



IFAC

International Federation of Automatic Control

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1991  
No. 3  
June

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## WELCOME IFAC AFFILIATES

Starting August last year, IFAC has commenced its newly devised IFAC Affiliate Scheme (cf. IFAC Newsletter 4/90). This scheme has the purpose of involving individuals more actively into the work of the Federation, by sending to them the IFAC Newsletter and by giving them easier access to information related to the technical events of IFAC (through the use of the keywords on the Affiliate Registration Form).

As this was a completely new form of participation in IFAC-related activities, we expected the reaction of our subscribers with great interest. And to our pleasant surprise, the reaction was overwhelming: More than 1.700 persons have meanwhile registered as IFAC Affiliates. And considering the number of IFAC events per year, i.e. approximately 40, at which IFAC Affiliate Registration Cards will be available, this number is expected to rise considerably over the coming triennium. This showed us that the community of

persons interested in control in the widest sense is very big indeed and proved the great need for this scheme.

With you as our partners I am also very much interested in your ideas on control engineering, in what IFAC means to you as a control engineer. I also welcome input concerning the Newsletter: Ideas, criticism, suggestions for changes or improvements - and maybe even praise.

When the new scheme was developed, we first wanted to put the name of every single IFAC Affiliate into this Newsletter. But in view of this tremendous response we think you will be more interested in facts than in long lists of names.

Thus, I would like to use this opportunity to extend a most heartfelt welcome to all of you. I am sure that this new form of partnership will provide new insights and promote control engineering in the widest sense

Gusztáv Hencsey, Newsletter Editor

## Informal Meeting of the Presidents Laxenburg, Austria, 25 - 27 April, 1991

For the first time the Informal Meeting of the IFAC Presidents took place under the chairmanship of B.D.O. Anderson. The other participants of the meeting were: M. Mansour, the IFAC Treasurer, S. Kahne, President-Elect, L. Ljung, Vice-President (Technical Board), Y.Z. Lu, Vice-President (Executive Board), B. Tamm, Past President and G. Hencsey, Secretary.

The character of this meeting was, as always, a very informal one, which is also shown by the fact that there is no fixed agenda and no decisions are taken. Main purpose of this, as well as previous meetings, was to have a closer look at the operation of the Secretariat on the one hand, and to strengthen and intensify the links to the Austrian authorities, which are, among others, gracefully providing IFAC with the Secretariat premises, and to the Austrian NMO and the IFAC Beirut, on the other hand.

For this purpose, the Presidents used the opportunity to meet with the Austrian Minister of Science and Research, Dr. Erhard Busek for a very fruitful exchange of opinion. The President then also had the pleasure to invite all Austrian friends and partners to the already traditional President's dinner.

In addition, and this time in particular, the meeting was used to have an informal brainstorming session on the strengths, weaknesses, opportunities and threats of the Federation. We were happy to see that, on the whole, the strengths by far outweigh the weaknesses, the opportunities are realized and the threats that may exist are recognized and eliminated or minimized.

One of the afternoons was used for a lecture series at Vienna Technical University. One lecture was also given at IIASA, IFAC's neighbouring institute.



**Safety of Computer Control - SAFECOMP 90**  
**IFAC Conference**  
**Gatwick, UK**  
**30 October – 2 November, 1990**

SAFECOMP '90 was held at Gatwick International Hilton. The Conference addressed the needs of technical experts, operators, legislators of systems using computers to provide safety, security and reliability. This 8th event in the SAFECOMP series was attended by 114 people from 18 countries.

The interdisciplinary nature of safety related computer systems is demonstrated by reclassifying the attendees by industry, sector or type of organizations.

Aerospace	5
Consultancies (IT)	8
Consultancies (Other)	5
Consumer Body	1
Energy	14
Insurance	1
Law	1
Medical	1
Other	8
Regulators/Gov.Dept.	6
Research Institutes	11
Road Transport	1
Software/System Houses	21
Universities	22

The Conference was opened with a keynote address by Marty Thomas, Praxis Systems plc, who compared and contrasted the experience of other engineering disciplines with that of the computing industry in safety critical operations.

The first day concentrated on formal aspects of computing with paper sessions on Mathematical Formalisms, Correctness and Issues of Security. In an evening panel session chaired by Mike Rodd, IFAC Technical Board Vice-Chairman, entertaining and informative presentations by representatives of the National Consumer Council (David Leadbetter), The Insurance Industry (Nick Foord-Kelcey) and The Legal Profession (Dai Davies) led to a lively discussion.

In four paper sessions, the second day addressed the topics Just Testing, Software Metrics, Reliability and Dependability, Assessment and Validation. The technical sessions closed with a panel session chaired by Peter Wilkinson, UK Government Department of Trade and Industry, describing the work of the UK Interdepartmental Committee on Safety. Ron Bell and John Balzendale of the Health and Safety Executive, and Robin Bloomfield of Adelard outlined Research and Development, Training, Market Survey and Standards activities proposed in the UK SafeT initiative launched in the middle of 1990.

At the Conference Dinner at Leeds Castle, Kent, in a thought-provoking after dinner speech, Heinz Wolff, Director of the Institute of Bio-Engineering at Brunel University, took up the theme "Are we trying to be too safe". He argued convincingly for the need for personal risk taking whilst controlling the imposition of involuntary risks on others and illustrated his points with many hilarious stories.

The third day included paper sessions on Static Analysis and Symbolic Execution, Safe Operation and four Case Studies in Industry and Practice. In concluding the Conference, Professor John McDerimid looked towards the

"Skills and Technologies for the Development and Evaluation of Safety Critical Systems" for the 90's and beyond.

The final day of SAFECOMP '90 included technical visits to August Computers, where oil and gas production platform safety related fault tolerant computer systems were demonstrated, and British Caledonian Training who were carrying out acceptance trials of a Redifusion Flight Training Simulator for Boeing 767 aircraft.

B.K. Daniels  
 IPC Chairman

**IFAC Congratulates**



Academician Boris Tamm

Academician Boris Tamm, IFAC Past President, was elected Foreign Member of the Royal Swedish Academy of Engineering Sciences, IVA, on the occasion of its General Meeting on November 29, 1990.

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**Intelligent Tuning and Adaptive Control**  
**IFAC Symposium**  
**Singapore, 15–18 January, 1991**

The Symposium on Intelligent Tuning and Adaptive Control (ITAC) was organized by the Instrumentation and Control Society, Singapore. It was the first IFAC-sponsored meeting to be held in South-East Asia. It was co-sponsored by the Singapore Section of the IEEE.

The International Program Committee was made up of 34 members from 15 countries. The Symposium was concerned with the state of the art of designing, implementing and applying intelligent auto tuning and adaptive control techniques to solve industrial control problems. It was intended as a forum for the presentation and discussion of papers describing new design approaches, novel applications and experience in implementing these intelligent control techniques in process control, servo-mechanisms, robotics and related fields.

The Symposium was preceded by two tutorials - System Identification and Adaptive Control. These tutorials were given by L. Ljung and K.J. Åström. 42 delegates attended each tutorial.

120 delegates from 26 countries participated in the Symposium. This was lower than expected, a result of the Gulf crisis. 179 abstracts were submitted to the members of the IPC and, after reviewing, 138 papers were accepted. 71 papers were presented at the Symposium in 15 sessions with 2 or 3 sessions running in parallel. A plenary session was held each morning of the 3-day Symposium. The topics for the plenary sessions were "Directions in Intelligent Control", by K.J. Åström; "Industrial Developments in Intelligent and Adaptive Control" by S. Yamamoto; and "Model Accuracy in System Identification" by L. Ljung.

Social events included a Speakers' and IPC Dinner and a Delegates' Dinner. Tours were arranged for delegates and spouses for sightseeing around Singapore. Factory and university visits were also arranged.

One of the main aims of organizing the Symposium was to arouse the interest of the local instrumentation and control community in intelligent tuning and adaptive control and to bring an IFAC Symposium to their area. The Organizing Committee believes that these aims were achieved and they hope that more Symposia will follow in Singapore.

Kang Chen Guan  
 NOC Chairman

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



## FORTHCOMING EVENTS (ctd)

Title	1992	Place	Deadline	Further Information
IFAC Workshop Distributed Computer Control Systems - DCCS '92	August 23-25	Beijing China, P.R.	15 Jan 1992	Prof. Bing Zheng Gong POB 927, Beijing 100080 China, P.R.
IFAC Symposium (7th) Automation in Mining, Mineral and Metal Processing	August 26-28	Beijing China, P.R.	20 Aug. 1991	7th IFAC MMM '92 Secretariat Mr. Sheng Wei-Zhi ARIM Information Section, POB 919 100071 Beijing, China, P.R.
IFAC Workshop Algorithms and Architecture for Real Time Control	Aug. 31 Sept. 2	Seoul Korea	15 Feb. 1992	Prof. Wook Hyun Kwon Dept. of Control and Instrumentation Engg. Seoul National Univ., Seoul 151-742, Korea
IFAC Workshop (2nd) System Structure and Control	Sept. 3 - 5	Prague CSFR	10 Jan. 1992	2nd IFAC WS, Inst of Information Theory&Automation, POB 18, CS 182 08Prague, CSFR
IFAC/IAF Symposium (12th) Automatic Control in Aerospace	Sept. 8-11	Munich FRG	Sept. 1991	VDI/VDE Secretariat, Att. Mr. H. Wiefels POB 1139 D-W-4000 Düsseldorf 1, FRG
IFAC Symposium (3rd) Low Cost Automation	Sept. 9-11	Vienna Austria	15 Nov. 1991	Ms. J. Hähnel c/o OePWZ Rockhgasse 6, A-1014 Vienna, Austria
IFAC Workshop Spacecraft Automation and On-Board Autonomy for Control of Missions in Space	Sept. 14-16	Darmstadt FRG	1 Jan. 1992	VDI/VDE Secretariat, Att. Mr. H. Wiefels POB 1139 D-W-4000 Düsseldorf 1, FRG
IFAC Workshop Supplemental Ways for Improving Intern. Stability - SWIIS	Sept. 21-24	Toronto area Canada	*	Prof. J.O'Shea, Ecole Polytechnique CP 6079, succ. "A" Montreal, QUE H3C 3A7, Canada
IFAC Symposium Automated Systems Based on Human Skill	Sept. 23-25	Boston, MA USA	*	Dr. Frank Emspak, Project Director Center for Applied Technology 9 Park Street, Boston, MA 02108, USA
IFAC Workshop Intelligent Manufacturing Systems	Oct. 1-2	Dearborn MI, USA	15 Oct. 1991	Prof. N.A. Kheir, Dept. of Electrical&Systems Engg Oakland University Rochester, MI 48309-4401, USA
IFAC Conference SAFECOMP '92	Oct. 28-30	Zurich Switzerland	27 Jan. 1992	Dr. Heinz Frey, ABB CH-8050 Zurich, CH

\* deadline not yet known  
- deadline past

### Introducing IFAC Technical Committees and Working Groups

#### Technical Committee on Biomedical Engineering and Control - BIOMED Scope and Activities

This Committee deals with the primary utilization of system and control principles and techniques in the interdisciplinary area involving engineering, biology, life science and medicine. Its activities are important to IFAC and to the international community for two reasons. First, there are many interesting and significant applications of system and control ideas to biomedical problems. Clearly, such applications can be of enormous value to mankind. Second, the biomedical arena is an excellent source for the kinds of hard, different, problems whose solution can provide great insight into the fundamentals of system modeling and control. All aspects related to modeling and control in biomedical systems are covered. Of particular interest are: Physiological modeling, simulation, identification, experiment design, control and AI techniques; application of modeling and control principles and techniques for understanding structure and function of physiological systems, e.g. cellular, neuromuscular, neurosensory, endocrine-metabolic, respiratory and circulatory systems, both in the healthy state and disease; control of drug delivery for optimal therapy; decision support systems for control of physiological variables in intensive and chronic therapy; control of voluntary movements; rehabilitation engineering; delivery of health care, its optimization and automation; man-machine interaction.

The TC on BIOMED has a membership of 39 members representing 30 different countries.

The TC on BIOMED has formed three Working Groups on specialized topics: Decision Support Systems for Control of Physiological Variables; Control of Voluntary Movements, and Control of Drug Delivery. Their scopes and activities will be described separately.

Technical events of the TC on BIOMED include: The Triennial IFAC Symposium on Modelling and Control in Biomedical Systems (the 1st was held in Venice, Italy, 1988; the 2nd will be held in Galveston, Texas, USA, 1992). The Workshops of the three Working Groups (a WS of the Decision Support Systems for Control of Physiological Variables WG was held in London, UK, 1989; the other two WGs will have their Workshops in 1992-93).

There is an increasing cooperation of the IFAC TC on BIOMED with international societies, in particular IMEKO TC 13 (Measurement in Medicine and Biology), IEEE EMBS (Engineering in Medicine and Biology Society) and IFMBE (International Federation for Medical and Biological Engineering). As a result, a number of biomedical events are being co-sponsored, and guest scientific sessions organized with significant cultural and organizations benefits.

BIOMED is also co-sponsoring events within IFAC, e.g. the Symposia Series on Identification and System Parameter Estimation. More will be done in the future along this line, e.g. by co-sponsoring events on adaptive control, nonlinear systems and AI.

### News from Sister Federations

#### IFIP Congress '92 Spain, September 7-11, 1992

#### Call for Papers

Papers submitted for the IFIP Congress '92 are due by

**10 January, 1992**

The due date was advanced to permit authors to include the latest possible material in their papers.

The Congress Organizing Committee informed the IFIP Council in March that there will be an exhibition associated with the Congress.

To receive a copy of the Call for Papers or further information about the Congress, please contact

**IFIP Congress '92  
Federacion Espanola de Sociedades  
de Informatica  
Hortaleza 104 - 2 izq.  
E-28004 Madrid, Spain  
fax: (+34-1)243 1003  
e-mail: fesi@dit.upm.es**



## Joint Automatica IEEE Transactions on Automatic Control Special Issue Meeting the Challenge of Computer Science in Industrial Applications of Control

## WHO IS WHO IN IFAC



Prof. André Titli  
Member of the IFAC Council

André Titli was born in Paris (France) in 1941. He received his engineer's degree in 1966 from the Ecole Nationale Supérieure d'Electrotechnique, d'Hydraulique et d'Informatique de Toulouse (ENSEEHT), his Docteur es Sciences Physiques degree in 1972, from the Université Paul Sabatier de Toulouse in Electrical Engineering and Automatic Control.

From 1968 to 1973, he was a researcher at the C.N.R.S (Centre National de la Recherche Scientifique); in 1973 he was nominated Maître de Conférences (Associate Professor), Professor in 1980 at the Institut National des Sciences Appliquées (I.N.S.A.) in Toulouse (a French Engineer High School); he was Chairman of the Electrical Engineering Department at the I.N.S.A. (1980-87), Head of the scientific operation: Decentralized and Hierarchical Control at the Laboratoire d'Automatique et d'Analyse des Systèmes (L.A.A.S.-C.N.R.S.) (1970-74), Head of the Complex System Department in this laboratory (1974-79). Since March 1990 he has been Deputy Director of the Mixed Research Group on Automotive Systems, a laboratory common to C.N.R.S. and Siemens Automotive in Toulouse, and has had responsibility for a national program of the C.N.R.S on integrated automation (control/command/supervision) since 1987.

Prof. Titli has held various visiting professorships, i.e. at the Federal University of Rio de Janeiro (1974), the Ecole Polytechnique Université de Montreal, Canada (1978) and the Technical University of Wuhan, China, P.R. (1980).

His research interests include the analysis, control and supervision of large scale and complex systems, with applications to engineering, power systems and automotive systems. More recently, Prof. Titli has been involved in the study of the use of Artificial Intelligence, fuzzy logic and neural networks in automatic control.

Professor Titli is author or co-author of more than 100 papers and books in the field of large scale systems.

In IFAC Professor Titli has held various positions to date, i.e. Secretary of the TC on Systems Engineering (SECOM) (1975-78), Vice-Chairman of SECOM (1978-81 and 1981-84), Member of the IFAC Council (1990-1993).

### Papers From the Next Issue - July 1991

#### Papers

- Industrial Adaptive Controllers Based on Frequency Response Techniques (T. Hägglund, K.J. Åström)  
MIMO Adaptive Constrained Predictive Control Case Study: An Environmental Test Chamber (J.M. Dion, L. Dugard, A. Franco, N.M. Tri, D. Rey)  
Fishery Management as a Problem in Feedback Control (O.L.R. Jacobs, D.J. Ballance, J.W. Horwood)  
Synthesis of Feedback Control Logic for Discrete Manufacturing Systems (B.H. Krogh, L.E. Holloway)  
Recursive Estimation of Time Delay in Sampled Systems (G. Ferretti, C. Maffezzoni, R. Scattolini)  
On Identification of Stable Systems and Optimal Approximation (P.M. Mäkilä)  
Circle Criteria, Small-Gain Conditions and Internal Stability for Infinite-Dimensional Systems (H. Logemann)

#### Brief Papers

- Large Scale Systems with Multiple Objectives: An Interface Negotiation Procedure (F.A. Gomide, J.R. Cardarelli, K. Tarvainen)  
Performance Analysis of Sampled-Data Control Systems (G.M.H. Leung, T.P. Perry, B.A. Francis)  
Robustness of Sampled-Data Control Systems with Uncertain Physical Plant Parameters (J.E. Ackermann, H.Z. Hu)  
Robust Characteristic Polynomial Assignment (H. Rotstein, R. Sanchez Peña, J. Bandoni, A. Desages, J. Romagnoli)  
Intermittent Phenomena in Adaptive Systems: A Case Study (M.D. España)  
Fast Suboptimal Solution to the Static Output Control Problem of Linear Singularly Perturbed Systems (Dj. Petkovski, N. Harkara, Z. Gajic)  
Perturbation Analysis of GPC with One-Step Control-Horizon (A.-L. Elshafei, G. Dumont, A. Elnaggar)  
An Iterative Learning Control Law for Dynamical Systems (T. Sugie, T. Ono)  
Optimal Input/Output Variable Assignments for Multivariable Systems (L.F. Yeung)  
The Edge Theorem and Graphical Tests for Robust Stability of Neutral Time-Delay Systems (M. Fu, A.W. Olbrot, M.P. Polis)  
Market-Clearing Prices in Coupled, Dynamic Systems (A.W. Berger)

#### Book Reviews

- Robust Multivariable Feedback Control, by J. Lunze (S. Engell)  
Optimale Lineare Regelung, by S. Engell (H. Kwakernaak)

**Background:** The development of large real-time control and signal processing systems represents one of the most challenging tasks the engineering community faces today. This challenge involves the integration of hardware, software, and intelligence, i.e. applications software involving particular algorithms.

**Meeting the challenge:** The IEEE Control Systems Society and IFAC Committee on Theory have decided to launch a project to help meet this challenge. Major outcomes of the project will be:

1. Reports of meetings with industry representatives to assess via selected projects the relative importance of hardware, basic software, applications software (including algorithms) in the systems control industry,
2. reported case studies on how relying on modelling plus mathematical methods of signal processing and control may be an efficient complement, or even superior to the use of heuristics or rule based approaches in industrial applications,
3. a final report summarizing conclusions, findings, and recommendations.

**Call for special issue papers:** this call covers item 2 of the project. Submission of papers for a joint special issue of Automatica and the IEEE Transactions on Automatic Control is encouraged. Accepted papers will be distributed between the two journals in the following way: a paper published in one journal will have its abstract published in the other. Selection of the papers will be performed in accord with the standard procedures of each journal, with K.J.Åström and A. Benveniste acting as Associate Editors.

Submitted papers should satisfy the following conditions:

1. report of an industrial case study;
2. presentation of the background of the application and the models used;
3. presentation of the algorithms used and the resulting implementation.

Longer papers than usual may be considered for publication. All areas of application are of interest. However, applications where non-mathematical techniques are most commonly used (e.g. diagnostics; information processing; large systems; command, communication and control,...) will be preferred. Authors may express preference for a particular journal, but the Associate Editors will make the final decision on distribution of the accepted papers among the two journals.

Authors are invited to submit seven (7) copies of their complete paper to

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**Deadline for submission of papers is October 31, 1991.**

Expected publication date for the joint special issue: early 1993.





# FORTHCOMING EVENTS 1991

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June

Title	1991	Place	Deadlines	Further Information
IFAC Workshop Electric Power System Control Centers	June 19-21	Semmering Austria	-	K. Schenk, IFAC Control Centre WS Siemens Osterreich AG, Gudrunstr. 11, A-1100 Vienna, Austria
IMACS/IFAC Symposium Parallel and Distributed Computing in Engineering Systems	June 23-28	Corfu Greece	-	Prof. S. Tzafestas, P.D.COM '91 IRCU, Computer Science Div. NTU Athens, Zografu 15773 Athens, Greece
IFAC Workshop Discrete Event System Theory and Applications in Manufacturing and Social Phenomena	June 25-27	Shenyang China, P.R.	-	Prof. Xu Xinhe, DES '91 Dept. of Automatic Control Northeast Univ. of Technology Shenyang 110006, PRC
IFAC Conference Advances in Control Education	June 24-25	Boston, MA USA	-	Prof. M. Rabins, Mech. Engg. Dept Texas A&M Univ. College Station, TX 77843-3123, USA
1991 American Control Conference in cooperation with IFAC	June 26-28	Boston, MA USA	-	Timothy L. Johnson, General Chairman GE Corp. R&D, KW-D217, POB 8 Schenectady, NY 12301, USA
IFAC/IFORS Symposium (9th) Identification & System Parameter Estimation	July 8-12	Budapest Hungary	-	Ms. Eva Sós, Computer & Automation Inst. HAS, POB 63 H-15181 Budapest, Hungary
IFAC/IFIP/IMACS Symposium (5th) Computer Aided Design in Control Systems	July 15-17	Swansea UK	-	Ms. F. McEwen, Dept. of Elect. Electronic Engg., Univ. College of Swansea, Singleton Park Swansea SA2 8PP, UK
IFAC Symposium Distributed Intelligence Systems DIS '91	Aug. 13-15	Arlington, VA USA	-	Prof. A.H. Levis Dept. of EE, George Mason University Fairfax, VA 22030-4444, USA
EFMI/IIASA/IFAC Intl. Conference Medical Information Systems and Expert Systems	Aug. 19-22	Vienna Austria	-	MIE'91 Interconvention A-1450 Vienna, Austria
IFAC Workshop Expert Systems in Mineral and Metal Processing	Aug. 26-28	Espoo Finland	-	Finnish Society of Automatic Control Hämeentie 6 A 15 SF-00530 Helsinki, Finland
IFIP/IFAC Conference (15th) System Modelling and Optimization	Sept. 2-6	Zurich Switzerland	-	Dr. K. Fraundorfer Institute for OR, Univ. Zurich Moussonstrasse 15 CH-8044 Zurich, Switzerland
IFAC Symposium Design Methods of Control Systems	Sept. 4-6	Zurich Switzerland	-	IFAC Symposium Zurich '91 Att. Ms. B. von Känel, ETH Zentrum CH-8092 Zurich, Switzerland
IFAC Workshop (10th) Distributed Computer Control Systems DCCS '91	Sept. 9-11	Semmering Austria	-	Prof. H. Kopetz TU Wien, Inst. f. Technische Informatik Treitlstr. 3/182.1, A-1040 Vienna, Austria
IFIP/IFAC Conference Computer Applications in Production and Engineering - CAPE '91	Sept. 10-12	Bordeaux France	-	CAPE '91 Conference Secr. Lab. GRAI, Cours de la Liberation, 351 F-33405 Talence, France
IFAC Symposium Fault Detection, Supervision and Safety for Technical Processes SAFEPROCESS '91	Sept. 10-13	Baden-Baden FRG	-	VDI/VDE GMA SAFEPROCESS '91 POB 1139 D-W 4000 Düsseldorf, FRG
IFAC Workshop Algorithms and Architectures for Real-Time Control	Sept. 11-13	Bangor UK	-	Prof. D.I. Jones, School of Electronic Engg. Science, UCNW Dean Street, Bangor Gwynedd LL57 1UT, UK
IMEKO/IFAC Conference Artificial Intelligence Based Measurement and Control - AIMaC '91	Sept. 12-14	Kyoto Japan	-	Prof. K. Kariya, Dept. of EE Fac. of Science and Engg. Ritsumeikan University 56-1, Tojiin-kita, Kita-ku, Kyoto 603, Japan
IFAC/IFIP/IMACS Symposium Robot Control SYROCO '91	Sept. 16-18	Vienna Austria	-	ÖPWZ, Att. Ms. J. Hähnel Rockhgasse 6 A-1014 Vienna, Austria
IFAC Workshop (3rd) Artificial Intelligence in Real Time Control	Sept. 23-25	Napa, CA USA	-	Dr. G.J. Suski, Lawrence Livermore Nat. Lab., POB 808, L550 Livermore, CA-94550, USA
IFAC/ISHS Workshop Mathematical and Control Applications in Agriculture and Horticulture	Sept. 30 Oct. 3	Matsuyama Japan	-	Prof. H. Nonami, Dept. of Bio- mechanical Systems, Ehime University, Tarumi, Matsuyama 790, Japan



## FORTHCOMING EVENTS (ctd.)

Title	1991	Place	Deadlines	Further Information
IFAC/IFIP Workshop Distributed Databases in Real-Time Control	Oct. 8-11	Rydzyzna Poland	-	Prof. J. Korbicz Higher College of Engg. ul. Podgórna 50, PL-65246 Zielona Góra, Poland
IFAC Symposium Advanced Control of Chemical Processes - ADCHEM '91	Oct. 14-16	Toulouse France	-	ADCHEM '91, LAAS/CNRS 7, av. du Colonel Roche F-31077 Toulouse Cedex, France
IFAC/IMACS/IFIP Workshop Cultural Aspects of Automation	Oct. 16-18	Krems Austria	15 June 1991	ÖPWZ, Ms. J. Hähnel Rockhgasse 6, A-1014 Vienna, Austria
IFAC/IFIP Conference Safety, Security, Reliability SAFECOMP '91	Oct. 30 - Nov. 1	Trondheim Norway	-	NFA POB 2312, Solli, N-0201 Oslo 2 Norway
Title	1992	Place	Deadlines	Further Information
IFAC Symposium Control of Power Plants and Power Systems	March 9-11	Munich FRG	15 June 1991	VDI/VDE-GMA Secretariat Symposium Power Plants and Systems POB 1139 D-W-4000 Düsseldorf 1, FRG
IFAC Conference Modelling and Control of Biotechnical Processes	April 5-8	Monterey, CA USA	*	Prof. M. Karim, Dept. of Agri/ Chem. Engg., Colorado State Uni. Fort Collins, CO 80523, USA
IFAC Workshop AI, Control and Advanced Technology in Marine Automation	April 8-10	Genoa Italy	*	Prof. E. Volta, Ist. Automazione Navale C.N.R., Viale Causa 18R I-16145 Genoa, Italy
IFAC Symposium On-Line Fault Detection and Supervision in the Chemical Process Industries	April 22-24	Newark Delaware USA	1 June 1991	Dr. P. Dhurjati, Dept. of Chem. Engg., Univ. of Delaware Newark, DE 19716, USA
IFAC Symposium DYCORD '92 (Advanced Control in Chemical Processes)	April 27-29	College Park MD, USA	1 June 1991	Dr. T. McAvoy Dept. of Chem. & Nuclear Engg. University of MD, College Park MD 20742-2111, USA
IFAC Symposium Intelligent Components and Instruments for Control Applications	May 20-22	Malaga Spain	30 June 1991	SICACA '92 Symposium Secretariat Faculty of Information, Plaza El Ejido s/n, E-29013 Malaga, Spain
IFAC/IFIP/IFORS/IMACS Symposium (7th) Information Control Problems in Manufacturing Technology	May 25-28	Toronto Canada	31 Aug. 1991	Ms. Nicole Léger INCOM '92 National Research Council Ottawa, Ont. K1A 0R6, Canada
IFAC Workshop Automatic Control for Quality and Productivity	June 3-5	Istanbul Turkey	*	Prof. A. Talha Dinibütün, Istanbul Tech. Univ., Inst. of Science & Technology Ayazaga 80626-Istanbul, Turkey
IFAC/IFIP/IFORS/IEA Symposium Analysis, Design and Evaluation of Man-Machine Systems - MMS	June 9-11	The Hague Netherlands	-	Ir. P. L. Brinkman, c/o Man-Machine Systems Group Lab. for Measurement and Control Fac. of Mech. Engg. & Marine Tech Mekelweg 2, NL-2628 CD Delft
IFAC Symposium Artificial Intelligence in Real Time Control	June 16-18	Delft Netherlands	1 Nov. 1991	Prof. H. B. Verbruggen, Delft University of Technology, Dept. of EE POB 5031, NL-2600 GA Delft, Netherlands
IFAC/IFIP Workshop Real-Time Programming	June 23-25	Bruges Belgium	*	Mr. Luk Pauwels, Coordinator BIRA, Desguinlei 214 B-2018 Antwerp, Belgium
1992 American Control Conference in cooperation with IFAC	June 24-26	Chicago, IL USA	15 Sept. 1991	Dale E. Seborg, Dept. of Chem. & Nuclear Engg. University of CA, St. Barabaram CA 93106, USA
IFAC Symposium Nonlinear Control Systems Design NOLCOS	June 24-26	Bordeaux France	1 Oct. 1991	Dr. M. Fliess, CNRS ESE, Lab. des Signaux & Systèmes, Plateau de Moulon, F-91192 Gyf sur Yvette, France
IFAC/IFORS Workshop Support Systems for Decision and Negotiation Processes	June 24-26	Warsaw Poland	1 Sept. 1991	Dr. Z. Nahorski, System Res. Inst. Newelska 6, PL-01 447 Warsaw Poland
IFAC Symposium Adaptive Control and Signal Processing	July 1-3	Grenoble France	*	L. Dugard, Lab d'Automatique de Grenoble-ENSIEG, BP 46 F-38402 St. Martin d'Herès, France
IFAC/IFORS/IFIP/(IIASA) Symp. (7th) Modelling and Control of National Economies	August 18-20	Beijing China, P.R.	15 Dec. 1991	Ms. Wang Hong, MCNE '92 Secretariat Chinese Association of Automation POB 2728 Beijing 100080, China, P.R.
IFAC/IFORS Symposium (6th) Large Scale Systems: Theory and Applications	August 22-25	Beijing China, P.R.	15 Aug. 1991	Prof. Y. P. Zheng, IFAC LSS92 Chinese Association of Automation POB 2728, Beijing 100080, China, P.R.