Identification and System Parameter Estimation
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Advances in Automation for Hard Rock and Underground Mining
IFAC Workshop, Canada
Trends in Control and Measurement Education
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Identification and System Parameter Estimation
IFAC/IFORS Symposium
Beijing, PRC, 27 - 31 August, 1988
Among the various symposia series of IFAC, the one on Identification has a long and respected history; 1967 in Prague; 1970 in Prague; 1976 in Caracas; 1978 in Tbilisi; 1979 Darmstadt; 1982 Washington; 1985 York. On the one hand this implies the positive image of a good tradition, on the other hand it generates expectations with respect to quality and effectiveness. These expectations were fulfilled to a high degree. The three organizers succeeded in making the symposium 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 6 plenary papers (6 presented in 4 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 systems; identification. Specific applications sessions dealt with the following subjects: industrial processes; chemical systems; power systems; biotechnological 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 based on a sample of 40 from 63 sessions and found highly satisfactory. The program participants were:
Adaptation and tracking in system identification (Prof. L. Ljung, Sweden);
Modeling 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. Adéle, Canada, 12 - 14 Sept., 1988
The Workshop took place in a resort hotel in Sainte-Adéle, province of Quebec, Canada. It was organized by the Canadian Centre for Automation and Robotics in Mining, jointly managed by the Ecole Polytechnique de Montreal and McGill University, under the joint chairmanship of Profs. A. Piché and M. Scoﬁle. Out of 52 participants, 25 came from abroad; 24 were professors and 25 engineers. The mining industry and its equipment suppliers. The IPC accepted 27 papers, most of them solicited, which originated from authors living in 10 different counties. 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 especially 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 failures 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 failures.
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 by Swansea Professor Brian Clarkson, Principal of the College, and Manfred Thom, Past President of IFAC, greeted the delegates on behalf of President Boris Tam

A plenary session presentation was given to start the technical program each day, the first by Professor Thom who described several 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 session was given by H. Doaly, 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 view graph 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, one was withdrawn and seven were 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 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, there were many opportunities available for informal discussion. The highlight of the social program was a Welsh evening, where delegates became so entertained and very familiar with 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 accepted 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, and power system control.
- Operating tools, power system control, economic optimization, state estimation (55 papers);
- Modelling of generating plant, power plant control (15 papers);
- Data administration and exchange (6 papers);
- Expert system applications (for both, units, network) (4 papers);
- Training simulators (for generating units, network) (4 papers).

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 meeting at the invitation of Prof. B. Tamm and Prof. M. Thomas, were greeted by the Region's Director, Dr. H. P. Thomas, by the President, Dr. Russell C. Drew. On behalf of IFAC, President Boris Tamm delivered an address to the IEEE Region 8, emphasizing the creative curiosity and cooperation between the specialists of two organizations. After hearing the invited tutorial papers, the sessions delivered IEEE awards to the most outstanding members of Region 8.

The 1988 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 Leon K. Godzick of the University of Illinois, P. M. Klahn of the University of Minnesota, and J. K. Pui of the University of Michigan. The Program Chairman is T. C. Rappoport of Georgia Tech, and T. C. T. Yao of Ohio State. A total of 900 papers have been accepted for presentation, 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, 2A, 11 - 14 Oct., 1988

The meeting was held over three days in the recently completed Bush Lodges at Sun City, a new Game Park which forms part of the 200,000 acre Eastern Transvaal Bushveld Reserve. Thus, daily safaris to view wildlife in the deep, rich, water-formed part of the area. Forty seven delegates started their day at 5.30 in the morning to fit in the game viewing with the six hours of technical sessions each 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 on each day, every delegate was convinced to have gained a better insight into the measurement problems and some of the solutions to these problems in the South African processing industry. This was made possible through the five chairmen selected for these sessions - each a professor at Unive. The Proceedings, which will be published by IFAC's publishing house, include all introductions and discussions of this successful Workshop.

G. Sommer
IPC Chairman
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 IMKO), 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 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.

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 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 could raise 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

Robust Adaptive Control
IFAC Workshop
Newcastle, NSW, Australia
22 - 24 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, Computer 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 Symposium 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. Twelve invited papers were presented at two special invited sessions. Twenty three concurrent sessions, including CAD/CAM 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 CAD/CAM software packages and functional programs developed by Chinese experts were demonstrated.

Chen Zhen-Yu, IPC Chairman
News from Sister Federations

Wisdom for the Problems of Today
12th Triennial Conference on
Operations Research
Athens, Greece June 25-28, 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 Athatheum Intercontinental, close to the Venizelon 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 A. P. Friend
Dept. of O.R. and Operations Management,
University of Lancaster
Lancaster LA1 4YX, UK

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 the 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 industries. 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 industrial scene. In 1982 Prof. 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 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 area of artificial intelligence methodologies in the solving of a wide range of problems arising in manufacturing and control. He is 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 1984-1986 period. At present he is also Editor of the International Journal for Engineering Applications of Artificial Intelligence. He is a member of IEEE's profession group on manufacturing and is their representative to BST'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 his own 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.
<table>
<thead>
<tr>
<th>Title</th>
<th>Date</th>
<th>Place</th>
<th>Deadlines</th>
<th>Further Information</th>
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</thead>
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<tr>
<td>IFAC Symposium</td>
<td>April 19-21</td>
<td>Glasgow, UK</td>
<td>Ms. Rosamund da Gama, The Institute of Measurement and Control, 87 Gower Street, London, WC1 6AA, UK</td>
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<td>Adaptive Systems in Control and Signal Processing</td>
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<td>IEMKO/IFAC Symposium (6th) Technical Diagnostics 89</td>
<td>May 31-June 2</td>
<td>Prague, CSSR</td>
<td>House of Technology, CSVT, Ms. L. Jarolímková, Gorkeho nam 23, CS-11282 Prague 1, CSSR</td>
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<td>IFAC Workshop (8th) Control Applications of Nonlinear Programming and Optimization</td>
<td>June 7-9</td>
<td>Paris, France</td>
<td>Feb. 15 1989</td>
<td>AFCET 156, bdv Périère, F-75017 Paris, France</td>
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<td>IFAC/IEEE Symposium Nonlinear Control Systems Design</td>
<td>June 14-16</td>
<td>Capri, Italy</td>
<td>Prof. S. Monaco, University of Rome &quot;La Sapienza&quot;, Via Eudossiana 18, I-00184 Rome, Italy</td>
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<td>IFAC/IMACS Workshop Computer Aided Control Systems Design</td>
<td>June 19-25</td>
<td>Alma Ata, USSR</td>
<td>Dr. V.I. Venets, USSR National Committee of Automatic Control, 65 Profsoyuznaja ul, 117606 Moscow, GSP 7, USSR</td>
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<td>IFAC/IMACS/IFIP Symposium (5th) Control of Distributed Parameter Systems</td>
<td>June 26-29</td>
<td>Perpignan, France</td>
<td>IMP/CNRS Univ. de Perpignan F-66000 Perpignan, France</td>
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<td>CNR/IFAC/SIAM/IEEE Conference Riccati Equation in Control Systems and Signals</td>
<td>June 26-28</td>
<td>Como, Italy</td>
<td>Riccati Workshop Villa Otmo, Via Cantoni 1, I-22100 Como, Italy</td>
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<td>IFAC/IFORS/IFIP/SEDC Conference Dynamic Modelling and Control of National Economies</td>
<td>June 27-29</td>
<td>Edinburgh, UK</td>
<td>Conference Division Inst. of Measurement &amp; Control 87 Gower Street, London WC1 6AA, UK</td>
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<td>IFAC/IFORS/IMACS/IEEE Int. Conf. Advanced Information Processing in Automatic Control - AIMAC '89</td>
<td>July 3-7</td>
<td>Nancy, France</td>
<td>CRAN IFAC Congress Secretariat Faculté des Sciences, BP 239 F-5460 Vandoeuvre Cedex, France</td>
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<td>IIFP/IFAC Conference (14th) System Modelling and Optimization</td>
<td>July 3-7</td>
<td>Leipzig, GDR</td>
<td>Dr. K. Tammer, Leipzig Univ. of Techn., Dept. of Math. &amp; Informatics POB 66, DDR-7030 Leipzig, GDR</td>
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<td>IFAC Symposium (11th) Automatic Control in Aerospace</td>
<td>July 17-21</td>
<td>Tsukuba, Japan</td>
<td>Prof. T. Tanabe, Dept. of Aeronautics University of Tokyo, Fac. of Engg. 7-3-1 Hongo, Bunkyo-ku, Tokyo 113, Japan</td>
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<td>IFAC/EFCE Symposium Dynamics and Control of Chemical Reactors, Distillation Columns and Batch Processes</td>
<td>August 21-23</td>
<td>Maastricht, Netherlands</td>
<td>DYCORDER '89 c/o Klv, POB 30 424 NL-2500 GK The Hague The Netherlands</td>
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<td>IFAC/IFORS/IMACS Symposium Large Scale Systems: Theory and Applications</td>
<td>August 29-31</td>
<td>Berlin, GDR</td>
<td>WGMA, Kammer der Technik Clara Zetkin Str. 115/117 DDR-1096 Berlin, GDR</td>
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<td>IFAC Workshop Decision Support for Patient Management: Sept. 2 Measurement, Modelling and Control</td>
<td>Aug. 31</td>
<td>London, UK</td>
<td>IFAC - BME 89 Bell Howe Conferences Gothic House, Barker Gate Nottingham NG1 1JU, UK</td>
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<td>IFAC Symposium (6th) Automation in Mining, Mineral and Metal Processing</td>
<td>Sept. 4-8</td>
<td>Buenos Aires</td>
<td>Argentina</td>
<td>Dr. J. Paluk c/o AADECA Av Callao 220 109 1022 Buenos Aires, Argentina</td>
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<tr>
<td>IFAC/IFIP/IFORS/CIRP Workshop Decisional Structures in Automated Manufacturing</td>
<td>Sept. 18-21</td>
<td>Genoa</td>
<td>Italy</td>
<td>Prof. A. Villa, Dip. Tecnologia e Sistemi di Produzione, Politecnico di Torino, corso Duca degli Abruzzi 24 I-10129, Italy</td>
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<td>IFAC Workshop (2nd) Artificial Intelligence in Real Time Control</td>
<td>Sept. 19-21</td>
<td>Shenyang</td>
<td>PRC</td>
<td>Ms. Chen Da-yang Conf Centre for Science &amp; Technl No. 3, Li 3, Section 4 Minzu Street Heping District, Shenyang, PRC</td>
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<td>IFAC/IFIP/IFORS Symposium Control, Computers, Communications in Transportation - CCCT '89</td>
<td>Sept. 19-21</td>
<td>Paris</td>
<td>France</td>
<td>AFCET - CCCT '89 156 Blvd Péreire, F-75017 Paris, France</td>
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<td>IFAC Workshop Systems Structure and Control: State Space and Polynomial Methods</td>
<td>Sept. 25-27</td>
<td>Prague</td>
<td>CSSR</td>
<td>IFAC Workshop Inst.of Inf. Theory&amp;Automation Pod vodarenoskou vez 4 CS-182 08 Prague, CSSR</td>
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<td>IFAC Workshop (9th) Distributed Computer Control Systems - DCCS '89</td>
<td>Sept. 26-28</td>
<td>Tokyo</td>
<td>Japan</td>
<td>Prof. S. Narita, Waseda University Dept. of Electr. Eng., 3-4-1 Okubo Shinyuku-ku, Tokyo 160, Japan</td>
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<tr>
<td>IFIP/IFAC Conference Computer Applications in Production&amp;Engineering CAPE 89</td>
<td>October 2-5</td>
<td>Tokyo</td>
<td>Japan</td>
<td>Conference Secr. CAPE 89 c/o Conf.Dept.; Business Ctr. f. Academic Societies Japan 2-40-14 Hongo, Bunkyo-ku Tokyo 113, Japan</td>
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<td>IFAC Workshop Distributed Databases in Real Time Control</td>
<td>October 16-18</td>
<td>Budapest</td>
<td>Hungary</td>
<td>Dr. E. Knuth, Computer&amp;Auto.Inst. HAS, POB 63, H-1502 Budapest Hungary</td>
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<td>IFAC Workshop Evaluation of Adaptive Control Strategies in Industrial Applications</td>
<td>October 16-20</td>
<td>Tbilisi</td>
<td>USSR</td>
<td>Dr. V. I. Venets 65 Profsozuznaja ul. 117806 Moscow, GSP 7, USSR</td>
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<td>IFAC Workshop (16th) Real Time Programming</td>
<td>October 20-22</td>
<td>Berlin</td>
<td>GDR</td>
<td>WRTP 89 WGMMA, Kammer d. Technik Clara Zetkin Str. 115/117 DDR-1086 Berlin, GDR</td>
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<td>IFAC/IFIP Workshop Energy Systems, Management and Economics</td>
<td>October 25-27</td>
<td>Tokyo</td>
<td>Japan</td>
<td>Feb. 28 1989 ESME '89 Secretary Dr. Kenji Yamaji, Central Res. Institute of Electric Power Industry 1-8-1 Otemachi, Chiyoda-ku Tokyo 100, Japan</td>
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<tr>
<td>IFAC/IFORS Workshop Production Control in Process Industry</td>
<td>Oct. 30-Nov. 2</td>
<td>Kyoto</td>
<td>Japan</td>
<td>Prof. T. Takamatsu, Kyoto University Japan Inst. of Systems Research 4, Yoshida-Ushino-miya Sakyo-ku Kyoto 606, Japan</td>
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<td>IFAC Symposium Low Cost Automation: Techniques, Components &amp; Instruments, Applications</td>
<td>Nov. 8-10</td>
<td>Milan</td>
<td>Italy</td>
<td>IFAC-LCA '89 Secretariat Dip. Informatica e Sistemistica Via Eudossiana 18 l-00184 Rome, Italy</td>
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<td>IFAC/IFIP/IMACS Symposium Skill Based Automated Production</td>
<td>Nov. 15-17</td>
<td>Vienna</td>
<td>Austria</td>
<td>Austrian Center for Productivity and Efficiency - OEPWZ Rockgasse 6, A-1014 Vienna, Austria</td>
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<tr>
<td>IFAC/IFIP Workshop Safety of Computer Control Systems - SAFECOMP '89</td>
<td>Dec. 5-7</td>
<td>Vienna</td>
<td>Austria</td>
<td>Austrian Center for Productivity and Efficiency - OEPWZ Rockgasse 6, A-1014 Vienna, Austria</td>
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* deadline past  
* deadline not yet known