3: Information technologies (2)**

D. Budakova, N. Tsaikin	
<i>Generalized net model for the behavior of home care intelligent virtual agent with pre-think architecture</i>	199
V. Nikolov, S. Panov, D. Pilev	
<i>Software system for condominium service</i>	205
V. Tersieva, P. Kademova-Katsarova	
<i>ICT in teachers' practice – a survey in Bulgarian schools</i>	209
M. Vladimirov, T. Stoilov	
<i>Quantitative models for the management of investments in financial securities</i>	213
N. Christova	
<i>Coordination of business, technology and operational management in pellet production</i>	217