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International Federation of Automatic Control

Secretariat: Schlossplatz 12, A-2361 Laxenburg, Austria

Phone (+43 2236) 71 4 47, Fax (+43 2236) 72 8 59, E-mail: secr@ifac.co.at – URL: <http://www.ifac-control.org>

Newsletter

Contents:

IFAC Technical Board Identifies Emerging Areas	*
IFAC Approaches its 50th Anniversary	*
Control Systems Design IFAC Conference, Slovak Republic September 2003	*
Forthcoming Events	*
Robot Control – SYROCO IFAC Symposium, Poland, September 2003	*
Call for Nominations of Significant Works on Control Education – The IFAC 50th Anniversary Control Education Database	*
Papers from Automatica, Nos 12, 2003 & 1, 2004	*
Papers from Control Engineering Practice, Nos 12, 2003 & 1, 2004	*

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Dipl. Ing. Dr. Gusztáv Hencsey
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*Season's Greetings
to all our readers*

IFAC Technical Board Identifies Emerging Areas

The goal of IFAC is to “promote (in both theory and applications) science and technology of control in all systems, whether engineering, physical, biological, social or economic.” In support of this goal, the IFAC Technical Board maintains on-going efforts to identify trends and forecast emerging areas within our field. The Technical Board’s most recent *formal* activity regarding this thrust was a Workshop and Panel Session held in Rotterdam, The Netherlands, in conjunction with the *IFAC Symposium on System Identification (SYSID)*.

The goal of the 2003 Emerging Areas Workshop / Panel was,

- Identify *emerging trends* within the control system and automation field
- Forecast tomorrow’s most significant *applications* which will achieve higher performance, increased efficiency, lower cost, or other benefits
- Identify the likely control *methodologies* and *implementations* that will enable such future improvements.

Workshop Participants in the Workshop portion of the meeting were members of the IFAC Technical Board and selected Invited Guests from Dutch industries invited by the Dutch NMO. Each participant was asked to suggest trends/developments/needs within their respective areas of competence. As a result, over 50 suggestions were presented and considered during the afternoon Workshop. (A complete inventory of all these suggestions is available at the IFAC web-site as described at the end of the article.)

After presentation and discussion of the various suggestions by each participant, several of the related suggestions were combined, and a final list was then prioritized to identify the following major trends believed to be especially significant:

- Increased development of theoretical techniques and practical application of hybrid / discrete event systems
- Increased development and use of distributed control techniques (especially for applications using wireless communication technology)
- Continued theoretical development and applications for nonlinear control; to overcome limitations with linear representations / models
- Increased use and development of innovative, ubiquitous sensors and actuators; MEMS will enable many new sensors
- More effective subsystems operating at optimal levels will be integrated and embedded to yield improved overall systems
- Interest in learning control systems will intensify; the name “Adaptive Control” may not be used, but the concepts will continue
- Autonomous robots and autonomous vehicle development will continue as enabling technologies advance
- Fault detection / isolation and predictive maintenance techniques will greatly improve operation of highly complex systems
- Collaborative robots will assist and collaborate with humans in complex and/or difficult work environments

- Tools that facilitate collaborative human-to-human work and activities (e.g. E-work and collaborative robotic systems) will develop
- New hard and soft sensors will be developed for biotechnology and biomedical applications
- Artificial intelligence and agent-based models will become more useful for controlling and improving economic systems
- Dramatic automotive control advancements will continue to improve safety, operation, and vehicle efficiency
- Autonomous systems will become practical for complex operating environments
- Control technologies will enable realization and deployment of next-generation high-performance nano and micro systems; future controllers will benefit.

Panel Session The above trends were further reviewed and several were selected and refined for presentation in an evening Panel Session, attended by many of the *SYSID Symposium* attendees and members of the Dutch NMO. The allowable time for the Panel Session was of course limited, so only five trends were selected for the Panel Session. The highlights of these presentations are:

Integrated / Embedded Control

Significant developments over the last decade within several different technologies now enable practical implementation of new control architectures. These advancements include innovative sensors & actuators (many based on MEMS techniques), more powerful computers & Digital Signal Processors, and exciting breakthroughs in communications & network technology. As a result, two distinct trends are now gaining momentum within control. The first trend is *integration* such that perception (measurement, sensing) can now be embedded with control (controller, actuator) so that these previously separate functions are now transparent; in fact, single components may someday sense, determine what to do, and then carry out the desired actions. The second trend is *distributed control* over wireless (and conventional wire-based) communication networks to connect embedded controllers into an overall closed loop operation. Such integrated/embedded controllers will enable improved medical technologies, increase energy efficiency, advance vehicle control, and enable many new consumer products.

Distributed Control (Over Communication Networks)

Recent developments within both control theory and hardware & tools now enable *distributed* control to become a practical reality. Numerous subsystems, each with their respective level of autonomy (but not co-located), can be integrated to control highly complex systems. As distributed control has progressed, it is common for large numbers of different types of components to exchange information through dispersed communication networks; furthermore, recent developments of *wireless* communication offer yet another tool for this field. Although control, information theory, and communications are mature disciplines, theoretical

issues in information theory and its effect upon performance of distributed control (conflict resolution, resource allocation, avoidance of deadlocks, etc.) are not well understood. Future control *theory* will address the impact of communication channel delays, quantization errors, transmission noise, random loss of information, as well as data handling and safety & reliability. Attention will also be given to *practical* design of encoders, decoders, estimators, filters, and other communication elements to achieve improved performance, efficiency, and decisions made by large numbers of distributed controllers.

Collaborative Control

Distributed systems are typically composed of numerous lower-level sub-systems with their individual control tasks and responsibilities. Collaboration among such interrelated systems is clearly essential in order to benefit from the respective strengths of the several "partners". Fortunately, collaborative control trends are apparent for all system types. *Machine-Machine*: Cooperation of smart robotic teams (including micro- and nano- as well as "routine" robots) will improve as new collaborative control techniques are developed; as faults, errors, and interactions are better managed; and as protocols for fault-tolerant operation are developed. *Human-Machine*: Better understanding of how to "share tasks" will improve operation and will come from improved software, more incorporation of human factors, continued adaptation (learning) by the machine, better displays, new types of feedback, and new sensors & actuators better tailored for human users. *Human-Human*: Human "team" performance will also improve as enterprise software integrates and aids team decisions, as new methods (e.g. internet-conferencing) improve team coordination (even when remotely located with different databases, culture, or knowledge disciplines), and as task

optimization methods enable multiple workers to share work and reduce local overloads.

Hybrid / Discrete Event Systems / Networks

Continuous (and discrete) *Time* Systems and Discrete *Event* Systems have essentially been developed independently of each other. However both phenomena frequently appear in the same process. Examples include manufacturing, process control (start-up/shut-down), autonomous, and distributed control systems. Radar processing provides a specific example which requires dynamic estimation of whether or not a target is present, what type target, whether or not it is maneuvering, forecasted track movements, etc. Typical solutions are "sequential" which involves detection, then classification, estimation, etc. Such approaches are clearly sub-optimal. *Combined* solutions for such Hybrid Systems will no doubt develop in the future. New controllers will be driven by the need for higher performance from such systems, as well as the need to make better use of resources and an increased use of embedded/integrated systems. Theoretical developments are already being addressed and, as proven performance improves and reliability & autonomy increase, the number of applications will grow. Controllers for such systems will probably be more complex than earlier solutions, and development of such methods will require merging of heretofore different fields and different designer approaches (sometimes even with different methods and solution languages).

Autonomous Systems

Today's automotive industry offers numerous innovations including driver assistance (ABS, ESP, Distance Detection), suspension control (passive), self-diagnostics, improved comfort (climate control, lighting, seats, entertainment), and more precise engine and driveline control.

Emerging developments include drive-by-wire, brake-by-wire, parking assistance, collision warning, pedestrian detection, active suspension control, noise & vibration control, and a host of telematics (navigation, on-board e-services, etc.). These developments will improve vehicle safety and, when coupled with infrastructure improvements, will yield *intelligent traffic control*. These developments will also leverage developments in *autonomous unmanned vehicles* for situations such as operation in hostile environments. Such vehicles will plan their own operations, as well as control the vehicle, to achieve these goals and develop alternate strategies when failures or unexpected hindrances are encountered. These "autonomous" concepts will also be extended to other applications such as unmanned factories and processing plants.

For further information If you are interested in more detail from this Workshop and Panel Session, files have been reserved on the IFAC webpage and can be viewed and downloaded at:

<http://www.oead.ac.at/ifac/about/emerging.htm>
or by hitting the newsbutton on the coverage of the IFAC homepage at
<http://www.ifac-control.org>

- Complete inventory of all suggestions made by Technical Board members and guests to be found under IFAC Emerging Areas Workshop
- Panel Session Presentation for final items to be found under IFAC Emerging Areas Panel

The Panel Session Presentation contains various comments that have been submitted *since* the meetings. If you would like to add your comments, please send them to m.masten@ieee.org

Mike Masten, Chair, Technical Board

IFAC Approaches its 50th Anniversary

The International Federation of Automatic Control was founded in Heidelberg, Germany in 1956. With the year 2006 not far away, it is time to think about the development of the Federation in these 50 years of its existence. For this purpose, a Task Force was entrusted with preparing the 50th anniversary of IFAC. Among the activities planned there is a Celebratory Event, to take place in Heidelberg on Friday, 15 September, 2006, in conjunction with the IFAC Symposium on Mechatronic Systems from 12 – 14 September, 2006. The title of the Celebratory Event will be "IFAC Conference on Present and Future of Automatic Control" and it will be sponsored by the IFAC Council, the IFAC Technical Board and the IFAC Executive Board.

This Celebratory Event will, however, not be the only activity dealing with the 50th anniversary of IFAC. A number of projects has been developed by the Task Force. These projects are designed to summarize the history of IFAC and its activities during its first 50 years and to help attract new people into the field.

The **first project** is to make more readily available all IFAC technical materials and provide the IFAC Secretariat with the ability to help people who seek IFAC materials to find it. Much of this has been done by the IFAC Publisher, Elsevier, but there are other archival materials only available through the Secretariat.

The **second project** is to create a Bibliography of control history books, control history papers, control textbooks, etc. that can serve as a resource to scholars who want to track IFAC's progress and its impact on the control field.

The **third project** is the production of a DVD (or other appropriate technology in 2006) of dramatic videos, experiments, exciting samples of control applications. One goal is for this product to be of great value in our efforts to attract younger people into our field.

The next project is a complete history of IFAC events officials that will document the evolution of IFAC primarily for those who come into the field in the future.

Another project is to encourage NMOs to make available the history of their own NMO that will help others understand how the control science professional community has evolved in various countries especially during the first 50 years of IFAC.

Finally there is a fundraising effort to support young people and those from developing countries so they can be more active in future IFAC events. The goal of this project is to obtain endowment funds that can generate substantial interest-only income to at least support younger researchers for travel and expenses for the Congresses.

The project leaders are Rolf Isermann (DE), Janos Gertler (US), Ljubo Vlacic (AU), Tibor Vamos (HU), Sirkka-Lisa Jamsa-Jounela (FI), Wook Kwon (KR), Steve Kahne (US). They are working with teams of volunteers to accomplish these tasks.

A Call for Nominations relating to Project # 3 is published on page 5 of this Newsletter. All our readers are cordially invited to contribute.

S. Kahne, IFAC Adviser

Control Systems Design

2nd IFAC Conference

Bratislava, Slovak Republic

September 7 – 10, 2003

The 2nd IFAC Conference "Control Systems Design" (CSD'03) held on September 7 – 10, 2003 in Bratislava, Slovak Republic, was organized jointly by the Slovak Society for Cybernetics and Informatics (which is the Slovak IFAC NMO) and the Faculty of Electrical Engineering and Information Technology. It was sponsored by the IFAC Technical Committee on "Control Design".

Being actually the fourth IFAC technical event on Control Systems Design organized in the Slovak Republic (preceded by the two IFAC Workshops "New Trends in Design of Control Systems" in 1994, 1997 in Smolenice and the 1st IFAC Conference "Control Systems Design" held in 2000 in Bratislava) the conference presented the current development and novel directions in Control Engineering and various control applications.

The aim of the conference was to provide an integrated forum for scientists and practitioners of new theoretical and applied areas of Control Engineering, integrating knowledge and experience from different fields of control system design and exploring current theoretical developments as well as their applications to engineering problems.

ctd. page 4

**CALL FOR NOMINATION
SIGNIFICANT WORKS ON CONTROL EDUCATION
FOR INCLUSION IN**

THE IFAC 50th ANNIVERSARY: CONTROL EDUCATION DATABASE

IFAC has initiated the IFAC50 Projects that will culminate in the celebration of IFAC's 50th Anniversary year during 2006. The anniversary celebration itself will be under the direction of Professor Rolf Iserman and the German NMO.

IFAC **Project #3** is one of these project initiatives and is aimed at:

- **Creating a Database and collecting copies of excellent talks/papers on Control Education in *Traditional Engineering Curricula*** that have been published since 1956. The Collection will be published on CDs and/or the IFAC website.

Person in Charge: Roman Prokop (prokop@ft.utb.cz)

- **Creating a Database of and collecting copies of excellent talks/papers on Control Education in *Non-Traditional Engineering Curricula*** (such as in medicine, economic systems, social systems, etc.), if any, that have been published since 1956. The Collection will be published on CDs and/or the IFAC website and in videos if such evidence exists.

Person in Charge: Zhong (Roy) Li (zhong.li@fernuni-hagen.de)

- **Organising an IFAC Workshop on New Directions in Control Education; the Workshop will be held in conjunction with the IFAC Congress in Prague.**

Persons in Charge: Ljubo Vlacic (L.Vlacic@griffith.edu.au) and
Bozenna Pasik-Duncan (bozenna@math.ukans.edu)

- **Creating a Database and collecting copies of Talks on Control Education suitable for highschool students and teachers.** This will also include interviews with undergraduate and graduate students in the broad area of control systems.

Person in Charge: Bozenna Pasik-Duncan (bozenna@math.ukans.edu)

- **Creating a Database of Education Technologies and Related Education Concepts.** This task is to produce a collection of papers and videos on the contribution of numerous education technologies to, and their use in, Control Education. It will include:

- a) Computer modelling tools
- b) Interactive dynamic systems software tools
- c) Virtual (web-based) lab technologies
- d) Structured list of Control education websites
- e) Learning-by-doing concepts
- f) Experimental lab-scaled control systems platforms
- g) Etc.

Persons in Charge: Lucy Pao (Pao@Colorado.EDU);
Sebastian Dormido (sdormido@dia.uned.es)
and Ljubo Vlacic (L.Vlacic@griffith.edu.au)

All members of the IFAC Community are cordially invited to contact a person in charge of the respective project task and to nominate reference(s) which, as he/she believes, is/are worth including in the database. We are seeking teaching materials that provide significant insight into certain control phenomena and assist students in developing their interest in control by providing them with well thought out experiments and demonstrations that will enhance their ability to learn the concepts of control engineering.

It will be of great assistance if a copy of the source document is also provided (including details of the library which holds that source document).

A brief justification of the proposal would be very welcome.

It is of the utmost importance that the Project Task Coordinators are provided with the required details before

28 February 2004.

Your willingness to assist is greatly appreciated.

Ljubo Vlacic
The Project 3 Team Coordinator
L.Vlacic@griffith.edu.au

Papers from the December 2003 Issue

Editorial

Some Automatica History and Recognition at a Time of Transition
G.S. Axelby

Call for papers for an Automatica Special Issue on Data-based Modelling and System Identification
P.M.J. Van den Hof

Papers

Abstractions of Hamiltonian Control Systems
P. Tabuada, G.J. Pappas
Bisimilar Linear Systems
G.J. Pappas
Intriguing Nonlinear Dynamics of a Controller with a Sluggish Actuator
B.D. Collier
Trajectory Tracking Control of Port-controlled Hamiltonian Systems via Generalized Canonical Transformations
K. Fujimoto, K. Sakurama, T. Sugie
Closed-loop Monitoring for Early Detection of Performance Losses in Feedback-control Systems
E. Mosca, T. Agnoloni
Decomposition of Human Motion into Dynamics-based Primitives with Application to Drawing Tasks
D. Del Vecchio, R.M. Murray, P. Perona

Brief Papers

Identification of Nonlinear Errors-in-variables Models
I. Vajk, J. Hetthessy
Stochastic Optimal Control via Bellman's Principle
L.G. Crespo, J.-Q. Sun
On-line Performance Optimisation of Aero Engine Control System
O.D. Lyantsev, T. Breikin, G.G. Kulikov, V.Y. Arkov
Passivity-based Torque and Flux Tracking for Induction Motors with Magnetic Saturation
H. A. Abdel Fattah, K. A. Loparo
Friction Induced Hunting Limit Cycles: A Comparison between the LuGre and Switch Friction Model
R.H.A. Hensen, M.J.G. van de Molengraft, M. Steinbuch
On Solution Concepts and Well-posedness of Linear Relay Systems
A.Yu. Pogromsky, W.P.M.H. Heemels, H. Nijmeijer
Computational Complexity of Randomized Algorithms for Solving Parameter-dependent Linear Matrix Inequalities
Y. Oishi, H. Kimura
New Results for Near-optimal Control of Linear Multiparameter Singularly Perturbed Systems
H. Mukaidani, H. Xu, K. Mizukami

Technical Communique

Fuzzy H-infinite Output Feedback Control of Nonlinear Systems under Sampled Measurements
S.K. Nguang, P. Shi

Papers from the January 2004 Issue

Editorials

A Smooth Transition: Moving Forward, Looking Forward
T. Basar
Two New Editors, and a Revised Editorial Area
T. Basar

Papers

Analysis of the Kalman Filter Based Estimation Algorithm: An Orthogonal Decomposition Approach
L. Cao, H.M. Schwartz
A Control Problem for Affine Dynamical Systems on a Full-dimensional Polytope
L.C.G.J.M. Habets, J.H. van Schuppen
Identification of Piecewise Affine Systems via Mixed-integer Programming
J. Roll, A. Bemporad, L. Ljung

Brief Papers

Model and Control Holonic Manufacturing Systems Based on Fusion of Contract Nets and Petri Nets
F.-S. Hsieh
Variable Structure Control of a Class of Uncertain Systems
M.O. Efe, C. Unsal, O. Kaynak, X. Yu
Delay-dependent Robust H-infinite Control for Uncertain Systems with a State-delay
Y.S. Lee, Y.S. Moon, W.H. Kwon, P.G. Park
Swinging up the Spherical Pendulum via Stabilization of its First Integrals
A.S. Shiriaev, H. Ludvigsen, Ø. Egeland
On Stabilizability and Exact Observability of Stochastic Systems with their Applications
W. Zhang, B.-S. Chen
Mean Square Error of the Empirical Transfer Function Estimator for Stochastic Input Signals
P.M.T. Broersen
Uniting Bounded Control and MPC for Stabilization of Constrained Linear Systems
N.H. El-Farfa, P. Mhaskar, P.D. Christofides
Design of PID Controllers Satisfying Gain Margin and Sensitivity Constraints on a Set of Plants
O. Yaniv, M. Nagurka
A Global Output-feedback Controller for Stabilization and Tracking of Underactuated ODIN: A Spherical Underwater Vehicle
K.D. Do, Z.P. Jiang, J. Pan, H. Nijmeijer
Robust Model Predictive Control Using Tubes
W. Langson, I. Chrysochoos, S.V. Rakovic, D.Q. Mayne
Observer Design for a Class of MIMO Nonlinear Systems
M. Farza, M. M'Saad, L. Rossignol
An Output-based Adaptive Iterative Learning Controller for High Relative Degree Uncertain Linear Systems
C.-J. Chien, C.-Y. Yao
Two-degree-of-freedom l_2 optimal Tracking with Preview
D. N. Hoover, R. Longchamp, J. Rosenthal

Technical Communique

A Synthesis Approach of On-line Constrained Robust Model Predictive Control
B. Ding, Y. Xi, S. Li

Book Review

Modeling and IPC Control of Interactive Mechanical Systems: A Coordinate-free Approach, by Stefano Stramigioli
E. Usai



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Papers from the December 2003 Issue

Award Winning Applications – 2002 IFAC World Congress
M. K. Masten, Ian K. Craig, Yasushi H. Hashimoto, Uwe Kiencke, Thomas J. McAvoy, Anibal Ollero and H. B. Verbruggen
Flatness-based Clutch Control for Automated Manual Transmissions
Joachim Horn, Joachim Bamberger, Peter Michau and Stephan Pindl

Estimation of Automotive Tire Force Characteristics Using Wheel Velocity
Eiichi Ono, Katsuhiro Asano, Masaru Sugai, Shoji Ito, Masaki Yamamoto, Mamoru Sawada and Yoshiyuki Yasui
Performance Evaluation of Two Industrial MPC Controllers
Jianping Gao, Rohit Patwardhan, K. Akamatsu, Y. Hashimoto, G. Emoto, Sirish L. Shah and Biao Huang
A flight Control System for Aerial Robots: Algorithms and Experiments
H. Jin Kim and David H. Shim
Modeling and Control of Quasi-keyhole Arc Welding Process
Y. M. Zhang and Y. C. Liu
Comparison of Structured Light and Stereovision Sensors for New Airbag Generations
S. Boverie, M. Devy and F. Lerasle
Application of Active Noise Control to an Elevator Cabin
J. Landaluze, I. Portilla, J. M. Pagalday, A. Martinez and R. Revero
A Flexible-arm as Manipulator Position and Force Detection Unit
Min Gu and Jean-Claude Piedboeuf
Implementation Procedure of an Advanced Supervisory and Control Strategy in the Pharmaceutical Industry
K. Preu, M. -V. Le Lann, M. Cabassud and G. Anne-Archard
Time Scaling Internal State Predictive Control of a Solar Plant
R. N. Silva, L. M. Rato and J. M. Lemos
Sintolab: The REPSOL-YPF PID Tuning Tool
R. Gonzalez-Martin, I. Lopez, F. Morilla and R. Pastor
Diagnosis of Plant-wide Oscillation through Data-driven Analysis and Process Understanding
Nina F. Thornhill, John W. Cox and Michael A. Paulonis
Soft Analyzers for a Sulfur Recovery Unit
L. Fortuna, A. Rizzo, M. Sinatra and M. G. Xibilia
Unconstrained and Constrained Generalised Predictive Control of Depth of Anaesthesia during Surgery
M. Mahfouf, A. J. Asbury and D. A. Linkens

Papers from the January 2004 Issue

Optimal Control of Urban Drainage Systems. A Case Study
G. Cembrano, J. Quevedo, M. Salamero, V. Puig, J. Figueras, J. Marti
A Novel Method for Mixture Viscosity Control Based on Change Detection
T. Svantesson, G. Olsson
Diagnosis of Automotive Electronic Throttle Control Systems
R. Conatser, J. Wagner, S. Ganta, I. Walker
Frequency Adaptive Control Technique for Rejecting Periodic Runout
J.-J. Liu, Y.-P. Yang
Power Control of a Doubly Fed Induction Machine via Output Feedback
S. Peresada, A. Tilli, A. Tonielli
Diagnosis of Acidification States in an Anaerobic Wastewater Treatment Plant Using a Fuzzy-based Expert System
E.F. Carrasco, J. Rodriguez, A. Punal, E. Roca, J.M. Lema
Optimal-setting Control for Complicated Industrial Processes and its Application Study
Z. Wang, Q. Wu, T. Chai
Modular Approach to Parameter Estimation in Geared and Linear Resonant Systems
J.G. O'Donovan, R.C. Kavanagh, J.M.D. Murphy, M.G. Egan
In-orbit Thruster Calibration Techniques and Experiment Results with UoSAT-12
S.-F. Wu, W.H. Steyn, R.E. Bordany
ProcGraph: a Procedure-oriented Graphical Notation for Process-control Software Specification
G. Godena
Milestone Report for Area 7 Industrial Applications
T.M. Avoy, S.L.J. Jounela, R. Patton, M. Perrier, H. Weber, C. Georgakis



FORTHCOMING EVENTS

2003
No. 6
December

Title	2004	Place	Further Information
IFAC Symposium Advanced Control of Chemical Processes – ADCHEM 2003 *(postponed from 2004)	January 11 – 14	Hong Kong China	http://www.ust.hk/adchem2003 http://www.adchem2003.uni-stuttgart.de/ e-mail: adchem2003@ist.uni-stuttgart.de
IFAC/(CIGR) Workshop 5 th Artificial Intelligence in Agriculture	March 8 – 10	Cairo Egypt	http://www.claes.sci.eg/aia04 e-mail: soliman@claes.sci.eg
IFAC Symposium Computer Applications in Biotechnology	March 28 – 31	Nancy France	http://www.ensic.inpl-nancy.fr/CAB9/ e-mail: cab9@ensic.inpl-nancy.fr
IFAC Symposium 11 th Information Control Problems in Manufacturing – INCOM 2004	April 5 – 7	Salvador Brazil	http://www.eletr.ufrgs.br/incom2004/ e-mail: cpereira@eletr.ufrgs.br
IFAC Symposium Advances in Automotive Control	April 19 – 23	Salerno Italy	http://www.ifac04.unisa.it e-mail: ifac04@unisa.it
IFAC Symposium Cost Oriented Automation- COA04	June 7 – 9	Gatineau Canada	http://www.uqo.ca/blum/ifac/ e-mail: heinz.erbe@tu-berlin.de
IFAC Symposium Automatic Control in Aerospace	June 14 – 18	St. Petersburg Russia	http://aca2004.aanet.ru e-mail: aca2004@aanet.ru
IFAC Symposium Telematics Applications in Automation and Robotics – TA 2004	June 21 – 23	Helsinki Finland	http://www.automaatioseura.fi/TA04 e-mail: office@atu.fi
American Control Conference – in co-operation with IFAC –	June 30 – July 2	Boston MA, USA	http://www.mie.uiuc.edu/acc2004/index.asp e-mail: speyer@seas.ucla.edu
IFAC Symposium Intelligent Autonomous Vehicles – IAV 2004	July 5 – 7	Lisbon Portugal	http://iav04.isr.ist.utl.pt e-mail: iav04@isr.ist.utl.pt
IFAC Symposium Dynamics and Control of Process Systems – DYCOPS-7	July 5 – 7	Cambridge MA, USA	http://www.dycops.org/ e-mail: craven@dycops.org
IFAC Conference Control Applications in Marine Systems – CAMS 2004	July 7 – 9	Ancona Italy	http://cams04.unian.it e-mail: cams04@unian.it
IFAC Workshop Fractional Differentiation and its Applications – FDA '04	July 19 – 20	Bordeaux France	http://www.lap.u-bordeaux.fr/fda04/home.html e-mail: fda04@lap.u-bordeaux.fr
Asian Control Conference (5th) – in co-operation with IFAC –	July 20 – 23	Melbourne Australia	http://www.ascc2004.com/ e-mail: ascc@ee.mu.oz.au
IFAC Symposium Large Scale Systems: Theory and Applications	July 26 – 28	Osaka Japan	http://www-watt.mech.eng.osaka-u.ac.jp/lss2004/ e-mail: ifac-lss04@watt.mech.eng.osaka-u.ac.jp
IFAC Symposium Modeling and Control of Economic Systems	July 28 – 31	Redlands CA, USA	http://newton.uor.edu/ifac_sme_2004/ e-mail: SME_2004@Redlands.edu
INSTICC/IFAC Conference Informatics in Control, Automation and Robotics – ICINCO	August 25 – 28	Setubal Portugal	http://www.icinco.org/ e-mail: secretariat@icinco.org
IFAC Workshops on – Adaptation and Learning in Control and Signal Processing – ALCOSP – Periodic Control Systems – PSYCO	August 30 – September 1	 Yokohama Japan	http://www.contr.sd.keio.ac.jp/ifacws04/main.htm e-mail: sano@sd.keio.ac.jp e-mail: katayama@amp.i.kyoto-u.ac.jp
IFAC Symposium 6 th Nonlinear Control Systems – NOLCOS'04	September 1 – 3	Stuttgart Germany	http://www.nolcos2004.uni-stuttgart.de e-mail: nolcos2004@ist.uni-stuttgart.de
IFAC Multitrack Conference Advanced Control Strategies for Social and Economic Systems	September 2 – 4	Vienna Austria	http://www.ihurt.tuwien.ac.at/acs04/ e-mail: kopacek@ihurt.tuwien.ac.at
IFAC Workshop Internet Based Control Education – IBCE'04	September 6 – 7	Grenoble France	http://ibce.lag.ensieg.inpg.fr e-mail: ibce@inpg.fr

FORTHCOMING EVENTS (ctd.)

Title	2004	Place	Further Information
IFAC Symposium Mechatronic Systems	September 6 – 8	Sydney Australia	http://rumi.newcastle.edu.au/mech2004/ e-mail: KDISNEY@mail.newcastle.edu.au
IFAC/(IFIP/IFORS/IEA) Symposium 9 th Analysis, Design, and Evaluation of Human-Machine Systems – HMS 04	September 7 – 9	Atlanta GA, USA	http://www.isye.gatech.edu/IFAC-HMS2004 e-mail: sheila.devezin@isye.gatech.edu
IFAC Workshop 5 th Time Delay Systems	September 8 – 10	Leuven Belgium	http://www.cs.kuleuven.ac.be/conference/tds04/ e-mail: tds04@cs.kuleuven.ac.be
IFAC Symposium 11 th Automation in Mining, Mineral and Metal Processing – MMM 2004	September 8 – 10	Nancy France	http://www.cran.uhp-nancy.fr/ifac-mmm2004/ e-mail: mmm2004@cran.uhp-nancy.fr
IFAC Workshop 2 nd Advanced Fuzzy/Neural Control	September 16 – 17	Oulu Finland	http://www.ntsai.oulu.fi/ e-mail: office@atu.fi
IFAC Workshop Discrete Event Systems	September 22 – 24	Reims France	http://www.univ-reims.fr/wodes04 e-mail: wodes04@univ-reims.fr
IFAC Workshop Modelling and Control for Participatory Planning and Managing Water Systems	September 29 – October 1	Venice Italy	http://www.elet.polimi.it/IFAC_TC_Environment/Venice2004 e-mail: venice2004@elet.polimi.it
IFAC Workshop Automatic Systems for Building the Infra- structure in Developing Countries	October 3 – 6	Bansko Bulgaria	http://hsi.iccs.bas.bg/decom04 e-mail: decom04@hsi.iccs.bas.bg
SCS/IFAC Conference Advances in Vehicle Control and Safety – AVCS	October 28 – 31	Genova Italy	http://www.liophant.org/i_m_scs/i3m2004/avcs/ e-mail: rachid@u-picardie.fr
IFAC Conference Management and Control of Production and Logistics – MCPL-2004	November 2 – 5	Santiago Chile	http:// not yet available e-mail: mcpl@uamericas.cl
IFAC Symposium System Structure and Control	December 8 – 10	Oaxaca Mexico	http://sssc04.cinvestav.mx e-mail: jtorres@cinvestav.mx
Title	2005	Place	Further Information
American Control Conference – in co-operation with IFAC –	June 8 – 10	Portland OR, USA	http://www.ee.washington.edu/conf/acc2005/ e-mail: SJayasuriya@mengr.tamu.edu
16TH IFAC WORLD CONGRESS	JULY 4 – 8	PRAGUE Czech Rep.	http://www.ifac.cz e-mail: praha@ifac.cz

Symposium on Robot Control SYROCO'2003

IFAC Symposium

Wroclaw, Poland, 1 – 3 September 2003

The 7-th IFAC Symposium on Robot Control was held on 1-3 September 2003 in Wroclaw, Poland. The conference took place in the Holiday Inn Wroclaw.

The aim of the symposium was to bring together academic, government laboratories, and industrial researchers involved in all aspects of control systems for robotics systems.

There were 143 paper submitted and five Plenary Addresses. The presentations were organized in five Plenary Sessions and twenty Regular Sessions. In addition there was one Special Session in which Professor Ilya Miroshnik presented the overview of nonlinear systems applied to robotics. The authors came from 27 countries around the World.

The main ideas were summarized in five plenary session presentations given by five well-known scientists and researchers. The first was given by Professor Wayne Book (Georgia Tech, USA): “Reach out and touch someone: controlling haptic manipulators near and far”, the second was presented by Professor Anibal Ollero (University of Seville, Spain): “Control of perception techniques for aerial robotics”, the third by Professor Suguru Arimoto (Ritsumeikan University, Japan): “Intelligent control of multi-fingered hands”, the fourth by Professor Claudio Melchiorri, University of Bologna, Italy): “Robotic telemanipulation systems: an overview on

control aspects”, the fifth by Dr. Carlos Canudas de Wit, CNRS Grenoble, France): “Virtual constraints: a tool for walking robot control and balancing aspects”.

There were other, robotics related and important issues presented at the SYROCO'03 Symposium. For example, the paper “Dynamical sequence of multi-sensor based tasks for mobile robots navigation” by Phillipe Soueres *et al.* from LAAS/CNRS in Toulouse described a very interesting method of robot motion control using sensory data and local perception of landmarks. The other example of rapidly advancing robotics methodology and related experimental work, was the paper by Yashida Hasegawa *et al.* from Nagoya University on “Dextrous manipulation from pinching to power grasping”. These are only two examples from many outstanding papers presented at the Symposium.

The SYROCO'03 Symposium was supremely well organized by the National Organization Committee chaired by Professor Krzysztof Tchou from Wroclaw University of Technology.

During the IFAC Robotics Technical Meeting that took place on September 1, 2003, it was decided that the venue of the next SYROCO Symposium in 2003 will be Bologna, Italy.

Professor Jurek Z. Sasiadek
IPC Chair, Carleton University,
Ottawa, Ontario, Canada

ctd. from page 2

The broad scope of the conference covered the following topics: *PID control, Model predictive control, Adaptive and selftuning control, Robust control, Intelligent control (including neural, fuzzy and genetic control), DEDS control and Control applications.*

Attendees from 24 countries contributed 97 papers in total. The papers were organized in 1 Plenary Session, 6 regular sessions, 1 Invited Session and 6 Poster Sessions.

The technical part of the Conference program included also the Tutorial on “Constrained Systems Design”. A rich social program comprised an excursion to the Hydro Power Plant Gabčíkovo which is a unique hydro electric project built on the Danube, a sightseeing tour of Bratislava by night and a concert performed by the Violin Orchestra Bratislava.

According to a “positive” feedback from attendees, the 2nd IFAC Conference “Control Systems Design” was a successful event and we hope to repeat it in three years.

Štefan Kozák
Mikuláš Huba