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Newsletter

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Offenlegung:

Das Medienwerk 'IFAC Newsletter' wird als Organ der 'International Federation of Automatic Control' (IFAC) verlegt und ist Eigentum dieser Internationalen Föderation, deren Tätigkeit der Förderung von Wissenschaft und Technik automatischer Regelung und Steuerung dient. Die Föderation hat ihren Sitz in Zürich und ist nach Schweizer Recht als gemeinnütziger Verein angemeldet. Sie verfolgt weder wirtschaftliche noch praktische Ziele. Das Sekretariat der IFAC befindet sich seit 1978 aufgrund eines Übereinkommens mit der Österreichischen Bundesregierung und der Österreichischen Akademie der Wissenschaften in Laxenburg. Der 'IFAC Newsletter' erscheint sechsmal jährlich in englischer Sprache unter der Redaktion des Generalsekretärs der IFAC, Dipl.-Ing. Dr. Gusztáv Hencsey. Die Zeitschrift dient der Information über die Aktivitäten der IFAC. Sie wird kostenlos an Abonnenten in 50 Ländern versandt. Die Kosten werden von der IFAC aus Beiträgen der derzeit 50 Mitgliedsländer getragen. Präsident der IFAC ist für 1993/96 Dr. Stephen Kahne (USA), Vizepräsidenten sind Prof. Vladimír Kucera (CZ) und Prof. Pedro Albertos (E). Alle Funktionen werden ehrenamtlich ausgeübt.

(To our readers: To comply with the Austrian 'Media Act', every publication must contain a declaration once a year concerning ownership and purpose, as above.)

Automated Systems Based on Human Skill Joint Design of Technology and Organization

IFAC Symposium

Berlin, Germany, 26 - 28 September, 1995

This Symposium was the fifth of its name. It brought together about 130 researchers, developers and users of automated systems and information technology. They came from about 30 different countries; about all European countries were represented, including the ones from Eastern Europe; furthermore there were also representatives from the USA, Africa, Japan, Australia, etc.

The Symposium venue was the Fraunhofer Gesellschaft (FhG), Institute for Production Systems and Design Technology (IPK), jointly with the University of Technology Berlin. 127 papers were submitted, 46 papers were accepted for presentation (= 36 %). 50 papers were submitted by the host country of which 17 were accepted (= 34 %). In addition, a number of short papers was accepted for 'ad hoc' presentation in the 9 Discussion Groups which took place in parallel within one 2-hour time slot.

As explained in the initial Plenary Session, industrial organizations are currently undergoing far-reaching changes in their ways of doing business. Lean production, virtual enterprises and concurrent engineering are some of the concepts which are reshaping the organization. The quality of working life will be determined by the way in which these concepts are implemented and also by the design of the supporting information technology infrastructure (Mackay, B.). Such work processes, however, are getting increasingly complex and involve many different actors and influences both from within the enterprise and from outside. In order to face such complexity it becomes more and more important to control the internal complexity of work and thus, to enhance knowledge and empowerment of operators within the enterprises (De Michelis, I).

As an example, the operating personnel in Process Control may need to know the process characteristics as they are dependent on time and space; the personnel may want to compare ideal and real data with respect to time. Researchers from Germany, France, Scandinavia, etc. reported on new control technology systems designed to comply with these pieces of information and empowerment needs. They described new information technology contributing substantially to this empowerment on the 'shopfloor': e.g. Hypermedia use for quality monitoring and diagnosis. Such systems need to be very reliable: comprehensive formal test methods have thus been developed, which are based on the awareness and intuition of control personnel and knowledge engineers. Beyond all technology, however, the personality and creativity of control personnel in problem-solving is decisive in case of crises and emergencies, a well-designed information

system can indicate to the (human) expert which specific risks exist and which action steps to choose in order to reduce or eliminate such risks (Schöneburg, D).

In Manufacturing, the issue of machine tool control by the skilled worker has become pronounced, particularly in Germany. The conventional 'hand-wheel' control has been re-introduced because it seems to correspond more closely to the 'mental models' of the users. The user experiences force-feedback through the hand-wheel. This new system contributes to increasing process efficiency. Furthermore, research and development in Europe has proved that CAM programming can partly be moved (back) to the shopfloor if the control system allows on-line adaptation and changes. Thus, the human-machine communication is gaining new importance and developmental momentum.

With these changes, the Organization of the enterprise is affected as a whole. These obvious changes are demonstrated by cell-based production and network enterprises. Such developments lead to new demands on the employees: Team-working, applying systemic views to work, taking on new responsibilities, etc. They also demand new support technologies: Computer-supported cooperative work, information networks, decision-support systems, etc. One of the aims is to reduce internal complexity while strengthening flexibility of human actions. The (human) operator becomes the 'system regulator', as extensively discussed at the Symposium by the Swiss team of engineers and psychologists.

The European project QUALIT is one example of how to put these concepts into industrial practice in order to contribute towards improving the Quality of Working Life (Butera, I.). In parallel, Japanese industry is starting to take these issues into account: Networked companies need new distributed information systems which in turn demand new skills of the operators as 'system managers' while offering new responsibilities to these individual users. The process of designing such systems, however, has only been successful where the future users have been fully integrated into this collaborative design process. Such experiences were reported from many different countries, including Eastern Europe and the USA.

Aircraft and Air Traffic Control has become particularly visible during the Symposium. Technology is being developed towards increasing automation of flight control: The human role is fundamentally challenged within this complex human-machine system. The information access and display for both pilot and ground controller

need to be designed to allow active control of the system. Frequently, however, boredom versus panic-like responses can be observed, as experts from the USA, Germany, Slovenia, the Netherlands, etc. discussed during several sessions. They suggested to continue this interdisciplinary dialogue at future IFAC events, e.g. the San Francisco World Congress in 1996.

The issue of Environmental Engineering was addressed by several contributors: The response of the audience, on the one hand, was not (yet) very strong; the future significance of this issue must not be underrated, however.

A special session was devoted to the subject Technology - Art - Craftsmanship - and People. In this session, the emphasis was on the human side of developing technology. The professional activity of being an engineer is based on skills which include the art of seeing what is the right thing to do. Thus, technology - the craft of knowing how to make things and the art of knowing what to make - is a central public good and a keystone of self-respect for individuals just as much as for communities (Platts, UK). Creativity is needed for this professional activity of engineers. Such

Adaptive Systems in Control and Signal Processing (ACASP '95)

IFAC Symposium (5th)

Budapest, Hungary, 14 - 16 June, 1995

The Hungarian National Member Organization of IFAC was the host of the Symposium at the Hotel Agro in the Buda Hills of Budapest, Hungary.

The Symposium was the fifth in a series that was started in San Francisco, USA (1983), followed by Lund, Sweden (1986), Glasgow, UK (1989) and Grenoble, France (1992).

Adaptive systems remain a very interesting field of theoretical research, extended by methodological studies and an increasing number of applications. The series focused on many aspects of adaptive systems, ranging from theoretical issues in adaptive control to the methodological aspects and applications of intelligent tuning and adaptive signal processing. This 1995 Symposium added some new areas, e.g. neural networks.

Five well-known international experts in areas where new activities are taking place were invited by the IPC to present plenary papers. They were

Prof. M. Gevers (Belgium): Identification for Control
Prof. L. Keviczky (Hungary): Combined Identification and Control: Another Way
Prof. P.M. Grant and M. Mulgrew (United Kingdom): Nonlinear Adaptive Filters: Design and Application
Prof. D. Clarke (United Kingdom): Adaptive Predictive Control
Prof. R. Kulhavy (Czech Republic): A Kullback-Leibler Distance Approach to System Identification

There was also an Invited Session: Weak Duality for Adaptive Control (organized by Prof. S.M. Veres, UK), and a case Study Session: Multistage Flash Seawater Desalination Plant Control (organized by Prof. G.P. Rao, India).

Furthermore, 75 regular papers were accepted and presented in 14 Technical Sessions. The whole program made a good balance between applications and theory oriented papers and resulted in a very stimulating and high quality event with topics of interest for all researchers and industrialists working with adaptive systems.

G. Hencsey, NOC Chairman
Cs. Banyasz, NMO Secretary

creativity can only be developed if the human brain is used to its full capacity, including its ability to experience emotions. These emotions may be anger, fear, frustration, also joy and compassion - to be shared, listened to and responded to in an individual's or group's decision-making process (Holmes, UK). Thus, the two worlds of being an engineer and being an artist come more closely together again, as Bigelmayr (D) finally described: He was both an artist and an engineer when he created the huge, well-known wooden sculpture 'The Broken Corn Stalk' (Munich, Germany, 1992). The artist's creativity in solving engineering problems can be seen as a challenge to the creativity needed in many areas of engineering today.

The next Symposium of the TC on Social Impact of Automation will take place in Slovenia, September 1997. Slovenia is a most beautiful and peaceful country in the Southern Alps, bordering Austria and Germany, and highly acknowledged for the quality of its engineering research. Those readers who are interested in cooperation are invited to contact me.

Dietrich Brandt, IPC Chairman

Model-Based Biomeasurements

IMEKO/IFAC/IEEE Conference

Stara Lesna, Slovak Republic

6 - 9 September, 1995

The Conference was the 7th event organized by IMEKO TC-13 (Technical Committee on Measurement in Biology and Medicine). The local organizer was the Institute of Measurement Science of the Slovak Academy of Sciences and the Conference was co-sponsored by IFAC, IEEE - Engineering in Medicine and Biology Society, national professional societies and universities. The main sponsor of the Conference was the Chirana-Prima Co., manufacturer of medical instrumentation.

The objective of the conference was to review the latest results in relevant topics and to bring together specialists from the Eastern/Central European research community and the world scientists in biomedical engineering. The scientific program of the conference consisted of submitted papers and posters. The main topics were

- simulation and modelling
- intelligent instrumentation
- sensory systems
- biosignal processing and analysis
- medical imaging
- clinical decision support systems
- information systems in healthcare
- clinical engineering
- electrocardiologic measurements
- neuroengineering
- biomechanics and rehabilitation engineering
- biomedical engineering and education

The sessions were organized in two parallel streams. Despite the relatively wide scope, most sessions concentrated on few problems and offered a good basis for discussions.

The refereeing procedure was based on abstracts. 146 of 161 submitted contributions were accepted, 81 papers and 50 posters were finally presented during the Conference. A Young Scientists competition was featured at the Conference and the winners I. Provaznik (Czech Republic) and N. Martins (Portugal) received an award from Chirana-Prima, Co.

The Conference attracted 144 participants from 20 countries of Europe and America.

Milan Tysler
IPC Chairman

Intelligent Components for Autonomous- and Semi-Autonomous Vehicles

ICASAV '95

IFAC Workshop

Toulouse, France, 25 - 26 October, 1995

This Workshop was motivated by the idea that future vehicles will increasingly deal with autonomous functions to improve safety and traffic management and to reduce fuel consumption and pollution. Numerous on-board decision systems will replace the driver in critical operation phases.

About 45 papers had been submitted to the Workshop of which 21 were selected for presentation by the International Program Committee. Three invited papers on automotive control and mobile robots were also proposed. In the area of autonomous and semi-autonomous vehicles, the 23 papers presented during the one and a half day of the Workshop permitted bringing together specialists in the field of components and instruments for automotive systems, mobile robots and transportation in general. Attendance at the event was very good: 62 participants came from Europe and the USA, with more than 30% coming from industry. The success of the event is an encouragement to organize a further one on this topic in the near future.

P. Bidan, NOC Chairman

News from Sister Organizations

XIV IMEKO Congress

Tampere, Finland, 1 - 6 June, 1997

Technical Programme

Scope

Special emphasis of the Congress is in reporting the state-of-the-art technology as well as in visioning challenges and future development in measurement and automation. Measurement is the most important method of gaining experimental information concerning any process or system. It is essential for decision making in automation and control issues.

The development goes rapidly towards more intelligent, more sensitive, more accurate and faster methods of measuring important quantities in manufacturing processes, in the environment, in the human body and in the laboratory. New efficient methods have been developed for processing the measured information for automation, in-process inspection, quality control, diagnostics and for other purposes. Non-invasive, non-contact types of measurement as well as new sensor principles and materials also gain interest. All fields of the IMEKO Technical Committees will be covered.

For more detailed information, please request the 2nd Announcement and Call for Papers from:

XIV IMEKO Secretariat
Finnish Society of Automation
Asemapaällikönkatu 12 C
SF-00520 Helsinki, Finland

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Email: atufin@ibm.net

IMEKO in Internet World Wide Web (URL):
<http://ee.tut.fi/laitokset/mit/imeko>

Deadline for submission of abstracts:
15 May, 1996

Control Engineering Practice

Volume 4 Number 2

February 1996

Preview

Experimental Results of Robotic Excavation Using Fuzzy Behavior Control
(Xiaobo Shi, Fei-Yue Wang and P.J.A. Lever)
Neural-Network Models for Classification and Forecasting of Freeway Traffic Flow Stability
(L. Florio and L. Mussone)

Special Section on Algorithms and Architectures for Real-Time Control
(Guest Editors: P. Fleming and L. Boullart)

Preface to the Special Section on Algorithms and Architectures for Real-Time Control
(P. Fleming and L. Boullart)
Constructive Empirical Modelling of Longitudinal Vehicle Dynamics Using Local Model Networks
(K.J. Hunt, J.C. Kalkkuhl, H. Fritz and T.A. Johansen)
Parallel Computation of a Control Algorithm for a Robot Manipulator
(C. Ginis, R. Carelli, D.I. Jones and E. Zavalla)
HEDRA: Heterogeneous Distributed Real-Time Architecture
(H. Thielemans, L. Demeestere and H. Van Brussel)
Reduced Algorithm Set Control
(J.G. McCulloch)
Time Requirement Specification in the Graphical Design of Real-Time Software
(J.J. Skubich, J.J. Schwarz, M. Maranzana and T. Szmuc)

Special Section on the Engineering of Complex Computer Control Systems
(Guest Editor: K.F. Man)
Preface to the Special Section on the Engineering of Complex Computer Control Systems
(K.F. Man)
A Decentralization Methodology for Real-Time Control Applications
(M. Törngren and J. Wikander)
Development Framework Approach to Heterogeneous System Design for Control Systems
(M.O. Baxter, J.M. Bass, A.R. Browne, M.S. Hajji, M.O. Tokhi, P.R. Croll and P.J. Fleming)
The Structured Design of an Industrial Robot Controller
(G. Ferretti, G. Magnani, P. Putz and P. Rocco)
Multiple-Goal Objective Functions for Optimization on Task Assignment in Complex Computer Systems
(T.J. Marlowe, A.D. Stoyenko, P.A. Laplante, R.S. Daita, C.C. Amaro, C.M. Nguyen and S.L. Howell)
Controlling a Large Physics Experiment; a Communication Issue
(C. Gaspar and J.J. Schwarz)

IFAC Meeting Papers – Keyword Listing

Algorithms and Architectures for Real-Time Control, May 1995, Ostend, Belgium
Dynamics and Control of Chemical Reactors, Distillation Columns and Batch Processes, June 1995, Helsingor, Denmark
Distributed Computer Control Systems, September 1995, Toulouse, France

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Control of Active Suspension Systems Using the Singular Perturbation Method
(Y. Ando and M. Suzuki)
The Practical Application of a Nonlinear Identification Methodology
(M. Thomson, S.P. Schooling and M. Soufian)
FlexControl - A Tool for Designing Real-Time Fuzzy Control Systems
(S. Tan, C.-C. Hang, H.-C. Lui, X. Liao, Q. Jiang, L. Teow and P.R. Krishnaswamy)
A Neurofuzzy Model-based Compliance Controller with Application to a Telerobot System
(D.H. Cha and H.S. Cho)
Control of Counter-current Washing Operation in Alumina Production; Classical and Optimal Solutions
(Y.L. Sidrak)

Special Section on Control Applications in Marine Systems
(Guest Editor: T.I. Fossen)
Preface to the Special Section on Control Applications in Marine Systems
(T.I. Fossen)
Operating Experience with a High-Precision Track Controller for Commercial Ships
(T. Holzhueter and R. Schultze)
Statistical Analysis and Design of a Rudder-Roll Stabilization System
(H. Oda, K. Ohtsu and T. Hotta)
Design of a Dynamic Positioning System Using Model-based Control
(A.J. Sørensen, S.I. Sagatun and T.I. Fossen)
Identification of Dynamically Positioned Ships
(T.I. Fossen, S.I. Sagatun and A.J. Sørensen)
Final Experimental Results of Full Scale Fin/Rudder Roll Stabilisation Sea Trials
(M.T. Sharif, G.N. Roberts and R. Sutton)
Minimum-time Manoeuvring of a Ship, with Wind Disturbance
(K. Ohtsu, K. Shoji and T. Okazaki)
Underwater Sonar Range Sensing and 3D Image Formation
(P.G. Auran and O. Silven)
Navigation, Guidance and Control of AUVs: An Application to the Marius Vehicle
(D. Fryxell, P. Oliveira, A. Pascoal, C. Silvestre and I. Kaminer)
A Neural-Network Approach to the Control of Surface Ships
(R. Burns and R. Richter)

IFAC Meeting Papers – Keyword Listing

Nonlinear Control Systems Design, June 1995, California, USA
Analysis, Design and Evaluation of Man-Machine Systems, June 1995, Massachusetts, USA

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This Newsletter may be re-produced in whole or in part. We encourage reprinting in national and local automatic control periodicals. Acknowledgement to IFAC would be appreciated.

Youth Automation IFAC Conference

IFAC YAC '95

Beijing, China, 22 – 25 August, 1995

This Conference, organized by the Chinese Association of Automation (CAA), the Youth Committee of CAA (YCCAA) and the Beijing Institute of Technology (BIT), took place in Beijing from 22-25 August, 1995. This is the first time that IFAC convened this international Youth Automation Conference. The Conference was sponsored by the IFAC TC on Automation in Developing Countries and the IFAC TC on Control Education.

The outstanding characteristic feature of this Conference was that both the participants and organizers were young experts in the field of automatic control. The Conference was attended by 140 participants from 19 countries and areas. 193 papers from a total 380 submitted ones were accepted for presentation and included into the preprints in addition to 6 plenary papers. The papers were organized in 13 regular sessions and 2 special sessions, covering a range of topics such as linear and nonlinear control, system modeling and identification, adaptive control, optimization methods, robust control, discrete-event dynamical system, filtering and digital signal processing, fault detection, robotics, intelligent control, neural networks applied to control, process control and application, and algorithms and architectures for real-time control.

YAC '95 also invited some internationally acclaimed scholars to be advisers and to present 3 plenary papers at the opening ceremony: Stochastic Approximation and its New Application (Prof. Han-Fu Chen, China, P.R.); Neural Networks for Control Engineering (Prof. C.P. Wu, China, P.R.); Discrete Event Dynamic Systems: Methodology and Some Recent Progress (Prof. Y.P. Zheng, China, P.R.). Three further plenary papers were given by 3 distinguished young scientists: New Trends and Challenges in Adaptive Control (Dr. Sandor M. Veres, UK); Hypermedia – A Tool for Better Understanding (Dr. J. Lindfors, Finland); Process Control: Art or Practice (Prof. Jian Chu, China, P.R.).

During the three days of YAC 95 there was a lively discussion among the participants. The Conference provided an opportunity for communication and an exchange of knowledge. At the closing ceremony, the young scientists expressed themselves satisfied with the success of the Conference.

Wang Hong and Wang Qinglin
Members of the NOC

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Editorial

Automatica Review and Publication Times
(H. Kwakernaak)

Papers

Control Systems Engineering Education
(N.A. Kheir, K.J. Åström, D. Auslander, K.C. Cheok, G.F. Franklin, M. Masten, M. Rabins)
Towards a Paradigm for Fuzzy Logic Control
(F.L. Lewis, Kai Liu)
Orthogonal Functions for Cross-directional Control of Web Forming Processes
(W.P. Heath)
Exact Output Control for a Family of Linear Plants with Parameter Uncertainties
(G. Conte, L. Jetto, S. Longhi, A.M. Perdon)

Brief Papers

H ∞ -optimal Sampled-data Control: Computation and Design
(Tongwen Chen, B.A. Francis)
Frequency-domain Conditions for Disturbance Rejection and Decoupling with Stability or Pole Placement
(T.G. Koussioris, K.G. Tziazakis)
A Fast Estimation Method for ARMA Processes
(J.K. Sabiti)
An Image-based Filter for Discrete-time Markovian Jump Linear Systems
(F. Dufour, P. Bertrand)
Irreducible Continuous Model Identification via Markov Parameter Estimation
(A.V.B. Subrahmanyam, D.C. Saha, G.P. Rao)
An Undershoot in Scalar Discrete-time Systems
(B. Leon de la Barra, M. El-Khoury, M. Fernandez)
Adaptive Internal Model Control: Design and Stability Analysis
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Time-invariant Representation of Discrete Periodic Systems
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Adaptive Controller Design for Flexible Joint Manipulators
(Shuzi S. Ge)
VSS Theory-based Parameter Identification Scheme for MIMO Systems
(Jian-Xin Xu, H. Hashimoto)

Correspondence Items

Comments on 'Sliding Mode Control of Linear Systems with Mismatched Uncertainties'
(S.B. Phadke)
Author's Reply
(Chi-Man Kwan)

Book Reviews

Intelligent Seam Tracking for Robotic Welding, by N. Nayak and A. Ray
(B. Bona)
Concise Encyclopedia of Environmental Systems, by P.C. Young
(G. van Straten, K.J. Keesman)

Software Review

Adaptech PIM + TR
(C. Downing)

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Electronic Text Processing, AUTOMATICA and Elsevier

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State Estimation for a Large-scale Wastewater Treatment System
(R. Tenno, P. Uronen)
Modelling of Uncertain Systems via Linear Programming
(T.K. Gustafsson, P.M. Mäkilä)
Identification of Non-linear Systems using Empirical Data and Prior Knowledge – An Optimization Approach
(T.A. Johansen)

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Disturbance Decoupling by Measurement Feedback for Structured Transfer Matrix Systems
(J.W. van der Woude)
Robust Stability of Nested Polynomials Families
(V.L. Kharitonov)
 ∞ H Model Matching Problems for Singularity Perturbed Systems
(H.M. Oloomi, M.E. Sawan)
Decoupling through Specified Input-Output Channels with Internal Stability
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(M.B. Rosenhaus)
Integral Constraints on the Accuracy of Least-squares Estimation
(B. Ninness)
A Separate Bias *U-D* Factorization Filter
(M.W. McConley)
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(J.T.H. Chan)
Low-order Multivariable Adaptive Control with Application to Flexible Structures
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Nonlinear Compartmental Model Indistinguishability
(M.J. Chapman, K.R. Godfrey)
A Robust Adaptive Nonlinear Control Design
(M.M. Polycarpou, P.A. Ioannou)
Exact Distribution and Moments for the RLS Estimate in a Time-varying AR(1) Process
(B. Lindoff, J. Holst)
A Multilayer Recurrent Neural Network for On-line Synthesis of Minimum-norm Linear Feedback Control Systems via Pole Assignment
(J. Wang, G. Wu)
A Passivity-based Approach to Force Regulation and Motion Control of Robot Manipulators
(B. Siciliano, L. Villani)
On the Identifiability of the Time Delay with Least-Squares Methods
(G. Ferretti, C. Maffezzoni, R. Scatoloni)
On Speed Control of Induction Motors
(R. Ortega, P.J. Nicklasson, G. Espinosa-Perez)

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Initial and Transient Response Improvement for Singular Systems
(W.Q. Liu, W.Y. Yan, K.L. Teo)
Robust and Reliable H ∞ Control for Linear Systems with Parameter Uncertainty and Actuator Failure
(Ch.-J. Seo, B.K. Kim)
An Approach to Perturbation Compensation for Variable Structure Systems
(S.P. Chan)
Design of Decentralized Control for Symmetrically Interconnected Systems
(A.El Kashlan, M.El. Geneidy)

Artificial Intelligence in Agriculture IFAC/IFIP/EurAgEng Workshop (2nd) Wageningen, Netherlands 29 – 31 May, 1995

With the statement that in organizations, computers and lawyers have one thing in common, being that 'you must possess at least as many as the competition does, so you never have enough', Mr. Mannes Heuver, Director General of the Dutch Agricultural Research Organization (DLO-NL) opened the 2nd Workshop on Artificial Intelligence in Agriculture.

Following the first IFAC Workshop on Expert Systems in Agriculture, held in Huangshan (China) in 1992 under the chairmanship of Prof. Fan-Lun Xiong, this second workshop was organized by the IFAC TC on control in Agriculture (Chairman Prof. Yasushi Hashimoto, Japan).

The change in the workshop title significantly indicates the shift in focus that is taking place in the field: From expert systems as a complete information system to AI as a technology – Mr. Heuver concluded.

At the workshop 106 delegates from 18 countries discussed 3 keynote addresses, 46 papers and 15 poster presentations. Contributions were well spread between the regions Japan/China, USA and Europe. From the paper references it was observed that the various regions do not communicate too much, so networking was an important activity at the workshop.

Dr. John Barrett (USA), the first keynote speaker, discussed the pitfalls experienced during a decade of expert systems development in agriculture, where many systems have not gone beyond the prototype phase. Prof. Jon Stickland (USA), the second keynote speaker, discussed the perspectives of using 2nd generation AI technology. In the third and concluding keynote address, Dr. Eddie Van de Kraats (NL) commented on the experience of the Shell organization with AI, stating that an expert system is like any information system – it has to solve a problem to begin with. In between the keynote addresses, the delegates discussed many applications of AI. From approximate reasoning, AI in simulation, fuzzy reasoning, neural networks to planning, genetic algorithms, constraint analysis and diagnosis. Prof. Aalt Dijkhuizen – the NOC Chairman – concluded in his closing address that AI in agriculture seems to concentrate on specific application fields such as planning, diagnosis and geographical information as well as on specific or AI related methodologies (including fuzzy reasoning, neural networks, constraint satisfaction, etc.).

The workshop was held at the Wageningen International Conference Center (WICC) in Wageningen, the Netherlands – which supported the organizers of the workshop to a great extent. From the many personal interactions among the various research groups and the discussions it can be concluded that AI in agriculture is a maturing field of research and is there to stay. A selected number of workshop contributions will be published in a special issue of the IFAC Affiliated Journal Engineering Applications of Artificial Intelligence. The Postprints will be published by Elsevier.

Alexander J. Udink ten Cate
General Chairman



FORTHCOMING EVENTS

1996

No. 1

Feb.

Title	1996	Place	Deadline	Further Information
IFAC WORLD CONGRESS	JULY 1 - 5	SAN FRANCISCO CALIFORNIA USA	-	IFAC '96 POB 111, Mabelton GA 30059 USA Phone: +1/708/491-3641 FAX: +1/708/491-4455 e-mail: ifac96@nwu.edu
IFORS '96 14th Triennial Conference	July 8 - 12	Vancouver, B.C. Canada	-	Venue West Conference Services Limited 645-375 Water Street, Vancouver, B.C. Canada FAX +1(604)681-2503
1996 Latin American Control Conference (in cooperation with IFAC)	Sept. 9 - 13	Buenos Aires Argentina	31 March 1996	J.P. Weiz - J. Paiuk AADECA Callao 220 lo "B" 1022 Buenos Aires, Argentina FAX +54 1 372 6746 e-mail aadeca@satlink.com
IFAC/IFIP Workshop (21st) Real Time Programming	Nov. 4 - 6	Canela Brazil	15 March 1996	Dr. Carlos E. Pereira UFRGS, El. Engg. Dept. Av. Osvaldo Aranha esq. Sarmento Leite, CEP 90035 - RS Porto Alegre - RS, Brazil FAX +55/51 227 5715 e-mail: cpereira@iec.ufrgs.br
Title	1997	Place	Deadline	Further Information
IFAC Workshop Manufacturing Systems Modelling Management and Control	Feb. 3 - 5	Vienna Austria	31 Aug. 1996	Prof. Peter Kopacek Technical University of Vienna Floragasse 7 a A-1040 Vienna, Austria FAX +43/1/504 18359 e-mail: kopacek@ihrt1.ihrt.tuwien.ac.at
IMACS/IFAC Symposium (2nd) Mathematic Modelling MATHMOD '2	Feb. 5 - 7	Vienna Austria	1 May 1996	Prof. I. Troch Technical University of Vienna (E114/5) Wiedner Hauptstrasse 8 - 10 A-1040 Vienna, Austria FAX +43/1/586 8093 e-mail: itroch@email.tuwien.ac.at
IFAC Symposium (3rd) Modelling and Control of Biomedical Systems including Biological Systems	March 23 - 36	Warwick UK	May 1996	Prof. K. Godfrey Dept. of Engineering University of Warwick Coventry CV4 7AL, UK FAX +44/1203/418922 krg@eng.warwick.ac.uk
IFAC/IEEE Symposium Computer-Aided Control Systems Design - CACSD 97	April 28-30	Ghent Belgium	1 Oct. 1996	Prof. Luc Boullart University of Ghent, Campus Ardoyen Technologiepark - Zwijnaarde, 9 B-9052 Zwijnaarde, Belgium FAX +32/9/264 5839 e-mail: boullart@autoctrl.rug.ac.be
IFAC Conference Control of Industrial Systems	May 20 - 22	Belfort France	20 May 1996	Dr. Michel Ferney ENIB, BP 525 F-90016 Belfort, France FAX +33/84582342
IMEKO/IFAC Congress New Measurements - Challenges and Visions	June 1 - 6	Tampere Finland	15 May 1996	XIV IMEKO Secretariat Finnish Society of Automation Asemapäällikkönkatu 12 C SF-00520 Helsinki, Finland FAX +358 9 1461 650 e-mail: atufin@ibm.net
1997 American Control Conference (in cooperation with IFAC)	June 4 - 6	Albuquerque, NM USA	15 Sept. 1996	Prof. A. Haddad AACC Secretariat, Dept. of EECS Northwestern University 2145 Sheridan Road Evanston, IL 60208-3118, USA FAX +1/708/491-4455 e-mail: ahaddad@eeecs.new.edu

FORTHCOMING EVENTS (ctd.)



Title	1997	Place	Deadline	Further Information
IFAC Symposium (3rd) Intelligent Components and Instruments for Control Applications – SICICA '97	June 9 - 11	Anney France	1 Sept. 1996	Prof. Laurent Foulloy LAMII/CESALP, BP 806 F-74016 Anney, France FAX +33/50 66 60 63 e-mail: foulloy@univ-savoie.fr
IFAC/(IFIP/IFORS) Symposium Transportation Systems	June 16-18	Chania Crete, Greece	30 Nov. 1996	Prof. Markos Papageorgiou Dynamic Symttems and Sim. Lab. Technical University of Crete GR-73100 Chania, Greece FAX +30/821 69568 e-mail: markos@dssl.tuc.gr
International Conference Transition to Advanced Market Institutions and Economies: Systems and Operations Research Challenges	June 18 - 21	Warsaw Poland	15 June 1996	Prof. Roman Kulikowski Systems Research Institute Polska Akademia Nauk ul. Newelska 6 PL-01-447 Warsaw, Poland FAX: +48/22/372772 e-mail: ibs@ibspan.waw.pl
IFAC Symposium Robust Control Design	June 25-27	Budapest Hungary	30 Sept. 1996	Ms. Csilla Banyasz Computer and Automation Res. Inst. POB 63, H-1518 Budapest, Hungary FAX +36/1/1667 503 e-mail: h10kev@huella.bitnet
1997 European Control Conference (in cooperation with IFAC)	July 1 - 4	Brussels Belgium	1 Sept. 1996	M. Gevers/G. Bastin CESAME, Batiment Euler B-1348 Louvain la Neuve, Belgium FAX +32/10/472 180 e-mail: gevers@auto.ucl.ac.be
IFAC/(IFORS) Symposium (11th) System Identification – SYSID '97	July 8 - 11	Fukuoka Japan	1 Sept. 1996	SYSID'97 Secretariat: Mrs. Y. Hayashi Fukuoka Institute of Technology 3-30-1 Wajiro-higashi, Higashi-ku Fukuoka 811-02, Japan FAX +81/92-606 1342 y-hayashi@dw.ee.fit.ac.jp
IFAC Symposium (4th) Advances in Control Education ACE 97	July 14-16	Istanbul Turkey	15 Oct. 1996	Prof. A. Talha Dinibütün Istanbul Technical University Mech. Engg. Faculty Gümüssuyu 80191, Istanbul Turkey FAX +90/212-245 0795 e-mail: mkdnib@tritu.bitnet
1997 Asian Control Conference (in cooperation with IFAC)	July 22-25	Seoul Korea, Rep.	1 Sept. 1996	Prof. Dong-il Cho 1997 ASCC Secretariat Automation and Systems Res. Institute Seoul National University, Bldg. 133 Kwanak-ku, Shinrim-dong, San 56-1 Seoul 151-742, Korea, Rep. FAX +82/2/889-4239 e-mail: ascc@asri.snu.ac.kr
IFAC/(CIGRE) Symposium Control of Power Plants and Power Systems	August 18 - 21	Beijing China, P.R.	31 May 1996	Chinese Association of Automation POB 2728, Beijing 100080, China FAX +86/10/25 45 229
IFAC Symposium Fault Detection, Supervision and Safety for Technical Processes – SAFEPROCESS '97	August 26 - 28	Hull UK	15 Oct. 1996	Prof. Ron Patton Dept. of El. Engg. The University of Hull Cottingham Rd., Hull HU6 7RX, UK FAX +44/1482/466006 e-mail: r.j.patton@e-eng.hull.ac.uk
IFAC Symposium Robot Control	Sept. 3 - 5	Nantes France	30 Jan. 1997	Prof. W. Khalil LAN - Ecole Centrale de Nantes F-44072 Nantes Cedex France FAX +33 7657 4754 e-mail: khalil@lan.ec.nantes.fr
IFAC Conference Manoeuvring and Control of Marine Craft – MCMC '97	Sept. 10 - 12	Brijuni Croatia	1 Feb. 1997	Prof. Z. Vukic University of Zagreb Fac. of El. Engg. and Computing Unska 3 HR-1000 Zagreb, Croatia FAX +385/1/6129809 e-mail: zoran.vukic@fer.hr