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# International Federation of Automatic Control

Secretariat: Schlossplatz 12, A-2361 Laxenburg, Austria — Phone (02236) 71447, Telex 79248 ifac a

# Newsletter

## Identification and System Parameter Estimation

### IFAC/IFORS Symposium

Beijing, PRC, 27 - 31 August, 1988

### Contents:

Identification and System Parameter Estimation IFAC/IFORS Symposium, PRC	*
Advances in Automation for Hard Rock and Underground Mining IFAC Workshop, Canada	*
Trends in Control and Measurement Education IFAC Symposium, UK	*
Power Systems: Modelling and Control Applications IFAC Symposium, Belgium	*
News from IEEE	*
Applied Measurements in Mineral and Metal Processing IFAC Workshop, ZA	*
Forthcoming Events	*
New Publication	*
Robust Adaptive Control IFAC Workshop, Australia	*
19th FIACC Meeting, France	*
Computer Aided Design in Control and Engineering Systems IFAC Symposium, PRC	*
Papers from the Next Issue of Automatica	*
News from Sister Federations: Triennial IFORS Conference	*
Who is Who in IFAC	*

Among the various symposia series of IFAC, the one on Identification has a fair and respected history: 1967 in Prague; 1970 Prague; 1973 The Hague; 1976 Tbilisi; 1979 Darmstadt; 1982 Washington; 1985 York. On the one hand this implies the positive force of a good tradition, on the other hand it generates high expectations with respect to quality and effectiveness. These expectations were fulfilled to a high degree. The Chinese organizers succeeded in making it into an event that was valuable, effective and pleasant at the same time. The IPC had to make a selection from among 821 proposed contributions of which 385 were foreign and 436 from Chinese authors. After the selection procedure a program was made consisting of 8 plenary papers (6 presented) in four sessions; and 369 contributed papers (84 % presented) in 63 sessions. Some 10 sessions were organized by colleagues around particular themes. The session topics included: Identification techniques; parameter estimation; structure identification; recursive estimation; convergence analysis; continuous time systems; signal processing; self-tuning control; adaptive control; robust adaptive control; nonlinear systems; distributed-parameter system identification. Specific applications sessions dealt with the following subjects: Industrial processes; failure detection; chemical systems; power systems; biological systems; environmental systems; health care; aeronautics and aerospace and social economic systems. The range of subjects indicates the width and depth of the program. The quality and

technical contents of the presentations was rated basing on a sample of 40 from 63 sessions and found highly satisfactory. The plenary presentations were: Adaptation and tracking in system identification (Prof. L. Ljung, Sweden); Modelling of social economic systems (Prof. B. Liu, China, P.R.) Some observations on robust stochastic estimation and control (Prof. G.C. Goodwin, Australia) Digital identification, forecasting and control (Prof. P.C. Young, Great Britain) Theory of system identification and adaptive control for stochastic systems (Prof. H.F. Chen, China, P.R.) Continuous time approaches to system identification (Profs. H. Unbehauen, FRG and G.P. Rao, India) All in all 190 colleagues from all over the world and some 200 from China were registered. These participants were mainly from universities; a stronger industrial participation remains to be an essential wish. Summarizing one might say that it was a good symposium indeed. The whole spectrum of identification and system parameter estimation was covered in great detail, ranging from theory-development to a multitude of applications - a mature part of the control field indeed. The IPC in its final meeting expressed its formal congratulations to the Chinese organizers for the quality of the Symposium, the facilities and the program. In short: A real contribution to the (control) engineering community. P. Eykhoff, IPC Chairman

## Advances in Automation for Hard Rock and Underground Mining IFAC Workshop

Ste. Adèle, Canada, 12 - 14 Sept., 1988

The Workshop took place in a resort hotel in Sainte-Adèle, province of Quebec, Canada. It was organized by the Canadian Centre for Automation and Robotics in Mining, jointly managed by the Ecole Polytechnique de Montréal and McGill University, under the joint chairmanship of Professors A. Piché and M. Scoble. Out of 52 participants, 25 came from abroad; 24 were professors and 28 engineers from the mining industry and its equipment suppliers. The IPC accepted 27 papers, most of them solicited, which originated from authors living in 10 different countries. These papers covered the following main topics:

- automation of underground transportation
- autonomous vehicle guidance, vision systems and robotics
- automation of rock breaking and support systems
- systems design and monitoring
- automation of drilling rigs

The main conclusions of the meeting can be summarized as follows: There is a great deal of research now taking place in underground

hard rock mining automation in general. However, there is a need to develop new mining methods and equipment that would ease automation. This is specially true for narrow vein ore bodies. Most of the technology required for mine automation already exists. Borrowing what has been done in other types of industry while adapting these methods to the specific mining environment has often given good results. There are many examples of this type of technology transfer in Scandinavian countries and in Canada. It appears that fallouts from military research projects underway in the USA could serve well for mining automation. The research taking place on automatic guided vehicles constitutes a good example of such fallouts. Much effort was taken to develop automatic hard rock continuous miners, drills and load-haul-dump vehicles. According to what was discussed at the Workshop it can be concluded that the efforts are starting to bear fruit in those domains.

J. O'Shea, NOC Chairman

## Trends in Control and Measurement Education

### IFAC Symposium

Clyne Castle, UK 11 - 13 July, 1988

The IFAC Symposium TRICMED 88 was held at Clyne Castle, a residence of University College, Swansea, UK. The meeting was sponsored by the Education Committee (EDCOM) of IFAC, in association with IMEKO and IMACS, and organized for the United Kingdom Automation Council (UKAC) by the Institute of Measurement and Control. It was attended by approximately 70 delegates, with 29 from the UK and the others from 20 different countries.

The technical program contained 56 papers which had been selected by the International Program Committee from an original offering of over 90 abstracts. The delegates were welcomed to Swansea by Professor Brian Clarkson, Principal of the College. Professor Manfred Thoma, Past President of IFAC, greeted the delegates on behalf of President Boris Tamm.

A plenary session presentation was given to start the technical program each day, the first by Professor Thoma who described two real-time control experiments used by students at Hannover Technical University. He stressed the importance not only of real-time control studied in the undergraduate curriculum but also of the need for control engineers with a strong theoretical background. Despite the increasing use of expert system ideas in control design, problems such as those described, especially that on the optimal control of two trains, which was excellently demonstrated by a short film, could not be solved without the use of advanced mathematics. The second plenary presentation was by H. Dorey, Director, Industry Affairs - Schlumberger (UK) Ltd, who gave a most interesting presentation covering both the technical problems and development times involved in producing industrial measurement systems. He illustrated his talk with many examples from a variety of industries before presenting his views on the educational requirements for engineers capable of successfully answering the challenging needs of industry. The final plenary session

presentation was given by Professor M.J. Rabins (Texas A&M University) who surveyed the one day series of presentations and exhibits given on Advances in Automatic Control Education at the 1988 American Control Conference. The lecture made excellent use of two screens, one showing photographs which Professor Rabins had taken at the meeting and the other viewgraphs highlighting the features of the presentations. Some innovative, and in some cases quite cheaply implemented laboratory experiments were described as well as details of new software packages for teaching.

The technical sessions for most of the meeting were conducted with two in parallel, and many interesting aspects of control and measurement education were discussed. The topics of the sessions included the following: Real-time control, measurement education, process control, measurement systems, education in developing countries, computer-aided instruction, continuing education, software development, course design, teaching methods, use of commercial software, robotics and manufacturing.

Of the 56 papers originally selected for the program, two were withdrawn and seven not presented. In the session on Continuing Education it was suggested that IFAC should be more involved in this growing field. Of the authors of the technical papers presented, 22 were from the UK with others coming from 16 different countries.

The venue for the meeting was particularly pleasant and, with the lodging and conference facilities adjacent, plenty of opportunity was available for informal discussion. The highlight of the social program was a Welsh evening, where delegates became so entertained conscious that Professor Thoma responded to the Welsh singing with a song in German. Perhaps we should have an IFAC song for such events!

D.P. Atherton  
IPC Chairman

## Power Systems: Modelling and Control Applications

### IFAC Symposium

Brussels, B, 5 - 8 Sept., 1988

This Symposium was sponsored by the Applications Committee and organized by the Belgian Federation of Automatic Control. The aim of this activity was to further the dialogue and exchange of ideas between the specialists of power plant control and those of power system control.

A total of 85 contributions of 150 submitted papers, were presented during 18 sessions. In addition, three plenary sessions were organized.

The sessions covered the following fields:

- voltage control, stability, security analysis and monitoring, power system modelling, emergency and restoration, planning and operating tools, power system control, economic optimization, state estimation (55 papers);
- modelling of generating plant, power plant control (15 papers);
- data administration and exchange (5 papers);
- expert system applications (for both, units, network) (6 papers);
- training simulators (for generating units, network) (4 papers)

Unfortunately 10 authors were not present and their papers were cancelled.

The three plenary sessions were devoted to "Improved Coordination of Power Plant and Power System Control", "Some Trends in Automatic Control of Power Plant" and "Security and Optimization in Power Systems".

At the same time, a technical exhibition took place and a poster presentation was dedicated to the research and development activities of universities and technical high schools.

This last part was organized free of charge for the participants and attracted 15 schools coming from 5 countries (one from Japan, the others from Poland, UK, the Federal Republic of Germany and Belgium).

The Symposium was attended by 236 participants from 29 countries worldwide (73 from Belgium), stressing the international character of the Symposium.

J. Debelle  
NOC Chairman

## News from IEEE

In October, IEEE Region 8 (including Europe, Africa and the Middle East) celebrated its 25th anniversary in Munich. At the corresponding technical session, the invited guests, among them Prof. B. Tamm and Prof. M. Thoma, were greeted by the Region 8 Director Hugo Rüdhardt and by the IEEE President Dr. Russell C. Drew. On behalf of IFAC, President Boris Tamm delivered an address to IEEE Region 8, emphasizing the creative continuity of cooperation between the specialists of the two organizations. After hearing the invited tutorial papers, the session delivered IEEE awards to the most outstanding members of Region 8.

The 1989 IEEE Conference on Decision and Control (CDC) will be held December 13-15, 1989 in Tampa, Florida. As usual, the Conference will be conducted in cooperation with the Society for Industrial and Applied Mathematics and the Operations Research Society of America. The General Chairman of the conference is Leonard Shaw of the Polytechnic University Brooklyn, and the Program Chairman is Tamar Basar of the University of Illinois at Urbana. Contributed papers and invited sessions are solicited in all aspects of the theory and applications of systems involving decisions, control, optimization and adaptation.

Deadline for the submission of papers is March 1, 1989  
Papers must be submitted to:

Prof. N.H. McClamroch  
Dept. of Aerospace Engineering  
University of Michigan  
Ann Arbor, MI 48109, USA

## Applied Measurements in Mineral and Metal Processing IFAC Workshop

Johannesburg, ZA, 11 - 14 Oct., 1988

The meeting was held over three days in the secluded Bush Lodge of the Sabi Sabi Game Park which forms part of the 200,000 acre Eastern Transvaal Bushveld Reserve. Thus, daily safaris to view wildlife in the deepest Africa formed part of the meeting. Forty seven delegates started their day at 5.30 in the morning to fit in the game viewing with the six hours of technical discussions every day. The international flavour was provided by contributions from Germany (2), Switzerland, Japan and the USA. A delegate from Chile provided the Latin American flavour. The South African contributions (10) were biased towards the main mineral industries in that country, the extraction of gold, platinum and diamonds. However, the steel manufacturers provide ample insight into measurement problems and achievements in this industry. Five technical sessions later every delegate was convinced to have gained a better insight into the measurement problems and some of the solutions to these problems in the mineral and metal processing industry. This was made possible through the five chairmen selected for these sessions - each one an expert who was capable of providing an overview and a scenario of the industrial environment which helped to put the written contributions into perspective.

The Proceedings, which will be published by IFAC's publishing house Pergamon Press, will include all introductions and discussions of this successful Workshop.

G. Sommer  
IPC Chairman

## New Publication

Proceedings of the  
IFAC/IFIP Symposium  
Safety of Computer Control Systems  
(SAFECOMP '88)

Fulda, FRG  
9 - 11 November, 1988

Editor: W.D. Ehrenberger  
Fachhochschule, FB Informatik, FRG

Contains 21 papers dealing with the many aspects of safety-related applications of industrial computer systems now being used in nuclear power plants, aeroplanes, railways and other traffic applications, in the chemical industry and in other automated manufacturing environments. Topics covered include: Specification, design and architecture of safe computer systems; testing, verification and licensing of safety-related computer systems; safety-related documentation and project management techniques; applications and experiences; standardisation questions; safety of computer systems and artificial intelligence.

For further details and pricing information please contact:

Marketing Department  
Pergamon Press plc  
Headington Hill Hall  
Oxford OX3 0BW, UK

## Robust Adaptive Control IFAC Workshop Newcastle, NSW, Australia 22 - 24 August, 1988

The Workshop was held in a scenic location at Salamander Bay, 40 km north of Newcastle, Australia.

Approximately 100 delegates attended the Workshop, including about 50 from overseas. Some people took the opportunity to attend the Workshop on their way to the 1988 IFAC Symposium on Identification and System Parameter Estimation in Beijing.

There was a high standard of papers at the Workshop. John Westcott from Imperial College London, gave the opening plenary address. This address showed an interesting perspective of adaptive control covering the past four decades as well as introducing some new results on estimation. The Newcastle hosts also presented their recent results and gave a demonstration of a practical adaptive controller. The final day included a round table discussion, with 50 % industrial and 50 % academic representation on the topic "What does industry expect from the next generation of adaptive controllers, and is this feasible?"

Other papers focused on a range of recent developments in robust adaptive control. It is clear from these presentations that the theory of adaptive control is moving closer to applications and is beginning to give realistic guidelines useful to practical situations.

There is now general acceptance of the value of such practical fixes such as filtering, normalization, deadzones and unification of robust control and adaptation. Other papers issued warnings about things that can go wrong with complex nonlinear adaptive algorithms, and chaos was raised as a potential threat to the unwary.

The Workshop was a great success and the organizers were excited to have this opportunity to bring together leading world experts in this area of robust adaptive control.

G.C. Goodwin, NOC Chairman

## FIACC Five International Associations Coordinating Committee 19th Meeting Paris, France, July 16, 1988

FIACC was formed in 1970 with the assistance of UNESCO, as a medium for the coordination of activities of the Five Sister Associations/Federations (IFAC, IFIP, IFORS, IMACS, and IMEKO), and to promote cooperation between them.

The 1950's had seen a rapid development of new disciplines that were at the interface between the older, more traditional branches of science, and the newer technologies based on electronics, computers and control systems that had recently emerged. Given the international nature of research, the need for cooperation had brought about within a short time span the formation, independently of one another, of the Five Associations/Federations.

With the evolution of those disciplines, it soon became evident that the boundaries between their respective fields of interest

were becoming blurred. To their credit, those who were in charge at the time resisted the temptation to engage in fruitless discussion of territory rights, and many workshops and conferences on specialized topics, where overlap was evident, became joint events between two or more Associations.

The formation of FIACC in 1970 came as the natural next step, and resulted in a collaboration that has been successful in every respect.

FIACC includes the Presidents of the "Five". The annual meeting gives them the opportunity to exchange views, resolve questions that may have come up, and generally share information that may be of common interest. This element of personal contact between them has proven through the many years to be a factor of significant value, contributing towards better understanding.



from left to right:

J. Lesourne, F (President of IFORS);  
G. Toumanoff, USA (President of IMEKO and President of FIACC);  
Ms. K. Havrilla, H (Administrative Secretary of FIACC);  
T. Kemeny, H (Secretary General of IMEKO);  
R. Vichnevetsky, USA (President of IMACS and President Elect of FIACC);  
E.A. Owolabi, UNESCO (Division of Scientific Research and Higher Education);  
Gy. Striker, H (Honorary Secretary of FIACC);  
G. Hencsey, (Secretary of IFAC);  
J. Fourot (Secretary of IFIP).

## Computer Aided Design in Control and Engineering Systems

IFAC Symposium (4th)

Beijing, PRC, 23 - 25 August, 1988

The 4th Symposium in this series was held in Beijing, China, P.R. with 136 participants coming from 26 countries and 50 from China. The Symposium was sponsored by the IFAC Technical Committees on Applications, Systems Engineering, Education, Computers, Theory as well as the Chinese Association of Automation, the China Association for Science and Technology, the China International Conference Center for Science and Technology and the National Natural Science Foundation of China.

The IPC, consisting of 37 scientists from 16 countries, accepted 132 papers of which 106 are included in the final preprints.

Professor Boris Tamm, President of IFAC, had specially come to China to attend the Opening Session of the Symposium and to give the opening address. In the three Sym-

posium days, three plenary sessions were held and six plenary papers presented covering expert-aided environments, interactive environments, data structures and software tools, CAD to robot control, optimization-based, etc. Further six invited papers were presented at two special invited sessions. Twenty three concurrent sessions, including CADCS packages, applications, mathematical and systems design methods, software and hardware, expert systems and round table discussion were distributed over two symposium days. A half day tour was arranged for the technical visit to the Automation Institute of the Academia Sinica and Tsinghua University and six different CADCS software packages and functional programs developed by Chinese experts were demonstrated.

Chen Zhen-Yu, IPC Chairman

## Papers

Future Design Environments for Control Engineering  
(A.G.J. MacFarlane, G. Gruebel, J. Ackermann)

Flow Control of a Long River Stretch  
(M. Papageorgiou, A. Messmer)

Development and Application of an Interactive Modeling Support System  
(Y. Nakamori)

Knowledge Representation Approaches in Sensor Fusion  
(L. Pau)

An Algorithm for Super-Optimal H Design: The 2-Block Case  
(D.-W. Gu, M.C. Tsai, I. Postlethwaite)

Optimal Correction Problem of a Multidimensional Stochastic System  
(J.L. Menaldi, M.I. Taksar)

New Dual-Type Decomposition Algorithm for Nonconvex Separable Optimization Problems  
(P. Tatjewski)

## Brief Papers

Computer Control of Cell Mass Concentration in Continuous Culture  
(G. Yi, Y.B. Hwang, H.N. Chang, K.S. Lee)

The Application and Expansion of the Input-Output Consumption-Tracking Control Model  
(G. Baoping, H. Baosheng)

Parametric Output Feedback Controller Design  
(G. Roppenecker, J. O'Reilly)

The Structured Robust Decentralized Servomechanism Problem for Interconnected Systems  
(A.F. Vaz, E.J. Davison)

Application of Identification - Free Algorithms for Adaptive Control  
(J. Marsik, V. Strejc)

On the Choice of Weighting Matrices in the Minimum Variance Controller  
(J.C. Engwerda, P.W. Otter)

Dominant Richness and Improvement of Performance of Robust Adaptive Control  
(P.A. Ioannou, G. Tao)

Global Optimization of Measurement Strategies for Linear Stochastic Systems  
(J.C. Geromel)

A Slow Manifold Approach to Linear Equivalents of Nonlinear Singularly Perturbed Systems  
(K. Khorasani)

Generalization of Integrated System Optimization and Parameter Estimation Techniques  
(C. Kambhampati, J.E. Ellis, P.D. Roberts)

A Man-Machine Interface for Computer-Aided Design and Simulation of Control Systems  
(H.A. Barker, M. Chen, P.W. Grant, C.P. Jobling, P. Townsend)

## Book Reviews

Systems & Control Series, Volume 8, by N. Viswanadham and V.V.S. Sarma  
(W. Ehrenberger)

Control System Design: Conventional, Algebraic and Optimal Methods, by Chi-Tsong Chen  
(V. Kucera)

Microprocessor-Based Control Systems, by N.K. Sinha  
(B. Schmidtbauer)

## News from Sister Federations

Wisdom for the Problems of Today  
12th Triennial Conference on  
Operations Research  
Athens, Greece June 25-29, 1990

The International Federation of Operational Research Societies (IFORS) will be 31 years old in 1990. As an association of 36 national OR societies and 6 kindred societies, its purpose is the development of operations research as a unified science and its advancement in all nations of the world. One of IFORS' main activities is the organization of an international conference every three years. The last conference was held in Buenos Aires. You are now invited to the next one in Athens, Greece. The conference venue will be the superb Hotel Athenaeum Intercontinental, close to the Parthenon and other famous classical sites.

The conference theme alludes to the inheritance that many of us have received from the wisdom of the ancient Greeks, as we consider the contribution we can make to the problems of today. The conference will run Monday to Friday and will include plenary and parallel sessions and several workshops. As is traditional, an all-day excursion will be arranged for the Wednesday.

Deadline for receipt of abstracts:

May 1, 1989

To be sent to

Graham K. Rand

Dept. of O.R. and Operations Management,  
University of Lancaster  
Lancaster LA1 4YX, UK

### 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. Gusztáv Hencsey. Die Zeitschrift dient der Information über die Aktivitäten der IFAC. Sie wird kostenlos an Abonnenten in 48 Ländern versandt, die Kosten werden von der IFAC aus Beiträgen der derzeit 44 Mitgliedsländer getragen.

Präsident der IFAC ist für 1987/90 Akademiemitglied Prof. Dr. B. Tamm (UdSSR), Vizepräsidenten sind Prof. Dr. L. Ljung (S) und Prof. Dr. S. Kahne (USA). 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.)

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## WHO IS WHO IN IFAC



Prof. M.G. Rodd

Chairman of TC on Computers

Professor Rodd obtained the B.Sc.(Eng), M.Sc.(Eng) and Ph.D. degrees in Electrical Engineering from the University of Cape Town, South Africa. Following five years in the computer-control industry in that country, he entered academic life as a Senior Lecturer in Electrical Engineering in Cape Town, where he was instrumental in developing an industrial-based research unit, dedicated to the use of microprocessor technology in the mineral- and metal-processing industry. In 1979 he was appointed Professor of Electronics at the University of the Witwatersrand in Johannesburg. Here he established, and was Director of the Mechatronics Research Program - a research and development program, sponsored by industry, dedicated to introducing high technology manufacturing methods into the South African industry. In 1986 Professor Rodd was appointed Professor of Electrical and Electronic Engineering, and Head of Department, at the University of Wales, Swansea.

His research interests are in the areas of real-time distributed computer control systems (with particular reference to their use in the factory and process environment), OSI-based communication systems, local area networks for industrial use, computer vision as an inspection tool, programmable logic controllers and real-time data acquisition. He is also interested in the general use of artificial intelligence methodologies in the solving of a wide range of problems arising in manufacturing and control. He is the author of some 75 publications in these and related areas.

Professor Rodd is a Fellow of the Institution of Electrical Engineers, and of the Institute of Measurement and Control. He is a senior member of the (American) Institute for Electrical and Electronic Engineers, and is a Chartered Engineer. He is currently Chairman of the IFAC Technical Committee on Computers and Associate Editor of many of its publications. Before he was Vice Chairman of this TC for the 1984-1987 period. At present he also is Editor of the International Journal for Engineering Applications of Artificial Intelligence. He is a member of IEEE's professional group on manufacturing and is their representative to BSI's AMT committees.

Professor Rodd also has interests other than in engineering. As a student he was President of the University of Cape Town's Student Health & Welfare Organization - serving a wide spectrum of needs in the many depressed areas of Cape Town and its environment. He was also a House Parent for six years at a Home for Children in need of care. He became interested in the worldwide Red Cross movement and has held many offices in the South African Red Cross Society.



# FORTHCOMING EVENTS

(cont.) 1989  
No.1  
Feb.

Title	1989	Place	Deadlines	Further Information
IFAC Symposium Adaptive Systems in Control and Signal Processing	April 19-21	Glasgow UK	-	Ms. Rosamund da Gama The Institute of Measurement and Control, 87 Gower Street London, WC1 6AA, UK
IMEKO/IFAC Symposium (6th) Technical Diagnostics 89	May 31 - June 2	Prague CSSR	-	House of Technology, CSVTS Ms.L. Jarolimkova Gorkeho nam 23 CS-11282 Prague 1, CSSR
IFAC/UNESCO Workshop International Conflict Resolution Using Systems Engineering	June 5-8	Budapest Hungary	-	Acad. T. Vamos Computer and Automation Institute HAS, Victor Hugo u. 18 H-1133 Budapest, Hungary
IFAC Workshop (8th) Control Applications of Nonlinear Programming and Optimization	June 7-9	Paris France	Feb. 15 1989	AF CET 156, blvd Pèrèire F-75017 Paris, France
IFAC/IEEE Symposium Nonlinear Control Systems Design	June 14-16	Capri Italy	-	Prof. S. Monaco, University of Rome "La Sapienza", Via Eudossiana 18 I-00184 Rome, Italy
IFAC/IMACS Workshop Computer-Aided Control Systems Design	June 19-25	Alma Ata USSR	-	Dr.V.I. Venets USSR National Committee of Automatic Control, 65 Profsojuznaja ul 117806 Moscow, GSP 7, USSR
IFAC/IMACS/IFIP Symposium (5th) Control of Distributed Parameter Systems	June 26-29	Perpignan France	-	IMP/CNRS Univ. de Perpignan F-66000 Perpignan, France
CNR/IFAC/SIAM/IEEE Conference The Riccati Equation in Control Systems and Signals	June 26-28	Como Italy	-	Riccati Workshop Villa Olmo, Via Cantoni 1 I-22100 Como, Italy
IFAC/IFORS/IFIP/SEDC Conference Dynamic Modelling and Control of National Economies	June 27-29	Edinburgh UK	-	Conference Division Inst. of Measurement & Control 87 Gower Street, London WC1 6AA, UK
IFAC/IFORS/IMACS/IEEE Intl. Conf. Advanced Information Processing in in Automatic Control - AIPAC 89	July 3-7	Nancy France	-	CRAN IFAC Congress Secretariat Faculté des Sciences, BP 239 F-54506 Vandoeuvre Cedex, France
IFIP/IFAC Conference (14th) System Modelling and Optimization	July 3-7	Leipzig GDR	-	Dr. K. Tammer, Leipzig Univ. of Techn., Dept. of Math. & Informatics POB 66, DDR-7030 Leipzig, GDR
IFAC Symposium (11th) Automatic Control in Aerospace	July 17-21	Tsukuba Japan	-	Prof. T.Tanabe, Dept. of Aeronautics University of Tokyo, Fac. of Engg. 7-3-1 Hongo, Bunkyo-ku, Tokyo 113, Japan
IFAC Workshop Singular Perturbations and Asymptotic Methods in Systems and Control	August 17-18	Boston MA, USA	March 1 1989	Prof. M. Ardema, Dept. of Mech.Engg. Santa Clara University Santa Clara, CA 95053, USA
IFAC/EFCE Symposium Dynamics and Control of Chemical Reactors, Distillation Columns and Batch Processes	August 21-23	Maastricht Netherlands	-	DYCORD+ '89 c/o KIVI, POB 30 424 NL-2500 GK The Hague The Netherlands
IFAC Symposium Power Systems and Power Plant Control	August 22-25	Seoul Korea	-	Prof. Jang Gyu Lee Dept. of Control&Instr. Engrg Seoul Nat. Univ., Seoul 151-742, Korea
IFAC Workshop Expert Systems and Signal Processing in Marine Automation	August 28-30	Copenhagen Denmark	Feb. 20 1989	Danish Automation Society Bldg 343, Techn. University of Demark DK-2800 Lyngby, Denmark
IFAC/IFORS/IMACS Symposium Large Scale Systems: Theory and Applications	August 29-31	Berlin GDR	-	WGMA, Kammer der Technik Clara Zetkin Str. 115/117 DDR-1086 Berlin, GDR
IFAC Workshop Decision Support for Patient Management: Measurement, Modelling and Control	Aug.31 Sept. 2	London UK	March 1 1989	IFAC - BME 89 Bell Howe Conferences Gothic House, Barker Gate Nottingham NG1 1JU, UK

# FORTHCOMING EVENTS (ctd.)



Title	1989	Place	Deadlines	Further Information
IFAC Symposium (6th) Automation in Mining, Mineral and Metal Processing	Sept. 4-8	Buenos Aires Argentina	-	Dr.J. Paiuk c/o AADECA Av.Callao 220 10B 1022 Buenos Aires, Argentina
IFAC/IFIP/IEA/IFORS Conf. (4th) Analysis, Design and Evaluation of Man-Machine Systems, MMS '89	Sept. 12-14	Xian PRC	-	MMS 89 Secretariat c/o Prof. Hu Baosheng Xian Jiaotong University Xian, Shaanxi, PRC
IFAC/IFIP/IFORS/CIRP Workshop Decisional Structures in Automated Manufacturing	Sept. 18-21	Genoa Italy	-	Prof.A.Villa, Dip.Tecnologia e Sistemi di Produzione, Politecnico di Torino, corso Duca degli Abruzzi 24 I-10129, Italy
IFAC Workshop (2nd) Artificial Intelligence in Real- Time Control	Sept. 19-21	Shenyang PRC	-	Ms. Chen Da-yang Conf. Centre for Science & Techn. No.3, Li 3, Section 4 Minzu Street Heping District, Shenyang, PRC
IFAC/IFIP/IFORS Symposium Control, Computers, Communica- tions in Transportation - CCCT '89	Sept. 19-21	Paris France	-	AFCET - CCCT '89, 156 blvd Péreire, F-75017 Paris, France
IFAC Workshop Systems Structure and Control: State Space and Polynomial Methods	Sept. 25-27	Prague CSSR	-	IFAC Workshop Inst.of Inf. Theory&Automation Pod vodarenskou vezi 4 CS-182 08 Prague, CSSR
IFAC Workshop (9th) Distributed Computer Control Systems - DCCS '89	Sept. 26-28	Tokyo Japan	*	Prof. S. Narita, Waseda University Dept. of Electr. Engg., 3-4-1 Okubo Shinyuku-ku, Tokyo 160, Japan
IFAC/IFIP/IMACS/IFORS Symposium (6th) Information Control Problems in Manufacturing Technology	Sept. 26-29	Madrid Spain	-	INCOM '89, E.T.S. Ingenieros Industriales, Po. Castellana, 80 E-28006 Madrid, Spain
IFIP/IFAC Conference Computer Applications in Production&Engineering CAPE 89	October 2-5	Tokyo Japan	-	Conference Secr. CAPE 89 c/o Conf.Dept.; Business Ctr. f. Academic Societies Japan 2-40-14 Hongo, Bunkyo-ku Tokyo 113, Japan
IFAC Workshop Distributed Databases in Real Time Control	October 16-18	Budapest Hungary	*	Dr.E.Knuth, Computer&Aut.Inst. HAS, POB 63, H-1502 Budapest Hungary
IFAC Workshop Evaluation of Adaptive Control Strategies in Industrial Applications	October 16-20	Tbilisi USSR	March 15 1989	Dr. V.I. Venets 65 Profsojuznaja ul. 117806 Moscow, GSP 7, USSR
IFAC Workshop (16th) Real Time Programming	October 20-22	Berlin GDR	June 1 1989	WRTP 89 WGMA, Kammer d. Technik Clara Zetkin Str. 115/117 DDR-1086 Berlin, GDR
IFAC/IFIP Workshop Energy Systems, Management and Economics	October 25-27	Tokyo Japan	Feb. 28 1989	ESME '89 Secretary Dr.Kenji Yamaji, Central Res. Institute of Electric Power Industry 1-6-1 Ohtemachi, Chiyoda-ku Tokyo 100, Japan
IFAC/IFORS Workshop Production Control in Process Industry	Oct.30 - Nov. 2	Kyoto Japan	*	Prof. T.Takamatsu, Kyoto University Japan Inst. of Systems Research 4, Yoshida-Ushino-miya Sakyo-ku Kyoto 606, Japan
IFAC Symposium Low Cost Automation: Techniques, Components& Instruments, Applications	Nov. 8-10	Milan Italy	Feb. 1 1989	IFAC-LCA '89 Secretariat Dip.Informatica e Sistemistica Via Eudossiana 18 I-00184 Rome, Italy
IFAC/IFIP/IMACS) Symposium Skill Based Automated Production	Nov. 15-17	Vienna Austria	-	Austrian Center for Productivity and Efficiency - OEPWZ Rockhgasse 6, A-1014 Vienna, Austria
IFAC/IFIP Workshop Safety of Computer Control Systems - SAFECOMP '89	Dec. 5-7	Vienna Austria	-	Austrian Center for Productivity and Efficiency - OEPWZ Rockhgasse 6, A-1014 Vienna, Austria

- deadline past

\* deadline not yet known