IFAC Newsletter
Issue 6 (December), 2001

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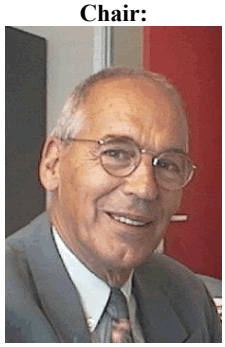
IFAC Technical Committees and their Scopes

In our introduction of TCs and their scopes we present the Coordinating Committee on Computer Control

Coordinating Committee on Computer Control

Chair:



H. Verbruggen, The Netherlands
H.Verbruggen@its.tudelft.nl

Technical Committee on Distributed Computer Control Systems

Chair:

J. Park, Korea, Rep.
jhyun@inha.ac.kr

Addresses fundamental concepts and theoretical issues in modern distributed computer control systems. Includes system architectures, inter-computer communications, algorithms, scheduling, programming, and man-machine interfaces for real-time distributed computer control systems. Theories/techniques for ensuring predictable timing, predictable behaviour under failure conditions, reliability, and maintainability. Methodologies and tools for specification, logical design, physical design, implementation, validation, verification, and testing/evaluation. Computer architectures, local-area networks, programmable logic controllers (PLC's), Fieldbus and standards-based platforms and environments.

Technical Committee on Real-Time Software Engineering

Chair:

W. Halang, Germany
wolfgang.halang@fernuni-hagen.de

Fosters all aspects of real-time software for computer control applications, including software engineering techniques for real-time systems, specification and design of real-time software, methods, environments, languages, databases, and operating systems. Management of software projects, collection and dissemination of qualitative and quantitative information relating to use of methods and tools, and identification and monitoring of real-time computer control trends**.**

Technical Committee on AI in Real-Time Control

Chair:

R. Vingerhoeds, France
eaai@wanadoo.fr

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Considers artificial intelligence methods within the framework of real-time. Promotes interactions between control engineering and computer science: Control engineering includes applications of knowledge-based systems, neural networks, genetic algorithms, fuzzy control, and modeling for low level control, supervision, monitoring, optimization, dynamic planning, and scheduling. Computer science includes temporal reasoning, verification methods, software and hardware requirements for real-time applications as well as parallel methods and structures.

Technical Committee on Algorithms and Architectures for Real-Time Control

Chair:

G. Irwin, UK
cep@ee.qub.ac.uk.

Addresses design and development of new algorithms, control methodologies, and hardware architectures for real-time control applications. Considers new computer hardware and software developments, including parallel processing, soft computing (neural, fuzzy, evolutionary), scheduling and operating system issues, Digital Signal Processors (DSP), Application Specific Integrated Circuits (ASICs) and Very Large Scale Integration (VLSI) custom devices

Technical Committee on Safety of Computer Control Systems

Chair:

J. Zalewski, USA
jza@ece.engr.ucf.edu
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Promotes safety-related aspects of computer hardware and software in critical applications, including nuclear systems, aerospace, transportation, chemical processes, and medical treatment systems. Addresses issues where computers in a system may impact human safety or availability of mission critical facilities; computers used to provide essential safety functions; design and life cycle requirements, verification and validation, vulnerability analysis, system design, diversity, defense-in-depth, and certification.

New IFAC Journals

At its last Council meeting in Arlington, USA, the proposal was made to make some changes and/or additions with respect to IFAC Journals. As a result, the IFAC Journal Annual Reviews will forthwith be published twice per year as described below. And, in addition to this Journal and to the IFAC Journals Automatica and Control Engineering Practice, two further journals, i.e. the Journal of Process Control and the Journal on Engineering Applications of Artificial Intelligence will forthwith have the status of IFAC Journals. Below find a description of these journals. Also the family of IFAC Affiliated Journals has been increased by one, i.e. the Journal on Mechatronics.

Annual Reviews in Control is IFAC's review journal, published twice a year. The Journal contains review articles selected from the material of the most recent IFAC Symposia, conferences and workshops and of the latest Congress. It will also increasingly carry review papers specifically commissioned for the Journal.
Annual Reviews in Control Editor-in-Chief: Prof. Janos Gertler. George Mason University, USA

Journal of Process Control

This Journal has recently been added to the IFAC family. Increased in 2002 from six to eight issues per year, the Journal publishes papers relating to all aspects of chemical process control, including many papers arising from the regular IFAC meetings in process control. All papers are rigorously reviewed, and the reputation and quality of the journal are among the highest of any in control engineering.
Journal of Process Control Editor-in-Chief: Prof. Thomas McAvoy. University of Maryland, USA

Engineering Applications of Artificial Intelligence

Another new addition to the IFAC family of journals. EAAI is an international journal that publishes papers relating to intelligent real-time automation. It is published six times a year and features directly submitted papers as well as many papers originating from IFAC meetings. All papers are rigorously reviewed prior to publication. Regular special issues are published on new and emerging topics of interest.
Engineering Applications of Artificial Intelligence Editor-in-Chief: Dr. Rob Vingerhoeds. Toulouse, France

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Telematic Applications in Automation and Robotics - TA 2001

1st IFAC Conference
Weingarten, Germany, July 24th - 26th , 2001

The exciting progress in telecommunication and information processing technologies offers an infrastructure for enabling the provision of services at remote locations with an enormous economic potential. The aim of this first IFAC-conference in telematics (= telecommunications + informatics) was to survey the state-of-the-art with emphasis on applications in automation and robotics. It was organised by the VDI/VDE Gesellschaft Mess- und Automatisierungstechnik (GMA) and the University of Applied Sciences FH Ravensburg-Weingarten. The IFAC TC on Intelligent Autonomous Vehicles sponsored this conference, with co-sponsoring by the IFAC TC's on Aerospace, Robotics, Automotive Control, Control Education, Marine Systems.

In order to enable telematic applications, interdisciplinary technology developments from control engineering, distributed information systems and telecommunication are to be integrated. This conference well combined presentations on new technology developments in these areas with reports on interesting industrial solutions and products in key areas like tele-operation, tele-maintenance and tele-diagnosis. The telematic applications focussed on contributions from the areas industrial automation, tele-robotics for hazardous environments, spacecraft telemetry and telecommand, traffic control, smart homes, tele-education, and tele-medicine. This broad spectrum of applications stimulated many interdisciplinary discussions during the conference

Two invited lectures emphasised the industrial importance and the broad applications range of telematics research :

- "The Industrial Potential of Telematics Solutions" by Lars Krantz, Asea Brown Boweri
- "Advanced Tele-Robotic Systems: From Space to Surgery" by Prof. Dr. Gerhard Hirzinger, DLR Oberpfaffenhofen

These lectures as well as the contributed papers displayed the general tendency for telematics applications : While the initially driving areas in telematics, space missions and robots for hazardous environments still offer challenging tasks today, the main development efforts have now shifted towards a broad spectrum of teleservice applications for a widespread consumer community.

The International Program Committee (IPC) had the difficult task to select the best 101 papers from the encouraging large response on submissions. The interesting contributions had been prepared by 250 authors from 23 countries. 140 people attended the conference. Beyond the broad European participation, also a strong American and Asian presence emphasized the international interest in the telematics topic. Thanks to the activities of the Industrial Advisory Committee (IAC) and the relevance of the theme, also a significant industrial participation (about 1/3) resulted.

The region Bodensee-Oberschwaben and the German industry were not only excited about hosting this first IFAC conference on Telematics Applications in Automation and Robotics, but also sponsored an interesting cultural and social program, including receptions, industrial visits, local high-tech demonstrations from organ pipes to Zeppelin airships and a cruise for the conference dinner on a historical steamboat on Lake Constance. The National Organizing Committee (NOC) was able to attract the generous support from the cities Weingarten, Ravensburg, Friedrichshafen and the companies Deutsche Telekom, Bosch, DaimlerChrysler, EADS Dornier /Astrium, Siemens, ZF to offer a very well balanced social program. It is acknowledged that the main workload for the conference was handled by the VDI/VDE-GMA and by the University of Applied Sciences FH Ravensburg-Weingarten with significant support from the Ministry of Science, Research and Arts of the State Baden-Württemberg.

Due to the good response to the telematic applications topic, it is planned to organise the "2nd IFAC Conference on Telematics Applications in Automation - TA2004" in June 2004 in Helsinki (Finland). As telematics is considered an area with high scientific and economic potential for automation, a Steering Committee was formed during the conference in order to coordinate the future IFAC activities in telematics. The first task will be to organise the already initiated sessions during the IFAC World Congress in Barcelona.

Prof. Dr. Klaus Schilling, IPC chairman
Prof. Dr. Hubert Roth, NOC chairman

Control Applications in Post-Harvest and Processing Technology - CAPPT2001

3rd IFAC/CIGR Workshop
Tokyo, Japan, 3-5 October 2001

About 80 participants from 17 countries participated in the Third IFAC/CIGR Workshop on "Control Applications in Post-Harvest and Processing Technology". The First Workshop of this series was held in Ostend (Belgium) during June 1995. The

Second was held in Budapest (Hungary) in 1998. The consistent scope of these Workshops is to give the state of the art and application of control methods in storage and processing of agricultural and horticultural products. In the Third Workshop, four keynote presentations were given and nine scientific sessions, including poster session, were held. In total, 38 presentations, including keynote presentations, were delivered.

Prof. J. De Baerdemaeker, from the Katholieke University Leuven (Belgium), made a keynote address about 'pear properties affecting the quality and measurement techniques', including non-destructive acoustic measurements, X-ray tomography, and MRI for the control and quality evaluation of pears.

"The history of development and the state of fruit sorter in Japan" was presented by Dr. H. Maeda, from FANTEC Research Institute (Japan). The future aspect of agriculture was discussed from the viewpoint of non-destructive quality evaluation.

"Application of elastic theory to high-speed impact sensing of fruits" was discussed by Prof. P. Chen, from the University of California Davis (USA). The smart engineering approach was shown to design a low-mass impact sensor for the real-time on-line firmness sorting system.

"Automatic Potato Sorting System in Underwater Ultrasonic Instrumentation" was deliberated by Prof. F-M. Lu from the National Taiwan University (Taiwan). It included the application of LabVIEW, a graphical programming software to control the potato sorting mechanism. It was shown that the power spectral moment, calculated from integral of power spectral density distribution, could be adopted as criterion for sorting potatoes with different densities.

Prof. J. De Baerdemaeker received the 'IFAC CC-IL-Outstanding Contribution Award'. Awards were also presented to the TC chairman, I. Farkas, the chairman of IPC, Prof. S. Oshita, and the chairman of NOC, Prof. Y. Seo by CC-IL chairman, Prof. Y. Hashimoto.

We learnt much from scientific sessions and benefited greatly from the many discussions. New bonds of friendships were made and old friendships were strengthened during the intimate workshop. The banquet, held in a peaceful atmosphere at Ueno Seiyo-ken (Tokyo), contributed to promote new and/or old friendships as well as exchange of scientific information.

Prof. S. Oshita, IPC Chair

Dynamics and Control of Process Systems (DYCOPS-6)

6th IFAC Symposium

Jejudo Island, Korea, June 4-6, 2001

On-line Fault Detection and Supervision in the Chemical Process Industries (CHEMFAS-4)

4th IFAC Workshop

Jejudo Island, Korea, June 7-8, 2001

The DYCOPS-6 and CHEMFAS-4 conferences were organized by the Korean Institute of Chemical Engineers (KIChE) and Institute of Control, Automation and Systems Engineers (ICASE), the IFAC NMO for Korea. They were sponsored by the IFAC Technical Committee on Chemical Process Control, with the SAFEPROCESS Technical Committee as the co-sponsor of CHEMFAS-4. Traditionally, both meetings had been held separately during the same period, but in different countries. Since there is a growing number of colleagues having interest in both meetings, we decided to hold both of them consecutively at the same venue, drawing mutual interest from both communities.

At **DYCOPS-6**, the 104 papers, including 40 poster presentations, were organized into 16 sessions. In addition, 3 plenary and 5 invited keynote presentations were arranged to complement the technical sessions. Plenary addresses were presented focusing on the following topics:

- "Hybrid System Analysis and Control via Mixed Integer Optimization" by Prof. Morari at ETH, Switzerland
- "Functional Genomics and Systems Engineering" by Prof. Stephanopoulos of MIT, currently at Mitsubishi Chemicals, Japan
- "The Role of Control in the Design and Scale-up of Complex Chemical Processes" by Prof. Shinnar at City College of New York

Special editions of the Journals on Process Control and Control Engineering Practice will contain representative papers from this conference.

At **CHEMFAS-4**, the 53 papers, including 14 poster presentations, were organized into 13 sessions. Particular emphasis was laid on fault detection and diagnosis, applications, statistical and trend analysis, various innovative methodologies, and sensor location and data reconciliation. The plenary address was given by Prof. Venkatasubramanian of Purdue University on "Process Fault Detection and Diagnosis: Past, Present and Future". In addition, there were four keynote talks, invited by the IPC from the regular paper submissions.

There were 201 participants from 27 countries for DYCOPS-6 and 128 from 18 countries for CHEMFAS-4. 64 attendees registered with fee for both meetings. The traditionally pleasant and relaxed island atmosphere was well appreciated by the participants. Folk dance and songs were enthusiastically received at both banquets.

The 7th Symposium on Dynamics and Control of Process Systems will be held in Boston, U.S.A., and shall be organized by Prof. Seider at the University of Pennsylvania.

The programs of both meetings can still be viewed at the conference home pages: http://pslab.snu.ac.kr/dycops6 and http://pslab.snu.ac.kr/chemfas4

En Sup Yoon, NOC Chair

Manufacturing, Modeling, Management and Control (MIM 2001)

IFAC Workshop

Prague, Czech Republic, 2-4 August, 2001

The IFAC Workshop on Manufacturing, Modeling, Management and Control (MIM 2001) was held in Prague, Czech Republic, 2-4 August 2001 at the Czech Technical University. The main sponsor of the event was IFAC (International Federation of Automatic Control) and it was co-sponsored by IFIP (International Federation of Information Processing) and by the Computer and Automation Research Institute of the Hungarian Academy of Sciences.

The Technical Committee (TC) of IFAC on Manufacturing Modeling, Management and Control (MIM) organizes its MIM conference every third year. Based on the great interest and success of the TC-MIM conferences of the past it was decided during MIM 2000 in Patras, Greece, that in the years when there is no conference MIM workshops would be organized. The first such workshop consisted of less formal presentations and gave room to more discussions and personal contacts. One of the reasons for choosing Prague to host the first TC-MIM workshop was that the 16th International Conference on Production Research (ICPR-16) (organized by the International Foundation for Production Research (IFPR), and co-sponsored by the World Federation of Engineering Organizations and the Czech Association of Scientific and Technical Societies) took place in Prague, 29 July - 3 August, 2001. ICPR was a prestigious and large meeting with several hundreds of participants. Our TC-MIM Workshop was more modest, with 22 papers being presented, selected from 39 submitted ones. We had 8 no show presentations.The TC-MIM Workshop was organized intentionally to be partly overlapping with ICPR, so that some ICPR participants could attend the workshop, TC-MIM participants got a chance to meet ICPR members, and could take part in some ICPR events. As the topics of the two events are quite close to each other, it is of special value that the MIM and ICPR communities get closer to each other. The workshop goals concern the development, the comparison and the application of formal models, both descriptive and prescriptive, of Computer Integrated Manufacturing (CIM) systems. Proposed models should be able to integrate optimization methods, simulation procedures and knowledge-based tools. The objective of the workshop activities was the active discussion and specification of new models to be used in planning and simulating manufacturing, management and control strategies, including discrete-event and continuous representations. Based on the evaluated and accepted papers the workshop had the following sessions: Production Planning; Virtual Manufacturing; Scheduling; Design, Planning, Management; Monitoring, Diagnostics; Manufacturing, Machining; Software, Decision Support Systems; Engineering, Control, Modeling. A good balance between traditional and modern disciplines of manufacturing automation was achieved.

The organizers of the TC-MIM Workshop are especially thankful to the Czech Technical University, Faculty of Civil Engineering and Architecture for their assistance to organize the meeting in Prague in conjunction with the ICPR-16 Conference. We hope that the results of this workshop, including the proceedings and the agenda for future collaboration in research and education within the scope of TC-MIM will be useful to the general, professional community and to students and scholars of manufacturing, modeling for management and control.

Prof. George L. Kovács, Editor

Control Engineering Practice

Papers from the October 2001 Issue

Development and testing of the suspension system for a flywheel battery
H. Nakai, A. Matsuda, M. Suzuki
Monitored robust force control of a milling process
P. Charbonnaud, F.J. Carrillo, D. Ladevèze

Special Section on Control in Defence Systems

Preface
A.Tsourdos, B.A. White

A robust self-scheduled missile autopilot design by multi-model eigenstructure assignment
C. Döll, Y. Le Gorrec, G. Ferreres, J.F. Magni
Application of velocity-based gain-scheduling to lateral auto-pilot design for an agile missile
D.J. Leith, A. Tsourdos, B.A. White, W.E. Leithead
Integrated design of agile missile guidance and autopilot systems
P.K. Menon, E.J. Ohlmeyer
Receding horizon guidance laws for constrained missiles with autopilot lags
K.B. Kim, T.-W. Yoon, W.H. Kwon
Synthesis of zero miss distance missile guidance via solution of an optimal tuning problem
P. Gurfil
Nonlinear guidance techniques for agile missiles
M. Innocenti
Real-time neural-network midcourse guidance
E.J. Song, M.J. Tahk
Book review
J.A. Mulder

Conference Calendar

Papers from the November 2001 Issue

Special Issue on PID Control

Preface
(K.J. Aström, P. Albertos, J. Quevedo)
The Future of PID Control
(K.J. Aström, T. Hägglund)
PID-deadtime Control of Distributed Processes
(F.G. Shinskey)
Optimal-tuning PID Control for Industrial Systems
(G.P. Liu, S. Daley)
Robust Tuning Procedures of Dead-time Compensating Controllers
(A.Ingimundarson, T. Hägglund)
Mobile Robot Path Tracking Using a Robust PID Controller
(J.E. Normey-Rico, I. Alcalá, J. Gómez-Ortega, E.F. Camacho)
The Blend Station – A New Ratio Control Structure
(T. Hägglund)
Fault-tolerant PID Controllers Using a Passive Robust Fault Diagnosis Approach
(V. Puig, J. Quevedo)
PID Control for a Distributed System with a Smart Actuator
(D. Lee, J. Allen, H.A. Thompson, S. Bennett)
Digital Servo IC for Optical Disc Drives
(T.H. Akkermans, S.G. Stran)
Dynamical Model Reference PI Control of Permanent Magnet AC Motor Drives
(P. Stewart, V. Kadirkamanathan)

Conference Calendar

AUTOMATICA

Papers from the January 2002 Issue

Editorial

Robert Bitmead succeeds retiring Editor Frank L. Lewis
(H. Kwakernaak)

Papers

The Explicit Linear Quadratic Regulator for Constrained Systems
(A.Bemporad, M. Morari, V. Dua, E.N. Pistikopoulos)
Autonomous Vertical Landing on an Oscillating Platform: An Internal-model Based Apprpoach
L. Marconi, A. Isidori, A. Serrani)
Robust Performance Assessment of Feedback Control Systems
(Sheng Wan, B. Huang)
Non-stationary Stochastic Embedding for Transfer Function Estimation
(G.C. Goodwin, J.H. Braslavsky, M.M. Seron)
Subspace Identification for Continuous-time Stochastic Systems via Distribution-based Approach
(Akira Ohsumi, K. Kameyama, K.I. Yamaguchi)
Parameter Estimation in Nonlinear Systems with Auto and Crosscorrelated Noise
(B. David, G. Bastin)
Firing Rate Optimization of Cyclic Timed Event Graphs by Token Allocations
(A.Giua, A. Piccaluga, C. Seatzu)

Brief Papers

Asymptotic Analysis of the Dither Effect in Systems with Friction
(A.A.Pervozanski, C. Canudas-De-Wit)
Adaptive Control of Nonlinearly Parametrized Systems with a Triangular Structure
(A.Kojic, A.M. Annaswamy)
A Hybrid Control Approach to Action Coordination for Mobile Robots
(M. Egerstedt, X. Hu)
Multivariable Quantitative Feedback Design for Tracking Error Specifications
(E. Boje)
Practical L2 Disturbance Attenuation for Nonlinear Systems
(A.Rapaport, A. Astolf)
Model Correction for a Class of Spatio-temporal Systems
(S.O.R. Moheimani, W.P. Heath)
Minimal and Non-minimal Optimal Fixed-order Compensators for Time-varying Discrete-time Systems
(L.G. Van Willigenburg, W.L. de Koning)
Robust Discrete Variable Structure Control with Finite-time Approach to Switching Surface
(Chih-Lyang Hwang)

Technical Communiques

On Uniqueness of Solutions to Relay Feedback Systems
(Chong Lin, Qing-Guo Wang)
Blind Identifiability of IIR Systems
E-W. Bai, Q. Li, S. Dasgupta)
A Modified Normality Condition for Decentralized Supervisory Control of Discrete Event Systems
(S. Takai, T. Ushio)

Papers from the February 2002 Issue

Papers

Partial State Feedback Control of Induction Motors with Magnetic Saturation: Elimination of Flux Measurements
(A.Behal, M. Feemster, D.M. Dawson, A. Mangal)
On H2 Model Reduction of Bilinear Systems
(Liqian Zang, J. Lam)
Monte-Carlo TC(lambda)-Methods for the Optimal Control of Discrete-time Markovian Jump Linear Systems
(O.L.V. Costa, J.C.C. Aya)

Brief Papers

Adaptive Motion Control Using Neural Network Approximations
(S.N. Huang, K.K. Tan, T.H. Lee)
Robust Neural Control for Robotic Manipulators
(O. Barambones, V. Extebarria)
A Passivity-based Analysis for Decentralized Integral Controllability
(J. Bao, P.J. McLellan, J.F. Forbes)
A Convex Approach to the Characterization of the Frequency Response of Ellipsoidal Plants
(G. Chesi, A. Garulli, A. Tesi, A. Vicino)
Error Encoding Algorithms for Networked Control Systems
(G.C. Walsh, O. Beldiman, L.G. Bushnell)
On the Linearizability of Nonisothermal Continuous Stirred-tank Reactors
(M. Guay)

WHO IS WHO IN IFAC

Prof. Henk Verbruggen
member of the Technical Board

Henk B. Verbruggen was born in Amsterdam, the Netherlands in 1938. He received his M.S. degree in Electrical Engineering from the Delft University of Technology in 1963. He joined the Control Engineering Laboratory of the Department of Electrical Engineering of this University in 1963 as an Assistant Professor and in 1975 became Associate Professor and in 1980 Full Professor in Control Engineering respectively at the Control Engineering Laboratory. He became vice-dean of the newly formed Department of Information Technology and Systems (a merge of the departments of Mathematics, Computer Science and Electrical Engineering). Since 1999 he has been an emeritus Professor and is still supervising a number of PhD students.

Over the past 38 years his research and educational activities have focused on different subjects in control engineering. Starting with research activities in nonlinear stability theory, he shifted his research activities to digital control systems and their real-time applications in computer control in the sixties. In the seventies his main research interest was focused on Adaptive Control. In the eighties his research interest was mainly concentrated on Model-based Predictive Control. In the nineties he built up a very active research team focusing on Intelligent Control (AI in real-time control, fuzzy modeling and control, neural nets) with many applications especially in Biochemical Engineering. After his retirement this research has been successfully continued by Dr Robert Babuska.

He has supervised over 250 M.S. students completing their research at the Control Engineering Laboratory and he was the supervisor of more than 20 PhD students. He is the (co)author of more than 250 journal papers and conference contributions and the author/editor of 5 books in the field of Intelligent Control. He was also involved in a number of projects funded by the European Community.

Henk is a past President of the Division of Control Engineering of the Royal Dutch Institute of Engineers. For 15 years he served as the chief-editor of the Dutch-Belgian Journal in Control: Journal A.

He began his affiliation with IFAC in 1976, organizing the 5th IFAC/IFIP Conference on Digital Computer Applications to

Process Control together with his colleague Professor H.R. van Nauta Lemke. He held the position of Chair of the Technical Committee of AI in Real-time Control (1993-1996). In 1999 he became the Chair of the Coordinating Committee of Computer Control, In 1992 he organized the first Symposium on AI in Real-time Control in Delft, the Netherlands and served as IPC chairman in subsequent events in Bled, Slovenia (1995) and Kuala Lumpur, Malaysia (1997). Recently he has served as the IPC Chair at the multi-track Conference on New Technologies in Computer Control (Hong Kong 2001). He is a member of the board of Editors of the IFAC Affiliated Journal Engineering Applications of Artificial Intelligence, and area editor in Control Systems of the Elsevier Journal Fuzzy Sets and Systems.

Large Scale Systems: Theory and Applications - LSS 2001

9th IFAC Symposium

Bucharest, Romania, July 18-20, 2001

LSS 2001 was the ninth in a series of a by now traditional symposium with the first one held at Udine, Italy, in 1976. Since then, in a three-year cycle, the Symposia took place in Toulouse (1980), Warsaw (1983), Zurich (1986), Berlin (1989), Beijing (1992), London (1995) and Patras, Greece (1998). The event was sponsored by the IFAC Technical Committee on Large Scale Systems and was co-sponsored by the IFAC Technical Committees on Manufacturing, Modeling, Management and Control, Advanced Manufacturing Technology and Man-Machine Systems. The Symposium was co-organised by the National Institute for R&D in Informatics ICI and "Politehnica" University of Bucharest (PUB) and was held on the premises of PUB.

The Symposium addressed the control aspects of industrial, economic, social and environmental systems of which characteristics are high dimensionality, nonlinearity and uncertainty, associated with a multitude of structural forms, with intense and time-critical information exchange and efficient co-ordination. It aimed at covering major aspects of large scale, complex systems including methodological aspects, technical solutions and practical applications.

The Final Programme of the Symposium included 114 papers, to be presented in regular, invited, and plenary sessions. 64 regular papers were selected (after reviews of the full texts), from as many as 80 which had been submitted under the 12 technical sessions.

The necessity for striking a fair balance between the technical sessions addressing methodological aspects and those devoted to practical applications encouraged the organisers to ask distinguished scientists from the Czech Republic, Japan, Romania, Switzerland and the UK, to organize invited sessions. 40 papers were included in the Final Programme under eight invited sessions.

Session topics included methodology and application fields, currently traditional for the LSS events over the year:

- Modelling and model reduction;
- Decentralised control and estimation;
- Hierarchical control;
- Intelligent and fuzzy control;
- Nonlinear dynamics in complex systems;
- Complex systems: theory and analysis;
- Water, gas and power systems;
- Large scale CIMs and Production planning and scheduling;
- Communication and information systems;
- Transportation systems;
- Modelling and control of waste water treatment plants;
- Societal systems modelling, planning and management.

In addition, several, less traditional, session topics were included in the technical programme such as:

- Decision support systems;
- Risk and governance in large scale complex systems.

Three technical sessions were held in parallel, to allow proper spaces of time for presentations on the one hand, and questions and discussions on the other. The Conference halls were placed in the same building, to give participants the possibility of establishing contacts in-between sessions. 88 papers were actually presented at regular and invited sessions.

Five highly reputed speakers presented plenary papers of broad and general interest in the DSS field, or communicated new approaches and emerging technologies at the turning of the century.

- Professor Christos Cassandras from the Boston University, spoke about how complexity can be made simple at a small price.
- Professor George Metakides from the European Commission DG "Information Society", presented the emerging technologies for ambient intelligence.

- Professor Peter David Roberts from the City University, London gave an overview of various techniques for integrated system optimization and parameter estimation.
- Professor Masao Ikeda from Osaka University, lectured on vibration suppression design of adaptive structures.
- Professor Peter Groumpos from Patras University, Greece made a comprehensive analysis of issues and challenges in multilevel hierarchical systems and intelligent control.

115 participants from 17 countries registered with the Symposium. They represented universities, R&D institutes and engineering companies. From the messages and comments so far received one can feel the appreciation of the quality of the technical programme and the organization of LSS 2001.

F.G.Filip, IPC chairman